Statistically Speaking

A Dictionary of Quotations

About the Compilers

Carl C Gaither was bom in 1944 in San Antonio, Texas. He has conducted

research work for the Texas Department of Corrections and for the Louisiana

Department of Corrections. Additionally he has worked as an Operations

Research Analyst for the past ten years. He received his undergraduate

degree (Psychology) from the University of Hawaii and has graduate degrees

from McNeese State University (Psychology), North East Louisiana University

(Criminal Justice), and the University of Southwestem Louisiana (Mathematical

Statistics).

Alma E Cavazos-Gaither was born in 1955 in San Juan, Texas. She has worked in

quality control, material control, and as a bilingual data collector. She received

her associate degree (Telecommunications) from Central Texas College.

Statistically Speaking

A Dictionary of Quotations

Selected and Arranged by

Carl C Gaither

and

Alma E Cavazos-Gaither

Institute of Physics Publishing

Bristol and Philadelphia

@ 1996 IOP Publishing Ltd

All rights reserved. No part of this publication may be reproduced, stored

in a retrieval system or transmitted in any form or by any means, electronic,

mechanical, photocopying, recording or otherwise, without the prior permission

of the publisher. Multiple copying is permitted in accordance with the terms

of licenses issued by the Copyright Licensing Agency under the terms of its

agreement with the Committee of ViceChancellors and Principals.

IOP Publishing Ltd has attempted to trace the copyright holders of all the

quotations reproduced in this publication and apologizes to copyright holders if

permission to publish in this form has not been obtained.

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN 0 7503 0401 4

Library of Congress Cataloging-in-Publication Data

Gaither, Carl C., 1944-

Statistically speaking : a dictionary of quotations / selected and

arranged by Carl C. Gaither and Alma E. Cavazos-Gaither.

Includes bibliographical references (p. - ) and index.

ISBN 0-7503-0401-4 (alk. paper)

1. Probabilities--Quotations, maxims, etc. 2. Mathematical

p. cm.

statistics--Quotations, maxims, etc. I. Cavazos-Gaither, Alma E.,

1955- 11. Title.

QA273.63124 1996

519.5- 4c20 96-44176

CIP

Published by Institute of Physics Publishing, wholly owned by The Institute of

Physics, London

Institute of Physics Publishing, Techno House, Redcliffe Way, Bristol BS1 6NX,

UK

US Editorial Office: Institute of Physics Publishing, Suite 1035, The Public Ledger

Building, 150 South Independence Mall West, Philadelphia, PA 19106, USA

Typeset in TE3( using the IOP Bookmaker Macros

Printed in Great Britain by J W Arrowsmith Ltd, Bristol

We respectfully dedicate this book to our parents

Mr and Mrs C C Gaither

and

Ms M Cavazos

CONTENTS

PREFACE

ACTUARY

ANALYSIS

AVERAGE

BAYESIAN

CAUSE AND EFFECT

CERTAINTY

CHANCE

COMMON SENSE

CORRELATION

DATA

DEFINITIONS

DEGREES OF FREEDOM

DESIGN OF EXPERIMENTS

DICE

DISTRIBUTIONS

ERROR

EXPERIMENT

FACTS

FORECAST

GAMBLING

GRAPHICS

HYPOTHESES

IMPOSSIBLE

INFINITE

xi

1

2

6

18

19

30

34

50

52

55

59

64

65

67

71

76

83

89

106

111

113

117

122

125

Vii

Viii STATISTICALLY SPEAKING

KNOWLEDGE

LAWS

LIKELIHOOD

MEASUREMENT

MODELS

OBSERVATIONS

ORDER

OUTLIERS

PERCENTAGES

PRAYER

PREDICTION

PROBABILITY

PROBABLE

PROBLEMS

QUALITY CONTROL

QUEUE

RANDOMNESS

REASON

RECURSION

REGRESSION

RESEARCH

RESIDUALS

SAMPLE

SCIENCE

STATISTICAL

STATISTICIAN

STATISTICS

SURVEYS AND QUESTIONNAIRES

SYMMETRY

TABLES

TEACHING

TESTING

THEORY

TRUTH

126

127

134

136

140

142

148

150

151

154

156

158

183

187

188

190

191

193

196

197

199

200

201

204

206

221

234

266

268

269

271

273

275

284

CONTENTS

VARIABILITY

BIBLIOGRAPHY

PERMISSIONS

SUBJECT BY AUTHOR INDEX

AUTHOR BY SUBJECT INDEX

ix

285

289

320

331

398

PREFACE

Statistically Speaking is a book of quotations. It has, for the first

time, brought together in one easily accessible form the best expressed

thoughts that are especially illuminating and pertinent to the disciplines

of probability and statistics. Some of the quotations are profound, others

are wise, some are witty, but none are frivolous. Quotations from the

most famous men and women lie in good company with those from

unknown wits. You may not find all the quoted ’jewels’ that exist, but

we are certain that you will find a great number of them here. We believe

that Benjamin Franklin was correct when he said that “Nothing gives an

author so much pleasure as to find his work respectfully quoted...”.

Statistically Speaking is also an aid for the individual who loves to

quote - and to quote correctly. “Always verify your quotations” was

advice given to Dean John William Bourgen, then fellow of Oriel College,

by Dr Martin Joseph Routh. That advice was given over 150 years ago

and is still true today. Frequently, books on quotations will have subtle

changes to the quotation, changes to punctuation, slight changes to the

wording, even misleading information in the attribution, so that the

compiler will know if someone used a quotation from ‘their’ book. We

attempted to verify each and every one of the quotations in this book to

ensure that they are correct.

The attributions give the fullest possible information that we could

find to help you pinpoint the quotation in its appropriate context or

discover more quotations in the original source. Judicial opinions and

speeches include, when possible, the date of the opinion or speech. We

assure the reader that not one of the quotations in this book was created

by us.

In summary, Statistically Speaking is a book that has many uses. You

0 Identify the author of a quotation.

0 Identify the source of the quotation.

0 Check the precise wording of a quotation.

0 Discover what an individual has said on a subject.

0 Find sayings by other individuals on the same subject.

Can:

xi

X i i STATISTKA L LY SPEAKING

How to Use This Book

1. A quotation for a given subject may be found by looking for that

subject in the alphabetical arrangement of the book itself. To illustrate,

if a quotation on likelihood is wanted, you will find nine quotations

listed under the heading likelihood. The arrangement of quotations

in this book under each subject heading constitutes a collective

composition that incorporates the sayings of a range of people.

2. To find all the quotations pertaining to a subject and the individuals

quoted use the SUBJECT BY AUTHOR INDEX. This index will help

guide you to the specific statement that is sought. A brief extract of

each quotation is included in this index.

3. If you recall the name appearing in the attribution or if you wish

to read all of an individual author’s contributions that are included

in this book then you will want to use the AUTHOR BY SUBJECT

INDEX. Here the authors are listed alphabetically along with their

quotations. The birth and death dates are provided for the authors

whenever we could determine them. When we could not find the

information we included a ( - ).

Thanks

It is never superfluous to say thanks where thanks are due. First, I

thank my stepdaughter Maritza Marie Cavazos for her assistance in

tracking down incomplete citations, looking for books in the libraries,

and helping to sort the piles of correspondence generated in obtaining

permissions. Next, we thank the following libraries for allowing us to use

their resources: the main library and the science library of The University

of Richmond; the main library of the Virginia Commonwealth University;

the medical library of the Virginia Commonwealth Medical School; the

main library and the science library of Baylor University; the main library

of the University of Mary-Hardin Baylor; the main library of the Central

Texas College; the main library, the physics-math-astronomy library, and

the human resource library of the University of Texas at Austin.

Additionally, we would like to thank each of the publishers who

provided permission to use the quotations. We made a very serious

attempt to contact the publishers for permission to use the quotations.

Letters were written to each publisher or agent for which we could find

an address. A follow-up letter was sent to those who did not respond to

our first letter. If no response was received we then assumed a calculated

risk and incorporated the quotation. In no way did we use a quotation

without attempting to obtain prior approval.

Carl Gaither

Alma Cavazos-Gaither

**ACTUARY**

Analytical and graphical treatment of statistics is employed by the

economist, the philanthropist, the business expert, the actuary, and'even

the physician, with the most surprising valuable results . . .

Karpansky, L.

High School Education

Chapter 6 (p. 134)

Someone once asked an accountant, a mathematician, an engineer, a

statistician and an actuary how much 2 plus 2 was. The accountant

said "4". The mathematician said "It all depends on your number base."

The engineer took out his slide-rule and said "approximately 3.99". The

statistician consulted his tables and said, "I am 95% confident that it lies

between 3.95 and 4.05." The actuary said "What do you want it to add

Unknown

up to?"

Actuaries are funny people. Even when they are wrong, they are right.

I told an actuary to go to the back of the queue. He immediately came

back and said that he couldn't-there was already someone there.

Unknown

An insurance company is like an automobile going down the road at high

speed. The managing director has his hands on the wheel, the marketing

director has his foot on the accelerator. The finance director is heaving

with all his might on the hand-brake and the actuary is in the back

screaming directions from a map he has just made by looking out of the

rear window.

Unknown

1

ANALYSIS

Not even the most subtle and skilled analysis can overcome completely

the unreliability of basic data.

Allen, R.G.D.

Statistics for Economists

Chapter I (p. 14)

The technical analysis of any large collection of data is a task for a

highly trained and expensive man who knows the mathematical theory of

statistics inside and out. Otherwise the outcome is likely to be a collection

of drawings-quartered pies, cute little battleships, and tapering rows of

sturdy soldiers in diversified uniforms-interesting enough in a colored

Sunday supplement, but hardly the sort of thing from which to draw

reliable inferences.

Bell, Eric T.

Mathematics: Queen and Servant of Science (p. 383)

He was in Logick, a great Critick,

Profoundly skill'd in Analytick;

He could distinguish and divide

A hair 'twixt south and south-west side.

Butler, Samuel

Hudibras

Part I, Canto I, 1. 65

The repetition of a catchword can hold analysis in fetters for f&y years

and more.

Cardozo, Benjamin N.

Harvard Law Review

Mr. Justice Holmes

Volume 44, Number 5, March 1931 (p. 689)

2

ANALYSIS 3

Murphy’s Laws of Analysis. (1) In any collection of data, the figures that

are obviously correct contain errors. (2) It is customary for a decimal to

be misplaced. (3) An error that can creep into a calculation, will. Also,

it will always be in the direction that will cause the most damage to the

calculation.

Deakly, G.C.

Quoted in Paul Dickson’s

The Official Rules (M-126)

The mere fact of naming an object tends to give definiteness to our

conception of it-we have then a sign that at once calls up in our minds

the distinctive qualities which mark out for us that particular object from

all others.

Eliot, George

The George Eliot Letters

Volume I1 (p. 251)

It is not the first use but the tiresome repetition of inadequate catchwords

which I am observing-phrases which originally were contributions, but

which, by their very felicity, delay further analysis for fifty years.

Holmes, O.W., Jr.

Collected Legal Papers (pp. 230-1)

I have seen too much not to know that the impression of a woman may

be more valuable than the conclusion of an analytical reasoner. . .

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherluck Holmes

The Man with the Twisted Lip

. . . be wary of analysts that try to quantify the unquantifiable.

Keeney, Ralph

Raiffa, Howard

Decisions with Multiple Objectives: Preferences and Value Trade-offs (p. 12)

But to argue, without analysis of the instances, from the mere fact that

a given event has a frequency of 10 percent in the thousand instances

under observation, or even in a million instances, that . . . it is likely to

have a frequency near to 1/10 in a further set of observations, is . . .

hardly an argument at all.

Keynes, John Maynard

Treatise on Probability

Chapter XXXIII (p. 407)

4 STATISTICALLY S P E A K "

An intelligence that, at a given instant, could comprehend all the forces

by which nature is animated and the respective situation of the beings

that make it up, if moreover it were vast enough to submit these data to

analysis, would encompass in the same formula the movements of the

greatest bodies of the universe and those of the lightest atoms. For such

an intelligence nothing would be uncertain, and the future, like the past,

would be open to its eyes.

Laplace, Pierre-Simon

A Philosophical Essay on Probabilities (p. 2)

Sweet Analytics, 'tis thou hast ravish'd me . . .

Marlowe, Christopher

Christopher Murlowe's Doctor Faustus

Scene 1

. . . the habit of analysis has a tendency to wear away the feelings.

Mill, John Stuart

Autobiography

V (p. 116)

The very excellence of analysis . . . tends to weaken and undermine

whatever is the result of prejudice; that it enables us mentally to separate

ideas which have only casually clmg together . . .

Mill, John Stuart

Autobiography

V ( p . 116)

As in Mathematics, so in Natural Philosophy, the Investigation of

difficult Things by the Method of Analysis, ought ever to precede the

Method of Composition. This Analysis consists in making Experiments

and Observations, and in drawing general Conclusions from them by

Induction, and admitting of no Objections against the Conclusions but

such as are taken from Experiments, or other certain Truths.

Newton, Sir Isaac

Opticks

Book 111, Part I

Analysis, Cross-reference analysis,

Psychological, philosophical, poetic analysis.

The age of analysis.

Not the event, but the picturing of the event.

Sherman, Susan

With AngerMrith Love

The Fourth Wall

Stanza 2

ANA LYSIS 5

“Our company’s president built a financial empire on the 50-50 future

theory,“ the manager told a new employee.

”Oh, you mean he used probability analysis to forecast and make

business decisions?”

”No, nothing like that,” the manager answered. ”I mean he believes that

every $50 raise he doesn’t give you increases future profits by the same

amount.”

Thomsett, Michael C .

The Little Black Book of Business Statistics (p. 74)

If data analysis is to be well done, much of it must be a matter of

judgment, and “theory”, whether statistical or non-statistical, will have

to guide, not command.

Tukey, John W.

Annals of Mathematical Statistics

The Future of Data Analysis

Volume 33, Number 1, March 1962 (p. 10)

It always helps to know the answer when you are working toward the

solution of a problem.

Unknown

It requires a very unusual mind to undertake the analysis of the obvious.

Whitehead, Alfred North

Science and the Modern World (p. 4)

AVERAGE

If at first you don’t succeed, you are running about average.

Alderson, M.H.

Quoted in Paul Dickson’s

The Ojicial Explanations (p. A-4)

In respect of honour and dishonour, the observance of the mean is

Greatness of Soul, the excess a sort of Vanity, as it may be called, and

the deficiency, Smallness of Soul.

Aristotle

The Nicomachean Ethics

Book 11, Chapter 7

. . . but they are more hysterical than the average because they have the

opportunity their constituents lack, of shouting in public.

Atherton, Gertrude

Senator North

Book 11, VI1

The average intelligence is always shallow, and in electric climates very

excitable.

Atherton, Gertrude

Senator North

Book 11, IX

There must be such a thing as a child with average ability, but you can’t

find a parent who will acknowledge that it is his child . . .

Bailey, Thomas D.

Wall Street Joumal

Notable and Quotable

December 17, 1962 (p. 16)

6

AVERAGE 7

Another very frequent application of mathematics to biology is the use

of averages which, in medicine and physiology, leads, so to speak,

necessarily to error . . By destroying the biological character of

phenomena, the use of averages in physiology and medicine usually gives

only apparent accuracy to the results.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 134)

Chemical averages are also often used. If we collect a man’s urine during

twenty-four hours and mix all this urine to analyze the average, we get an

analysis of a urine which simply does not exist; for urine, when fasting,

is different from urine during digestion. A startling instance of this kind

was invented by a physiologist who took urine from a railroad station

urinal where people of all nations passed, and who believed he could

thus present an analysis of average European urine!

Bernard, Claude

An Introduction to the Study of Experimental Medicine (pp. 134-5)

About the hardest thing a phellow kan do, iz tew spark two girls at

onest, and preserve a good average.

Billings, Josh

Old Probability: Perhaps Rain-Perhaps Not

May 1870

Great numbers and the averages resulting from them, such as we always

obtain in measuring social phenomena, have great inertia.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 8)

Of itself an arithmetic average is more likely to conceal than to disclose

important facts; it is the nature of an abbreviation, and is often an excuse

for laziness.

Bowley, Arthur L.

The Mathematical Gazette

Volume 12, Number 77, July 1925

#319 (p. 421)

I abhor averages. I like the individual case. A man may have six meals

one day and none the next, making an average of three meals per day,

but that is not a good way to live.

Brandies, Louis D.

Quoted in Alpheus T. Mason‘s

Brandies: A Free Man’s Life (p. 145)

8 S TATlS TICA L LY S PE AKlNG

Have shaving too entailed upon their chins,-

A daily plague, which in the aggregate

May average on the whole with parturition.

Byron, Lord

Don Juan

Canto X I V , 23-4

The best way of increasing the [average] intelligence of scientists would

be to reduce their number.

Carrel, Alexis

Man the Unknown

Chapter 2, 4 (p. 49)

The concept of average was developed in the Rhodian laws as to the

distribution of losses in maritime risks.

Cohen, Morris R.

Journal of the American Statistical Association

The Statistical View of Nature

Volume 31, Number 194, June 1936 (p. 328)

. . . the criminal intellect, which its own professed students perpetually

misread, because they persist in trying to reconcile it with the average

intellect of average men instead of identifying it as a horrible wonder

apart. . .

Dickens, Charles

The Work of Charles Dickens

The Mystery of Edwin Drood xx

The plain man is the basic clod

From which we grow the demigod;

And the average man is curled

The hero stuff that rules the world.

Foss, Sam Walter

Back County Poems

Memorial Day

Stanza 2

True, the average rate for the year as a whole, though on the high side, is

not too bad, but that is like assuring the nonswimmer that he can safely

walk across a river because its average depth is only 4 feet.

Freidman, Martin

Newsweek

Irresponsible Monetary Policy

January 10,1972 (p. 57)

AVERAGE 9

Unfortunately, the average of one generation need not be the average of

the next.

Froude, James Anthony

Short Studies on Great Subjects

The Science of History (p. 26)

There is no medium at sea. You are either dead sick or ravenous, and

we, not excluding the two boys were the latter.

Froude, James Anthony

Short Studies on Great Subjects

A Fortnight in Kerry (p. 195)

We have to consider the million, not the units; the average, not the

exceptions.

Froude, James Anthony

Short Studies on Great Subjects

On Progress (p. 261)

My friends at Rhodes made me so. I cost as much as sixteen gold gods

of average size.

Froude, James Anthony

Short Studies on Great Subjects

Lucian (p. 225)

The knowledge of an average value is a meager piece of information.

Galton, Francis

Natural Inheritance

Scheme of Distribution and of Frequency (p. 35)

It is difficult to understand why statisticians commonly limit their

enquiries to Averages, and do not revel in more comprehensive views.

Their souls seem as dull to the charm of variety as that of the native of one

of our flat English counties, whose retrospect of Switzerland was that, if

its mountains could be thrown into its lakes, two nuisances would be got

rid of at once. An average is but a solitary fact, whereas if a single other

fact be added to it, an entire Normal Scheme, which nearly corresponds

to the observed one, starts potentially into existence.

Galton, Francis

Natural Inheritance

The Charms of Statistics (p. 62)

10 STATlSTlCALLY SPEAKING

But though to visit the sins of the fathers upon the children may be

a morality good enough for divinities, it is scorned by average human

nature; and it therefore does not mend the matter.

Hardy, Thomas

Tess of the d’Urbervilles

XI

Give me a man that is capable of a devotion to anything, rather than a

cold, calculating average of all the virtues!

Harte, Francis Bret

Two Men of Sandy Bar

Act IV (p. 425)

If a man stands with his left foot on a hot stove and his right foot

in a refrigerator, the statistician would say that, on the average, he’s

comfortable.

Heller, Walter

in Harry Hopkins’

The Numbers Game: The Bland Totalitarianism

Chapter 12, Faithful Partners

Counter Attack (p. 270)

They had on average, about a quarter of a suit of clothes and one shoe

apiece. One chap was sitting on the floor of the aisle, looking as if he

were working a hard sum in arithmetic. He was trying very solemn, to

pull a lady’s number two shoe on a number nine foot.

Henry, 0.

Tales of 0. Henry

Holding Up a Train

But an average, which was what I meant to speak about, is one of the

most extraordinary subjects of observation and study.

Holmes, O.W.

The Autocrat of the Breayast Table

Chapter 6

On the average, bunting with a man on first loses a lot of runs. On the

average, it doesn’t increase the probability of scoring at least one run in

the inning.

Hooke, Robert

Quoted in J.M. Tanur’s

Statistics: A Guide to the Unknown

Statistics, Sports, and Some Other Things

There is a mean in things, fixed limits on either side of which right living

cannot get a foothold.

Horace

The Complete Works of Horace

The Golden Mean (p. 6)

AVERAGE 11

The average man believes a thing first, and then searches for proof to

bolster his opinion.

Hubbard, Elbert

The Philistine: A Periodical of Protest

Volume XI, July 1900 (p. 36)

Fertilize and bokanovskify-in other words, multiply by seventy-twand

you get an average of nearly eleven thousand brothers and sisters in

a hundred and fifty two batches of identical twins, all within two years

of the same age.

Huxley, Aldous

Brave New World (p. 7 )

. . . public opinion, a vulgar, impertinent, anonymous tyrant who

deliberately makes life unpleasant for anyone who is not content to be

the average man.

Inge, William Ralph

Outspoken Essays

Our Present Discontents (p. 9)

The average man is rich enough when he has a little more than he has

got, and not till then.

Inge, William Ralph

Outspoken Essays

Patriotism (pp. 38-9)

Such is the past career, present condition, and certain future of the Middle

American. There are as many above him as below him, and especially as

many below him as above him.

Jacobs, Joseph

American Magazine

The Middle American

Volume 63, March 1907

"Pardon me for staring," said Milo, after he had been staring for some

time, "out I've never seen half a child before.''

"It's .58 to be precise," replied the child from the left side of his mouth

(which happened to be the only side of his mouth).

"I beg your pardon?" said Milo.

"It's .58," he repeated; "it's a little bit more than a half."

. . .

"Oh, we're just the average family," he said thoughtfully; "mother, father,

and 2.58 children-and, as I explained, I'm the .58."

Juster, Norton

The Phantom Tollbooth (pp. 195-6)

12 STATlSTlCALLY SPEAKING

“But averages aren’t real,” objected Milo, ”they’re just imaginary.”

”That may be so,” he agreed, ”but they’re also very useful at times. For

instance, if you didn’t have any money at all, but you happened to be

with four other people who had ten dollars apiece, then you’d each have

an average of eight dollars. Isn’t that right?”

Juster, Norton

The Phantom Tollbooth (p. 196)

. . . ’hitting the target’, for centuries the principal military skill, is

henceforth to be left to the law of averages.

Keegan, John

The Face of BattIe (p. 307)

One need not accept Shaw’s own estimate of his intellectual equipment

to see that the doctor’s remark cut through a confusion in which

psychologists and sociologists flounder. Frequently they make no

distinction between what is “normal” and what is ”usual”, ”average”,

or ”statistically probable”.

Krutch, Joseph Wood

Human Nature and the Human Condition

Chapter 5 (p. 75)

. . . the question ”How many legs does a normal man have?” should

be answered by finding a statistical average. And since some men have

only one leg, or none, this would lead inevitably to the conclusion that

a ”normal” man is equipped with one and some fraction legs.

Krutch, Joseph Wood

Human Nature and the Human Condition

Chapter 5 (p. 76)

All very old men have splendid educations; all men who apparently

know nothing else have thorough classical educations; nobody has an

average education.

Leacock, Stephen

Literary Lapses

A Manual of Education (p. 127)

Dear Sir,-We beg to acknowledge your letter of application and cheque

for fifteen dollars. After careful comparison of your case with the average

modem standard, we are pleased to accept you as a first-class risk.

Leacock, Stephen

Literary Lupses

Insurance up to Date (p. 158)

AVERAGE 13

What does this mean for The Average Man?

Lieber, Lillian R.

The Education of T.C. MITS (p. 71)

In former times, when the hazards of sea voyages were much more

serious than they are today, when ships buffeted by storms threw a

portion of their cargo overboard, it was recognized that those whose

goods were sacrificed had a claim in equity to indemnification at the

expense of those whose goods were safely delivered. The value of the

lost goods was paid for by agreement between all of those whose

merchandise had been in the same ship. This sea damage to cargo in

transit was known as 'havaria' and the word came naturally to be applied

to the compensation money which each individual was called upon to

pay. From this Latin word derives our modem word average.

Moroney, M.J.

Facts from Figures

On the Average (p. 34)

A want of the habit of observing and an inveterate habit of taking

averages are each of them often equally misleading.

Nightingale, Florence

Notes on Nursing

Chapter XI11

The average American is just like the child in the family.

Nixon, Richard M.

The New York Times

Statement from PreElection Interviews with Nixon Outlining 2nd Term Plans

Page 20, Column 8

November 10,1972

For, I ask, what is man in Nature? A cypher compared with the Infinite,

an All compared with Nothing, a mean between nothing and all.

Pascal, Blaise

Pascal's Pensees

Section I, 43

. . . it suggests Huverie-average, you know . . .

Pynchon, Thomas

Gravity's Rainbow (p. 207)

l'homme moyen

[the average man]

Quetelet, Adolphe

A Treatise on Man and the Develupment of His Faculties (p. 100)

14 STATISTICALLY SPEAKING

Make sure that the real average is what you are dealing with.

Redfield, Roy A.

Factors of Growth in a Law Practice (p. 170)

Great minds discuss ideas, average minds discuss events, small minds

discuss people.

Rickover, H.G.

The Saturday Evening Post

The World of the Uneducated

November 28,1959 (p. 59)

Scientific laws, when we have reason to think them accurate, are different

in form from the common-sense rules which have exceptions: they are

always, at least in physics, either differential equations, or statistical

averages.

Russell, Bertrand A.

The Analysis of Matter

Chapter XIX (p. 191)

The Normal is the good smile in a child's eyes-all right. It is also the

dead stare in a million adults. It both sustains and kills-like a God. It

is the Ordinary made beautiful; it is also the Average made lethal.

Shaffer, Peter

Two Plays by Peter Shafer

Equus

Act I, Scene 19

Nerissa. They are as sick that surfeit with too much as they that starve

with nothing. It is no mean happiness therefore, to be seated in the mean:

superfluity comes sooner by white hairs, but competency lives longer.

Shakespeare, William

The Complete Works of William Shakespeare

Merchant of Venice

Act I, Scene 2, 1. 5

It is a well-known statistical paradox that the average age of women over

forty is under forty . . .

Slonim, Morris James

Sampling (p. 26)

"You can't fight the law of averages," Grover said, "you can't fight the

curve."

Snood, Grover

Quoted in Thomas Pynchon's

Slow Learner

The Secret Integration (p. 142)

AVERAGE 15

Ask a fenyman or a toll-keeper how many visitors come through daily

on an average, and with an appearance of great intellectual discomfort

he assures you the number varies so much, ”Some days it’s a lot, and

some days only a few, there isn’t exactly an average”.

Stamp, Josiah

Some Economic Factors in Modern Life

Chapter VI1 (p. 253)

Sir,-In your issue of December 31 you quoted Mr. B.S. Morris as saying

that many people are disturbed that about half the children in the

country are below the average in reading ability. This is only one of

many similarly disturbing facts. About half the church steeples in the

country are below average height; about half our coal scuttles below

average capacity, and about half our babies below average weight. The

only remedy would seem to be to repeal the law of averages.

Stewart, Alan

The Times

Averages

Monday, January 4,1954 (p. 7)

GUIL: The law of averages, if I have got this right, means that if six

monkeys were thrown up in the air for long enough they would land on

their tails about as often as they would land on their -

Stoppard, Tom

Rosencrantz and Guildenstern are Dead

Act One (p. 13)

The equanimity of your average tosser of coins depends upon a law,

or rather a tendency, or let us say a probability, or at any rate a

mathematically calculable chance, which ensures that he will not upset

himself by losing too much nor upset his opponent by winning too often.

Stoppard, Tom

Rosencrantz and Guildenstern are Dead

Act One (p. 19)

Expectation in the general sense may be considered as a kind of average.

The Encyclopaedia Britannica

11th Edition

Probability

The wise student hears of the Tao and practices it diligently. The average

student hears of the Tao and gives it thought now and again.

Tsu, Lao

Tao Te Ching (Forty-one)

16 STATlSTlCALLY SPEAKlNG

The only very marked difference between the average civilized man and

the average savage is that the one is guilded and the other painted.

Twain, Mark

Mark Twain Laughing

1904, #370 (p. 98)

I was very young in those days, exceedingly young, marvelously young,

younger than 1 am now, younger than I shall ever be again, by hundreds

of years. I worked every night from eleven or twelve until broad day

in the morning, and as I did 200,000 words in the sixty days, the

average was more than 3,000 words a day-nothing for Sir Walter Scott,

nothing for Louis Stevenson, nothing for plenty of other people, but quite

handsome for me. In 1897, when we were living in Tedworth Square,

London, and I was writing the book called Following the Equator, my

average was 1,800 words a day; here in Florence (1904) my average seems

to be 1,400 words per sitting of four or five hours.

Twain, Mark

The Autobiography of Mark Tkuain

Chapter 29

The average man’s a coward . . . The average man don’t like trouble and

danger.

Twain, Mark

Huckleberry Finn

XXII

In medio fortissimus ibis.

[Always choose the middle road.]

Unknown

If we start with the assumption, grounded on experience, that there is

uniformity in this average, and so long as this is secured to us, we can

afford to be perfectly indifferent to the fate, as regards causation, of the

individuals which compose the average.

Venn, J.

The Logic of Chance

Chance, Causation, and Design

Section 4 (p. 239)

AVERAGE 17

Why do we resort to averages at all?

Venn, J.

Journal of the Royal Statistical Society

On the Nature and Uses of Averages

Volume 54, 1891 (p. 429)

How can a single introduction of our own [average], and that a fictitious

one, possibly take the place of the many values which were actually

given to us? And the answer surely is, that it can not possibly do so; the

one thing cannot take the place of the other for purposes in general, but

only for this or that specific purpose.

Venn, J.

Journal of the Royal Statistical Society

On the Nature and Uses of Averages

Volume 54, 1891 (p. 430)

We have seen that man in general, one with another, or (as it is expressed)

on the average, does not live above two-and-twenty years . . .

Voltaire

Philosophical Dictionary

Miscellany

Cecily: Mr. Moncrieff and I are engaged to be married, Lady Bracknell.

Lady Bracknell [with a shiver, crossing to the sofa and sitting down]: I do

not know whether there is anything peculiarly exciting in the air of this

particular part of Hertfordshire, but the number of engagements that go

on seems to me considerably above the proper average that statistics

have laid down for our guidance.

Wilde, Oscar

The Importance of Being Earnest: A Trivial Comedy for Serious People

Act I11 (p. 118)

BAYESIAN

I am not altogether facetious in suggesting that, while non-Bayesians

should make it clear in their writings whether they are non-Bayesian

Orthodox or non-Bayesian Fisherian, Bayesians should also take care

to distinguish their various denominations of Bayesian Epistmologis ts,

Bayesian Orthodox, and Bayesian Savage.

Bartlett, M.S.

Journal of the Royal Statistical Society

Discussion on Professor Pratt’s Paper (p. 197)

I believe that assumptions are useful to state in statistical practice,

because they impose a discipline on the user. Once a full set of

assumptions is stated, the conclusion should follow. (Actually, only a

Bayesian analysis can meet this standard, but that’s another topic for

another time.)

Kadane, Joseph

Statistical Science

Comment

Volume 1, Number 1, February 1986 (p. 12)

I have seen the collective noun for statisticians cited as ”a variance of

statisticians”. I prefer ”a skewer of statisticians”. There might also be

some specialized terminology for Bayesians, but I have not seen any.

Luchenbruch, Peter

Unknown source

. . . there are at least 46,656 varieties of Bayesians.

Wan& Chamont

Sense and Nonsense of Statistical Inference (p. 158)

18

CAUSE AND EFFECT

Give me to learn each secret cause;

Let number’s figure motion’s laws

Revealed before me stand;

These to great Nature’s secret apply,

And round the Globe, and through the sky,

Disclose her working hand.

Akenside, Mark

The Poetical Works of Mark Akenside and John Dyer

Hymn to Science in Works of the English Poets (p. 357)

The universal cause is one thing, a particular cause another. An effect can

be haphazard with respect to the plan of the second, but not of the first.

For an effect is not taken out of the scope of one particular cause save by

another particular cause which prevents it, as when wood dowsed with

water will not catch fire. The first cause, however, cannot have a random

effect in its own order, since all particular causes are comprehended in

its causality. When an effect does escape from a system of particular

causality, we speak of it as fortuitous or a chance happening . . .

Aquinas, Thomas

Summa Theologiae

Part I

Question 22. God‘s Providence

Article 2. Is everything subject to divine Providence?

Thus all the action of men must necessarily be referred to seven causes:

chance, nature, compulsion, habit, reason, anger, and desire.

Aristotle

The Art of Rhetoric

Book I, Chapter X

19

STATISTICALLY SPEAKING

Only a few look at causes, and trace them to their effects.

Arthur, T.S.

Ten Nights in a Bar Room and What I Saw There

Night the Fifth

The law of cause and effect does not hide in the realm of the unexpected

when intelligent beings go looking for it.

Atherton, Gertrude

Senator North

Book 11, XXI

In the series of things those which follow are always aptly fitted to those

which have gone before . . .

Aurelius, Marcus

The Meditations of the Emperor Antonius Marcus Aurelius

Book IV, Section 45

The end of our foundation is the knowledge of causes, and secret motions

of things; and the enlarging of the bounds of human empire, to the

effecting of all things possible.

Bacon, Francis

New Atlantis (p. 288)

. . . the present contains nothing more than the past, and what is found

in the effect was already in the cause.

Bergson, Henri

Creative Evolution (p. 17)

First causes are outside the realm of science; they forever escape us in

the sciences of living as well as in those of inorganic bodies.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 66)

Every effect becomes a cause.

Buddhist Maxim

The Causes of events are ever more interesting than the events

themselves.

Cicero

Epistolae ad atticum

Book IX, Section 5

CAUSE AND EFFECT 21

The most important events are often determined by very trivial causes.

Cicero

Orationes Philippicae

V

We know the effects of many things, but the causes of few; experience,

therefore, is a surer guide than imagination, and inquiry than conjecture.

Colton, Charles Caleb

Lacon: or many things in a few words (p. 111)

There is no result in nature without a cause; understand the cause and

you will have no need of the experiment.

da Vinci, Leonardo

The Notebooks of Leonardo da Vinci

Philosophy (p. 64)

I understand that to be CAUSE OF ITSELF (causa sui) whose essence

involves existence and whose nature cannot be conceived unless existing.

de Spinoza, Benedict

Ethics

Conceming God

Definition I

III. From a given determined cause an effect follows of necessity, and on

the other hand, if no determined cause is granted, it is impossible that

an effect should follow.

de Spinoza, Benedict

Ethics

Conceming God

Axiom I11

. . . that all men are born ignorant of the causes of things, and that all

have a desire of acquiring what is useful; . . .

de Spinoza, Benedict

Ethics

Conceming God

Appendix

But great things spring from causalities.

Disraeli, Benjamin

Sybil or the Two Nations

Book V, I11 (p. 345)

22 STATISTICALLY SPEAKING

Happy the man, who studying Nature’s laws,

Through known effects can trace the secret cause-

His mind, possessing in a quiet state,

Fearless of fortune and resigned to fate.

Dryden, John

The Poetical Works of Dryden

Translation of Virgil

The Second Book of the Georgics, 1.701

Cause and effect are two sides of one fact.

Emerson, Ralph Waldo

Essays

Circles

Cause and effect, means and ends, seed and fruit, cannot be severed; for

the effect already blooms in the cause; the end preexists in the means,

the fruit in the seed.

Emerson, Ralph Waldo

Essays

Compensation

Do not clutch at sensual sweetness until it is ripe on the slow tree of

cause and effect.

Emerson, Ralph Waldo

Essays

Prudence

Cause and effect, the chancellors of God.

Emerson, Ralph Waldo

Essays

Self-Reliance

Some play at chess, some at cards, some at the Stock Exchange. I prefer

to play at Cause and Effect.

Emerson, Ralph Waldo

The Journals of Ralph Waldo Emerson (p. 234)

CAUSE AND EFFECT 23

Shallow men believe in luck, believe in circumstances . . . Strong men

believe in cause and effect.

Emerson, Ralph Waldo

Conduct of Life

Worship (pp. 191-2)

Primary causes are unknown to us; but are subject to simple and constant

laws, which may be discovered by observation, the study of them being

the object of natural philosophy.

Fourier, Jean Baptiste Joseph

Analytical Theory of Heat

Preliminary Discourse

Every effect has its cause.

Froude, James Anthony

Short Studies on Great Subjects

Calvinism (p. 12)

Causation depends on an extraordinary turning of reality at a particular

instant such that one event transmutes into another.

Heise, David R.

Causal Analysis (p. 6)

But he who, blind to universal laws,

Sees but effects, unconscious of the cause,-

Holmes, O.W.

The Complete Poetical Works of Oliver Wendell Holmes

A Metrical Essay

. . . you have erred perhaps in attempting to put colour and life into each

of your statements, instead of confining yourself to the task of placing

upon record that severe reasoning from cause to effect which is really

the only notable feature about the thing.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Copper Beeches

24 STATISTICALLY SPEAKING

“A coincidence! Here is one of the three men who we had named as

possible actors in this drama, and he meets a violent death during the

very hours when we know that the drama was being enacted. The odds

are enormous against its being a coincidence. No figures could express

them. No, my dear Watson, the two events are connected-must be

connected. It is for us to find the connection.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Second Stain

In a word, then, every effect is a distinct event from its cause.

Hume, David

An Enqiii y Concerning Human Understanding

Section IV (p. 28)

From causes which appear similar we expect similar effects. This is the

sum of all our experimental conclusions.

Hume, David

An Enqiii y Concerning Human Understanding

Section IV (p. 35)

It is universally allowed that nothing exists without a cause of its

existence, and that chance, when strictly examined, is a mere negative

word, and means not any real power which has anywhere a being in

nature.

Hume, David

An Enqiii y Concerning Human Understanding

Section VI11 (p. 99)

All effects follow not with like certainty from their supposed causes.

Hume, David

An Enqui y Concerning Human Understanding

Section X (p. 115)

Here is a billiard ball lying on the table, and another ball moving toward

it with rapidity. They strike; the ball which was formerly at rest now

acquires a motion. This is as perfect an instance of the relations of cause

and effect as any which we know either by sensation or reflection.

Hume, David

An Enqui y Concerning Human Understanding

An Abstract of A Treatise of Human Nature (pp. 186-7)

CAUSE AND EFFECT 25

As in the night all cats are gray, so in the darkness of metaphysical

criticism all causes are obscure.

James, William

The Principles of Psychology

V

With earth’s first clay they did the last man knead,

And there of the last harvest sowed the seed.

And the first morning of creation wrote

What the last dawn of reckoning shall read.

James, William

Unitarian Review and Religious Magazine

The Dilemma of Determinism

Volume XXII, Number 3, September 1884

Pure mathematics can never deal with the possibility, that is to say, with

the possibility of an intuition answering to the conceptions of the things.

Hence it cannot touch the question of cause and effect, and consequently,

all the finality there observed must always be regarded simply as formal,

and never as a physical end.

Kant, Immanuel

Philosophical Writings

The Critique of Judgment

Critique of Teleological Judgment

63, fn

Causes are often disproportionate to effects.

Lee, Hannah Famham

The Log Cabin, or, The World before You

Part the Second

Man is a creature who searches for causes; he could be named the causesearcher

within the hierarchy of minds.

Lichtenberg, Georg

Lichtenberg: Aphorisms B Letters

Aphorisms (p. 62)

The truth that every fact which has a beginning has a cause, is coextensive

with human experience.

Mill, John Stuart

Book 111, V, 1

system of Logic

26 STATlSTlCALLY SPEAKING

Before the effect one believes in other causes than after the effect.

Nietzsche, Friedrich

The Complete Works of Friedrich Nietzsche

The Joyful Wisdom, 111, Number 217

The cause is hidden, but the enfeebling power of the fountain is well

known.

Ovid

Metamorphoses

IV, 1. 287

Rem Viderunt, Causomnon Viderunt.

[They saw the thing, but not the cause.]

Pascal, Blaise

The Thoughts of Blaise Pascal

On the Necessity of the Wager

#235

Sutch as the cause of every thing is, sutch wilbe the effect.

Pettie, George

A Petite Pallace of Pettie His Pleasure

Volume I

Germanicus and Agrippina

On the assumption that all happens by Cause, it is easy to discover the

nearest determinants of any particular act or state to trace it plainly to

them.

Plotinus

The Six Enneads

Third Ennead

First Tractate, Fate, 1

We must rather seek for a cause, for every event whether probable or

improbable must have some cause.

Polybius

The Histories

Book XI, 38.5

If the law of the relation of effect and cause does not exist, then the

non-existence of cause will follow also from non-existence of effect.

Non-existence of effect is not instrumental towards the non-existence of

cause; but non-existence of cause is instrumental towards non-existence

of effect.

Prakash, Satya

Founders of Sciences in Ancient India (p. 322)

CAUSE AND EFFECT 27

Sublata causa, tollitur flectus.

[The cause being taken away, the effect is removed.]

Proverb, Latin

Post hoc, ergo propter hoc.

[After this, therefore because of this.]

Proverb, Latin

Every Effect Presupposes some Cause.

Rohault, Jacques

Rohault’s System of Natural Philosophy

Volume I, Part I, Chapter 5, 6

. . . for no more by the law of reason than by the law of nature can

anything occur without a cause.

Rousseau, Jean Jacques

The Social Contract

Book 11, Chapter 4

But we are not likely to find science returning to the crude form of

causality believed in by Fijians and philosophers of which the type is

”lightning causes thunder”.

Russell, Bertrand A.

The Analysis of Matter

Chapter XI (p. 102)

. . . and now remains

That we find out the cause of this effect,

Or rather say, the cause of this defect,

For this effect defective comes by cause.

Shakespeare, William

The Complete Works of William Shakespeare

Hamlet, Prince of Denmark

Act 11, Scene 2, 1. 100

There is occasions and causes why and wherefore in all things.

Shakespeare, William

The Complete Works of William Shakespeare

The Life of King Henry the Fifth

Act V, Scene 1,l. 3

28 STATISTICALLY SPEAKING

It is the cause, it is the cause, my soul-

Let me not name it to you, you chaste stars!-

It is the cause.

Shakespeare, William

The Complete Works of William Shakespeare

Othello, The Moor of Venice

Act V, Scene 2,l. 1

Thou art the cause, and most accursed effect.

Shakespeare, William

The Complete Works of William Shakespeare

The Tragedy of King Richard the Third

Act I, Scene 2,l. 120

Looking for long-term causes of things is like ascribing motor accidents

to the existence of the internal combustion engine.

Taylor, J.P.

London Review Books 3(1)

Wherefore by their fruits ye shall know them.

The Bible

Matthew 7:20

The combination of phenomena is beyond the grasp of the human

intellect. But the impulse to seek cause is innate in the soul of man.

And the human intellect, with no inkling of the immense variety and

complexity of circumstances conditioning a phenomenon, any one of

which may be separately conceived as the cause of it, snatches at the

first and most easily understood approximation, and says here is the

cause.

Tolstoy, Leo

War and Peace

Book X I I , Chapter 1

Everything can be a "that"; everything can be a "this". One man cannot

see things as another sees them . . . Therefore it is said "'That' comes

from 'this' and 'this' comes from 'that"'-which means "that" and "this"

give birth to one another.

Tsu, Chuang

Inner chapters (p. 29)

I am not a heretic; I do believe in causality.

unknown

CAUSE AND EFFECT 29

The cause is the same with a Barmter (a Barometer I suppose she meant,

if she meant anything), which has a great Effect on the Weather. Say

rather the Weather has a great Effect on it.

Unknown

Adventures of Sylvia Hughes

Written by herself, 48

Happy is he who has been able to learn the causes of things, . . .

Virgil

Quoted in James Lonsdale’s

The Works of Virgil

The Georgics

11, 1. 489

CERTAINTY

. . . if a man will begin with certainties he shall end in doubts, but if he

will be content to begin with doubts, he shall end in certainties.

Bacon, Francis

The Advancement of Learning

First Book (p. 41)

Oh! let us never doubt

What nobody is sure about!

Belloc, Hilaire

More Beasts for Worse Children

The Microbe

There is one thing certain, namely that we can have nothing certain; and

therefore it is not certain that we can have nothing certain.

Butler, Samuel

Samuel Butler’s Note-Books (p. 195)

. . . we’re not sure, we can’t be sure. Otherwise, there would be a solution;

at least one could get oneself taken seriously.

Camus, Albert

The Fall (p. 74)

Sometimes the probability in favor of a generalization is enormous, but

the infinite probability of certainty is never reached.

Dampier-Whetham, William

Science and the Human Mind

Chapter X

It was not a PERHAPS; it was a certainty.

Froude, James Anthony

Short Studies on Great Subjects

Times of Erasmus, Desderius and Luther (p. 47)

30

CERTAINTY 31

"Certainty," Father Newman insists, is the same in kind wherever and

by whomsoever it is experienced. The gravely and cautiously formed

conclusion of the scientific investigator, and the determination of the

school-girl that the weather is going to be fine, do not differ from each

other so far as they are acts of the mind.

Froude, James Anthony

Short Studies on Great Subjects

The Grammar of Assent (p. 105)

If one thing is more certain than another-which is extremely doubtful-

Galsworthy, John

End of the Chapter

Maid in Waiting

Chapter 13

He is a fool who leaves certainties for uncertainties.

Hesiod

Fragments

Frag 18 (p. 278)

Quoted by Plutarch

Moralia

Section 505D

We can be absolutely certain only about things we do not understand.

Hoffer, Eric

The True Belimn

Part 3, Chapter XII, Section 57 (p. 79)

Heads I win, Tails you lose.

Holmes, O.W.

The Professor at the Breayast Table (p. 223)

But certainty generally is illusion, and repose is not the destiny of man.

Holmes, O.W., Jr.

Harvard Law Rm'ew

The Path of the Law

Volume 10, Number 7, February 25, 1897 (p. 466)

Certitude is not the test of certainty. We have been cock-sure of many

things that were not so.

Holmes, O.W., Jr.

Harvard Law Rm'ew

Natural Law

Volume 32, Number 1, November 1918 (p. 40)

32 STATISTICALLY SPEAK"

. . , we can know nothing . . .for certain . . .

Jeans, James Hopwood

The New Background of Science (p. 58)

When speculation has done its worst, two and two still make four.

Johnson, Samuel

The ldler

Yet I shall not deny that the number of phenomena which are happily

explained by a given hypothesis may be so great that it may be taken as

morally certain.

Leibniz, Gottfried Wilhelm

Leibniz: Philosophical Papers and Letters

Volume I

On the Elements of Natural Science (p. 347)

. . . the highest probability amounts not to certainty, without which there

can be no true knowledge.

Locke, John

An Essay Concerning Human Understanding

Book IV, 111, 14

As mathematical and absolute certainty is seldom to be attained in

human affairs, reasoning and public utility require that judges and all

mankind in forming their opinion of the truth of facts should be regulated

by the superior number of probabilities on the one side or the other.

Mansfield, Lord

Quoted in Francis Wellman's

The Art of Cross-Examination (p. 168)

I must have certainty. Give it to me; or I will kill you when next I catch

you asleep.

Shaw, George Bernard

Back to Methuselah

Act I

In the Beginning

Not a resemblance, but a certainty.

Shakespeare, William

The Complete Works of William Shakespeare

Measure for Measure

Act IV, Scene 2,l. 203

CERTAINTY 33

All predictions are statistical, but some predictions have such a high

probability that one tends to regard them as certain.

Walker, Marshall

The Nature of Scient@ Thought (p. 70)

Heads I win, Tails you lose.

O.W. Holmes - (See p. 31)

CHANCE

A substantial portion of the lecture was devoted to risks . . . He

emphasized that one in a million is a very remote risk.

Abelson, Philip H.

Science

Editorial

4 February 1994

A Frenchman named Chamfort, who should have known better, once

said that chance was a nickname for Providence.

Ambler, Eric

A CofinfO~D imitrios (p. 1)

In all such beings chance occurs, not in the sense that everything about

them occurs by chance, but that in each of them there is room for chance

and this very fact is a sign that they are subject to someone’s rule.

Aquinas, Thomas

Summa Theologiae

Part I

Question 103. God’s Government taken as a Whole

Article 5. Whether all things are subject to God’s government

Clearly none of the traditional sciences concerns itself with the accidental.

Aristotle

Metaphysics

Book XI, Chapter VI11

To begin with, then, we note that some things follow upon others

uniformly or generally, and it is evidently not such things that we

attribute to chance or luck.

Aristotle

The Physics

Book 11, Chapter V

34

CHANCE 35

. . . chance is excluded from natural events, and whatever applies

everywhere and to all cases is not to be ascribed to chance.

Aristotle

On the Heavens

Book 11, Chapter VI11

. . . rational action is merely a question of calculating the chances.

Aron, Raymond

The Opium of the Intellectuals

Chapter VI

The Illusion of Necessity (p. 165)

Chance is the fool’s name for fate.

Astaire, Fred

The movie The Gay Divorcee

Games of chance are probably as old as the human desire to

get something for nothing; but their mathematical implications were

appreciated only after Fermat and Pascal in 1654 reduced chance to law.

Bell, Eric T.

The Development of Mathematics (p. 154)

Every night and every mom

Some to misery are bom;

Every mom and every night

Some are bom to sweet delight.

Blake, William

The Complete Writings of William Blake

Poems from the Pickering Manuscript

Auguries of Innocence, 1.119-21

Of all the gin joints in all the towns in all the world, she walks into mine!

Bogart, Humphrey

The movie Casablanca

Can there be laws of chance? The answer, it would seem. should be

negative, since chance is in fact defined as the characteristic of the

phenomena which follow no law, phenomena whose causes are too

complex to permit prediction.

Borel, Emile

Probabilities and Life

Introduction ( p. 1)

36 STATISTICALLY SPEAKING

The conception of chance enters into the very first steps of scientific

activity in virtue of the fact that no observation is absolutely correct.

I think chance is a more fundamental conception than causality; for

whether in a concrete case, a cause-effect relationship holds or not can

only be judged by applying the laws of chance to the observation.

Born, Max

Natural Philosophy of Cause and Chance (p. 47)

What we still designate as chance, merely depends on a concatenation

of circumstances, the intemal connection and the final causes of which

we have as yet been unable to unravel.

Buchner, Ludwig

Force and Matter

The Fitness of Things in Nature (p. 179)

It must always be remembered that man’s body is what it is through

having been molded into its present shape by the chances and changes

of an immense time . . .

Butler, Samuel

Erewhon

Chapter XXII

We see but a part, and being thus unable to generalize human conduct,

except very roughly, we deny that it is subject to any fixed laws at all,

and ascribe much both of a man’s character and actions to chance, or

luck, or fortune . . .

Butler, Samuel

Erewhon

Chapter XXIII

Quoth She: ”I’ve heard old cunning Stagers

Say, Fools for Arguments use wagers.”

Butler, Samuel

Hudi bras

The Second Part

Canto I, verses 298-9

Quelqu’un disait que la providence strat le nom de bapthe du hasard . . .

[Chance is a nickname of Providence.]

Chamfort, Sebastien Roch

Maximes et pensies

Ib. 62

”Proof!” he cried. ”Good God! the man is looking for proof! Why, of

course, the chances are twenty to one that it has nothing to do with

CHANCE 37

them. But what else can we do? Don’t you see we must either follow

one wild possibility or else go home to bed.”

Chesterson, Gilbert Keith

The Father Brown Omnibus

The Innocence of Father Brown

The Blue Cross

Surely nothing is so at variance with reason and stability as chance.

Cicero

Cicero: De Senectute, De Amicitia, De Divinatione

De Divinatione

XI, vii

. . . but things that happen by chance cannot be certain.

Cicero

Cicero: De Senectute, De Amicitia, De Divinatione

De Divinatione

XI, ix

As in the game of billiards, the balls are constantly producing effects

from mere chance, which the most skillful player could neither execute

nor foresee, but which, when they do happen, serve mainly to teach him

how much he has still to learn . . .

Colton, Charles Caleb

Lacon: or many things in a fm words (p. 345)

One has to be extraordinarily lucky, in our society, to meet one

nymphomaniac in a lifetime.

Comfort, Alex

Darwin and the Naked Lady: Discursive Essays on Biology and Art

The Rape of Andromeda (p. 87)

A fool must now and then be right, by chance.

Cowper, William

Cowper: Poetical Works

Conversation, 1. 96

Chance is the only source of true novelty.

Crick, Francis Harry Compton

Life Itself (p. 82)

When the game of hazard is broken up, he who loses remains sorrowful

. . .

Dante

The Divine Comedy of Dante Alighiere

Purgatory

Canto 6, 1. 1-2

38 S TATlS TlCA LLY SPEA KlNG

When we look at the plants and bushes clothing an entangled bank, we

are tempted to attribute their proportional numbers and kinds to what

we call chance. But how false a view this is!

Darwin, Charles

The Origin of Species

Chapter 111

I am inclined to look at everything as resulting from designed laws, with

the details, whether good or bad, left to the working out of what we may

call chance.

Darwin, Charles

The Life and Letters of Charles Darwin

Volume I1

C. Darwin to Asa Gray

May 22nd [1860] (p. 105)

. . . some of the Problems about Chance having a great appearance of

Simplicity, the Mind is easily drawn into a belief, that their Solution

may be attained by the mere Strength of natural good Sense; Which

generally providing otherwise and the Mistakes occasioned thereby being

not unfrequent. ’Tis presumed that a Book of this Kind, which teaches to

distinguish Truth from what seems nearly to resemble it, will be looked

upon as a help to good reasoning.

de Moivre, Abraham

The Doctrine of Chances (p. ii)

There are many People in the World who are prepossessed with an

Opinion, that the Doctrine of Chances has a Tendency to promote Play;

but they soon will be undeceived . . . this Doctrine is so far from

encouraging Play, that it is rather a Guard against it, by setting in a

clear Light, the Advantages and Disadvantages of those Games wherein

Chance is concemed.

de Moivre, Abraham

The Doctrine of Chances

Dedication

Nothing can come into being from that which is not, or pass away into

what is not.

Democritus

in Diogenes Laterius’

Lives of Eminent Philosophers

Chapter IX

She hadn’t a Chinaman’s chance.

Disney, Dorothy

Crimson Fridny (p. 206)

CHANCE 39

Be juster, Heav’n: such virtue punish’d thus,

Will make us think that Chance rules all above,

And shuffles, with a random hand, the Lots

Which Man is forc’d to draw.

Dryden, John

The Poetical Works of D yden

All For Love

Act V

There was once a brainy baboon,

Who always breathed down a bassoon,

For he said ”It appears

That in billions of years

I shall certainly hit on a tune.”

Eddington, Sir Arthur Stanley

New Pathways in Science

Chapter 111, Section IV

The End of the World (p. 62)

In our scientific expectation we have grown antipodes. You believe in

God playing and I in perfect laws in the world of things existing as real

objects, which I try to grasp in a wildly speculative way.

Einstein, Albert

Letter to Max Bom

7 November 1944

Value depends upon price and price upon chance and caprice.

Eldridge, Paul

Maxims for a Modern M a n

1855

Great Jove!

What shall I say? that thou from Heaven look‘st down

Upon mankind, or have they rashly formed

A vain opinion, deeming that the race

Of gods exists, though fortune governs all?

Euripides

The Plays of Euripides

Hecuba, 1. 486

A general is a man who takes chances. Mostly he takes a fifty-fifty

chance; if he happens to win three times in succession he is considered

a great general.

Fermi, Enrico

Quoted in Leo Szilard’s

Leo Szilard: His Version of the Facts (p. 147)

40 STATlSTlCALLY SPEAKlNG

There are fifty ways which I may go after I leave my door. The odds

are forty-nine to one against my taking any particular way that can be

mentioned, yet a person says that he saw me go that way and not another,

his evidence is accepted without difficulty, and the fact is taken to be

proved.

Froude, James Anthony

Short Studies on Great Subjects

The Grammar of Assent (p. 109)

It’s all chance, but we can’t stop now.

Galsworthy, John

End of the Chapter

Maid in Waiting, Chapter 28

The whimsical effects of chance in producing stable results are common

enough. Tangled strings variously twitched, soon get themselves into

tight knots. Rubbish thrown down a sink is pretty sure in time to choke

the pipe; no one bit may be so large as its bore, but several bits in their

numerous chance encounters will at length so come into collision as to

wedge themselves into a sort of arch across the tube, and effectively plug

it.

Galton, Francis

Natural lnheritance

Organic Stability (p. 21)

He had left off being a perfectionist then, when he discovered that not

promptly kept appointments; not a house circumspectly clean, not even

membership in Onwentsa, or the Lake Forest Golf and Country Club, or

the Lawyer’s Club, not power-not anything-leared you through the

terrifying office of chance; that it is chance and not perfection that rules

the world.

Guest, Judith

Ordina y People

Chapter 11

The odds are still about five to one against hitting the right combination,

but that is better than no odds at all.

Harrison, Harry

Astounding

The Mothballed Spaceship

CHANCE 41

If there is a 50-50 chance that something can go wrong, then 9 times out

of 10 it will.

Harvey, Paul

Paul Harvey News, 1979

. . . chance, that is, an infinite number of events, with respect to which

our ignorance will not permit us to perceive their causes, and the chain

that connects them together. Now, this chance has a greater share in our

education than is imagined. It is this that places certain objects before us

and, in consequence of this, occasions more happy ideas, and sometimes

leads us to the greatest discoveries . . .

Helvetius, C.A.

On Mind

Essay 111, Chapter I (p. 196)

If chance be generally acknowledged to be the author of most discoveries

in almost all the arts, and if in speculative sciences its power be less

sensibly perceived, it is not perhaps less real . . .

Helvetius, C.A.

On Mind

Essay 111, Chapter IV (p. 221)

. . . it is well to bear in mind that chances rule men, and not men chances.

Herodotus

The History of Herodotus

Volume 11, Book VII, 49

Roll dem bones . . .

Heyward, DuBose

Carolina Chansons: Legends of the Low County

Gamesters All

Then let a man now face the foe and perish or be saved: such is the

intercourse of war.

Homer

The Iliad of Homer

Book XVII, 226

Though there be no such thing as Chance in the world, our ignorance of

the real cause of any event has the same influence on the understanding,

and begets a like species of belief or opinion.

H u e , David

An Enquiy Concerning Human Understanding

Section VI (p. 37)

42 STATlSTlCALLY SPEAKlNG

Nothing was ever said with uncommon felicity, but by the cooperation

of chance; and therefore, wit, as well as valor must be content to share

its honors with fortune.

Johnson, Samuel

The Yale Edition of the Works of Samuel Johnson

The Idler and the Adventurer

Idler No. 58

Caput aut navia

[Heads or Tails]

Latin Expression

I shot an arrow into the air,

It fell to earth I know not where,

For so swift it flew, the sight

Could not follow it in its flight.

Longfellow, Henry Wadsworth

The Poems of Longfellow

The Arrow and the Song

”I should estimate,” this scientist was supposed to have said, “that there

is one chance in ten nothing will happen with the bomb, and one chance

in a hundred that it will ignite the atmosphere.”

Masters, Dexter

The Accident (p. 16)

But then I was reading in the paper just the other day about one of

them saying there wasn’t more than one chance in God-knows-what, a

trillion maybe, that these Bikini bombs could blow up the world. I said to

myself, this seems pretty safe odds. But then I said to myself, hey! how

come any odds at all? Who’s running this show anyway? I sort of get to

wondering every once in a while whether anybody knows the middle

and the end of what’s going on as well as the beginning.

Masters, Dexter

The Accident (p. 382)

. . . that power which erring men call Chance.

Milton, John

Poetical Works of John Milton

Volume I1

Comus

1. 587

CHANCE

. . . Chnce govems all.

43

Milton, John

Paradise Lost

Book 11, 1. 910

No conqueror believes in chance.

Nietzsche, Friedrich

The Complete Works of Friedrich Nietzsche

The Joys of Wisdom, 111, Number 258

There must be chance in the midst of design; by which we mean, that

events which are not designed, necessarily arise from the pursuit of

events which are designed. One man travelling to York, meets another

man travelling to London.

Paley, William

Natural Theology

Volume 11, Goodness of the Deity (p. 186)

The appearance of chance will always bear a proportion to the ignorance

of the observer.

Paley, William

Natural Theology

Volume 11, Goodness of the Deity (p. 186)

Cleopatra’s nose-had it been shorter, the whole face of the earth would

have been changed.

Pascal, Blaise

Pascal’s Penskes

Section I, 93

A game is on, at the other end of this infinite distance, and heads or tails

will turn up. What will you wager?

Pascal, Blaise

Pascal’s Penskes

Section I, 223

In the field of experimentation, chance favors only the prepared mind.

Pasteur, Louis

in Rent2 Dubos’

Louis Pasteur: Free Lance of Science (p. 101)

Nick the Greek’s Law of Life. All things considered, life is 9 to 5 against.

Peers, John

ZOO1 Logical Laws (p. 50)

Crito. But you see, Socrates, that the opinion of the many must be

regarded, for what is now happening shows that they can do the greatest

evil to any one who has lost their good opinion.

44 STATISTICALLY SPEAKlNG

Socrates. I only wish it were so, Crito; and that the many could do the

greatest evil; for then they would be able to do the greatest good-and

what a fine thing this would be! But in reality they can do neither, for

they cannot make a man either wise or foolish; and whatever they do is

the result of chance.

Plato

Crito

44

. . . in human affairs chance is almost everything.

Plato

Laws

Book IV, 709

Athenian Stranger. They say that the greatest and fairest things are the

work of nature and of chance, the lesser of art, which, receiving from

nature the greater and primeval creations, molds and fashions all those

lesser works which are generally termed artificial.

Plato

Laws

Book X, 889

The lover of intellect and knowledge ought to explore causes of

intelligent nature first of all, and, secondly, of those things which, being

moved by others, are compelled to move others. And this is what we

too must do. Both kinds of causes should be acknowledged by us, but

a distinction should be made between those which are endowed with

mind and are the workers of things fair and good, and those which are

deprived of intelligence and always produce chance effects without order

or design.

Plato

Timaeus

46

But from outside there is no knowing which is true. From outside, there

is a five-tenths chance that the cat’s alive.

But a cat can’t be five-tenths alive.

Pohl, Frederik

The Coming of the Quantum Cuts

22 August 1983

4:20 A.M. Senator Dominic DeSota (p. 57)

And first, what is chance? The ancients distinguished between

phenomena seemingly obeying harmonious laws, established one and

for all, and those which they attributed to chance; these were the ones

CHANCE 45

unpredictable because rebellious to all law. In each domain the precise

laws did not decide everything, they only drew limits between which

chance might act. In this conception the word chance had a precise and

objective meaning: what was chance for one was also chance for another

and even for the gods.

Poincare, Henri

The Foundations of Science

Science and Method (p. 395)

Every phenomenon, however minute, has a cause; and a mind infinitely

powerful, infinitely well-informed about the laws of nature, could have

foreseen it from the beginning of the centuries. If such a mind existed,

we could not play with it at any game of chance; we should always lose.

Poincark, Henri

The Foundations of Science

Science and Method (p. 395)

Chance is only the measure of our ignorance.

Poincark, Henri

The Foundations of Science

Science and Method (p. 395)

The greatest bit of chance is the birth of a great man. It is only by

chance that the meeting of two germinal cells, of different sex, containing

precisely, each on its side, the mysterious elements whose mutual

reaction must produce the genius. One will agree that these elements

must be rare and that their meeting is still more rare. How slight a thing it

would have required to deflect from its route the carrying spermatozoon.

It would have suffered to deflect it a tenth of a millimeter and Napoleon

would not have been bom and the destinies of a continent would have

been changed. No example can better make us understand the veritable

characteristics of chance.

Poincar6, Henri

The Foundations of Science

Science and Method (pp. 41C-1)

All chance, direction, which thou canst not see;

All discord, harmony, not understood,

All partial evil, universal good:

And, spite of Pride, in erring Reason’s spite,

One truth is clear, ”Whatever is, is Right.”

Pope, Alexander

The Complete Poetical Works of POPE

An Essay on Man

Epistle I, 289

46 STATISTICALLY SPEAKlNG

Wisdom liketh not chance.

Proverb, English

Thus we must content our selves for the most part, to find out how

Things may be; without pretending to come to a certain knowledge and

determination of what they really are.

[We must for the most part be content with probability.]

Rohault, Jacques

Rohault‘s System of Natural Philosophy

Volume I, Part I, Chapter 3, 3

I long ago came to the conclusion that all life is 6 to 5 against.

Runyon, Damon

Collier’s

A Nice Place

8 September 1934 (p. 8)

There’s no such thing as chance;

And what to us seems merest accident

Springs from the deepest source of destiny.

Schiller, Friedrich

Early Dramas

The Death of Wallenstein

Act 11, Scene I11

Consider that chance, which, with error, its brother, and folly, its aunt,

and malice, its grandmother, rules in this world; which every year and

every day, by blows great and small, embitters the life of every son of

earth, and yours too.

Schopenhauer, Arthur

Parerga and Paralipomena: Short Philosophical Essays

Wisdom of Life: Aphorisms

Chance will not do the work-Chance sends the breeze;

But if the pilot slumbers at the helm,

The very wind that wafts us toward the port

May dash us on the Shelves-The steersman’s part is viglance,

Blow it or rough or smooth.

Scott, Sir Walter

Fortunes of Nigel

Chapter XXII

CHANCE 47

Give up yourself merely to chance and hazard,

From firm security.

Shakespeare, William

The Complete Works of William Shakespeare

Anthony and Cleopatra

Act 111, Scene 7, 1. 48

As things but done by chance.

Shakespeare, William

The Complete Works of William Shakespeare

Anthony and Cleopatra

Act V, Scene 2,l. 120

Wherein I spake of most disastrous chances . . .

Shakespeare, William

The Complete Works of William Shakespeare

Othello, The Moor of Venice

Act I, Scene 3, 1. 134

Portia. In terms of choice I am not solely led

By nice direction of a maiden’s eyes;

Besides, the lottery of my destiny

Bars me the right of voluntary choosing.

Shakespeare, William

The Complete Works of William Shakespeare

The Merchant of Venice

Act 11, Scene 1, 1. 13

Portia. You must take your chance,

And either not attempt to choose at all

Or swear before you choose, if you choose wrong . . .

Shakespeare, William

The Complete Works of William Shakespeare

The Merchant of Venice

Act 11, Scene 1, 1. 38

Come, bring me unto my chance.

Shakespeare, William

The Complete Works of William Shakespeare

The Merchant of Venice

Act 11, Scene 1, 1. 43

If chance will have me King, why, chance may crown me . . .

Shakespeare, William

The Complete Works of William Shakespeare

Macbeth

Act I, Scene 3,l. 143

48 STATISTICALLY SPEAHNG

Florizel . . .

But as the unthought-on accident is guilty

To what we wildly do, so we profess

Ourselves to be the slaves of chance and flies

Of every wind that blows.

Shakespeare, William

The Complete Works of William Shakespeare

The Winter's Tale

Act IV, Scene 4,l. 548

Of Fate, and Chance, and God, and Chaos old . . .

Shelley, Percy Bysshe

The Poems of Percy Bysshe Shelley

Prometheus Unbound

Act 11, Scene 111, 1. 92

Fate, T i e , Occasion, Chance and Change-to these all things are subject.

Shelley, Percy Bysshe

The Poems of Percy Bysshe Shelley

Prometheus Unbound

Act 11, Scene IV, 1. 119

And grasps the skirt of happy chance. . .

Tennyson, Alfred Lord

The Poems and Plays of Tmnyson

In Memoriam A.H.H.

Part 1, xiv

Blessed be the gods, by whose aid things happen that we wouldn't even

dare hope for!

Terence

Phormio

Act V, Scene 4,l. 757

Quoted in George E. Duckworth's

The Complete Roman Drama

So they cast lots, and the lot fell upon Jonah.

The Bible

Jonah 1:7

. . . the race is not to the swift, nor the battle to the strong . . .

The Bible

Proverbs 16:33

CHANCE 49

. . . chance is an empty word without sense, but which is always opposed

to that of intelligence, without attaching any determinate, or any certain

idea.

Thiery, Paul Henri, Baron d'Holbach

The System of Nature

Volume I

Chapter 5 (p. 71)

For sometimes the course of things is as arbitrary as the plans of man;

indeed this is why we usually blame chance for whatever does not

happen as we expected.

Thucydides

The History of the Peloponnesian War

I, 140

Why did it happen in this and not in some other way? Because it

happened so! "Chance created the situation; genius utilized it," says

But what is chance? What is genius?

The words chance and genius do not denote any really existing thing and

therefore cannot be defined.

Tolstoy, Leo

War and Peace

First Epilogue, Chapter I1

history.

No more chance than a snowball in Hell.

Unknown

Omnium versatur uma serius ocius sors exitura.

[Age at death is a chance variable.]

Unknown

Since Fortune sways to the world . . .

[Chance sways all.]

Virgil

Quoted in James Lonsdale's

The Works of Virgil

The Eclogues

Ix, 1.5

COMMON SENSE

Common sense is not really so common.

Amauld, Antoine

The Art of Thinking: Port-Royal Logic

First Discourse ( p . 9)

The double analysis kills the single analysis, and the treble kills the

double, until at last a sufficiency of statistics comes very near to common

sense.

Belloc, Hilaire

The Silence of the Sea

On Statistics (p. 173)

And then he knew that something within him more powerful than his

common-sense would force him to stake that five-franc piece. He glanced

furtively at the crowd to see whether anyone was observing him. No.

Well, it having been decided to bet, the next question was, how to

bet? Now, Henry had read a magazine article concerning the tables at

Monte Carlo, and, being of a mathematical turn, had clearly grasped

the principles of the game. He said to himself, with his characteristic

caution: “I’ll wait till red wins four times running, and then I’ll stake on

the black.”

(”But surely,” remarked the logical superior person in him, ”You don’t

mean to argue that a spin of the ball is affected by the spins that have

proceeded it? You don’t mean to argue that because red wins four times,

or fifty times, running, black is any the more likely to win at the next

spin?” “You shut up!” retorted the human side of him crossly. ”I know

all about that.”)

Bennett, Arnold

A Great Man

Chapter XXV (pp. 245-6)

50

COMMON SENSE 51

Statistics are no substitute for common sense.

Bialac, Richard N.

Quoted in Paul Dickson's

The OfFcial Explanations (p. B14)

There is no more remarkable feature in the mathematical theory of

probability than the manner in which it has been found to harmonize

with, and justify, the conclusions to which mankind have been led, not

by reasoning, but by instinct and experience, both of the individual and

of the race. At the same time it has corrected, extended, and invested

them with a definiteness and precision of which these crude, though

sound, appreciations of common sense were till then devoid.

Crofton, M.W.

Encyclopaedia Britannica

9th Edition

Probability

. . . common sense is nothing more than a deposit of prejudices laid down

in the mind before you reach eighteen.

Einstein, Albert

Quoted in Eric T. Bell's

Mathematics: Queen and Servant of Science (p. 42)

What is common sense? That which attracts the least opposition: that

which brings most agreeable and worthy results.

Howe, E.W.

Sinner Sermons (p. 7)

We know that the probability of a well-established induction is great,

but, when we are asked to name its degree, we cannot. Common sense

tells us that some inductive arguments are stronger than others, and that

some are very strong. But how much stronger or how strong we cannot

express.

Keynes, John Maynard

A Treatise on Probability

Chapter XXI (p. 259)

One sees in this essay that the theory of probabilities is basically only

common sense reduced to a calculus.

Laplace, Pierre-Simon

A Philosophical Essay on Probabilities (p. 124)

CORRELATION

There is no correlation between the cause and the effect. The events

reveal only an aleatory determination, connected not so much with the

imperfection of our knowledge as with the structure of the human world.

Aron, Raymond

The Opium of the lntellectuuls

Chapter VI (p. 163)

”You know those penetration figures?”

“Mm.”

“Well, there’s a positive correlation between penetration and the height

of the man firing.”

“Easy,” I said. ”The taller the man, the more rarefied the atmosphere and

the less the air resistance.”

Balchin, Nigel

The Small Buck Room (p. 8 )

”Very true,” said the Duchess: “flamingos and mustard both bite. And

the moral of that is ’Birds of a feather flock together.”’

’’Only mustard isn’t a bird.’’ Alice remarked.

“Right as usual,” said the Duchess: ”what a clear way you have of putting

Carroll, Lewis

The Complete Works of Lewis Carroll

The Mock Turtle’s Story

things!‘,

Reading the twenty-sixth chart, one correlation suddenly occurred to

Jason. Although the patients did not share physical symptoms, their

charts showed a predominance of high-risk social habits. They were

overweight, smoked heavily, used drugs, drank too much, and failed

to exercise, or combined any and all of these unhealthy practices; they

52

CORRELATION 53

were men and women who were eventually destined to have severe

medical problems. The shaking fact was that they deteriorated so quickly.

And why the sudden upswing in deaths. People weren’t indulging in

vices more than they were a year ago. Maybe it was a kind of statistical

equalizing. They’d been lucky and now the numbers were catching up

to them.

Cook, Robin

Mortal Fear

Chapter 11 (p. 220)

The well-known virtue of the experimental method is that it brings

situational variables under tight control. It thus permits rigorous

tests of hypotheses and confidential statements about causation. The

correlational method, for its part, can study what man has not learned

to control. Nature has been experimenting since the beginning of time,

with a boldness and complexity far beyond the resources of science.

The correlator’s mission is to observe and organize the data of nature’s

experiments.

Cronbach, L.J.

The American Psychologist

The Two Disciplines of Scientific Psychology

Volume 12, November 1957 (p. 672)

Hall’s Law: There is a statistical correlation between the number of

initials in an Englishman’s name and his social class (the upper class

having sigruficantly more than three names, while members of the lower

class average 2.6).

Dickson, Paul

The OfFciaZ Rules (p. H-80)

The futile elaboration of innumerable measures of correlation, and the

evasion of the real difficulties of sampling problems under cover of

a contempt for small samples, were obviously beginning to make its

pretensions ridiculous. These procedures were not only ill-aimed, but

for all their elaboration, not sufficiently accurate.

Fisher, Sir Ronald A.

Statistical Methods for Research Workers (p. v)

STATISTICALLY SPEAKlNG

”Co-relation or correlation of structure’’ is a phrase much used in biology,

and not least in that branch of it which refers to heredity, and the idea

is even more frequently present than the phrase but I am not aware of

any previous attempt to define it clearly, to trace its mode of action in

detail, or to show how it measures its degree.

Galton, Francis

Proceedings of the Royal Society of London

Co-relations and Their Measurements, Chiefly for Anthropometric Data

Volume 45,1888

It had appeared from observation, and it was fully confirmed by this

theory, that such a thing existed as an ”Index of Correlation”, that is

to say, a fraction, now commonly written T, that connects with close

approximation every value of the deviation on the part of the subject,

with the average of all the associated deviations of the Relative . . .

Galton, Francis

Memories of My Life

Chapter XX

It is now beginning to be generally understood, even by merely practical

statisticians, that there is truth in the theory that all variability is much

the same kind.

Galton, Francis

North American Review

Kinship and Correlation

Volume 150, Part 11, April 1890 (pp. 427-8)

I can only say that there is a vast field of topics that fall under the laws

of correlation, which lies quite open to the research of any competent

person who cares to investigate it.

Galton, Francis

North American Review

Kinship and Correlation

Volume 150, Part 11, April 1890 (p. 431)

Biological phenomena in their numerous phases, economic and social,

were seen to be only differentiated from the physical by the intensity of

their correlations. The idea Galton placed before himself was to represent

by a single quantity the degree of relationships, or of partial causality

between the different variables of our everchanging universe.

Pearson, Karl

The Life, Letters, and Labours of Francis Galton

Volume IIIA, Chapter XIV (p. 2)

The quantity of the correlation is inversely proportional to the density of

the control (the fewer the facts, the smoother the curves).

unknown

DATA

There is no substitute for honest, thorough, scientific effort to get correct

data (no matter how much of it clashes with preconceived ideas). There

is no substitute for actually reaching a correct claim of reasoning. Poor

data and good reasoning give poor results. Good data and poor reasoning

give poor results. Poor data and poor reasoning give rotten results.

Berkeley, Edmund C.

Computers and Automation

Right Answers-A Short Guide for Obtaining Them

Volume 18, Number 10, September 1969 (p. 20)

Lots of people bring you false information.

Berkeley, Edmund C.

Computers and Automation

Right Answers-A Short Guide for Obtaining Them

Volume 18, Number 10, September 1969 (p. 20)

Anyone can easily misuse good data.

Deming, William Edwards

Some Theory of Sampling (p. 18)

There is only one kind of whiskey, but two broad classes of data, good

and bad.

Deming, William Edwards

The American Statistician

On the Classification of Statistics

Volume 2, Number 2, April 1948 (p. 16)

55

56 S TATIS TlCA L LY SPEAKZNG

Scientific data are not taken for museum purposes; they are taken as a

basis for doing something. If nothing is to be done with the data, then

there is no use in collecting any. The ultimate purpose of taking data is

to provide a basis for action or a recommendation for action. The step

intermediate between the collection of data and the action is prediction.

Deming, William Edwards

Journal of the American Statistical Association

On a Classification of the Problems of Statistical Inference

Volume 37, Number 218, June 1942 (p. 173)

Data are often presented in a form that is not immediately clear. The

reader can then either ignore the data, analyze them himself, or retum

them to the author for him to analyze.

Ehrenberg, A.S.C.

Data Reduction (p. 1)

It does not follow that because something can be counted it therefore

should be counted.

Enarson, Harold L.

Speech to Society for College and University Planning, September 1975

No.human mind is capable of grasping in its entirety the meaning of any

considerable quantity of numerical data.

Fisher, Sir Ronald A.

Statistical Methods for Research Workers (p. 6 )

I can only suggest that, as we are practically without data, we should

endeavor to obtain some.

Freeman, R. Austin

A Certain Dr. Thorndyke

Thomdyke Takes up the Inquiry

My data were very lax but this method of treatment got all the good out

of them that they possessed.

Galton, Francis

Natural Inheritance

Schemes of Distribution and of Frequency (p. 48)

Still, it is an error to argue in front of your data. You find yourself

insensibly twisting them around to fit your theories.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of Wisteria Lodge

DATA 57

“Data! Data! Data!’’ he cried impatiently. ”I can’t make bricks without

clay.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Copper Beeches

It is a capital mistake to theorize before one has the data.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

Scandal in Bohemia

”No data yet,” he answered. ”It is a capital mistake to theorize before

you have all of the evidence. It biases the judgment.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

A Study in Scarlet

If you can’t have an experiment, do the best you can with whatever data

you can gather, but do be very skeptical of historical data and subject

them to all the logical tests you can think of.

Hooke, Robert

Quoted in J.M. Tanur‘s

Statistics: A Guide to the Unknown

Statistics, Sports, and Some Other Things

To the optical astronomer, radio data serves like a good dog on a hunt.

Hoyle, Fred

Galaxies, Nuclei and Quasars (p. 43)

By no process of sound reasoning can a conclusion drawn from limited

data have more than a limited application.

Mellor, J .W.

Higher Mathematics for Students of Chemistry and Physics (p. 4)

58 STATISTZCA L LY SPEAK"

When a man of science speaks of his "data", he knows very well in

practice what he means. Certain experiments have been conducted, and

have yielded certain observed results, which have been recorded. But

when we try to define a "datum" theoretically, the task is not altogether

easy. A datum, obviously, must be a fact known by perception. But

it is very difficult to arrive at a fact in which there is no element of

inference, and yet it would seem improper to call something a "datum"

if it involved inferences as well as observation. This constitutes a problem

Russell, Bertrand A.

The Analysis of Matter

Chapter X I X (p. 187)

The individual source of the statistics may easily be the weakest link.

Harold Cox tells a story of his life as a young man in India. He quoted

some statistics to a Judge, an Englishman, and a very good fellow. His

friend said, "Cox, when you are a bit older, you will not quote Indian

statistics with that assurance. The Government are very keen on amassing

statistics-they collect them, and they raise them to the nth power, take

the cube root and prepare wonderful diagrams. But what you must never

forget is that every one of those figures comes in the first instance from

the chowty dur (village watchman), who just puts down what he damn

pleases."

Stamp, Josiah

Some Economic Factors in Modern Life

Chapter VI1 (p. 258)

We have no scientific data whatever on clock-eating and hence no

controlled observation.

Thurber, James

Lanterns and Lances

The Last Clock

In general, it is necessary to have some data on which to calculate

probabilities . . . Statisticians do not evolve probabilities out of their

inner consciousness, they merely calculate them.

Tippett, L.C.

The World of Mathematics

Sampling and the Standard Error

Volume 3 (p. 1486)

Sint ut sunt aut non sint.

[Accept them as they are or deny their existence.]

Unknown

If at first you don't succeed, transform your data set.

unknown

An observation with an abnormally large residual will be referred to

as an outlier. Other terms in English are "wild, "straggler", "sport"

and "maverick; one may also speak of a "discordant", "anomalous"

or "aberrant" observation.

Anscombe, F.J.

Technometn'cs

Rejection of Outliers

Volume 2,1960

Common knowledge is, in fact, nothing else than the raw material which,

assorted, refined and chemically transmuted, has served as the basic

substance of its vastly elaborated synthesis.

Barry, Frederick

The Scientific Habit of Thought (p. 20)

Die, n. The singular of "dice". We seldom hear the word, because there

is a prohibitory proverb, "Never say die". At long intervals, however,

some one says: "The die is cast", which is not true, for it is cut. The

word is found in an immortal couplet by that eminent poet and domestic

economist, Senator Depew:

A cube of cheese no larger than a die

May bait the trap to catch a nibbling mie.

Bierce, Ambrose

The Devil's Dictionary

Faith, n. Belief without evidence in what is told by one who speaks

without knowledge, of things without parallel.

Bierce, Ambrose

The Dezd's Dictionary

59

60 S TATlS TZCA L LY SPEAKING

Reason, vi. To weigh probabilities in the scales of desire.

Bierce, Ambrose

The Datil’s Dictionary

Indecision, n. The chief element of success; ”for whereas”, said Sir

Thomas Brewbold, ”there is but one way to do nothing and diverse

ways to do something, whereof, to a surety, only one is the right way,

it followeth that he who from indecision standeth still hath not so many

chances of going astray as he who pusheth forwards”-a most clear and

satisfactory exposition of the matter.

”Your prompt decision to attack, said General Grant on a certain

occasion to General Gordon Granger, ”was admirable; you had but five

minutes to make up your mind in.”

“Yes, Sir,” answered the victorious subordinate, “it is a great thing to

know exactly what to do in an emergency. When in doubt whether to

attack or retreat I never hesitate a moment-I toss up a copper.”

”Do you mean to say that’s what you did this time?”

“Yes, General; but for Heaven’s sake don’t reprimand me: I disobeyed

the coin.”

Bierce, Ambrose

The Devil’s Dictionary

A chunk is a convenient slice of a population.

Deming, William Edwards

Some Theory of Sampling (p. 14)

assessed probability: One manipulated by the Intemal Revenue Service.

assignable cause: The cause that takes the rap when the process runs

amok.

best estimate: In the theory of estimation, an estimate having optimum

qualities under conditions almost never met in practice.

commode: Term applied to each mode of a bimodal distribution.

data: 1. Brandname for the products from down here. 2. Plural of datum,

meaning reference point. When there are more than one, they almost

always conflict. 3. Deified numbers.

expected value: One that the sample average will almost never equal.

posterior probability: A result arrived at by the application of an elegant

mathematical formula to nothing more than seat-of-the-pants reasoning.

probability: An erudite measure of ignorance. Being dimensionless, it is

best used with a dimensional measure, especially a grain of salt.

DEFlNITlONS 61

random normal deviate: A contradiction in terms, since deviates are

abnormal.

regression fallacy: The naive belief that regression analysis is a cure-all.

Those who entertain it are known as regressions, and their way is hard.

They regress first and think afterward.

scatterbrain: 1. A Bayesian whose beliefs have been randomized in order

to facilitate deriving personal probabilities without systematic bias. 2. A

Classicist who scatters test levels to the wind, hoping that one will prove

sigruficant.

sequential analysis: A systematic procedure for generating second

guesses.

statistics: 1. A form of lying that is neither black, white, nor color. 2. An

attempt to analyze data-rare and archaic. 3. A disorderly, but not quite

random, progress from datum to datum.

Durand, David

The American Statistician

A Dictionary for Statismagicians

Volume 24, Number 3, June 1970 (,p. 21)

When there is no explanation, they give it a name, which immediately

explains everything.

Fabing, Harold

Mar, Ray

Fischerisms (p. 4)

Thinking in words, consciousness is behavior, experiment is measurement.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 172)

Misinforming people by use of statistical material might be called

statistical manipulation; in a word (though not a very good one),

statisticulation.

H u f f , Darrell

How to Lie with Statistics ( p . 100)

summation convention n. A mathematicians’ shindig held each year in

the Kronecker Delta.

Kelly-Bootle, Stan

The Devil’s DP Dictionary

standard deviation n. A sexual activity formerly considered perverted

but now universally practiced and accepted.

62 STATlSTlCALLY SPEAKING

A DP Freudian writes: ”I divide my patients into two broad categories:

those who are tumed on by normally distributed curves and those who

are not. Do not fret, I tell them all. One person’s meat is another person’s

Poisson. That soon gets the idiots off my couch, out of my sample, and

into my accounts payable . . .”

Kelly-Bootle, Stan

The Devil‘s DP Dictionary

map n. The imponderable correspondence between two sets, one of

which is unknown (called the domain), while the other (the range) is

unknowable.

Kelly-Bootle, Stan

The Devil’s DP Dictionary

The words figure and fictitious both derive from the same Latin root,

fingere. Beware!

Moroney, M.J.

Facts from Figures

Scatter (p. 56)

Innumerancy, an inability to deal comfortably with the fundamental

notions of numbers and chance, plagues far too many otherwise

knowledgeable citizens.

Paulos, John Allen

lnnumeracy (p. 3)

Inference, n. A mysterious process allowing us to reach a conclusion that

is desired.

An old sea captain kept a personal diary. On his sixty-fifth birthday he

wrote: ”Awoke this moming with a fine erection, couldn’t bend it with

both hands.” On his seventieth birthday he wrote: “Awoke this morning

with a fine erection; couldn’t bend it with both hands.’’ On his seventyfifth

birthday he wrote: “Awoke this morning with a fine erection; could

barely bend it with both hands. Must be getting stronger.”

Plonk, Phineas

Quoted in Edmund H. Volkart‘s

The Angel’s Dictionary

A posit is a statement which we treat as true although we do not know

whether it is so.

Reichenbach, Hans

The Rise of Scient@ Philosophy (p. 240)

DEFINlTlONS 63

Statistics, n. pl. The collection, analysis, and interpretation of numerical

data in such a way as to be understood by computers and misunderstood

by everyone else.

Volkhart, Edmund H.

The Angel’s Dictionary

Define your terms, you will permit me again to say, or we shall never

understand one another.

Voltaire

The Portable Voltaire

Philosophical Dictionary

Miscellany (p. 225)

A precise and universally acceptable definition of the term ’nonpararnetric’

is not presently available.

Walsh, John E.

Handbook of Nonparametric Statistics

Volume 1, Chapter 1 (p. 2)

It must always be

remembered that man’s

body is what it is through

having been molded into its

present shape by the

chances and changes of

an immense time. . .

Samuel Butler -

(See p. 36)

DEGREES OF FREEDOM

Degrees of freedom. The number of fetters on the statistician. The number

of d.f. is usually considered self-evident-xcept for the analysis of data

that have not appeared in a textbook.

Durand, David

The American Statistician

A Dictionary for Statismagicians

Volume 24, Number 3, June 1970 (p. 21)

The conception of degrees of freedom is not altogether easy to attain. . .

Tippett, L.C.

The Method of Statistics (p. 64)

64

DESIGN OF EXPERIMENTS

”The first thing I’ve got to do” said Alice to herself as she wandered in

the woods, ”is to grow to my right size again; and the second thing is to

find my way into that lovely garden. I think that will be the best plan.”

It sounded an excellent plan, no doubt; the only difficulty was that she

had not the smallest idea how to set about it; . . .

Carroll, Lewis

The Complete Works of Lewis Carroll

The Rabbit Sends in a Little Bill

A lady declares that by tasting a cup of tea made with milk she can

discriminate whether the milk or the tea infusion was first added to

the cup. We will consider the problem of designating an experiment by

means of which this assertion can be tested.

Fisher, Sir Ronald A.

The Design of Experiments (p. 13)

If you’re trying to establish cause-and-effect relationships, do try to do

so with a properly designed experiment.

Hooke, Robert

Quoted in J.M. Tanur‘s

Statistics: A Guide to the Unknown

Statistics, Sports, and Some Other Things

One day when I was a junior medical student, a very important

Boston surgeon visited the school and delivered a great treatise on a

large number of patients who had undergone successful operations for

vascular reconstructions. At the end of the lecture, a young student at

the back of the room timidly asked, ”DO you have any controls?” Well,

the great surgeon drew himself up to his full height, hit the desk, and

said, ”Do you mean did I not operate on half the patients?” The hall

grew very quiet then. The voice at the back of the room very hesitantly

replied, “Yes, that’s what I had in mind.” Then the visitor’s fist really

65

66 STATISTICALLY SPEAKlNG

came down as he thundered, "Of course not. That would have doomed

half of them to their death." It was absolutely silent then, and one could

scarcely hear the small voice ask, "Which half?"

Peacock, E.E.

Medical World News

September 1,1972 (p. 45)

A mighty maze! but not without a plan . . .

Pope, Alexander

The Complete Poetical Works of POPE

An Essay on Man, Epistle I, 1. 6

A committee or an investigator considering a scheme of experiments

should first . . . ask whether each experiment or question is framed in

such a way that a definite answer can be given. The chief requirement is

simplicity; only one question should be asked at a time.

Russell, E.J.

Journal of the Minist y of Agriculture of Great Britain

Field Experiments: How They are Made and What They Are

Volume 32, 1926 (p. 989)

For which of you intending to build a tower, sitteth not down first, and

counteth the cost, whether he have sufficient to finish it?

The Bible

Luke 14:28

DICE

. . . to repeat the same throw ten thousand times with the dice would be

impossible, whereas to make it once or twice is comparatively easy.

Aristotle

On the Heavens

Book 11, Chapter XI1

Appeal: v.t. In law, to put the dice into the box for another throw.

Bierce, Ambrose

The Dm'l's Dictionary

Four dice are cast and a Venus throw results-that is chance; but do

you think it would be chance, too, if in one hundred casts you made

one hundred Venus throws? It is possible for paints flung at random

on a canvas to form the outline of a face; but do you imagine that an

accidental scattering of pigments could produce the beautiful portrait

of Venus of Cos? Suppose that a hog should form a letter 'A' on the

ground with its snout; is that a reason for believing that it could write

out Ennius's poem The Andromche?

Cicero

Cicero: De Senectute, De Amicitia, De Divinatione

De Divinatione

I. xiii

'lis fate that flings the dice,

and as she flings

of Kings makes peasants,

and of peasants Kings.

Dryden, John

Works

Volume XV, 1821 Edition (p. 103)

67

68 STATISTICALLY SPEAKING

Quantum mechanics is certainly imposing. But an inner voice tells me

that it is not yet the real thing. The theory says a lot but does not bring

us any closer to the secret of the Old One. I, at any rate, am convinced

that He does not throw dice.

Einstein, Albert

Quoted in Ronald W. Clark’s

Einstein: The Life and Times (p. 340)

I can, if the worst comes to worst, still realize that God may have created

a world in which there are no natural laws. In short, a chaos. But that

there should be statistical laws with definite solutions, i.e., laws which

compel God to throw the dice in each individual case, I find highly

disagreeable.

Einstein, Albert

Quoted in Ronald W. Clark‘s

Einstein: The Life and Times (p. 340)

Acorns may be food for hogs or rise into magruficent oaks, as the dice

of chance decree.

Eldridge, Paul

Maxims for a Modern Man

1849

The first steps in Agriculture, Astronomy, Zoology (those first steps

which the farmer, the hunter, and the sailor take), teach that Nature’s

dice are always loaded; that in her heaps of rubbish are concealed sure

and useful results.

Emerson, Ralph Waldo

Nature

Discipline ( p . 38)

The dice of God are always loaded.

Emerson, Ralph Waldo

Essays

First Series

Compensation

It therefore seems that Einstein was doubly wrong when he said that

God does not play dice. Consideration of particle emission from black

holes suggests that God not only plays with dice but that he sometimes

throws them where they cannot be seen.

Hawking, S.

Nature

The Breakdown of Physics

Volume 257, 1975 (p. 362)

DICE 69

For dice will run the contrary way

As well is known to all who play. . .

Hood, Thomas

Miss Kilmansegg and Her Previous Leg

Her Misery

1. 2150

They need only adapt to the circumstances that old Lydian tradition

which says that games of chance were invented during great famine.

Men permitted themselves to eat only every second day, and tried to

forget their hunger by playing at draughts and dice.

Lang, Andrew

Lost Leaders

Winter Sports

Un Coup de dis jamis n’abolira le hasard.

[ A throw of the dice will never abolish chance.]

Mallarmt5, Stephane

Title of poem in Poems (p. 159)

Jacta alea est.

[The die is cast.]

Plu t arch

Plutarch‘s Lives

Caesar

One day in Naples the reverend Galiana saw a man from the Basilicata

who, shaking three dice in a cup, wagered to throw three sixes; and, in

fact, he got three sixes right away. Such luck is possible, you say. Yet the

man succeeded a second time, and the bet was repeated. He put back the

dice in the cup, three, four, five times, and each time he produced three

sixes. ‘Sangue di Bacco,’ exclaimed the reverend, ’the dice are loaded!’

And they were.

Polya, G.

Patterns of Plausible Inference (p. 74)

I hear the clackwho

cast the dice

on the bathroom tiles?

Ritsos, Yannis

Erotica

Small Suite in Red Major

70 STATlSTlCALLY SPEAKING

And by the hazard of the spotted die

Let die the spotted.

Shakespeare, William

The Complete Works of William Shakespeare

Timon of Athens

Act V, Scene 4,l. 34

King Richard. A horse! a horse! my kingdom for a horse!

Catesby. Withdraw, my lord; I'll help you to a horse.

King Richard. Slave, I have set my life upon a cast

And I will stand the hazard of the die:

I think there be six Richmonds in the field;

Five have I slain to-day instead of him.

A horse! a horse! my kingdom for a horse!

Shakespeare, William

The Complete Works of William Shakespeare

The Tragedy of King Richard the Third

Act V, Scene 4,l. 7

Midas in tesseris consultor optimus.

[Midas on the dice gives the best advice.]

Suidas

Collected Works of Erasmus

Adages I1 vii 1 to I11 iii 100 (p. 124)

We were shaken into existence, like dice from a box.

Wilder, Thomton

The Eighth Day

11, Illinois to Chile (p. 107)

I of dice possess the science,

And in numbers thus am skilled.

Williams, Monier

The Story of Nala

Book XX (p. 133)

DISTRIBUTIONS

A sea-fight must either take place to-morrow or not, but it is not

necessary that it should take place to-morrow, neither is it necessary

that it should not take place, yet it is necessary that it either should or

should not take place to-morrow.

Aristotle

On Interpretation

Chapter IX

Yet there are Writers, of a Class indeed very different from that of James

Bernoulli, who insinuate as if the Doctrine of Probabilities could have no

place in any serious Enquiry; and that Studies of this kind, trivial and

easy as they be, rather disqualify a man for reasoning on every other

subject. Let the Reader chuse.

de Moivre, Abraham

The Doctrine of Chances (p. 254)

The primary objects of the Gaussian Law of Error were exactly opposed,

in one sense, to those to which I applied them. They were to get rid of,

or to provide a just allowance for errors. But these errors or deviations

were the very thing I wanted to preserve and to know about.

Galton, Francis

Memories of M y Life

Chapter XX

It has been objected . . . that I pushed the application of the Law of

Frequency of Error somewhat too far. I may have done so . . . ; but I am

sure that, with the evidence before me, the applicability of that law is

more than justified within . . . reasonable limits.

Galton, Francis

Natural Inheritance

Schemes of Distribution and of Frequency (p. 44)

71

72 STATISTICALLY SPEAKING

Normality is a myth; there never has, and never will be, a normal

distribution.

Geary, R.C.

B iometrika

Testing for Normality

Volume 34, 1947 (p. 241)

If the prior distribution, at which I am frankly guessing, has little or no

effect on the result, then why bother; and if it has a large effect, then since

I do not know what I am doing how would I dare act on the conclusions

drawn?

Hamming, Richard W.

The Art of Probability for Scientists and Engineers (p. 298)

Which Bemoulli do you wish to see-‘Hydrodynamics’ Bemoulli,

’Calculus’ Bernoulli. ‘Geodesic’ Bemoulli. ‘Large Numbers’ Bemoulli or

‘Probability’ Bemoulli?

Harris, Sidney

What‘s So Funny about Science

Caption to Cartoon

. . . to quote a statement of Poincark, who said (partly in jest no

doubt) that there must be something mysterious about the normal law

since mathematicians think it is a law of nature whereas physicists are

convinced that it is a mathematical theorem.

Kac, Mark

Statistical lndependence in Probability Analysis and Number Theoy

Chapter 3, The Normal Law (p. 52)

A mathematician in Reno,

Overcome by the heat and the vino,

Became quite unroulli

Expounding Bemoulli,

And was killed by the crows playing Keno.

Kelly-Bootle, Stan

The Devil’s DP Dictiona y

A misunderstanding of Bernoulli’s theorem is responsible for one of

the commonest fallacies in the estimation of probabilities, the fallacy of

the maturity of chances. When a coin has come down heads twice in

succession, gamblers sometimes say that it is more likely to come down

tails next time because ‘by the law of averages’ (whatever that may mean)

the proportion of tails must be brought right some time.

Kneale, W.

Probability and Induction (p. 140)

DISTRIBUTIONS 73

It has become increasingly apparent over a period of several years

that psychologists, taken in the aggregate, employ the chi-square test

incorrectly.

Lewis, Don

Burke, C.J.

Psychological Bulletin

The Use and Misuse of the Chi-square Test

Volume 46, Number 6, November 1949 (p. 433)

Distribute dissatisfaction uniformly.

Lidberg, A.A.

Quoted in Paul Dickson’s

The OfFcial Explanations (p. B-21)

Les Expbimentateurs s’imaginent que c‘est un thiorhe de mathhatique, et

les mathhaticiens d‘itreun fait expkimental!

[Everybody believes in the [normal approximation], the experimenters

because they think it is a mathematical theorem, the mathematicians

because they think it is an experimental fact!]

Lippmann, G.

Quoted in DArcy Thompson’s

On Growth and Form

Volume I (p. 121)

I would therefore urge that people be introduced to [the logistic equation]

early in their mathematical education. This equation can be studied

phenomenologically by iterating it on a calculator, or even by hand.

Its study does not involve as much conceptual sophistication as does

elementary calculus. Such study would greatly enrich the student’s

intuition about nonlinear systems.

Not only in research but also in the everyday world of politics and

economics, we would all be better off if more people realized that

simple nonlinear systems do not necessarily possess simple dynamical

properties.

May, Robert M.

Nature

Simple Mathematical Models with very Complicated Dynamics

Volume 261, June 10,1976 (p. 467)

We know not to what are due the accidental errors, and precisely because

we do not know, we are aware they obey the law of Gauss. Such is the

paradox.

Poincark, Henri

The Foundations of Science

Science and Method (p. 406)

74 STATlSTlCALLY SPEAKING

Roger has tried to explain to her the V-bomb statistics: the difference

between distribution . . . She’s almost got it; nearly understands his

Poisson equation . . .

Pynchon, Thomas

Gravity‘s Rainbow (p. 54)

But a hardon, that’s either there, or it isn’t. Binary, elegant. The job of

observing it can even be done by a student.

Pynchon, Thomas

Gravity’s Rainbow (p. 84)

You have two chances-

One of getting the germ

And one of not.

And if you get the germ

You have two chances-

One of getting the disease

And one of not.

And if you get the disease

You have two chances-

One of dying

And one of not.

And if you die-

Well, you still have two chances.

Unknown

When you get an 8 on the midterm, there ain’t a curve in the world that

can save you.

Unknown

An exterminator made this contribution

On rats arriving in random profusion

”I know nothing of math,

Probability of stats,

But I handle ’em with Poisson distributions.”

unknown

Quoted in Amold 0. Allen’s

Probability, Statistics, and Queueing Theory with

Computer Science Applications (p. 86)

Keep your hyperexponential away from me!

unknown

Quoted in Amold 0. Allen‘s

Probability, Statistics, and Queueing Theory m’th

Computer Science Applications (p. 178)

DISTRIBUTIONS 75

Monique is exponentially distributed.

Unknown

Quoted in Arnold 0. Allen’s

Probability, Statistics, and Queueing Theory with

Computer Science Applications (p. 178)

Socrates took Poisson.

Unknown

Quoted in Arnold 0. Allen’s

Probability, Statistics, and Queueing Theory with

Computer Science Applications (p. 178)

The

normal

law of error

stands out in the

experience of mankind

as one of the broadest

generalizations of natural

philosophy. It serves as the guiding

instrument in researches in the physical

and social sciences and in medicine, agriculture and

engineering. It is an indispensable tool for the analysis and the

interpretation of the basic data obtained by observation and experiment.

Youden, W.J .

Experimentation and Measurement (p. 55)

See also

The American Statistician

April-May 1950 (p. 11)

ERROR

If frequently I fret and fume,

And absolutely will not smile,

I err in company with H u e ,

Old Socrates and T. Carlyle.

Adams, Franklin

Tobogganing on Pamassus

Erring in Company

One sufficiently erroneous reading can wreck the whole of a statistical

analysis, however many observations there are.

Anscombe, F.J.

Technometrics

Rejection of Outliers

Volume 2, 1960 (p. 226)

The problem of error has preoccupied philosophers since the earliest

antiquity. According to the subtle remark made by a famous Greek

philosopher, the man who makes a mistake is twice ignorant, for he

does not know the correct answer, and he does not know that he does

not know it.

Borel, b i l e

Probability and Certainty

Chapter 9 (p. 114)

For error and mistake are infinite,

But truth has but one way to be i’ th’ right.

Butler, Samuel

The Poetical Works

Miscellaneous Thoughts

1.114

76

ERROR 77

An error is simply a failure to adjust immediately from a preconception

to an actuality.

Cage, John

Silence 1961

45’ for a Speaker

No error at all! They were positively steeped in error!

Carroll, Lewis

The Complete Works of Lewis Carroll

A Tangled Tale

Pepys probably did not much increase his popularity in the Grafton by

getting Dartmouth to call for the dead-reckoning from twelve different

persons on board, especially as this was done before they sighted land.

Their errors were subsequently found to be very considerable--one was

as much as seventy leagues out! It is interesting to note that the inference

drawn from these discrepancies was that the chart must be wrong, and

it was corrected accordingly.

Chappell, Edwin

The Tangier Papers of Samuel Pepys (p. xxxviii)

Mal-information is more hopeless than non-information; for error is

always more busy than ignorance.

Colton, Charles Caleb

Lacon: or many things in a few words (p. 2)

Man, on the dubious waves of error toss’d.

Cowper, William

Cowper: Poetical Works

Truth

1. 1

0 mathematicians, throw light on this error.

da Vinci, Leonardo

The Notebooks of Leonardo da Vinci

Volume I

Philosophy (p. 64)

If someone made a mistake he would drawl, ”Hell that’s why they make

erasers.’’

Darrow, Clarence

Quoted in Irving Stone’s

Clarence Darrow for the Defense (p. 75)

Precision is expressed by an international standard, viz., the standard

error. It measures the average of the difference between a complete

78 STATISTICALLY SPEAKING

coverage and a long series of estimates formed from samples drawn

from this complete coverage by a particular procedure or drawing, and

processed by a particular estimating formula.

Deming, William Edwards

Journal of the American Statistical Association

On the Presentation of the Results of Sample Surveys as Legal Evidence

Volume 49, Number 268, December 1954 (p. 820)

Errors, like straws, upon the surface flow,

He who would search for pearls must dive below.

Dryden, John

The Poetical Works of D y d e n

All for Love, Prologue, 1. 25

However we define error, the idea of calculating its extent may appear

paradoxical. A science of errors seems a contradiction in terms.

Edgeworth, Francis Ysidro

Journal of the Royal Statistical Society

Volume 53 (p. 462)

Error is Prolific.

Erasmus, Desiderius

Epicureus

No error is harmless.

Evans, Bergen

The Natural H i s t o y of Nonsense

A Tale of a Tub

The phrase "Errors of the Second Kind", although apparently only a

harmless piece of technical jargon, is useful as indicating the type of

mental confusion in which it was coined.

Fisher, Sir Ronald A.

Journal of the Royal Statistical Society

Statistical Methods and Scientific Induction

Series B, Number 17, 1955 (p. 73)

It is doubtful if "Student" ever realized the full importance of his

contribution to the Theory of Errors. From correspondence with him

before the War . . . I should form a confident judgment that at that time

certainly he did not see how big a thing he had done . . . Probably he

felt, had the problem really been so important as it had once seemed, the

leading authorities in English statistics would have at least given him

the encouragement of recommending the use of his method; and better

still, would have sought to gain similar advantages in more complex

problems. Five years, however, passed without the writers in Biometrika,

ERROR 79

the joumal in which he had published, showing any sign of appreciating

the signrficance of his work. This weighty apathy must greatly have

chilled his enthusiasm . . . It was sixteen years before, in 1928, the system

of tests of which Student was the prototype was logically complete. Only

during the thirteen years which have since passed has “Student’s” work

found its proper place as an experiment resource.

Fisher, Sir Ronald A.

Annals of Eugenics

Student

Volume 9, 1939 (p. 5)

No vehement error can exist in this world with impunity.

Froude, James Anthony

Short Studies on Great Subjects

Spinoza

An error? What error?

Gilbert, W.S.

Sullivan, Arthur

The Complete Plays of Gilbert and Sullivan

The Pirates of Penance

Act I

Nature itself cannot err.

Hobbes, Thomas

Mathan

Part I, Chapter IV

The greatest follies are often composed, like the largest ropes, or a

multitude of strands.

Hugo, Victor

Les Miskrables

Cosette

Book V, Chapter 10

It sounds paradoxical to say the attainment of scientific truth has been

effected, to a great extent, by the help of scientific errors.

Huxley, Thomas H.

Method and Results

The Progress of Science (p. 63)

There is no greater mistake than the hasty conclusion that opinions are

worthless because they are badly argued.

Huxley, Thomas H.

Method and Results

Natural Rights and Political Rights (p. 369)

80 STATISTICALLY SPEAKING

. . . irrationally held truths may be more harmful than reasoned errors.

Hwley, Thomas H.

Collected Essays

The Coming of Age of ”The Origin of Species”

Volume I1

. . . quantities which are called mors in one case, may really be most

important and interesting phenomena in another investigation. When we

speak of eliminating error we really mean disentangling the complicated

phenomena of nature.

Jevons, W.S.

The Principles of Science

Chapter 15 (p. 339)

. . . When I make a mistake, it’s a beaut.

Manners, William

Patience and Fortitude (p. 219)

. . . the errors are not the art, but in the artifiers.

Newton, Sir Isaac

Mathematical Principles of Natural Philosophy

Preface to the First Edition

In those sciences of measurement which are the least subject to errormeteorology,

geodesy, and metrical astronomy-no man of self-respect

ever now states his results, without affixing to it its probable mor; and if

this practice is not followed in other sciences it is because in those the

probable errors are too vast to be estimated.

Peirce, Charles Sanders

Philosophical Writing of Peirce (p. 3)

A final word about the theory of errors. Here it is that the causes are

complex and multitude. To how many snares is not the observer exposed,

even with the best instruments.

Poincark, Henri

The Foundations of Science

Science and Method (p. 402)

The best may slip, and the most cautious fall;

He’s more than mortal that ne’er err’d at all.

Pomfret, John

The Poetical Works of John Pomfret

Love Triumphant over Reason

1. 145

ERROR 81

I will stand on, and continue to use, the figures I have used, because I

believe they are correct. Now, I’m not going to deny that you don’t now

and then slip up on something; no one bats a thousand.

Reagan, Ronald

Washington Post

On Bandwagon, Reagan Seeks to Stiffen Credibility Grip

20 April 1980 (A8)

Always expect to find at least one error when you proofread your own

statistics. If you don’t, you are probably making the same mistake twice.

Russell, Cheryl

Quoted in Tom Parker’s

Rules of Thumb (p. 124)

One cannot too soon forget his errors . . .

Thoreau, Henry David

Winter

9 Jan 1842

For the Bureau has worked hard to leam the accuracy of its

measurements and it supplies with each weight a certificate indicating

how much the weight may differ from exactly one pound. The calibration

of the weight is valuable just because its possible error is known. When

the Bureau of the Census makes an enumeration, there are errors, which

they acknowledge. They know the extent of the errors from many sources

and they try to leam more about those from others . . . It is far easier to

put out a figure, than to accompany the figure with a wise and reasoned

account of its liability to systematic and fluctuating errors. Yet if the figure

is . . . to serve as the basis of an important decision, the accompanying

amount may be more important than the figures themselves.

Tukey, John W.

The American Statistician

Memorandum on Statistics in the Federal Government

Volume 3, Number 5, February 1949 (p. 9)

A Type I11 error is a good solution to the wrong problem.

Unknown

A Type IV error is a wrong solution to the wrong problem.

Unknown

A standard error is just as bad as any other error.

Watson, Alfred N.

Statement made at a meeting of the American Statistical

Association, Chicago, 1942

82 STATISTlCA L LY S P EAKlNG

There is great room for error here.

Whitehead, Alfred North

Science and the Modern World

Chapter I1

The dice of God me always loaded.

Ralph Waldo Bhnerrron - (See p. 68)

EXPERIMENT

But the method of experiment which men now make use of is blind and

stupid: and so, while they wander and stray without any certain way, but

only take counsel from the Occurrence of circumstances, they are carried

about to many points, but advance little; . . .

Bacon, Francis

The Nmum Organon

First Book, 70

If an experiment works, something has gone wrong.

Bloch, Arthur

Murphy‘s Law

Finangle’s First Law (p. 15)

The experiment may be considered a success if no more than 50% of the

observed measurements must be discarded to obtain a correspondence

with the theory.

Bloch, Arthur

Murphy‘s Law

Maier’s Law: Corollary (p. 47)

Just an experiment first, for candour’s sake.

Browning, Robert

The Poems and Plays of Robert BrDwning

Mr. Sludge, ’The Medium’

La Experiencia madre es de la ciencia.

[Experiment is the mother of science.]

Cahier, Charles

Quelques Six Mille Prmerbes (p. 248)

“This is the most interesting Experiment” the Professor announced. ”It

will need time, I’m afraid: but that is a trifling disadvantage. Now

83

84 STATISTICALLY SPEAKlNG

observe. If I were to unhook this weight, and let go, it would fall to

the ground. You do not deny that?"

Nobody denied it.

"And in the same way, if I were to bend this piece of whalebone round

the post-thus-and put the ring over this hook-thus-it stays bent:

but, if I unhook it, it straightens itself again. You do not deny that?"

Again, nobody denied it.

"Well, now suppose we left things as they are, for a long time. The force

of the whalebone would get exhausted, you know, and it would stay bent,

even when you unhooked it. Now, why shouldn't the same thing happen

with the weight. The whalebone gets so used to being bent, that it ca'n't

straighten itself any more. Why shouldn't the weight get so used to being

held up, that it ca'n't fall any more? That's what I want to know!"

"That's what we want to know!" echoed the crowd.

"How long must we wait?" grumbled the Emperor.

The Professor looked at his watch. "Well, I think a thousand years will

do to begin with,. . .'I

Carroll, Lewis

The Complete Works of Lewis Carroll

Sylvie and Bruno Concluded

Chapter XXI

The statistician who supposes that his main contribution to the planning

of an experiment will involve statistical theory, finds repeatedly that

he makes his most valuable contribution simply by persuading the

investigator to explain why he wishes to do the experiment, by

persuading him to justdy the experimental treatments, and to explain

why it is that the experiment, when completed, will assist him in his

research.

Cox, Gertrude M.

Lecture in Washington, 11 January 1951

If you knew some of the experiments (if they may be so-called) which I

am trying, you would have a good right to sneer, for they are so absurd

even in my opinion that I dare not tell you.

Darwin, Charles

The Life and Letters of Charles Darwin

Volume I

C. Darwin to J.D. Hooker

[April 14th, 18551 (p. 415)

WE MUST KNOW MORE ABOUT A PLAN THAN THE PROBABILITIES

OF SELECTION. WE MUST KNOW ALSO THE PROCEDURE BY

EXPERIMENT 85

WHICH TO DRAW THE SAMPLING UNITS, AND THE FORMULA OR

PROCEDURE BY WHICH TO CALCULATE THE ESTIMATE.

Deming, William Edwards

Sampling Design in Business Research (p. 39)

Those who fear muddy feet will never discover new paths.

Eldridge, Paul

Maxims for a Modern Man

1286

Do not be too timid and squeamish about your actions. All life is an

experiment. The more experiments the better.

Emerson, Ralph Waldo

Journals of Ralph Waldo Emerson

. . . the null hypothesis is never proved or established, but is possibly

disapproved, in the course of experimentation. Every experiment may

be said to exist only in order to give the facts a chance of disproving the

null hypothesis.

Fisher, Sir Ronald A.

The Design of Experiments (p. 19)

To consult the statistician after an experiment is finished is often merely

to ask him to conduct a post mortem examination. He can perhaps say

what the experiment died of.

Fisher, Sir Ronald A.

Sankya

Indian Statistical Congress, ca 1938

Volume 4 (p. 17)

There are some things that are sure to go wrong as soon as they stop

going right.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 171)

No experiment can be more precarious than that of a half-confidence.

Godwin, William

St. Leon; A Tale of the Sixteenth Centuy (p. 140)

. . . it being justly esteemed an unpardonable temerity to judge the whole

course of nature from one single experiment, however accurate or certain.

Hume, David

An Enqui y Concerning Human Understanding

-ion VI1 (p. 77)

86 STATISTICALLY SPEAKING

Why think? Why not try the experiment?

Hunter, John

Letter to Edward Jenner, August 2, 1775

Ancient traditions, when tested by the severe processes of modem

investigation, commonly enough fade away into mere dreams: but it

is singular how often the dream tums out to have been a half-waking

one, presaging a reality.

Huxley, Thomas H.

Man's Place in Nature

I (p. 1)

Hiawatha Designs an Experiment

Kendall, Maurice G.

The American Statistician

Hiawatha Designs an Experiment

Volume 13, Number 5, December 1959 (pp. 23-4)

. . . in the full tide of successful experiment . . .

Jefferson, Thomas

The Inaugural Addresses of the Presidents of the United States

First Inaugural Address at Washington DC, March 4, 1801

. . . theory is a good thing but a good experiment lasts forever.

Kapitza, Pyetr Leonidovich

Nature

Science East and West: Reflections of Peter Kapitza

(Book Review by Nevill Mott)

Volume 288,ll December 1980 (p. 627)

Every experiment is like a weapon which must be used in its particular

way-a spear to thrust, a club to strike. Experimenting requires a man

who knows when to thrust and when to strike, each according to need

and fashion.

Paracelsus, Philippus Aureolus

Surgeon's Book

If one wishes to obtain a definite answer from Nature one must attack

the question from a more general and less selfish point of view.

Planck, Max

A Survey of Physics

The Unity of the Physical Universe (p. 15)

EXPERIMENT 87

Polus. 0 chaerephon, there are many arts among mankind which are

experimental, and have their origin in experience, for experience makes

the days of men to proceed according to art, and inexperience according

to chance, and different persons in different ways are proficient in

different arts, and the best persons in the best arts.

Plato

Gorgias

448

Experiment is the sole source of truth. It alone can teach us something

new; it alone can give us certainty.

Poincar6, Henri

The Foundations of Science

Science and Hypothesis (p. 127)

It is often said that experiments must be made without preconceived

ideas. That is impossible. Not only would it make all experiment barren,

but that would be attempted which could not be done.

PoincarC, Henri

The Foundations of Science

Science and Hypothesis (p. 129)

If your experiment needs statistics, you ought to have done a better

experiment.

Rutherford, Ernest

Quoted in N.T. Bailey’s

The Mathematical Approach to Biology and Medicine

Chapter 2 (p. 23)

Prove all things; hold fast that which is good.

The Bible

1 Thessalonians 5:21

Tuesday. She has taken up with a snake now. The other animals are glad,

for she was always experimenting with them and bothering them; and I

am glad, because the snake talks, and this enables me to get a rest.

Twain, Mark

Adam’s Diary

88 STATISTICALLY SPEAKING

The Eleven Phases of an Experiment

1. Wild enthusiasm

2. Exciting commitments

3. Total confusion

4. Re-evaluation of goals

5. Disillusionment

6. Cross-accusations

7. Search for the guilty

8. Punish the innocent

9. Promote the non-participants

10. Verbally assassinate visible leaders

11. Write and publish the report

Unknown

Diversity of treatment has been responsible for much of the criticism

leveled against the experiment.

Unknown

No experiment is ever a complete failure. It can always be used as a bad

example.

Unknown

You must be using the wrong equipment if an experiment works.

Unknown

If an experiment is not worth doing at all, it is not worth doing well.

Unknown

Allow me to express now, once and for all, my deep respect for the work

of the experimenter and for his fight to wring signrficant facts from an

inflexible Nature, who says so distinctly "No" and so indistinctly "Yes"

to our theories.

Weyl, Hermann

The Theory of Groups and Quantum Mechanics

Introduction ( p . xx)

. . . experiment is nothing else than a mode of cooking the facts for the

sake of exemphfying the law.

Whitehead, Alfred North

Adventures of Ideas

Foresight

Section I

FACTS

From dreams I proceed to facts.

Abbott, Edwin A.

Flafland (p. 68)

The facts seemed certain, or at least as certain as other facts; all they

needed was explanation.

Adams, Henry

The Education of Henry A d a m

The Abyss of Ignorance (p. 435)

Entrenching himself behind an undeniable fact.

Alcott, Louisa May

Little Women

XXXV

. . . with a true view all the data harmonize, but with a false one the

facts soon clash.

Aristotle

The Nicomchean Ethics

Book I, Chapter VI11

Deny the facts altogether, I think, he hardly can.

Amold, Matthew

Discourse in America

Literature and Science (p. 101)

"Well facts are facts," said Tiilly sulkily.

"So they are, and figures are figures. Stop subtracting the date and get

with it."

Balchin, Nigel

The Small Back Room (p. 24)

89

90 STATlSTlCALLY SPEAKING

”Am I supposed to give all the facts, or some of the facts, or my opinions

or your opinions or what?”

Balchin, Nigel

The Small Back Room (p. 53)

Facts were never pleasing to him. He acquired them with reluctance and

got rid of them with relief. He was never on terms with them until he

had stood them on their heads.

Barrie, Sir J.M.

The Greenwood Hat

Love me Never or Forever (pp. 50-51)

To an ordinary person a fact is a fact, and that is all there is to be said

about it.

Barry, Frederick

The Scientific Habit of Thought (p. 91)

A fact is no simple thing.

Barry, Frederick

The Scientific Habit of Thought (p. 91)

Facts are to begin with, coercive.

Barry, Frederick

The Scientific Habit of Thought (p. 92)

In science one must search for ideas. If there are no ideas, there is no

science. A knowledge of facts is only valuable in so far as facts conceal

ideas: facts without ideas are just the sweepings of the brain and the

memory.

Belinski, Vissarion Grigorievich

Collected Works

Volume 2 (p. 348)

If the facts used as the basis for reasoning are ill-established or erroneous,

everything will crumble or be falsified; and it is thus that errors in

scientific theories most often originate in errors of fact.

Bernard, Claude

An Introduction to the Study of Expm’mental Medicine ( p . 13)

Facts are neither great or small in themselves.

Bernard, Claude

An Introduction to the Study of Expm‘mental Medicine (p. 34)

FACTS 91

A fact is nothing in itself, it has value only through the idea connected

with it or through the proof it supplies.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 53)

It is a statistikal fakt, that the wicked work harder tew reach Hell, than

the righteous do tew git to heaven.

Billings, Josh

Old Probability: Perhaps Rain-Perhaps Not

April 1870

This plain, plump fact.

Browning, Robert

The Poems and Plays of Robert Browning

Mr. Sludge, ’The Medium’

But facts are facts and flinch not.

Browning, Robert

The Ring and the Book

Part I1

Half-Rome, 1. 1049

. . . in the long run there is no contending against facts; it is useless to

“kick against the pricks”.

Buchner, Ludwig

Force and Matter

Preface to the First Edition (p. vi)

But enough of facts!

Buchner, Ludwig

Force and Matter

Brain and Mind (p. 231)

Plain matters of fact are terrible stubbom things.

Budgell, Eustace

Liberty and Progress

ii, 76

Facts are chiels that winna ding an’ downa be disputed.

[Facts are entities which cannot be manipulated or disputed.]

Burns, Robert

The Complete Poetical Works of Robert Bums

A Dream, 1.30

92 STATlSTZCALLY SPEAKlNG

I grow to honor facts more and more, and theory less and less. A fact, it

seems to me, is a great thing-a sentence printed, if not by God, then at

least by the Devil.

Carlyle, Thomas

Letter to Ralph Waldo Emerson, April 29, 1836

First accumulate a mass of Facts: and then construct a Theory.

Carroll, Lewis

The Complete Works of Lewis Carroll

Sylvie and Bruno

Queer Street, Number Forty

The Theory hardly rose to the dignity of a Working Hypothesis. Clearly

more Facts were needed.

Carroll, Lewis

The Complete Works of Lewis Carroll

Sylvie and Bruno

Queer Street, Number Forty

Some facts are so incredible that they are believed at once, for no one

could possibly have imagined them.

Clarke, Arthur C.

The Lost Worlds of 2001

Chapter 30

Every lawyer knows that the name of the game is what label you succeed

in imposing on the facts.

Cohen, Jerome

Time

Tense Triangle-What to Do About Taiwan

June 7, 1971 (p. 24)

They demand facts from him, as if facts could explain anything.

Conrad, Joseph

Lord Jim

IV

The language of facts, that are so often more enigmatic than the craftiest

arrangement of words.

Conrad, Joseph

Lord Jim

XXXVI

Facts make life long-not years.

Crawford, F. Marion

Don Orsino xv

FACTS 93

The trouble with facts is that there are so many of them.

Crothers, Samuel McChord

The Gentle Reader (p. 183)

Now, what I want are facts . . . Facts alone are wanted in life.

Dickens, Charles

The Work of Charles Dickens

Hard Times

Book I, Chapter I

In this life we want nothing but Facts, sir, nothing but Facts.

Dickens, Charles

The Work of Charles Dickens

Hard Times

Book I, Chapter 1

The labors of others have raised for us an immense reservoir of important

facts.

Dickens, Charles

The Work of Charles Dickens

Pickwick Papers

Chapter 4 (p. 46)

Facts and Figures! Put ‘em down.

Dickens, Charles

The Work of Charles Dickens

The Chimes: First Quarter

With fuller knowledge we should sweep away the references to

probability and substitute the exact facts.

Eddington, Sir Arthur Stanley

The Nature of the Physical World (p. 305)

I am absolutely convinced that one will eventually arrive at a theory in

which the objects connected by laws are not probabilities, but conceived

facts.

Einstein, Albert

Letter to Max Bom

December 3,1947

We hew and saw and plane facts to make them dovetail with our

prejudices, so that they become mere omaments with which to parade

our objectivity.

Eldridge, Paul

Maxims for a Modern Man

2098

94 STATISTICALLY SPEAKING

Combining superstition with facts is often as efficacious as breaking rocks

with fists.

Eldridge, Paul

Maxims for a Modem Man

2159

Facts only emphasize that men are guided by fancies.

Eldridge, Paul

Maxims for a Modem Man

2168

You seem to have a decided faculty for digestingfucts as evidence.

Eliot, George

The George Eliot Letters

Volume I1 (p. 205)

Facts are stubborn things.

Eliott, Ebenezer

Field Husbandry (p. 35)

No facts are to me sacred; none are profane; I simply experiment, an

endless seeker, with no Past at my back.

Emerson, Ralph Waldo

Essays

Circles (p. 297)

No anchor, no cable, no fences avail to keep a fact a fact.

Emerson, Ralph Waldo

Essays

History (p. 14)

I distrust the facts and the inferences.

Emerson, Ralph Waldo

Essays

Experience (p. 57)

A little fact is worth a whole limbo of dreams . . .

Emerson, Ralph Waldo

Lectures and Biographical Sketches

The Superlative

Facts are not scienceas the dictionary is not literature.

Fabing, Harold

Mar, Ray

Fischerisms (p. 21)

FACTS 95

We may make our own opinions, but facts were made for us; and, if we

evade or deny them, it will be the worse for us.

Froude, James Anthony

Short Studies on Great Subjects

Times of Erasmus, Desderius and Luther (p. 41)

The necessitarian fall back upon the experienced reality of facts.

Froude, James Anthony

Short Studies on Great Subjects

Calvinism (p. 11)

These are facts which no casuistry can explain away.

Froude, James Anthony

Short Studies on Great Subjects

Calvinism (p. 11)

It is through a conviction of the inadequacy of all formulas to cover the

facts of nature, it is by a constant recollection of the fallibility of the best

instructed intelligence, and by an unintermittent skepticism which goes

out of its way to look for difficulties, that scientific progress has been

made possible.

Froude, James Anthony

Short Studies on Great Subjects

The Grammar of Assent (pp. 89-90)

Facts are no longer looked in the face, and objections are either ignored

altogether or are caricatured in order to be answered.

Froude, James Anthony

Short Studies on Great Subjects

The Grammar of Assent (p. 99)

Facts can be accurately known to us only by the most rigid observation

and sustained and scrutinizing skepticism. . .

Froude, James Anthony

Short Studies on Great Subjects

Scientific Method Applied to History (p. 453)

4th VOICE. Let’s get the facts. Let’s go and watch TV.

Garson, Barbara

MacBird

Act I, Scene VI1 (p. 18)

96 STATISTICALLY SPEAKING

Her taste exact

For faultless fact

Amounts to a disease.

Gilbert, W.S.

Sullivan, Arthur

The Complete Plays of GiZbert and Sullivan

The Mikado

Act I1

The acts and facts of to-day continually diverge from the concepts of

yesterday.

Gilman, Charlotte P.

Human Work

Concept and Conduct (p. 41)

”And of what possible use is that information?” Kerk asked.

“Well, you never know; might come in handy.”

Harrison, Harry

Astounding

The Mothballed Spaceship (p. 212)

What are the facts? Again and again and again-what are the facts?

Shun wishful thinking, ignore divine revelation, forget what ”the stars

foretell”, avoid opinion, care not what the neighbors think, never mind

the unguessable ”verdict of history”-what are the facts, and how many

decimal places? You pilot always into an unknown future; facts are your

single clue. Get the facts!

Heinlein, Robert A.

Time Enough f i r Lave (p. 264)

The more facts one has, the better the judgment one can make, but one

must never forget the corollary that the more facts one has, the easier it

is to put them together wrong.

Heyworth, Sir Geoffrey

Inaugural Address

President of the Royal Statistical Society

1949

All generous minds have a horror of what are commonly called ”facts”.

They are the brute beasts of the intellectual domain.

Holmes, O.W.

The Autocrat of the Brealgfast Table

Chapter 1

FACTS 97

Absolute, preemptory facts are bullies and those who keep company

with them are apt to get a bullying habit of mind . . .

Holmes, O.W.

The Autocrat of the BreaYast Table

Chapter 3

Facts always yield the place of honor in conversation, to thoughts about

facts; but if a false note is uttered, down comes the finger on the key and

the man of facts asserts his true dignity.

Holmes, O.W.

The Autocrat of the BreaYast Table

Chapter 6

”The ideal reasoner,” he remarked, “would, when he has once been

shown a single fact in all its bearings, deduce from it not only all the

chain of events which led up to it, but also all the results which would

follow from it . . .”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Five Orange Pips

“I find it hard enough to tackle facts, Holmes, without flying away after

theories and fancies.”

”You are right,” said Holmes demurely; “you do find it very hard to

tackle the facts.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Boscombe Valley Mystery

There is nothing more deceptive than an obvious fact.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Boscombe Valley Mystery

If you will find the facts, perhaps others may find the explanation.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Problem of Thor Bridge

98 STAT1STICALL.Y SPEAKING

A further knowledge of facts is necessary before I would venture to give

a final and definite opinion.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of Wisteria Lodge, I

”I should have more faith,” he said; ”I ought to know by this time that

when a fact appears to be opposed to a long train of deductions, it

invariably proves to be capable of bearing some other interpretation.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

A Study in Scarlet

Facts are ventriloquists’ dummies. Sitting on a wise man’s knee they may

be made to utter words of wisdom; elsewhere they say nothing or talk

nonsense . . .

Huxley, Aldous

Time Must Have a Stop (p. 301)

Facts do not cease to exist because they are ignored.

Huxley, Aldous

Proper Studies

A Note on Dogma (p. 205)

. . . he had one eye upon fact, and the other on Genesis.

Huxley, Thomas H.

Methods and Results

The Progress of Science (p. 127)

Those who refuse to go beyond fact rarely get as far as fact.

Huxley, Thomas H.

Methods and Results

The Progress of Science (p. 62)

The fatal futility of Fact.

James, Henry

The Spoils of Poynton

Preface

I have to forge every sentence in the teeth of irreducible and stubbom

facts.

James, William

Letter to brother Henry James

FACTS 99

Just statin’ eevidential facts beyon’ all argument.

Kipling, Rudyard

Rudyard Kipling’s Verse

McAndrew’s Verse

An impartial and reliable research substitutes facts for hunches.

Kratovil, Robert

Real Estate Law (p. 419)

Facts are stubbom things.

LaSage, Alan Rent5

The Adventure of Gil Blas of Santillane

Book X , Chapter I

The ultimate umpire of all things in Life is-Fact.

Laut, Agnes C.

The Conquest of the Great Northwest

Part 111, Chapter XX (p. 391)

The method of how psychologists as scientists dispose of facts is of

special interest. One of the most common is to give the facts a new

name. In this way they are given a special compartment and therefore

cease to infringe on the privacy of the theory.

Maier, N.R.F.

The American Psychologist

Maier‘s Law

March 1960 (p. 208)

If the facts do not conform to the theory, they must be disposed of.

Maier, N.R.F.

The American Psychologist

Maier’s Law

March 1960 (p. 208)

To all facts there are laws,

The effect has its cause, and I mount to the cause.

Meredith, Owen (Lord Lytton)

Lucile

Part 11, canto iii, stanza 8

What you want are facts, not opinions-

Nightingale, Florence

Notes on Nursing

Chapter XI11

100 STATISTICALLY SPEAK"

Facts are carpet-tacks under the pneumatic tires of theory.

OMalley, Austin

Keystones of Thought

. . . when technical people talk they always emphasize the facts that they

are not sure.

Oppenheimer, Julius Robert

Harper's Magazine

The Tree of Knowledge

Volume 217, October 1958 (p. 57)

When five days later the Morning Star has lifted up its radiance bright

from out the ocean waves, then is the time that spring begins. But yet

be not deceived, cold days are still in store for thee, indeed they are:

departing winter leaves behind great tokens of himself.

[Believe the facts]

Ovid

Fasti

11, 1. 149

I'm not afraid of facts. I welcome facts-but a congeries of acts is not

equivalent to an idea. This is the essential fallacy of the so-called "scientific"

mind. People who mistake facts for ideas are incomplete thinkers; they

are gossips.

Ozick, Cynthia

Quoted in Francis Klagsbrun's

The First Ms. Reader

We are the Crazy Lady and Other Feisty Feminist Fables (p. 67)

Leam, compare, collect facts.

Pavlov, Ivan

Bequest of the Academic Youth of Soviet Russia

1936

Gross's Postulate. Facts are not all equal. There are good facts and bad

facts. Science consists of using good facts.

Peers, John

2001 Logical Laws (p. 35)

Res ipse laquitur

[The fact speaks for itself]

Phrase, Latin

FACTS 101

The facts are to blame my friend. We are all imprisoned by facts.

Pirandello, Luigi

The Rules of the Game, The Life I Gave you land1 Lnzarus

Nothing is more interesting to the true theorist than a fact which directly

contradicts a theory generally accepted up to that time, for this is his

particular work.

Planck, Max

A Survey of Physics

New Path of Physical Knowledge (pp. 72-3)

Res ipsa testit.

[Facts speak for themselves.]

Plautus

Aulularia

1, 421

see also Aldous Huxley’s

Time Must Have a Stop (p. 301)

The facts of greatest outcome are those we think simple; may be they

really are so, because they are influenced only by a small number of welldefined

circumstances, may be they take on an appearance of simplicity

because the various circumstances upon which they depend obey the

laws of chance and so come to mutually compensate.

PoincarC, Henri

The Foundations of Science

Science and Method (pp. 544-5)

. . . the most interesting facts are those which may serve many times;

these are the facts which have a chance of coming up again. We have

been so fortunate as to be born in a world where there are such.

Poincark, Henri

The Foundations of Science

Science and Method (p. 363)

Science is built up with facts, as a house is with stones. But a collection

of facts is no more a science than a heap of stones is a house.

PoincarC, Henri

The Foundations of Science

Science and Hypothesis (p. 127)

A fact is a fact.

PoincarC, Henri

The Foundations of Science

Science and Hypothesis (p. 128)

102 STATISTICALLY S P E A K "

I beg to advise you of the following facts of which I happen to be the

equally impartial and horrified witness.

Queneau, Raymond

Exercises in Style

Official Letter

But it was a fact-not a theory, not a hypothesis, but a fact-that she

was attracted, that she did trust, that she did believe.

Roberts, Nora

Without a Trace

Chapter 5 (p. 104)

With solid facts on hand one may have only one undisputed explanation;

with no facts, there can be a dozen argumentative ones.

Romanoff, Alexis L.

Encyclopedia of Thoughts

Aphorisms

241 1

Facts were facts, fantasies were fantasies. And never the twain should

meet.

Ross, JoAnn

Tempting Fate

Chapter One

Science, as its name implies, is primarily knowledge; by convention it is

knowledge of a certain kind, the kind namely, which seeks general laws

connecting a number of particular facts.

Russell, Bertrand A.

The Scientific Outlook

Introduction

One of the chief motivations behind the attempt to defend a distinction

between theoretical and observational terms has been the desire to

explain how a theory can be tested against the data of experience, and

how one theory can be said to "account for the facts" better than another;

that is, to give a precise characterization of the idea, almost universally

accepted in modem times, that the sciences are "based on experience,"

that they are "empirical".

Shapere, Dudly

Philosophical Problems of Natural Science (p. 15)

FACTS 103

Putiokim: In Russia we face facts.

Edstaston: In England, sir, a gentleman never faces any facts if they are

unpleasant facts.

Putiokim: In real life, all facts are unpleasant.

Shaw, George Bernard

Complete Plays with Prefaces

Volume IV

Great Catherine

Scene I

A mere fact will never stop an Englishman.

Shaw, George Bernard

Speech, October 28, 1930

. . . the facts, the stubbom, immovable facts.

Smedley, F.E.

Frank Fairlegh or Scenes from the Life of a Private Pupil

Chapter 49

Facts are facts, as the saying is.

Smollett, Tobias

The Life and Adventures of Sir Latincelot Greaves

Chapter III

Comment is free but facts are on expense.

Stoppard, Tom

Night and Day

Act 2

Facts speak louder than statistics.

Streatfield, Mr. Justice Geoffrey

The Observer

Sayings of the Week, 19 March, 1950

Let us look at the facts.

Terence

Adelphoe

1. 796

Matters of fact, which as Mr. Budgell somewhere observes, are very

stubbom things.

Tindall, Matthew

The Will of Matthew Tindall (p. 23)

104 STATISTICALLY SPEAK”

Get your facts first, and then you can distort them as much as you please.

Twain, Mark

Quoted in Rudyard Kipling’s

From Sea to Sea

An Interview with Mark Twain

My mind is made up, do not confuse me with facts.

unknown

We want the facts to fit the preconceptions. When they don’t, it is easier

to ignore the facts than change the preconceptions.

West, Jessamyn

The Quaker Reader

Introduction (p. 2)

No matter of fact can be mathematically demonstrated, though it may

be proved in such a manner as to leave no doubt on the mind.

Whatley, Richard

Logic

IV

It was an ultimate fact.

Whitehead, Alfred North

Science and the Modern World

Chapter I11

They remain ’stubbom fact’ . . .

Whitehead, Alfred North

Adventures of Ideas

Philosophic Method

Section XVII

But a fact ‘contrary’ is consciousness in germ . . . Consciousness requires

more than the mere entertainment of theory. It is the feeling of the

contrast of theory, as mere theory with fact, as mere fact. This contrast

holds whether or not the theory is correct.

Whitehead, Alfred North

Process and Reality

Part I1

Discussions and Applications

Propositions

Section I

FACTS 105

A chain of facts is like a barrier reef. On one side there is wreckage, and

beyond it harbourage and safety.

Whitehead, Alfred North

Process and Reality

Part I11

The Theory of Prehensions

The Theory of Feelings

Section IV

There is nothing in the real world which is merely an inert fact . . I

Whitehead, Alfred North

Process and Reality

The Theory of Extension

Part IV

Facts fled before philosophy like frightened forest things.

Wilde, Oscar

The Picture of Dorian Gray

I11

?

ITS A HOUSE!

Science is built up with facts, aa a house is with stones.

But a collection of facts is no more a science than a heap

of stones is a house.

H d pO inau4 - (See p. 101)

FORECAST

Foreknowledge of the future makes it possible to manipulate both

enemies and supporters.

Aron, Raymond

The Opium of the Intellectuals

Chapter IX (p. 284)

How could one haruspex look another in the face without laughing?

Cicero

Cicero: De Senectute, De Amicitia, De Divinatione

De Divinatione

ii, 24

Forecasting in economics is an activity fully licensed in the City of

Action and the City of Intellect. Sought and subsidized by executives

in govemment and business, it is also recognized and accredited by the

universities. For it to attain so remarkable a status, two suspicions had to

be overcome: that of men of action "the speculative views of intellectuals

who lack any experience of reality"; and that, even stronger, of men

of learning about "intellectual adventurism which discredits science by

going beyond the established facts".

de Jouvenel, Bertrand

The Art of Conjecture @. 179)

Forecasting is very difficult, especially about the future.

Fiedler, Edgar R.

Across the Bwrd

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

106

FORECAST 107

He who lives by the crystal ball soon leams to eat ground glass.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

The moment you forecast you know you’re going to be wrong, you just

don’t know when and in which direction.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

The herd instinct among forecasters makes sheep look like independent

thinkers.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

When you know absolutely nothing about the topic, make your forecast

by asking a carefully selected probability sample of 300 others who don’t

know the answer either.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

If you have to forecast, forecast often.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

I know of no way of judging the future but by the past.

Henry, Patick

Speech at Second Virginia Convention, March 23, 1775

It appears to me a most excellent thing for the physician to cultivate

Prognosis; for by foreseeing and foretelling, in the presence of the sick,

the present, the past, and the future, and explaining to omissions which

patient have been gudty of, he will be the more readily believed to be

acquainted with the circumstances . . .

Hippocrates

The Book of Prognostics

1

108 STATISTICALLY SPEAKING

Nearly every inference we make with respect to any future event is more

or less doubtful. If the circumstances are favorable, a forecast may be

made with a greater degree of confidence than if the conditions are not

so disposed.

Mellor, J.W.

Higher Mathematics for Students of Chemistry and Physics

Probability and Theory of Errors (p. 498)

We are making forecasts with bad numbers, but bad numbers are all

we've got.

Penjer, Michael

The New York Times

September 1,1989

It is far better to foresee even without certainty than not to foresee at all.

Poincark, Henri

The Foundations of Science

Science and Hypothesis (p. 129)

Qui bene conjiciet, hunc vatem.

[He who guesses right is the prophet.]

Proverb, Greek

A forecast is a forecast is a forecast. What if an important new trend

developed? All the possibilities were considered three months ago, and

it's too late to discuss any further changes in this year's projections.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

He's fed in enough data for a dozen forecasts-let the electronic brains

do the rest. While the THINK machines grind out prophecies, he can

relax and contemplate the cosmos.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

His forecasts could have been presented at the deadline date-but he's

held it up six weeks waiting for information which will clear up one

"crucial" point-crucial only to him.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

FORECAST 109

Will he ever be able to correlate all these facts into one forecast that makes

sense? What does it matter? He’s just obtained a new and exclusive figure

on discretionary consumer income in Hudson N.Y.-and he’s sublimely

Strong, Lydia

Management Rm’ew

Sales Forecasting: Problems and Prospects

September 1956

happy.

Two plus two is four? Not to this forecaster. He knows the sales manager

(who hired him) wants a different answer.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

The charts rustle as the wind murmurs through the sacred grove. The

high priest interprets the prophecy to the waiting supplicant. Business

will improve, he says . . . unless it takes a tum for the worse.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

Why fool around with market research? Why try to correlate economic

indicators? The correct prediction will strike suddenly-like a bolt from

the blue.

Strong, Lydia

Management Review

Sales Forecasting: Problems and Prospects

September 1956

“You’ve got a tough job ahead of you,’’ the manager told the new

employee in the research department. “Our president respected the guy

you’re replacing and had great faith in his forecasting abilities.”

“Was he a statistician?” the employee asked.

”In a way. He used to hang around the lunchroom and read coffee

grounds.”

Thomsett, Michael C.

The Little Black Book of Business Statistics (p. 140)

110 STATISTICALLY SPEAKING

It is said that the present is pregnant with the future.

Voltaire

The Portable Voltaire

Philosophical Dictionary

Concatenation of Events

Men have always valued the ability to predict future events, for those

who can predict events can guard against them.

Walker, Marshall

The Nature of Scientific Thought (p. 2)

GAMBLING

Gambling is increasing beyond what you could imagine. ’Pitch-and-toss’

is too dull: all must bet; women as well as men. Bookies stand about and

meet men as they go to and from their work.

Booth, Charles

Charles Booth’s London (p. 336)

In moderation, gambling possesses undeniable virtues. Yet it presents

a curious spectacle replete with contradictions. While indulgence in its

pleasures has always lain beyond the pale of fear of Hell’s fires, the great

laboratories and respectable insurance palaces stand as monuments to a

science originally born of the dice cup.

Kasner, Edward

Newman, James

Mathematics and the lmagination (p. 239)

People don’t like to choose #1 in a lottery. ‘Choose it,’ Reason cries

loudly. ‘It has as good a chance of winning the 12,000 thalers as any

other.’ ’In Heaven’s name don’t choose it,’ a je ne sais 9uoi whispers.

’There’s no example of such little numbers being listed before great

winnings.‘ And actually no one takes it.

Lichtenberg, Georg

Lichtenberg: Aphorisms 6 Letters

Aphorisms (p. 46)

There are three roads to ruin; women, gambling and technicians. The

most pleasant is with women, the quickest is with gambling, but the

surest is with technicians.

Pompidou, Georges

Sunday Telegraph

26 May 1968

111

112 STATISTICALLY SPEAKING

He felt the table was having a run of bad luck, but he knew. Gronevelt

would never accept that explanation. Gronevelt believed that the house

could not lose over the long run, that the laws of percentage were

not subject to chance. As gamblers believed mystically in their luck so

Gronevelt believed in percentages.

Puzo, Mario

Fools Die: A Novel

Chapter 17 (pp. 187-8)

How could one haMlspex look another in the face without laughing?

Ciaetro - (See p. 106)

GRAPHICS

Every picture tells a story.

Advertisement for Doan’s Backache Kidney Pills

One picture is worth ten thousand words.

Advertisement for Royal Baking Powder

Printers Ink

Volume 138,lO March 1927

When graphing a function, the width of the line should be inversely

proportional to the precision of the data.

Albinak, Marvin J.

Quoted in Paul Dickson’s

The Official Explanations (p. A-3)

”I’ll give you a graphic display,” Gerhard said. He punched buttons,

wiping the screen. After a moment, cross-hatching for a graph appeared

and the points began to blink on. . .

Crichton, Michael

The Terminal Man

Chapter 5 (p. 121)

You can draw a lot of curves through three graph points. You can

extrapolate it a lot of ways.

Crichton, Michael

The Terminal Man

Chapter 5 (p. 155)

The preliminary examination of most data is facilitated by the use

of diagrams. Diagrams prove nothing, but bring outstanding features

readily to the eye; they are therefore no substitutes for such critical tests

as may be applied to the data, but are valuable in suggesting such tests,

and in explaining the conclusions founded upon them.

Fisher, Sir Ronald A.

Statistical Methods For Research Workers (p. 27)

113

114 STATISTICALLY SPEAKING

. . . no nation ranks higher in its collective passion for statistics. In Japan,

statistics are the subject of holidays, local and national conventions,

award ceremonies and nationwide statistical collection and graphdrawing

contests.

Malcolm, Andrew H.

New York Times

Data-Loving Japanese Rejoice on Statistics Day

October 26, 1977. A-1

It pays to keep wide awake in studying any graph. The thing looks so

simple, so frank, and so appealing that the careless are easily fooled.

Moroney, M. J.

Facts from Figures

The Magic Lantem Technique (p. 27)

Despite the prevailing use of graphs as metaphors for communicating

and reasoning about dependencies, the task of capturing informational

dependencies by graphs is not at all trivial.

Pearl, Judea

Probabilistic Reasoning in Intelligent Systems (p. 81)

As to the propriety and justness of representing sums of money, and

time, by parts of space, tho' very readily agreed to by most men, yet a

few seem to apprehend there may possibly be some deception in it, of

which they are not aware. . .

Playfair, William

The Commercial and Political Atlas

A picture is worth more than ten thousand words.

Proverb, Chinese

You must never tell a thing. You must illustrate it. We leam through the

eye and not the noggin.

Rogers, Will

The Will Rogers Book

June 25,1933 (p. 121)

Dost thou love pictures?

Shakespeare, William

The Complete Works of William Shakespeare

The Taming of the Shrew

Introduction, Scene 2,l. 51

GRAPHICS 115

Graphical integrity is more likely to result if these six principles are

followed:

The representation of numbers, as physically measured on the surface

of the graphic itself, should be directly proportional to the numerical

quantities represented.

Clear, detailed, and thorough labeling should be used to defeat graphical

distortion and ambiguity. Write out explanations of the data on the

graphic itself. Label important events in the data.

Show data variations, not design variations.

In time-series displays of money, deflated and standardized units of

monetary measurements are nearly always better than nominal units.

The number of information-carrying (variable) dimensions depicted

should not exceed the number of dimensions in the data.

Graphics must not quote data out of context.

Tufte, Edward R.

The Visual Display of Quantitative Information (p. 77)

Excellence in statistical graphics consists of complex ideas communicated

with clarity, precision, and efficiency. Graphical displays should

0 show the data

0 induce the viewer to think about the substance rather than about the

methodology, graphic design, the technology of graphic production,

or something else

0 avoid distorting what the data have to say

0 present many numbers in a small space

0 make large data sets coherent

0 encourage the eye to compare different pieces of data

0 reveal the data at several levels of detail, from a broad overview to the

0 serve a reasonable clear purpose: description, exploration, tabulation,

0 be closely integrated with the statistical and verbal descriptions of a

Tufte, Edward R.

The Visual Display of Quantitative Information (p. 13)

Of course statistical graphics, just like statistical calculations, are only as

good as what goes into them. An ill-specified or preposterous model or

a puny data set cannot be rescued by a graphic (or by calculation), no

matter how clever or fancy. A silly theory means a silly graphic.

Tufte, Edward R.

The Visual Dispky of Quantitative Information (p. 15)

fine structure

or decoration

data set.

116 S TATlS TlCA L LY SPEAKING

A sketch tells me as much in a glance as a dozen pages of print.

Turgenev, Ivan

Fathers and Sons

Chapter 16

Every picture tells a story.

Advertisement for Doan’s Backache Kidney Pills - (See p. 113)

HYPOTHESES

Jolie hypothese elle explique tant de choses.

[A pretty hypothesis which explains many things.]

Asquith, Herbert

Speech in House of Commons

March 29,1917

. . . hypothetical questions get hypothetical answers.

Baez, Joan

Daybreak

What Would You Do If (p. 134)

Hypothesis, however, is an inference based on knowledge which is

insufficient to prove its high probability.

Barry, Frederick

The Scientific Habit of Thought

The Elements of Theory (p. 164)

The shrewd guess, the fertile hypothesis, the courageous leap to a

tentative conclusion-these are the most valuable coin of the thinker

at work.

Bruner, Jerome Seymour

The Process of Education (p. 14)

”Would you tell me, please, which way I ought to go from here?”

”That depends a good deal on where you want to get to,” said the Cat.

”I don’t much care where-,’ said Alice.

’Then it doesn’t matter which way you go,” said the Cat.

Carroll, Lewis

The Complete Works of h i s Carroll

Pig and Pepper

117

118 STATISTICALLY SPEAK."

There is . . . no genuine progress in scientific insight through the

Baconian method of accumulating empirical facts without hypotheses

or anticipation of nature. Without some guiding idea we do not know

what facts to gather . . . we cannot determine what is relevant and what

is irrelevant.

Cohen, Moms R.

A Preface to Logic (p. 148)

Since the newness of the hypotheses of this work-which sets the earth

in motion and puts an immovable sun at the center of the universehas

already received a great deal of publicity, I have no doubt that certain

of the savants have taken grave offense and think it wrong to raise any

disturbance among liberal disciplines which have had the right set-up

for a long time now.

Copemicus, Nicolaus

On the Revolutions of the Heavenly Spheres

Introduction

But suspicion is a thing very few people can entertain without letting

the hypothesis turn, in their minds, into fact.

Cort, David

Social Astonishments

Believing in Books

A false hypothesis, if it serve as a guide for further enquiry, may, at the

right stage of science, be as useful as, or more useful than, a truer one

for which acceptable evidence is not yet at hand.

Dampier-Whetham, William

Science and the Human Mind

Science in the Ancient World (p. 39)

An honorable man will not be bullied by a hypothesis.

Evans, Bergen

The Natural History of Nonsense

A Tale of a Tub

We see what we want to see, and observation conforms to hypothesis.

Evans, Bergen

The Natural History of Nonsense

A Tale of a Tub

Many confuse hypothesis and theory. An hypothesis is a possible

explanation; a theory, the correct one.

Fabing, Harold

Mar, Ray

Fischerisms (p. 7)

HYPOTHESES 119

In the complete absence of any theory of the instincts which would help

us to find our bearings, we may be permitted, or rather, it is incumbent

upon us, in the first place to work out any hypothesis to its logical

conclusion, until it either fails or becomes confirmed.

Freud, Sigmund

On Narcissism

If the fresh facts which come to our knowledge all fit themselves into the

scheme, then our hypothesis may gradually become a solution.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of Wisteria Lodge

. . . it is the first duty of a hypothesis to be intelligible . . .

Huxley, Thomas H.

Man’s Place in Nature

I1 (p. 126)

The great tragedy of Science-the slaying of a beautiful hypothesis by

an ugly fact.

Huxley, Thomas H.

Collected Essays

Biogenesis and Abiogenesis

This is called the inductive method. Hypothesis, my dear young friend,

established itself by a cumulative process; or, to use popular language,

if you make the same guess often enough it ceases to be a guess and

becomes a Scientific Fact.

Lewis, C.S.

The Pilgrim’s Regress: An Allegorical Apology for

Christianity, Reason and Romanticism

Book Two

Chapter I (p. 37)

It is a good morning exercise for a research scientist to discard a pet

hypothesis every day before breakfast. It keeps him young.

Lorenz, Konrad

On Aggression (p. 12)

We are to admit no more causes of natural things than such as are both

true and sufficient to explain their appearances.

Newton, Sir Isaac

Mathematical Principles of Natural Philosophy

Book 111, Rule I

120 STATlSTlCA L LY SPEAKING

In experimental philosophy we are to look upon propositions inferred

by general induction from phenomena as accurately or very nearly true,

notwithstanding any contrary hypotheses that may be imagined, till such

time as other phenomena occur, by which they may either be made more

accurate, or liable to exceptions.

Newton, Sir Isaac

Mathematical Principles of Natural Philosophy

Book 111, Rule IV

I frame no hypotheses; for whatever is not deduced from the phenomena

is to be called an hypothesis; and hypotheses, whether metaphysical or

physical, whether of occult qualities or mechanical, have no place in

experimental philosophy.

Newton, Sir Isaac

Mathematical Principles of Natural Philosophy

Book 111, General Scholium

For sometimes an obvious absurdity follows from its negation, and then

the hypothesis is true and certain; or an obvious absurdity follows from

its affirmation, and then the hypothesis is considered false; and when we

have not yet been able to draw an absurdity either from its negation or

from its affirmation, the hypothesis remains doubtful. So that to establish

the truth of an hypothesis it is not enough that all the phenomena should

follow from it, whereas if there follows from it something opposed to a

single phenomenon, that is enough to make certain its falsity.

Pascal, Blaise

Scient@ Treatises

Concerning the Vacuum

It is the nature of an hypothesis, when once a man has conceived it, that

it assimilates every thing to itself, as proper nourishment; and, from the

first moment of your begetting it, it generally grows stronger by every

thing you see, hear, read, or understand. This is of great use.

Steme, Laurence

Tristram Shandy

Book 2, Chapter 19

HYPOTHESES 121

"I just finished up in the budget review meeting," an exhausted manager

told a friend. "It was tough. We were way off on our projections, and I

had to explain why."

"How did you do?" the friend asked.

"At first, I tried to tell them we simply made a mistake, but they wouldn't

accept that explanation. So then I said that our hypothesis had not

included the entire scope of probabilities, and the outcome fell outside

of the range we had used."

"And?"

"They loved it."

Thomsett, Michael C.

The Little Black Book of Business Statistics (p. 164)

[Hypothesis] Something murdered by facts.

unknown

IMPOSSIBLE

It is impossible to import things into an infinite area, there being no

outside to import things in from.

Adam, Douglas

The Original Hitchhiker Radio Scripts

Fit the Fifth (p. 101)

What is convincing though impossible should always be prefered to what

is possible and unconvincing.

Aristotle

The Poets

Chapter XXIV

Events with a suficiently small probability never occur, or at least we must

act, in all circumstances, as if they were impossible.

Borel, Emile

Probabilities and Life

Introduction (pp. 2-3)

Alice laughed. “There’s no use trying,” she said “one ca’n’t believe

impossible things.”

”I daresay you havn’t had much practice,” said the Queen. “When I was

your age, I always did it for half-an-hour a day. Why, sometimes I’ve

believed as many as six impossible things before breakfast . . .’I

Carroll, Lewis

The Complete Works of Lewis Carroll

Through the Looking Glass

Wool and Water

122

IMPOSSIBLE 123

A round square or a wooden iron is an absurdity and consequently an

impossibility . . .

Chestov, Leon

Forum Philosophicum

Look Back and Struggle

Volume 1, Number 1, 1930 (p. 112)

The only way of finding the limits of the possible is by going beyond

them into the impossible.

Clarke, Arthur C.

The Lost Worlds of 2001

Chapter 34

I’ll tell you in two words-im-possible.

Goldwyn, Samuel

New York Times

Obituary, February 1,1974

Except under controlled conditions, or in circumstances where it is

possible to ignore individuals and consider only large numbers and the

law of averages, any kind of accurate foresight is impossible.

Huxley, Aldous

Time Must Have a Stop (p. 296)

. . . so many things are possible just as long as you don’t know they’re

impossible.

Juster, Norton

The Phantom Tollbooth (p. 247)

Well, I’ll have her: and if it be a match, as nothing is impossible-.

Shakespeare, William

The Complete Works of William Shakespeare

The Two Gentlemen of Verona

Act 111, Scene 2, 1. 379

A likely impossibility is always preferable to an unconvincing possibility.

Sheynin, O.B.

Archive for History of Exact Science (p. 101)

The fact is certain because it is impossible.

Tertullian

De Came Christi

Chapter V, Part I1

124 STATISTICALLY SPEAKlNG

All things, as we know, are impossible in this most impossible of all

impossible worlds.

Thurber, James

Lanterns and Lances

The Last Clock

Man can believe the impossible, but man can never believe the

improbable.

Wilde, Oscar

Epigrams: Phrases and Philosophies fir the Use of the Young

Sebastian Melmoth

INFINITE

The ignorant suppose that infinite number of drawings require an infinite

amount of time; in reality it is quite enough that time is infinitely

subdivisible, as is the case in the famous parable of the Tortoise and

the Hare. This infinitude harmonizes in an admirable manner with the

sinuous numbers of Chance and of the Celestial Archetype of the Lottery,

adored by the Platonists.

Borges, Jorge Luis

Ficciones

The Babylon Lottery

It is a pity, therefore, that the authors have confined their attention to the

relatively simple problem of determining the approximate distribution of

arbitrary criteria and have failed to produce any sort of justification for

the tests they propose. In addition to those functions studied there are

an infinity of others, and unless some principle of selection is introduced

we have nothing to look forward to but an infinity of test criteria and an

infinity of papers in which they are described.

Box, G.E.P.

Journal of the Royal Statistical Society

Discussion

Series B, 18,1956 (p. 29)

I had expressed my wish to have a thermometer of probability, with

impossibility at one end, as 2 plus 2 makes 5, and necessity at the other

as 2 plus 2 make 4.

de Morgan, Augustus

Budget of Paradoxes

Volume I1

James Smith Once More (p. 247)

125

KNOWLEDGE

Incomplete knowledge must be considered as perfectly normal in

probability theory; we might even say that, if we knew all the

circumstances of the phenomena, there would be no place for probability,

and we would know the outcome with certainty.

Borel, Emile

Probability and Certainty

Chapter I (p. 13)

Thus, the scientist must recognize the statistical aspect of much of his

knowledge, not, on the one hand, unduly hesitating to accept it as true

if the probability is reasonably high, but, on the other hand, maintaining

an alertness to the possibility that what may for good appear to be highly

improbable may indeed occur or be true.

Fischer, Robert B.

Science, Man and Society (p. 37)

I am convinced that it is impossible to expound the methods of

induction in a sound manner, without resting them on the theory of

Probability. Perfect knowledge alone can give certainty, and in nature

perfect knowledge would be infinite knowledge, which is clearly beyond

our capacities. We have, therefore, to content ourselves with partial

knowledge,-knowledge mingled with ignorance, producing doubt.

Jevons, W.S.

The Principles of Science

Chapter 10 (p. 197)

We give them an excellent survey of the methods and techniques of

thinking, taken from logic, statistics, scientific method, psychology, and

mathematics.

Skinner, B.F.

Walden Two (p. 111)

126

LAWS

But physicians have nothing to do with what is called the law of large

numbers, a law which, according to a great mathematician’s expression,

is always true in general and false in particular.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 138)

Negative expectations yield negative results.

Positive expectations yield negative results.

Bloch, Arthur

Murphy‘s Law

The Nonreciprocal Laws of Expectation (p. 21)

Indeed, the laws of chance are just as necessary as the causal laws

themselves.

Bohm, D.

Causality and Chance in Modern Physics (p. 23)

[in quantum mechanics] we have the paradoxical situation that

observable events obey laws of chance, but that the probability for these

events itself spreads according to laws which are still in all essential

features causal laws.

Born, Max

Natural Philosophy of Cause and Chance (p. 103)

. . . if they do only one jump, you know, there’s a fifty percent chance of

an injury. Two jumps it’s eighty percent. The third time, it’s dead certain

they won’t get off scot free. You see? It‘s not a question of training, but

the law of averages.

Boulle, Pierre

The Bridge over the River Kwai

Part Two, Chapter 8 (p. 67)

127

128 STATISTICALLY SPEAKING

In the course of the committee’s investigations, it had been discovered,

to everyone’s dismay, that the Law of Averages had never been

incorporated into the body of federal jurisprudence, and though the

upholders of States’ Rights rebelled violently, the oversight was at once

corrected, both by Constitutional amendment and by a law-the Hills-

Slooper Act-implementing it. According to the Act, people were required

to be average, and, as the simplest way of assuring it, they were divided

alphabetically and the permissible activities catalogued accordingly.

Coates, Robert M.

The World of Mathematics

Volume 3

The Law (p. 2271)

I believe neither in chance nor in miracle, but only in phenomena

regulated by laws.

de Jouvenel, Bertrand

Quoted in Ludwig Buchner‘s

Force and Matter (p. 80)

It would be splendid if all action required in social, economic, and

industrial planning could be based on scientific laws; but actually, so

many of the laws remain yet to be discovered that most action must be

taken on the basis of knowledge of the subject matter in related fields.

Deming, William Edwards

Statistical Adjustment of Data (p. 11)

Ashley-Perry Statistical Axioms

(1) Numbers are tools, not rules.

(2) Numbers are symbols for things; the numbers and the things are not

the same.

(3) Skill in manipulating numbers is a talent, not evidence of divine

guidance.

(4) Like other occult techniques of divination, the statistical method

has a private jargon deliberately contrived to obscure its methods from

nonpractitioners.

(5) The product of an arithmetical computation is the answer to an

equation; it is not the solution to a problem.

(6) Arithmetical proofs of theorems that do not have arithmetical bases

prove nothing.

Dickson, Paul

The Oficial Rules (p. A-5)

LAWS 129

The Greeks, says Mr. Galton, if they had known of the law of errors,

would have personified and deified it; the modems should at least

respect it as the most universal law of nature.

Edgeworth, Francis Ysidro

] o u m l of the Royal Statistical Society

On the Representation of Statistics by Mathematical Formula (concluded)

Volume XLII, 1899 (p. 552)

As far as the laws of mathematics refer to reality, they are not certain;

and as far as they are certain, they do not refer to reality.

Einstein, Albert

Sidelights on Relativity

Geometry and Experience (p. 28)

But when I came to reflect on the facts observed, I was struck by their

singularity. Moustache hairs are shed very freely, but they do not drop

out at regular intervals. One, two, or more hairs in any one box would not

have been surprising. A man who was in the habit of pulling or stroking

his moustache might dislodge two or three at once. The surprising thing

was the regularity with which these hairs occurred; one, and usually one

only, in each box, and no complete box in which there was none. It was

totally opposed to the laws of probability.

Freeman, R. Austin

A Certain Dr. Thorndyke

Thomdyke COM&S the Links

Superstition, heroworship, ignorance of the laws of probability, religious,

political, or speculative prejudice. One or other of these has tended from

the beginning to give us distorted pictures.

Froude, James Anthony

Short Studies on Great Subjects

Scientific Method Applied to History (p. 470)

It will, I trust, be clearly understood that the numbers of men in the

several classes in my table depend on no uncertain hypothesis. They are

determined by the assured law of deviations from the average.

Galton, Francis

Hereditary Genius

According to Their Natural Gift (p. 30)

I know of scarcely anything so apt to impress the imagination as the

wonderful form of cosmic order expressed by the “Law of Frequency of

Error”. The law would have been personified by the Greeks and deified, if

130 STATISTICALLY SPEAKlNG

they had known of it. It reigns with serenity, and in complete effacement

amidst the wildest confusion. The huger the mob, and the greater the

apparent anarchy, the more perfect is its sway. It is the supreme law of

Unreason. Whenever a large sample of chaotic elements are taken in hand

and marshalled in the order of their magnitude, an unsuspected and most

beautiful form of regularity proves to have been latent all along. The tops

of the marshalled now form a flowing curve of invariable proportions;

and each element, as it is sorted in place, finds, as it were, a preordained

niche, accurately adapted to fit it.

Galton, Francis

Nuturul Inheritance

Normal Variability (p. 66)

. . . but the laws of probability, so true in general, so fallacious in

Gibbon, Edward

Gibbon's Autobiography (p. 124)

particular.

"Law" means a rule which we have always found to hold good, and

which we expect always will hold good.

Huxley, Thomas H.

Collected Essays

On Descartes' "Discourse Touching the Method of Using One's Reason

Rightly and of Seeking Scientific Truth

Volume I

. . . all the richness of structure observed in the natural world is not a

consequence of the complexity of physical law, but instead arises from

the many-times repeated application of quite simple laws.

Kadanoff, Leo P.

Physics Today

Complete Structure from Simple Systems

March 1991 (p. 9)

. . . laws serve to explain events and theories to explain laws; a good law

allows us to predict new facts and a good theory new laws. At any rate,

the success of prediction . . . adds credibility to the beliefs which led to

it, and a corresponding force to the explanations they provide.

Kaplan, Abraham

The Conduct of Inquiry

Chapter I X , Section 40 (p. 346)

Dieselbe Ordnung waltet iiberall:

Im wechselvollen Reigen der Gestime

Gebietet das Gesetz nach Mass und Zahl,

Wie in des Menschen denkendm Gehime.

LAWS 131

[The same order rules everywhere;

the law of measure and number rules

in the changeful hosts of the stars

as it does in man’s thinking brain.]

Krass, F.

Quoted in Ludwig Buchner’s

Force and Matter (p. 103)

Law of Probable Disposal: Whatever hits the fan will not be evenly

distributed.

Logical Machine Advertisement

Quoted in Paul Dickson’s

The OfFcial Rules (p. P-152)

I feel like a fugitive from th’ law of averages.

Mauldin, Bill (William Henry)

Up Front

Cartoon caption (p. 39)

We can never achieve absolute truth but we can live hopefully by a

system of calculated probabilities. The law of probability gives to natural

and human sciences-to human experience as a whole-the unity of life

we seek.

Meyer, Agnes

Education for a New Morality (p. 21)

The Law of Causation, the recognition of which is the main pillar of

inductive science, is but the familiar truth, that the invariability of

succession is found by observation to obtain between every fact in nature

and some other fact which has preceded it.

Mill, John Stuart

System of Logic

Book 111, Chapter V, Section 2

Osbom’s Law. Variables won’t, constants aren’t.

Osbom, Don

Quoted in Paul Dickson’s

The Official Rules (p. 0-138)

The purpose I mean is, to show what reason we have for believing that

there are in the constitution of things fixed laws according to which

events happen. . .

Price, Richard

Introduction to Bayes’ Essays

132 STATlSTZCA LLY SPEAKING

When any principle, law, tenet, probability, happening, circumstance, or

result can in no way be directly, indirectly, empirically, or circuitously

proven, derived, implied, inferred, induced, deduced, estimated, or

scientifically guessed, it will always for the purpose of convenience,

expediency, political advantage, material gain, or personal comfort, or

any combination of the above, or none of the above, be unilaterally and

unequivocally assumed, proclaimed, and adhered to as absolute truth to

be undeniably, universally, immutably, and infinitely so, until such time

as it becomes advantageous to assume otherwise, maybe.

Rhodes, Charles E.

Quoted in Paul Dickson’s

The Oficial Explanations (p. R-192)

Scientific laws, when we have reason to think them accurate, are different

in form from the common-sense rules which have exceptions: they are

always, at least in physics, either differential equations, or statistical

averages. It might be thought that a statistical average is not very

different from a rule with exceptions, but this would be a mistake.

Statistics, ideally are accurate laws about large groups; they differ from

other laws only in being about groups, not about individuals. Statistical

laws are inferred from particular statistics, just as other laws are inferred

from particular single occurrences.

Russell, Bertrand A.

The Analysis of Matter

Data, Inferences, Hypotheses, and Theories (p. 191)

I come now to the statistical part of physics, which is concemed with

the study of large aggregates. Large aggregates behave almost exactly

as they were supposed to do before quantum theory was invented, so

that in regard to them the older physics is very nearly right. There is,

however, one supremely important law which is only statistical; this is

the second law of thermodynamics. It states, roughly speaking, that the

world is growing continuously more disorderly.

Russell, Bertrand A.

The Scientific Outlook

Scientific Metaphysics (p. 92)

Only by reducing this element of free will to the infinitesimal, that is, by

regarding it as an infinitely small quantity, can we convince ourselves

of the absolute inaccessibility of the causes, and then instead of seeking

causes, history will take the discovery of laws as its problem.

Tolstoy, Leo

War and Peace

Second Epilogue, Chapter XI

LAWS 133

We must discover the laws on which our profession rests, and not invent

them.

unknown

Twyman’s Law states that any figure that looks interesting or different

is usually wrong.

unknown

If the law states a precise result, almost certainly it is not precisely

accurate; and thus even at the best the result, precisely as calculated,

is not likely to occur.

Whitehead, Alfred North

An Introduction to Mathematics

Chapter 3

Laws are statements of observed facts.

Whitehead, Alfred North

Adventures of Ideas

Laws of Nature

W o n VI1

LIKELIHOOD

"I wonder how we can account for such parallelism in door design," Ted

said. "The likelihood of its occurring by chance is astronomically small.

Why, this door is the perfect size and shape for human beings!"

Crichton, Michael

Sphere

The Door (p. 64)

Mopworth always took a seat at a window already cracked and taped,

or patched with cardboard, banking on the Law of Probability to reduce

the likelihood of another rock coming in that one again before it came

in another.

de Vries, Peter

Ruben, Ruben

Mopworth

Chapter Thirty-Four (p. 411)

He was a strange boy to be sure. There was always some ground of

probability and likelihood mingled with his absurd behaviour. That was

the best of it.

Dickens, Charles

The Work of Charles Dickens

Martin Chuzzlewit

Chapter XI (p. 166)

No doubt if it had been discovered who wrote the "Vestiges," many an

ingenious structure of probabilities would have been spoiled, and some

disgust might have been felt for a real author who made comparatively

so shabby an appearance of likelihood.

Eliot, George

Theophrastus Such

The Wasp Credited with the Honeycomb (p. 82)

134

LIKE LIHOOD 135

I have no objection to the study of likelihood as such.

Jefferys, Harold

Proceedings of the Royal Statistical Society

Probability and Scientific Method

Series A, Volume 146,1934

A professor’s enthusiasm for teaching introductory courses varies

inversely with the likelihood of his having to do it.

Martin, Thomas L., Jr.

Malice in Blunderland

Fuglemenship (p. 103)

There was not much likelihood now that a third encounter would take

place, and the fact is that from that day to this I have never seen the

young man again, in conformity with the established laws of probability.

Queneau, Raymond

Exercises in Style

Probabilist

A meeting was called to review the result of a recent market sample for

a new product. The president started out by asking, ”Will we make a

profit?”

The manager of the research department answered, “Based on the specific

assumptions applied to our test, there is a reasonable likelihood that

response will fall within our range of expectations.”

The president leaned over and whispered to his secretary, ”What was

the answer?”

She whispered back, “Yes.”

Thomsett, Michael C.

The Little Black Book of Business Statistics (p. 194)

The likelihood of a thing happening is inversely proportional to its

desirability.

Wright, Jim

The Dallas Morning News

September 9,1969

MEASUREMENT

. . . we must remember that measures were made for man and not man

for measures.

Asimov, Isaac

Of Time and Space and Other Things

Part I1

Of Other Things (p. 143)

One grain of wheat does not constitute a pile, nor do two grains, nor three

and so on. On the other hand, everyone will agree that a hundred million

grains of wheat do form a pile. What, then is the threshold number? Can

we say that 325,647 grains of wheat do not form a pile, but that 325,648

grains do? If it is impossible to fix a threshold number, it will also be

impossible to know what is meant by a pile of wheat; the words can

have no meaning, although, in certain extreme cases, everybody will

agree about them.

Borel, Emile

Probability and Certainty

Chapter 8 (p. 98)

In every thing, I woot, ther lyth mesure.

Chaucer, Geoffrey

Troyfus and Crysyde

Book ii, 1. 715

. . . polynomials are notoriously untrustworthy when extrapolated.

Cochran, William

Cox, Gertrude

Experimental Designs (p. 336)

It is important to realize that it is not the one measurement, alone, but

its relation to the rest of the sequence that is of interest.

Deming, William Edwards

Statistical Adjustment of Data (p. 3)

136

MEASUREMENT 137

Insistence upon numerical measurement when it is not inherently

required by the consequence to be effected, is a mark of respect for the

ritual of scientific practice at the expense of its substance.

Dewey, John

Logic: The Theory of Inquiry

Chapter XI (p. 205)

Measurement has meaning only if we can transmit the information

without ambiguity to others.

Fox, Russell

Gorbuny, Max

Hooke, Robert

The Science of Science

A Standard Language (p. 31)

Who hath measured the waters in the hollow of his hand . . .?

The Bible

Isaiah 40:12

One of the subjects of Kinsey’s study of sexual behavior in the human

male afterwards complained bitterly of the injury to his masculine ego.

”NO matter what I told him,” he explained, ”he just looked me straight

in the eye and asked, ’How many times?’” . . . The principle, “Let’s get

it down to something we can count!” does not always formulate the best

research strategy.

Kaplan, Abraham

The Conduct of Inquiry

Chapter V, Section 20 (p. 171)

Measurement, we have seen, always has an element of error in it. The

most exact description or prediction that a scientist can make is still

only approximate. If, as sometimes happens, a perfect correspondence

with observation does appear, it must be regarded as accidental, and, as

Jevons [see The Principles of Science, p. 4571 . . . remarks, it “should give

rise to suspicion rather than to satisfaction”.

Kaplan, Abraham

The Conduct of Inquiry

Chapter VI, W o n 25 (p. 215)

Proleptically, I would say that whether we can measure something

depends, not on that thing, but on how we have conceptualized it, on

our knowledge of it, above all on the skill and ingenuity which we can

bring to bear on the process of measurement which our inquiry can put

to use.

Kaplan, Abraham

The Conduct of Inquiry

Chapter V, Section 20 (p. 176)

138 STATISTICALLY SPEAK”

We are committed to the scientific method and measurement is the

foundation of that method; hence we are prone to assume that whatever

is measurable must be signhcant md that whatever cannot be measured

may as well be disregarded.

Krutch, Joseph Wood

Human Nature and Human Condition

Chapter 5 (p. 78)

We are ourselves the measure of the miraculous; if we should find a

universal measure, the miraculous elements would disappear, and all

things would be of equal size.

Lichtenberg, Georg

Lichtenberg: Aphorisms t3 Letters

Aphorisms (p. 27)

Coomb’s Law. If you can’t measure it, I’m not interested.

Peter, Lawrence J.

Human Behavior

Peter’s People

August, 1976 (p. 9)

Beauty had been bom, not, as we so often conceive it nowadays, as

an ideal of humanity, but as measure, as the reduction of the chaos

of appearances to the precision of linear symbols. Symmetry, balance,

harmonic division, mated and mensurated intervals-such were its

abstract characteristics.

Read, Herbert

Icon and Idea: The Function of Art in the Development of Human Consciousness

Chapter IV (p. 75)

Crude measurement usually yields misleading, even erroneous conclusions

no matter how sophisticated a technique is used.

Reynolds, H.T.

Analysis of Nominal Data (p. 56)

Measurement demands some one-one relations between the numbers

and magnitudes in question-a relation which may be direct or indirect,

important or trivial, according to circumstances.

Russell, Bertrand A.

The Principles of Mathematics

Entry 164

Measure for Measure

Shakespeare, William

Title of play

MEASUREMENT 139

Nay, if these measures give any ground of confidence, we think that thy

design is not amiss.

Sophocles

The Plays of Sophocles

Trachiniae

1.587

. . . great as may be the potency of this [the experimental method],

or of the preceding methods, there is yet another one so vital that, if

lacking it, any study is thought by many authorities not to be scientific

in the full sense of the word. This further and crucial method is that of

measurement, . . .

Spearman, Charles

Psychology Down the Ages

Volume I (p. 89)

I often say that when you can measure what you are speaking about,

and express it in numbers, you know something about it; but when

you cannot measure it, when you cannot express it in numbers, your

knowledge is of a meager and unsatisfactory kind: it may be the

beginning of knowledge, but you have scarcely, in your thoughts,

advanced to the stage of science whatever the matter might be.

Thompson, William (Lord Kelvin)

Popular Lectures and Addresses (p. 80)

What the measurements will not do, is to get you out of the crisis you

are already in.

Unknown

If you don’t measure it, it won’t happen.

unknown

I’ve measured it from side to side:

‘Tis three feet long, and two feet wide.

Wordsworth, William

Wordsworth Poetry and Prose

The Thom

iii (Early Reading)

MODELS

A theory has only the altemative of being right or wrong. A model has

a third possibility: it may be right, but irrelevant.

Eigen, Manfred

The Physicist’s Conception of Nature

edited by Jagdish Mehra (p. 618)

Models are often used to decide issues in situations marked by

uncertainty. However statistical differences from data depend on

assumptions about the process which generated these data. If the

assumptions do not hold, the inferences may not be reliable either.

This limitation is often ignored by applied workers who fail to idenbfy

crucial assumptions or subject them to any kind of empirical testing. In

such circumstances, using statistical procedures may only compound the

uncertainty . . . Statistical modeling seems likely to increase the stock of

things you think you know that ain’t so.

Greedman, D.A.

Navidi, W.C.

Statistical Science

Regression Models for Adjusting the 1980 Census

Volume 1, Number 1, 1986 (p. 3)

The words “model” and “mode” have, indeed, the same root; today,

model building is science h la mode.

Kaplan, Abraham

The Conduct of Inquiry

Chapter VII, Section 30 (p. 258)

The purpose of models is not to fit the data but to sharpen the questions.

Karlin, Samuel

11th R.A. Fisher Memorial Lectures

Royal Society 20 April 1983

140

MODELS 141

Nay, Knowledge must come through action; thou canst have no test

which is not fanciful, save by trial.

Sophocles

The Plays of Sophocles

Trachiniae

1. 589

The sciences do not try to explain, they hardly even try to interpret, they

mainly make models.

Unknown

(Statistician) A figure head

Bvan Bsar - (See p. 223)

OBSERVATIONS

No observations are absolutely trustworthy.

Anscombe, F. J.

Technometrics

Rejection of Outliers

Volume 2,1960 (p. 124)

. . . while those whom devotion to abstract discussions has rendered

unobservant of the facts are too ready to dogmatize on the basis of a few

observations.

Aristotle

On Generation and Corruption

Book I, Chapter I1

Consider that everything which happens, happens justly, and if thou

observest carefully, thou wilt find it to be so.

Aurelius, Marcus

The Meditations of the Emperor Antonius Marcus Aurelius

Book IV, Section 10

Speaking concretely, when we say ”making experiments or making

observations,” we mean that we devote ourselves to investigation and

to research, that we make attempts and trials in order to gain facts from

which the mind, through reasoning, may draw knowledge or instruction.

Speaking in the abstract, when we say, ”relying on observation and

gaining experience,” we mean that observation is the mind’s support in

reasoning, and experience the mind’s support in deciding, or still better,

the fruit of exact reasoning applied to the interpretation of facts.

Observation, then, is what shows facts; experiment is what teaches about

facts and gives experience in relation to anything.

Bernard, Claude

An lntmduction to the Study of Experimental Medicine (p. 11)

142

OBSERVATIONS 143

You can observe a lot by just watching.

Bema, Yogi

Quoted in Dick Schaap and Mort Gerberg’s

Joy in Mudville: The Big Book of Baseball Humor

Reflections (p. 185)

A fool sees not the same tree that a wise man sees.

Blake, William

The Complete Writings of William Blake

The Marriage of Heaven and Hell

Proverbs of Hell

1. 8

To find out what happens to a system when you interfere with it you

have to interfere with it (not just passively observe it).

Box, G.E.P.

Technometrics

Use and Abuse of Regression

Volume 8, Number 4, November 1966 (p. 629)

Shakespeare says, we are creatures that look before and after: the more

surprising that we do not look round a little, and see what is passing

under our very eyes.

Carlyle, Thomas

Sartor Resartus

Book I, Chapter 1

Oh, he is a good observer, but he has no power of reasoning!

Darwin, Charles

The Life and Letters of Charles Darwin

Volume I

Mental Qualities (p. 82)

For no one is so weak in mind that he does not perceive that while he is

seated he is in some way different from what he is when he is standing

on his feet.

Descartes, RenQ

Rules for the Direction of the Mind

Rule XI1

The bearing of this observation lays in the application on it.

Dickens, Charles

The Work of Charles Dickens

Dombey and Son

Chapter 23

144 STATISTICALLY SPEAKING

A man should look for what is, and not for what he thinks should be . . .

Einstein, Albert

Quoted in Peter Michelmore’s

Einstein (p. 20)

Ettore’s Observation: The Other Line moves faster. This applies to all

lines-bank, supermarket, tollbooth, customs, and so on. And don’t try

to change lines. The Other Line-the one you were in originally-will

then move faster.

Ettore, Barbara

Harper’s Magazine

Volume 249, Number 1491, August 1974

You must acquire the ability to describe your observations and your

experience in such language that whoever observes or experiences

similarly will be forced to the same conclusion.

Fabing, Harold

Mar, Ray

Fischerisms (p. 8)

. . . the link between observation and formulation is one of the

most difficult and crucial in the scientific enterprise. It is the process

of interpreting our theory or, as some say, of ”operationalizing our

concepts”. Our creations in the world of possibility must be fitted in

the world of probability; in Kant’s epigram, ”Concepts without precepts

are empty”. It is also the process of relating our observations to theory;

to finish the epigram, ”Precepts without concepts are blind”.

Greer, Scott

The Logic of Social Inquiry (p. 160)

This assumption is not permissible in atomic physics; the interaction

between observer and object causes uncontrollable and large changes

in the system being observed, because of the discontinuous changes

characteristic of atomic processes.

Heisenberg, W.

The Physical Principles of the Quantum Theory

Introductory ( p . 3)

You see, but you do not observe. The distinction is clear.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

A Scandal in Bohemia

0 B SERVATIONS 145

Never trust impressions, my boy, but concentrate yourself upon details.

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

A Case of Identity

The way into my parlor is up a winding stair,

And I have many curious things to show when you are there . . .

Howitt, Mary

The Poems of M a y Howitt

The Spider and the Fly

Seeing many things, but thou observest not . . .

The Bible

Isaiah 42:20

I do love to note and to observe.

Jonson, Ben

Volpone

Act 11, Scene 1

Although by now a large amount of observational material is available,

the implications of the observations are far from clear.

Longair, M.S.

Contemporay Physics

Quasi-stellar Radio Sources

Volume 8, 1967

But I keep no log of my daily grog,

For what’s the use 0’ being bothered?

I drink a little more when the wind’s offshore,

And most when the wind’s from the no’th’ard.

Macy, Arthur

Poems

The Indifferent Mariner

It urges the scientist, in effect, not to take risks incurred in moving far

from the facts. However, it may properly be asked whether science can

be undertaken without taking the risk of skating on the possibly thin ice

of supposition. The important thing to know is when one is on the more

solid ground of observation and when one is on the ice.

O’Neil, W.M.

Fact and Theory

Chapter 8 (p. 154)

146 STATISTICALLY SPEAKING

. . . to observe is not enough. We must use our observations, and to do

that we must generalize.

Poincar4, Henri

The Foundations of Science

Science and Hypothesis (p. 127)

To observations which ourselves we make,

We grow more partial for th’ observer’s sake.

Pope, Alexander

The Complete Poetical Works of POPE

Moral Essays

Epis. I, 1. 11

Some scientists find, or so it seems, that they get their best ideas when

smoking; others by drinking coffee or whiskey. Thus there is no reason

why I should not admit that some may get their ideas by observing or

by repeating observations.

Popper, Karl R.

Realism and the Aim of Science (p. 36)

Keine Antwort ist auch eine Antwort.

[No answer is also an answer.]

Proverb, German

De lo 9ue veas, Cree muy poco,

De lo que te cuenten, nuda.

[Of what you see, believe very little,

Of what you are told, nothing.] Proverb, Spanish

I will tell you a moment in my life when I almost missed learning

something. It was during the war and I was a farm laborer and my

task was before breakfast to go to yonder hill and to a field there and

count the cattle. I went and I counted the cattle-there were always

thirty-two-and then I went back to the bailiff, touched my cap, and

said, “Thnty-two, sir.” and went and had my breakfast. One day when I

arrived at the field an old farmer was standing at the gate, and he said,

“Young man, what do you do here every morning?” I said, ”Nothing

much. I just count the cattle.” He shook his head and said, “If you count

them every day they won’t flourish.” I went back, I reported thutytwo,

and on the way back I thought, Well, after all, I am a professional

statistician, this is only a country yokel, how stupid can he get. One day I

went back, I counted and counted again, there were only thirty-one. The

bailiff was very angry. He said, “Have your breakfast and then we‘ll go

up there together.” And we went together and we searched the place

and indeed, under a bush, was a dead beast. I thought to myself, Why

OBSERVATIONS 147

have I been counting them all the time? I haven’t prevented this beast

dying. Perhaps that’s what the farmer meant. They won’t flourish if you

don’t look and watch the quality of each individual beast. Look him in

the eye. Study the sheen on his coat. Then I might have gone back and

said, ”Well, I don’t know how many I saw but one looks mimsey.”

Schumacher, E.F.

Good Work

Education for Good Work (p. 145)

You will see something new.

Two things. And I call them

Thing One and Thing Two.

Seuss, Dr.

The Cat in the Hat (p. 33)

The observed of all observers . . .

Shakespeare, William

The Complete Works of William Shakespeare

Hamlet, Prince of Denmark

Act 111, Scene 1, 1. 162

. . . and in his brain, . . . he hath strange places cram”d with

observations. . .

Shakespeare, William

The Complete Works of William Shakespeare

As You Like It

Act 11, Scene 7, 1. 38

That was excellently observ’d, say I, when I read a Passage in an Author,

where his Opinion agrees with mine. When we differ, there I pronounce

him to be mistaken.

Swift, Jonathan

Satires and Personal Writings

Thoughts on Various Subjects

‘lis here, ’tis there. ’Ti gone.

Whitehead, Alfred North

An Introduction to Mathematics (p. 1)

ORDER

. . . altho’ Chance produces Irregularities, still the Odds will be infinitely great,

that in the process of Time, those Irregularities will bear no proportion to the

recurrency of that Order which naturally results from ORIGINAL DESIGN

. . . such Laws, as well as the original Design and Purpose of their

Establishment, must all be from without . . . if we blind not ourselves

with metaphysical dust, we shall be led, by a short obvious way, to the

acknowledgment of the great MAKER and GOVERNOUR of all; Himself

all-wise, all-powerful and good.

de Moivre, Abraham

The Doctrine of Chances (pp. 251-2)

The order is rapidly fading

And the first one now will later be last.

Dylan, Bob

“The Times They Are A-Changin‘ ”

If you take a pack of cards as it comes from the maker and shuffle it

for a few minutes, all trace of the original systematic order disappears.

The order will never come back however long you shuffle. Something

has been done which cannot be undone, namely, the introduction of a

random element in place of the arrangement.

Eddington, Sir Arthur Stanley

The Nature of the Physical World (p. 63)

For in very truth, not by design did the first-beginnings of things place

themselves each in their order with foreseeing mind, nor indeed did they

make compact what movements each should start, but because many

of them shifting in many ways throughout the world are harried and

148

ORDER 149

buffeted by blows from limitless time, by trying movements and unions

of every kind, at last they fall into such dispositions as those, whereby

our world of things is created and holds together.

Lucretius

Lucretitrs On the Nature of Things

Book I, 1020

Order is heaven's first law.

Pope, Alexander

The Complete Poetical Works of POPE

An Essay on Man

Epistle IV, 1. 49

No answer is also an answer.

Oennaa Proverb - (See p. 146)

OUTLIERS

The fact that something is far-fetched is no reason why it should not be

true; it cannot be as far-fetched as the fact that something exists.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 1)

I don’t see the logic of rejecting data just because they seem incredible.

Hoyle, Fred

Quoted in D.O. Edge and M.J. Mulkay’s

Astronomy Transformed (p. 432)

In almost every true series of observations, some are found, which differ

so much from the others as to indicate some abnormal source of error

not contemplated in the theoretical discussions, and the introduction

of which into the investigations can only serve, in the present state of

science, to perplex and mislead the inquirer.

Peirce, Benjamin

The Astronomical Journal (p. 160)

The folly of rejecting an extreme observation was demonstrated when

shortly after 7 AM on the moming of December 7, 1941, the officer in

charge of a Hawaiian radar station ignored data solely because it seemed

so incredible.

Unknown

150

PERCENTAGES

There’s a 50 percent chance of anything-ither it happens or it doesn’t.

Barnes, Michael R.

Quoted in Paul Dickson’s

The OfFcial Explanations (p. 89)

Ninety per cent of everything is crap

Bloch, Arthur

Murphy’s Law

Sturgeon’s Law

”I did,” Gerhard said. “But I don’t know any more. We‘ve passed the

confidence limits already. They were about plus or minus two minutes

for ninety-nine percent.”

Crichton, Michael

The Terminal Man

Chapter 6 (p. 157)

John. Trust us on this, we have the figures. We are telling you with

ninety-five percent confidence intervals how the people feel.

Crichton, Michael

Rising Sun

Second Day (p. 255)

My eye was caught this morning by a statement in the paper that

“76 percent of adults have bad breath”. I am always puzzled by

such dogmatic observations. How are these conclusions reached? Do

investigators scamper about the streets, sniffing?

Davies, Robertson

The Dia y of Samuel Marchbanks

Winter, Section IV, Wednesday (p. 17)

151

152 STATISTICALLY SPEAKING

Using any reasonable definition of a scientist, we can say that between

80 and 90 percent of all the scientists that have ever lived are alive now.

de Solla Price, Derek John

Little Science, Big Science (p. 1)

Kissinger’s concem about a Russian attack on China was expressed many

times. I used to tease him about his use of percentages. He would say

there was a 60 percent chance of a Soviet strike on China for example, and

I would say, “Why 60, Henry? Couldn’t it be 65 percent or 58 percent?”

Haldeman, H.R.

The Ends of Power

Book Three (p. 89)

It’s a little like the tale of the roadside merchant who was asked to explain

how he could sell rabbit sandwiches so cheap. ”Well” he explained, ”I

have to put in some horse meat too. But I mix them 50-50. One horse,

one rabbit.”

Huff, Darrell

How to Lie with Statistics (p. 114)

When half a million babies are bom in England in a year, we may say

that 20 percent of them are bom in London, 2 percent in Manchester, 1

percent in Bristol, and so on. But when we think of one baby bom in

a single minute of time, we cannot say that 20 percent of it was bom

in London, 2 percent in Manchester, and so on. We can only say that

there is a 20 percent probability of its being bom in London, a 2 percent

probability of its being bom in Manchester, and so on.

Jeans, James Hopwood

Physics and Philosophy

Chapter V (p. 136)

When the weather predicts 30 percent chance of rain, rain is twice as

likely as when 60 percent chance is predicted.

Parry, Thomas

Quoted in Paul Dickson’s

The Official Explanations (p. P-175)

Later that evening we were watching the news, and the TV weathercaster

announced that there was a 50 percent chance of rain for Saturday, and

a 50 percent chance for Sunday, and concluded that there was therefore

a 100 percent chance of rain that weekend.

Paulos, John Allen

Innumeracy (p. 3)

PERCENTAGES 153

"That would be a little like saying '102 percent normal,'" said the Master

smugly.

"If you like statistical scales better than the truth," B w growled.

Sturgeon, Theodore

Quoted in Harlon Ellison's

Dangerous Visions

If All Men Were Brothers, Would You Let One Marry Your Sister? (p. 350)

. . . I do not remember just when, for I was not bom then and cared

nothing for such things. It was a long joumey in those days and must

have been a rough and tiresome one. The village contained a hundred

people and I increased the population by 1 percent. It was more than

many of the best men in history could have done for a town. It may not

be modest in me to refer to this but it is true.

Twain, Mark

The Autobiography of Mark Twain

Chapter 1

"Well", he explained,

"I have to put in some

horse meat too. But I

mix them 50-50.

One horse, one rabbit."

(See p. 152)

D m l l H ~ f-f

PRAYER

Thank God for compensating errors.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

Lord, please find me a one-armed statistician . . . so I won't always hear

'on the other hand . . .'

Hammond, Kenneth R.

Adelman, Leonard

Paraphrasing Edmund Muskie

Science

Science, Values, and Human Judgment

Volume 194, Number 4263, 22 October 1976 (p. 390)

What is the thing we call Common Sense? It is prayer practically applied;

assistance given hope.

Howe, E.W.

Sinner Sermons (p. 7)

I call upon God, and beg him to be our savior out of a strange and

unwanted enquiry, and to bring us to the heaven of probability.

Plato

Tit?WeUS

48

The physical sciences are used to "praying over" their data, examining

the same data from a variety of points of view. This process has been very

rewarding, and has led to many extremely valuable insights. Without this

sort of flexibility, progress in physical science would have been much

slower. Flexibility in analysis is often to be had honestly at the price of

154

PRAYER 155

a willingness not to demand that what has already been observed shall

establish, or prove, what analysis suggests. In physical science generally,

the results of praying over the data are thought of as something to

be put to further test in another experiment, as indications rather than

conclusions.

Tukey, John W.

The Annals of Mathematical Statistics

The Future of Data Analysis

Volume 33, Number 1, March 1962 (p. 46)

PREDICTION

The aim of every science is foresight (prevoyunce). For the laws of

established observation of phenomena are generally employed to foresee

their succession. All men, however little advanced make true predictions,

which are always based on the same principle, the knowledge of the

future from the past.

Compte, Auguste

Quoted in Bertrand de Jouvenel's

The Art of Conjecture (p. 111)

Cutting up fowl to predict the future is, if done honestly and with as little

interpretation as possible a kind of randomization. But chicken guts are

hard to read and invite flights of fancy or corruption.

Hacking, Ian

The Emergence of Probability

Am Absent Family of Ideas (p. 3)

. . . if we can predict successfully on the basis of a certain explanation

we have good reason, and perhaps the best of reason, for accepting the

explanation.

Kaplan, Abraham

The Conduct of Inquiry

Chapter IX, Section 40 (p. 350)

Wall Street indexes predicted nine out of the last five recessions!

Samuelson, Paul A.

Newsweek

Science and Stocks

September 19, 1966 (p. 92)

156

PRE DZCTZON 157

“Hold your peace, old soothsayer,’’ said Heriot, who at that instant

entered the room with a calm and steady countenance. ”Your calculations

are true and undeniable when they regard brass and wire and mechanical

force; but future events are at the pleasure of Him who bears the hearts

of kings in His hands.”

Scott, Sir Walter

The Fortunes of Nigel

Chapter VI (p. 75)

To predict is one thing. To predict correctly is another.

unknown

WHAT DA’I IS IT? ( PROBABLY MOUOAY,

1

The most we can know is in term of probabilities.

Blnhazd P. F v - (See p. 167’)

PROBABILITY

FORD: Arthur, This is fantastic, we‘ve been picked up by a ship

with the new Infinite Improbability Drive, this is really incredible, Arthur

. . . Arthur, what’s happening?

ARTHUR: Ford, there’s an infinite number of monkeys outside who

want to talk to us about this script for Hamlet they’ve worked out.

Adam, Douglas

The Original Hitchhiker’s Guide to the Galaxy Radio Script

Fit the Second (pp. 41-2)

TRILLIAN: Five to one against and falling . . . four to one against and

falling . . . three to one . . . two . . . one . . . Probability factor one to one . . . we have normality . . . I repeat we have normality . . . anything you

still can’t cope with is therefore your own problem.

Adam, Douglas

The Original Hitchhiker’s Guide to the Galaxy Radio Script

Fit the Second (p. 42)

The Reader may here observe the Force of Numbers, which can be

successfully applied, even to those things, which one would imagine are

subject to no Rules. There are very few things which we know, which

are not capable of being reduc’d to a Mathematical Reasoning, and when

they cannot, its a Sign our Knowledge of them is very small and confus’d;

And where mathematical reasoning can be had, its as great folly to make

use of any other, as to grope for a thing in the dark, when you have

a Candle standing by you. I believe the Calculation of the Quantity of

Probability might be improved to a very useful and pleasant Speculation,

and applied to a great many Events which are accidental, besides those

of Games; . . .

Arbuthnot, John

Of the Laws of Chance

Preface

158

PROBABILZTY 159

The calculus of probabilities, when confined within just limits, ought to

interest, in an equal degree, the mathematician, the experimentalist, and

the statesman. From the time when Pascal and Fermat established its

first principles, it has rendered, and continues daily to render, services

of the most eminent kind. It is the calculus of probabilities, which, after

having suggested the best arrangements of the tables of populations

and mortality, teaches us to deduce from those numbers, in useful

character; it is the calculus of probabilities which alone can regulate

justly the premiums to be paid for assurances; the reserve funds for

the disbursements of pensions, annuities, discounts, etc. It is under its

influence that lotteries and other shameful snares cunningly laid for

avarice and ignorance have definitely disappeared.

Arago

Smithsonian Report

Eulogy on Laplace

1874 (p. 164)

For that which is probable is that which generally happens.

Aristotle

The Art of Rhetoric

Book I, Chapter I1

The good or evil of an event should be considered in view of the event's

likelihood of occurrence.

Amauld, Antoine

The Art of Thinking: Port-Royal Logic

Belief in future contingent events (p. 355)

Probability and Birds in the Yard

Atkins, Russell

Title of poem

Are no probabilities to be accepted, merely because they are not

certainties?

Austen, Jane

Sense and Sensibility

Volume I, Chapter 15

Life is a school of probability.

Bagehot, Walter

Quoted in Rudolf Flesch's

The New Book of Unusual Quotations

160 STATISTICALLY SPEAKING

The more ridiculous a belief system, the higher the probability of its

success.

Bartz, Wayne R.

Human Behavior

Keys to Success

Luck was not probability, but it acted through probability. It was, so

to speak, quantities of probability, a quantitative average throughout the

universe. And like any other fixed quantity, it could only be concentrated

or increased at the cost of a diminution elsewhere.

Bayley, Barrington J.

The Grand Wheel (p. 151)

Ambrozial weather will permeate all around Pordunk for the next 16

months, with rain and snow, and all sorts ov stuff in the ballance ov the

United States of America.

The probabilitiz that the abuv probabilitiz will assimilate themselfs tew

the principal probabilitiz in the case.

If they don’t, du notiss will be giv.

In the mean time be kalm, be digrufied, and don’t be skeerd.

Billings, Josh

Old Probability: Perhaps Rain-Perhaps Not

Probabilitiz 1873

. . . all is to them a dull round of probabilities and possibilities.

Blake, William

The Complete Writings of William Blake

The Ancient Britons

Probability is expectation founded upon partial knowledge. A perfect

acquaintance with all the circumstances affecting the occurrence of an

event would change expectation into certainty, and leave neither room

nor demand for a theory of probabilities.

Boole, George

Collected Logical Works

Volume I1

An Investigation of the Law of Thought

Chapter X M (p. 258)

Probabilities must be regarded as analogous to the measurement of

physical magnitudes; that is to say, they can never be known exactly,

but only within certain approximation.

Borel, Emile

Probabilities and Life

Introduction (pp. 32-3)

PRO BA BZLITY 161

It is easier to make true misleading statements in the subject of

probabilities than anywhere else.

Bostwick, Arthur E.

Science

The Theory of Probabilities

Volume 111, Number 54, January 10,1896 (p. 66)

Johnson. “If I am well acquainted with a man, I can judge with great

probability how he will act in any case, without his being restrained by

my judging. God may have this probability increased to certainty.”

Boswell, James

The Life of Samuel Johnson

Volume I1

April 15, 1778 (pp. 209-10)

Probability tells us what we ought to believe, what we ought to believe

on certain data . . . Probability is no more ’relative’ and ‘subjective’ than

is any other act of logical inference from hypothetical premise.

Bradley, F.H.

The Principles of Logic (p. 208)

Fate laughs at probabilities.

Bulwer, Lytton, E.G.

Eugene Aram

Book I

Chapter 10 (p. 71)

The play of imagination, in the romance of early youth, is rarely

interrupted with scruples of probability.

Bumey, Fanny

Camilla

Book 11, Chapter V (p. 102)

But to us, probability is the very guide to life. Butler, Joseph

The Analogy of Religion

Introduction (p. xxv)

. . . law, like other branches of social science, must be satisfied to test

the validity of its conclusions by the logic of probabilities rather than the

logic of certainty.

Cardozo, Benjamin N.

The Growth of the Law (p. 33)

162 STATlSTICALLY SPEAKING

”Do you think that to cut a man’s throat like that would need a great

force? Or, perhaps, only a very sharp knife?”

”I should say that it could not be done with a knife at all,” said the pale

doctor.

“Have you any thought,” resumed Valentine, ”of a tool with which it

could be done?”

“Speaking within modem probabilities, I really haven’t,” said the doctor,

arching his painful brow.

Chesterson, Gilbert Keith

The Father Brown Omnibus

The Innocence of Father Brown

The Secret Garden

. . . the electron is just a “smear of probability”.

Coats, R.H.

Journal of the American Statistical Association

Science and Society

Volume 34, Number 205, March 1939 (p. 6)

Unlike almost all mathematics, I agree completely with your statement

that every probability evaluation is a probability evaluation, that is,

something to which it is meaningless to apply such attributes as right,

wrong, rational, etc.

Cohen, John

Chance, Skill, and Luck

Chapter 2, Part 1 (p. 28)

Considine’s Law. Whenever one word or letter can change the entire

meaning of a sentence, the probability of an error being made will be in

direct proportion to the embarrassment it will cause.

Considine, Bob

Quoted in Paul Dickson’s

The Oficiul Rules (p. C-32)

Harry sighed irritably, pulled out a sheet of paper. “It’s a probability

equation.” He wrote:

P = f p n h f i f i f c

“What it means,” Harry Adams said, “is that the probability, p, that

intelligent life will evolve in any star system is a function of the

probability that the star will have planets, the number of habitable

planets, the probability that simple life will evolve on a habitable planet,

the probability that intelligent life will evolve from simple life, and the

PROBABILITY 163

probability that intelligent life will attempt interstellar communication

within five billion years. That’s all the equation says.”

Crichton, Michael

Sphere

The Briefing (p. 29)

“But the point is that we have no facts,” Harry said. “We must guess at

every single one of these probabilities.’’

Crichton, Michael

Sphere

The Briefing (p. 29)

The mathematical theory of probability is a science which aims at

reducing to calculation, where possible, the amount of credence due to

propositions or statements, or to the occurrence of events, future or past,

more especially as contingent or dependent upon other propositions or

events the probability of which is known.

Crofton, M.W.

The Encyclopaedia Britannicn

9th Edition

Probability

Indeed the intellectual basis of all empirical knowledge may be said to

be a matter of probability, expressible only in terms of a bet.

Dampier-Whetham, William

A History of Science

Chapter I11 (p. 155)

As for a future life, every man must judge for himself between conflicting

vague probabilities.

Darwin, Charles

The Life and Letters of Charles Darwin

Religion (p. 277)

. . . I should reply that the falsehood is all the greater when it appears in

the guise of truth, and that as fiction, the more it contains of the pleasing

and the possible the more it delights us.

de Cervantes, Miguel

The Ingenious Gentleman Don Quixote de la Mancha

Part I, Chapter 47

My thesis . . . is simply this:

PROBABILITY DOES NOT EXIST.

The abandonment of superstitious beliefs about. . . Fairies and Witches

was an essential step along the road to scientific thinking. Probability, too,

164 STATISTICALLY SPEAKING

if regarded as something endowed with some kind of objective existence,

is no less a misleading conception, an illusory attempt to exteriorize or

materialize our true probabilistic beliefs.

In investigating the reasonableness of our own modes of thought and

behavior under uncertainty, all we require, and all that we are reasonably

entitled to, is consistency among these beliefs, and their reasonable

relation to any kind of relevant objective data . . . This is Probability

Theory.

de Finetti, B.

Theory of Probability (p. x)

We defined the art of conjecture, or stochastic art, as the art of evaluating

as exactly as possible the probabilities of things, so that in our judgments

and actions we can always base ourselves on what has been found to be

the best, the most appropriate, the most certain, the best advised; this is

the only object of the wisdom of the philosopher and the prudence of

the statesman.

de Jouvenel, Bertrand

The Art of Conjecture

(p. 21, note 19)

But how is it they suffer themselves to incline to and be swayed by

probability, if they know not the truth itself?

de Montaigne, Michel Eyquem

The Essays

Essays 11,12

Deifield’s Principle. The probability of a young man meeting a desirable

receptive young female increases by pyrimidical progression when he is

already in the company of (1) a date, (2) his wife, (3) a better looking

and richer male friend.

Deifield, Ronald H.

Quoted in Paul Dickson’s

The OfFcial Rules (p. B-12)

The statistician’s report to management should not talk about

probabilities. It will merely give outside margins of error for the results

of chief importance.

Deming, William Edwards

Sample Design in Business Research (p. 13)

As to the influence and genius of great generals-there is a story that

Enrico Fermi once asked Gen. Leslie Groves how many generals might be

called “great”. Groves said about three out of every 100. Fermi asked how

a general qualified for the adjective, and Groves replied that any general

PROBABILITY 165

who had won five major battles in a row might safely be called great. This

was in the middle of.World War II. Well, then, said Fermi, considering

that the opposing forces in most theaters of operation are roughly equal,

the odds are one of two that a general will win a battle, one of four that

he will win two battles in a row, one in eight for three, one of sixteen for

four, one of thuty-two for five. “So you are right, General, about three

out of every 100. Mathematical probability, not genius.”

Deming, William Edwards

Out ofthe Crisis (p. 394)

There can be no unique probability attached to any event or behaviour:

we can only speak of ”probability in the light of certain given

information”, and the probability alters according to the extent of the

information.

Eddington, Sir Arthur Stanley

The Nature of the Physical World (p. 315)

One difficulty in employing strength of belief as a measure of probability

is that an expectation of belief has partly a subjective bias. We have

agreed that it depends (and ought to depend) on the information

or evidence supplied; but in addition the strength of the expectation

depends on the personality of the man who weighs the evidence. We

try to remove this subjective element by saying that the true probability

corresponds to the judgment of a ’right-thinking person’; but how shall

we define this ideal reference? We do not mean a perfectly logical person,

for there is no question of making a strictly logical deduction from the

evidence; if that were possible the conclusion would be a matter of

certainty not probability. We do not mean a person gdted with secondsight,

for we want to know the probability relative to the information

stated and not relative to occult information. We do not particularly

mean a person of long experience in similar judgments, for he is likely

to use his past experience to supplement surreptitiously the information

on which the judgment of probability is ostensibly based. Apart from the

obvious definition of a right-thinking person as ‘someone who thinks as

I do’ (which is probably the definition at the back of our minds) there

seems to be no easy way of defining his qualities.

Eddington, Sir Arthur Stanley

New Pathways in Science

Probability (p. 112)

In most modem theories of physics probability seems to have replaced

aether as ”the nominative of the verb ’to undulate”’.

Eddington, Sir Arthur Stanley

New Pathways in Science

Probability (p. 110)

166 STATISTICALLY SPEAKING

Probability may be described, agreeably to general usage, as importing

partial incomplete belief.

Edgeworth, Francis Ysidro

Mind

The Philosophy of Chance

Volume 9,1884

. . . ignorance gives one a large range of probabilities.

Eliot, George

Daniel Deronda 11

xiii (p. 100)

Secrets are rarely betrayed or discovered according to any program

our fear has sketched out. Fear is almost always haunted by terrible

dramatic scenes, which recur in spite of the best-argued probabilities

against them. . .

Eliot, George

The Mill on the Floss

Book v, v

Still there is a possibility-even a probability-the other way.

Eliot, George

The George Eliot Letters

Volume I1 (p. 127)

But I see no probability of my being able to be with you before your

other Midsummer visitors arrive.

Eliot, George

The George Eliot Letters

Volume I1 (p. 160)

Fourth Law of Thermodynamics. If the probability of success is almost

one, then it is damn near zero.

Ellis, David

Quoted in Paul Dickson’s

TIE q c i a r Rules (p. F-60)

Probability is a mathematical discipline with aims akin to those, for

example, of geometry or analytical mechanics. In each field we must

carefully distinguish three aspects of the theory: (a) the formal logical

content, (b) the intuitive background, (c) the applications. The character,

and the charm, of the whole structure cannot be appreciated without

considering all three aspects in their proper relation.

Feller, William

An Introduction to Probability Theory and Its Applications (p. 1)

PROBABILITY 167

All possible "definitions" of probability fall short of the actual practice.

Feller, William

An Introduction to Probability Theory and Its Applications (p. 19)

In its efforts to learn as much as possible about nature, modem physics

has found that certain things can never be "known" with certainty. Much

of our knowledge must always remain uncertain. The most we can know

is in terms of probabilities.

Feynman, Richard P.

The Feynman Lectures on Physics (pp. 6-11)

. . . the ratios or probabilities of which we have been speaking have no

absolute signification with reference to an event which has occurred . . .

They represent only the state of expectation of the mind of a person before

the event has occurred, or having occurred before he is informed of the

results.

Forbes, J.D.

The London, Edinburgh and Dublin Philosophical h4agazine and Journal of Science

On the alleged evidence for a Physical Connection between

Stars forming Binary or Multiple Groups

Third Series, December 1850 (p. 406)

It is a question of probabilities . . .

Freeman, R. Austin

A Certain Dr. Thorndyke

Thomdyke Makes a Beginning

The balance of probabilities is in favor of that view.

Friedman, Thomas L.

From Beirut to Jerusalem (p. 35)

Philosophy goes no further than probabilities, and in every assertion

keeps a doubt in reserve.

Froude, James Anthony

Short Studies on Great Subjects

Calvinism (p. 51)

After all, without the experiment-either a real one or a mathematical

model-there would be no reason for a theory of probability.

Fry, Thomton C.

Probability and Its Engineering Uses (p. 15)

But if probability measures the importance of our state of ignorance it

must change its value whenever we add new knowledge. And so it does.

Fry, Thomton C.

Probability and Its Engineering Uses (p. 145)

168 STATlSTlCALLY SPEAKING

Lest men suspect your tale untrue,

Keep probability in view.

Gay, John

John Gay: Poetry and Prose

Fables

The Painter Who Pleased Nobody and Everybody

1. 1

Men are deplorably ignorant with respect to natural things, and modem

philosophers, as though dreaming in the darkness, must be aroused and

taught the uses of things, the dealing with things; they must be made to

quit the sort of learning that comes only from books, and that rests only

on vain arguments from probability and upon conjecture.

Gilbert, William

On the Loadstone and Magnetic Bodies and on the Great h4agnet the Earth

Book 1, Chapter 10

Of course, if your work is strong, and you can afford to wait, the

probability is that half a dozen people will at last begin to shout that

you have been monstrously neglected, as you have.

Gissing, George

New Grub Street

Interim (p. 411)

It is only by mature meditation on the possibilities and probabilities of

future events-that we can elude the tortuous troubles of the tomorrows.

Gracian, Balthasar

Quoted in Thomas G. Corvan’s

The Best of Grucian (p. 22)

Whereas wisdom favors the probabilities, folly favors only the

possibilities.

Gracian, Balthasar

Quoted in Thomas G. Corvan’s

The Best of Grucian (p. 38)

Wisdom does not trust to probabilities; it always marches in the midday

light of reason.

Gracian, Balthasar

Quoted in Rudolf Flesch’s

The New Book of Unusual Quotations

PROBA BZLZTY 169

. . . the contradictory of a welcome probability will assert itself whenever

such an eventuality is likely to be most frustrating.

Gumperson, R.F.

Changing Times

Gumperson’s Law

Volume 11, Number 11, November, 1957 (p. 46)

The outcome of a given desired probability will be inverse to the degree

of desirability.

Gumperson, R.F.

Changing Times

Gumperson’s Law

Volume 11, Number 11, November, 1957 (p. 46)

Probability is too important to be left to the experts.

Hamming, Richard W.

The Art of Probability for Scientists and Engineers (p. 4)

Probability is truth in some degree.

Harris, Errol E.

Hypothesis and Perception

The Logic of Construction (p. 342)

probability = (possibility)\*

Herbert, Nick

Quantum Reality (p. 96)

No priest or soothsayer that ever lived could hold his own against Old

Probabilities.

Holmes, O.W.

Pagesfrom an Old Volume of Life (p. 327)

As for probabilities, what thing was there ever set down so agreeable

with sound reason but some probable show against it might be made.

Hooker, Richard

Quoted in S. Austin Allibone’s

Prose Quotations from Socrates to Mncauhy

Probability

A reasonable probability is the only certainty.

Howe, E.W.

Sinner Sermons (p. 23)

1 70 S TATZS TZCA LLY SPEAKING

All knowledge resolves itself into probability.

Hume, David

A Treatise of Human Nature

Book I, Part IV, Section 1

”Now, your Honor; in much the same way that there are laws goveming

our society, there are also laws goveming chance, and these are called

the laws of probability, and it is against these that we must examine the

use of an identical division number.”

Hunter, Evan

The Paper Dragon

Tuesday

Chapter 6

Magic and devils offend our sense of probabilities.

Hwley, Aldous

Proper Studies

Varieties of Intelligence (p. 7)

. . . I have finally judged that it was better worth while to publish this

writing such as it is, than to let it run the risk, by waiting longer, of

remaining lost.

There will be seen in it demonstrations of those kinds which do not

produce as great a certitude as those of geometry, and which even differ

much therefrom, since, whereas the geometers prove their propositions

by fixed and incontestable principles, here the principles are verified by

the conclusions to be drawn from them; the nature of these things not

allowing of this being done otherwise. It is always possible to attain

thereby to a degree of probability which very often is scarcely less than

complete proof. To wit, when things which have been demonstrated

by the principles that have been assumed correspond perfectly to the

phenomena which experiment has brought under observation; especially

when there are a great number of them, and further, principally, when

one can imagine and foresee new phenomena which ought to follow from

the hypotheses which one employs, and when one finds that therein the

fact corresponds to our prevision. But if all these proofs of probability

are met with in that which I propose to discuss, as it seems to me they

are, this ought to be a very strong confirmation of the success of my

Huygens, Christiaan

Treatise on Light

Preface

inquiry.. .

PROBABILITY 171

"Juries hate scientific evidence."

"They think they won't be able to understand it so naturally they can't

understand it. As soon as you step into the box you see a curtain of

obstinate incomprehension clanging down over their minds. What they

want is certainty. Did this paint particle come from this car body? Answer

yes or no. None of those nasty mathematical probabilities we're so fond

of."

James, P.D.

Death of an Expert Witness

Book 11, Chapter 111 (p. 83)

Perhaps an editor might begin a reformation in some way as this. Divide

his paper into four chapters, heading the lst, Truth. 2nd, Probabilities.

3rd, Possibilities. 4th, Lies.

Jefferson, Thomas

Letter to John Norvell

June 11,1807

To the author the main chain of probability theory lies in the

enormous variability of its applications. Few mathematical disciplines

have contributed to as wide a spectrum of subjects, a spectrum ranging

from number theory to physics, and even fewer have penetrated so

decisively the whole of our scientific thinking.

Kac, Mark

Lectures in Applied Mathematics

Volume I

Probability and Related Topics in Physical Sciences (p. ix)

Equiprobability in the physical world is purely a hypothesis . . . Thus,

the statement "head and tail are equiprobable'' is at best an assumption.

Kasner, Edward

Newman, James

Mathematics and the Imagination (p. 251)

. . . others have suggested seriously a 'barometer of probability'.

Keynes, John Maynard

A Treatise on Probability

Chapter 111 (p. 20)

Probability is, so far as measurement is concerned, closely analogous to

Keynes, John Maynard

A Treatise on Probability

Chapter 111 (p. 28)

Similarity.

172 STATZSTZCALLY SPEAKlNG

It is difficult to find an intelligible account of the meaning of 'probability',

or of how we are ever to determine the probability of any particular

proposition; and yet treatises on the subject profess to arrive at

complicated results of the greatest precision and the most profound

practical importance.

Keynes, John Maynard

A Treatise on Probability

Chapter IV (p. 251)

The theory of probability as mathematical discipline can and should

be developed from axioms in exactly the same way as Geometry and

Algebra.

Kolmogorov, Andrei N.

Foundations of the Theory of Probability

Chapter 1

Elementary Theory of Probability (p. 1)

. . . there is no problem about probability: it is simply a non-negative,

additive set function, whose maximum value is unity.

Kyburg, H.E., Jr. and Smokler, H.E.

Studies in Subjective Probability (p. 3)

It is remarkable that a science that began by considering games of chance

should itself be raised to the rank of the most important subject of human

knowledge.

Laplace, Pierre-Simon

A Philosophical Essay on Probabilities (p. 123)

The most important questions of life are, for the most part, really only

problems of probability.

. . . in the small number of things we are able to know with any certainty

. . . the principle means of arriving at the truth . . . are based on

probabilities. . .

Laplace, Pierre-Simon

A Philosophical Essay on Probabilities (p. 1)

Probability has reference partly to our ignorance, partly to our

knowledge.

Laplace, PierreSimon

Essai Philosophique sur les Probabilith (p. 9)

PROBABILITY 1 73

. . . the art of weighing probabilities is not yet even partly explained,

though it would be of great importance in legal matters and even in the

management business.

Leibniz, Gottfried Wilhelm

Leibniz: Philosophical Papers and Letters

Volume I

Letter to John Frederick, Duke of Brunswick Hanover (p. 399)

There is no such thing as the probability of four aces in one hand, or the

probability of anything else. Given all the relevant data which there are

to be known, everything is either certainly true or certainly false.

Lewis, Clarence Irving

Mind and the World-Order

Chapter X (p. 330)

A ”poor evaluation” of the probability of anything may reflect ignorance

of relevant data which “ought” to be known . . .

Lewis, Clarence Irving

Mind and the World-Order

Chapter X (p. 331)

. . . empirical knowledge is exclusively a knowledge of probabilities . . .

Lewis, Clarence Irving

Mind and the World-Order

Chapter X I (p. 345)

We may not be able to get certainty, but we can get probability, and half

a loaf is better than no bread.

Lewis, C.S.

Christian Reflections

Para. 22 (p. 111)

The probability that we may fall in the struggle ought not to deter us from

the support of a cause we believe to be just; it shall not deter me.

Lincoln, Abraham

The Sub-Treasury Speech

Springfield, Illinois

December 26,1839

Are we probabilists, believers, or fuzzifiers?

Lindley, Dennis V.

Statistical Science

Comment: A Tale of Two Wells

Volume 2, Number 1

February 1987 (p. 38)

174 STATISTICALLY SPEAKING

Probability is the appearance of agreement upon fallible proofs.

Locke, John

An Essay Concerning Human Understanding

Book IV, XV, 1

Probability is likeness to be true . . .

Locke, John

An Essay Concerning Human Understanding

Book IV, XV, 4

The mind ought to examine all the grounds of probability, and upon

a due balancing the whole, reject or receive it proportionably to the

preponderancy of probability on the one side or the other.

Locke, John

Quoted in S. Austin Allibone's

Prose Quotations from Socrates to Macaulay

Probability

It wasn't a probability anymore, it was a reality.

Ludlum, Robert

The Bourne Supremacy

Chapter 18 (p. 256)

It was a desperate strategy, based on probabilities, but it was all he had

left.

Ludlum, Robert

The Bourne Supremacy

Chapter 24 (p. 365)

Messenger said, "Can you work out any equations of probability of one

hitting here?"

"No sir. A hurricane has no memory. Like a coin. If a coin comes up

heads fifty times, the odds on the next flip are still fifty-fifty, head or

tail. But if you flip it ten thousand times, you'll get five thousand heads,

plus or minus."

MacDonald, John D.

Condominium: A Novel

Chapter 26 (p. 235)

If absolutes had disappeared under the inquiries of science, and

apparently they had, why then the only rational procedure, the only

procedure consistent with man's development, was to follow where the

probabilities led.

Masters, Dexter

The Accident (p. 19)

PROBABILZ" 175

Uncertainty is introduced, however, by the impossibility of making

generalizations, most'of the time, which happens to all members of a

class. Even scientific truth is a matter of probability and the degree of

probability stops somewhere short of certainty.

Minnick, Wayne C.

The Art of Persuasion (p. 167)

The probability is, I suppose that the Monarchy has become a kind of

ersatz religion. Chesterton once remarked that when people ceased to

believe in God they do not believe in nothing, but in anything.

Muggeridge, Malcolm

New Statesman 1955

Take away probability, and you can no longer please the world; give

probability, and you can no longer displease it.

Pascal, Blaise

The Thoughts of Blaise Pascal

Appendix: Polemical Fragments

918

Probabilities are summaries of knowledge that is left behind when

information is transferred to a higher level of abstraction.

Pearl, Judea

Probabilistic Reasoning in Intelligent Systems (p. 21)

Hitherto the user has been accustomed to accept the function of

probability theory laid down by the mathematicians; but it would be

good if he could take a larger share in formulating himself what are the

practical requirements that the theory should satisfy in applications.

Pearson, E.S.

Biometrika

The Choice of Statistical Test Illustrated on the Interpretation of

Data Classed in a 2 x 2 Table

Volume 34, Number 35,1948 (p. 142)

. . . it may be doubtful if there is a single extensive treatise on probabilities

in existence which does not contain solutions absolutely indefensible.

Peirce, Charles Sanders

Writings of Charles Sanders Peirce

Volume 3 (p. 278)

This branch of mathematics [probability] is the only one, I believe, in

which good writers frequently get results entirely erroneous.

Peirce, Charles Sanders

Writings of Charles Sanders Peirce

Volume 3 (p. 279)

176 STATISTICALLY SPEAKING

The idea of probability essentially belongs to a kind of inference which

is repeated indefinitely. An individual inference must be either true or

false, and can show no effect of probability; and, therefore, in reference

to a single case considered in itself, probability can have no meaning.

Peirce, Charles Sanders

Writings of Charles Sanders Peirce

Volume 3 (p. 281)

I know too well that these arguments from probabilities are impostors,

and unless great caution is observed in the use of them, they are apt to

be deceptive.

Plato

Phaedo

92

”I think we can see the extent of the problem. I’ve measured harmonics

up to the sixth-order already, and still propagating.” He paused to look

at the other faces for disagreement. There wasn’t any. “If this goes on,” he

said evenly, ”I project a nine-nines probability that within one standard

year the disturbances will be effectively both plenary and irreversible.”

Pohl, Frederik

The Coming of the Quantum Cats (p. 189)

The very name calculus of probabilities is a paradox. Probability opposed

to certainty is what we do not know, and how can we calculate what we

do not know?

Poincar6, Henri

The Foundations of Science

Science and Hypothesis (p. 155)

No matter how solidly founded a prediction may appear to us, we

are never absolutely sure that experiment will not contradict it, if we

undertake to venfy it . . . It is far better to foresee even without certainty

than not to foresee at all.

Poincar6, Henri

The Foundations of Science

Science and Hypothesis (p. 129)

The most important application of the theory of probability is to what

we may call ‘chance-like’ or ’random’ events, or occurrences. These seem

to be characterized by a peculiar kind of incalculability which makes one

disposed to believe-after many unsuccessful attempts-that all known

PROBABILITY 177

rational methods of prediction must fail in their case. We have, as it

were, the feeling that not a scientist but only a prophet could predict

them. And yet, it is just this incalculability that makes us conclude that

the calculus of probability can be applied to these events.

Popper, Karl R.

The Logic of Scientific Discovery (p. 150)

"You haven't heard of probability math? You, and tomorrow you become

Chairman of the Board of Widdershins and heir to riches untold? Then

first we will talk, and then we will eat."

Pratchett, T .

The Dark Side of the Sun ( p . 13)

"I can't pretend to understand probability math. But if the universe is

so ordered, so-immutable-that the future can be told by a handful of

numbers, then why need we go on living?"

Pratchett, T .

The Dark Side of the Sun ( p . 22)

"Understanding is the first step towards control. We now understand

probability. . ."

Pratchett, T .

The Dark Side of the Sun ( p . 37)

. . . by the mathemagic of probability, sifting through the population of

the galaxy to find those who's probability profile matched the theoretical

one for the discoverers of Jokers World.

Pratchett, T .

The Dark Side of the Sun ( p . 153)

PROBABILI'IY MATH:

"As with the first Theory of Relativity and the Sadhimist One

Commandment, so the nine equations of probability math provide an

example of a deceptively simple spark initiating a great explosion of

social change."

"Probability math predicts the future." So says the half-educated man . . .

"Probability math arises from the premise that we dwell in a truly infinite

totality, space and time without limit, worlds without end-a creation so

vast that what we are pleased to call our cause-and-effect datum Universe

is a mere circle of candlelight. In such a totality we can only echo the

words of Quixote: All things are possible . . ."

Pratchett, T.

The Dark Side of the Sun ( p . 24)

178 STATISTICALLY SPEAKING

In this case probability must atone for want of Truth.

Prior, Matthew

The Literary Works of Matthew Prior

Solomon

Preface (p. 309)

A thousand probabilities does not make one fact.

Proverb, Italian

I think I perceive or remember something but am not sure; this would

seem to give me some ground for believing it, contrary to Mr. Keynes'

theory, by which the degree of belief in it which it would be rational

for me to have is that given by the probability relation between the

proposition in question and the things I know for certain.

Ramsey, Frank Plumpton

The Foundation of Mathematics and Other Logical Essays

Truth and Probability

The Logic of Consistency (p. 190)

I feign probabilities. I record improbabilities.

Reade, Charles

A Tm'ble Temptation: a story of the day

Good and bad come mingled always. The long-time winner is the

man who is not unreasonably discouraged by persistent streaks of ill

fortune not at other times made reckless with the thought that he is

fortune's darling. He keeps a cool head and trusts in the mathematics of

probability, or as often said, the law of averages.

Redfield, Roy A.

Factors of Grozoth in a Law Practice (p. 168)

There is a special department of hell for students of probability. In

this department there are many typewriters and many monkeys. Every

time that a monkey walks on a typewriter, it types by chance one of

Shakespeare's sonnets.

Russell, Bertrand A.

Nightmares of Eminent Persons

The Metaphysician's Nightmare (p. 29)

When we want something, we always have to reckon with probabilities.

Sartre, Jean-Paul

The Philosophy of Existentialism (p. 46)

PRO BA BZLZTY 1 79

It is better to be satisfied with probabilities than to demand

impossibilities and starve.

Schiller, Friedrich

Quoted in Rudolf Flesch's

The New Book of Unusual Quotations

And nobody can get . . . far without at least an acquaintance with the

mathematics of probability, not to the extent of making its calculations

and filling examination papers with typical equations, but enough to

know when they can be trusted, and when they are cooked. For when

their imaginary numbers correspond to exact quantities of hard coins

unalterably stamped with heads and tails, they are safe within certain

limits; for here we have solid certainty . . . but when the calculation

is one of no constant and several very capricious variables, guesswork,

personal bias, and pecuniary interests, come in so strong that those who

began by ignorantly imagining that statistics cannot lie end by imagining

equally ignorantly, that they never do anything else.

Shaw, George Bernard

The World of Mathematics

Volume 3 (p. 1531)

The Vice of Gambling and the Virtue of Insurance

I hope that you flourish in Probabilities.

Letter from Francis Ysidro Edgeworth to Karl Pearson

11 September 1893

Quoted in Stephen M. Stigler's

The History of Statistics

Chapter 10 (p. 326)

If we postulate that within un-, sub- or supematural forces the probability

is that the law of probability will not operate as a factor, then we must

accept that the probability of thejirst part will not operate as a factor with

un-, sub- or supematural forces. And since it obviously hasn't been doing

so, we can take it that we are not held within un-, sub- or supematural

forces after all; in all probability, that is.

Stoppard, Tom

Rosencrantz and Guildenstern Are Dead

Act One (p. 17)

For we know in part, and we prophesy in part.

The Bible

I Corinthians 13:9

180 STATISTICALLY SPEAKING

A pinch of probability is worth a pound of perhaps.

Thurber, James

Lanterns and Lances

Such a Phrase as Drifts Through Dreams

Though moral certainty be sometimes taken for a high degree of

probability, which can only produce a doubtful assent, yet it is also

frequently used for a firm assent to a thing upon such grounds as fully

satisfy a prudent man.

Tollotson, John

Quoted in S. Austin Allibone's

Prose Quotations from Socrates to Mucaulay

Probability

It is a known fact that if a man uses one of the end urinals his probability

of being pissed on is reduced by 50 percent.

Unknown

He who has heard the thing told by twelve thousand eye-witnesses,

has only twelve thousand probabilities, equal to one strong probability,

which is not equal to certainty.

Voltaire

The Portable Voltaire

Philosophical Dictionary

Truth

From generation to generation skepticism increases; and probability

diminishes; and soon probability is reduced to zero.

Voltaire

The Portable Voltaire

Philosophical Dictionary

Truth

Almost all human life depends on probabilities.

Voltaire

Essays

Probabilities

In short, absolute, so-called mathematical factors never find a firm

basis in military calculations. From the very start there is an interplay

of possibilities, probabilities, good luck and bad that weaves its way

throughout the length and breadth of the tapestry. In the whole range

of human activities war most closely resembles a game of cards.

von Clausewitz, Karl

On War

Chapter 1,21 (p. 86)

PROBABILITY 181

The theory of probability can never lead to a definite statement

concerning a single event.

von Mises, Richard

Probability, S tu tistics and Truth

First Lecture (p. 33)

. . . if one talks of the probability that the two poems known as the

Iliad and the Odyssey have the same author, no reference to a prolonged

sequence of cases is possible and it hardly makes sense to assign a

numerical value to such a conjecture.

von Mises, Richard

Mathematical Theory of Probability and Statistics (pp. 13-4)

One can locate an octopus by giving the coordinates of his beak, but

it would be unwise to forget that neighboring coordinates for two or

three yards out in all directions have a considerable probability of being

occupied by octopus at a given instant.

Walker, Marshall

The Nature of Scient@ Thought (p. 65)

The road is a strange place. Shuffling along I looked up and you were

there walking across the grass toward my truck on an August day. In

retrospect, it seemed inevitablcit could not have been any other way-a

case of what I call the high probability of the improbable.

Waller, Robert James

The Bridge of Madison County (pp. 22-3)

But Positivistic science is solely concemed with observed fact, and must

hazard no conjecture as to the future. If observed fact be all we know,

then there is no other knowledge. Probability is relative to knowledge.

There is no probability as to the future within the doctrine of Positivism.

Whitehead, Alfred North

Adventures of Ideas

Cosmologies (p. 125)

Only a certain probability remains of a one-to-one association of any

spatial feature now with a similar feature a moment later. It is sheer luck,

in a sense, that any physical apparatus stays put, for the laws of quantum

mechanics allow it a finite, though small, probability of dispersing while

one is not looking, or even while one is.

Whyte, Lancelot Law

Essay on Atomism: from Democritus to 2960

Chapter 2 (pp. 25-6)

182 STATISTICALLY SPEAKING

If the universe is a mingling of probability clouds spread through a

cosmic eternity of space-time, how is there as much order, persistence,

and coherent transformation as there is?

Whyte, Lancelot Law

Essay on Atomism:from Democritus to 1960

Chapter 2 (p. 27)

Gilbert . . . No ignoble consideration of probability, that cowardly

concession to the tedious repetitions of domestic or public life, affect

it ever.

Wilde, Oscar

The Critic as Artist

Part I

Ashley had no competitive sense and no need for money, but he took

great interest in the play of numbers. He drew up charts analyzing the

elements of probability in the various games. He had a memory for

numbers and symbols.

Wilder, Thomton

The Eighth Day

11, Illinois to Chile (p. 123)

The theory of probabilities and the theory of errors now constitute a

formidable body of knowledge of great mathematical interest and of great

practical importance. Though developed largely through the applications

to the more precise sciences of astronomy, geodesy, and physics, their

range of applicability extends to all the sciences; and they are plainly

destined to play an increasingly important role in the development and

in the applications of the sciences of the future. Hence their study is not

only a commendable element in a liberal education, but some knowledge

of them is essential to a correct understanding of daily events.

Woodward, Robert S.

Probability and Theory of Errors

Preface

PROBABLE

In short, these fundamental elements of scientific knowledge assimilate

and grow, coalesce and separate and recombine, shrink and wane, die

and come to life again; and while they persist they are never more than

probable.

Barry, Frederick

The Scient@ Habit of Thought (p. 139)

. . . it is always probable that something improbable will happen.

Bleckley, Logan E.

Warren v. Purtell, 63 Georgia Reports 428, 430 (1879)

. . . many sensations are probable, that is, though not accounting to a full

perception they are yet possessed of a certain distinctness and cleamess,

and can serve to direct the conduct of the wise man.

Cicero

De Natura Deorum

Book I, Chapter 5, section 12

The laws of chance tell us what is probable, but not what is certain to

happen. They do not predict. They do not tell us what will, but what

my, happen.

de Leeuw, A.L.

Rambling through Science

Gambling (p. 88)

When it is not in our power to determine what is true, we ought to act

accordingly to what is most probable . . .

Descartes, Rent!

Discourse on the Method of Rightly Conducting the

Reason and Seekingfor Truth in the Sciences

Part 111

183

184 STATlSTlCALLY SPEAKlNG

Such a fact is probable, but undoubtedly false.

Gibbon, Edward

The Decline and Fall of the Roman Empire

Notes: Chapter XXIV, 116

Of that there is no manner of doubt,

No probable, possible, shadow of doubt,

No possible doubt whatever.

Gilbert, W.S.

Sullivan, Arthur

The Complete Plays of Gilbert and Sullivan

The Gondoliers

Act I

The only seasonable inquiry is, Which is of probables the most, or of

improbables the least, such.

Hammond, Henry

Quoted in S. Austin Alibone’s

Prose Quotations from Socrates to Macaukay

Probability

The only knowledge a priori is purely analytic; all empirical knowledge

is probable only.

Lewis, Clarence Irving

Mind and the World-Order

Chapter X (p. 309)

There are certain notions which it is impossible to define adequately.

Such notions are found to be those based on universal experience

of nature. Probability is such a notion. The dictionary tells me that

’probable’ means ’likely’. Further reference gives the not very helpful

information that ‘likely’ means ’probable’.

Moroney, M.J.

Facts from Figures

The Laws of Chance (p. 4)

But is it probable that probability gives assurance?

Pascal, Blaise

The Thoughts of Blaise Pascal

Appendix: Polemical Fragments, 908

As being is to become, so is truth to belief . . . Enough if we adduce

probabilities as likely as any other; for we must remember that I who

am the speaker, and you who are the judges, are only mortal men, and

we ought to accept the tale which is probable and enquire no further . . .

Plato

Timaeus

29

PROBABLE

Predicted facts . . . can only be probable.

185

PoincarC, Henri

The Foundations of Science

Science and Hypothesis (p. 155)

I think that we shall have to get accustomed to the idea that we must

not look upon science as a 'body of knowledge' but rather as a system of

hypotheses; that is to say, as a system of guesses or anticipations which

in principle cannot be justified, but with which we work as long as they

stand up to tests, and of which we are never justified in saying that we

know that they are 'true' or 'more or less certain' or even 'probable'.

Popper, Karl R.

The Logic of Scientific Discovery (p. 317)

To say that observations of the past are certain, whereas predictions are

merely probable, is not the ultimate answer to the question of induction;

it is only a sort of intermediate answer, which is incomplete unless a

theory of probability is developed that explains what we should mean

by "probable" and on what ground we can assert probabilities.

Reichenbach, Hans

The Rise of Scientific Philosophy (p. 93)

All views are only probable, and a doctrine of probability which is not

bound to a truth dissolves into thin air. In order to describe the probable,

you must have a firm hold on the true. Therefore, before there can be

any truth whatsoever, there must be absolute truth.

Sartre, Jean-Paul

The Philosophy of Existentialism (p. 51)

It may be probable she lost it . . .

Shakespeare, William

The Complete Works of William Shakespeare

C ymbeline

Act 11, Scene 4, 1. 115

Most probable

That so she died . . .

Shakespeare, William

The Complete Works of William Shakespeare

Anthony and Cleopatra

Act V, Scene 2,1.76

'lis probable and palpable to thinking.

Shakespeare, William

The Complete Works of William Shakespeare

Othello, The Moor of Venice

Act I, Scene 2, 1. 76

186 STATZSTlCA L LY SPEAKING

Which to you shall seem probable . . .

Shakespeare, William

The Complete Works of William Shakespeare

The Tempest

Act V, Scene 1,l. 249

How probable, I do not know

Shakespeare, William

The Complete Works of William Shakespeare

Coriolanus

Act IV, Scene 2,l. 178

'lis pretty, sure, and very probable . . .

Shakespeare, William

The Complete Works of William Shakespeare

As You Like It

Act 111, Scene 5, 1. 11

That is accounted probable which has better arguments producible for it

than can be brought against it.

South, Robert

Quoted in S. Austin Alibone's

Prose Quotations fiom Socrates to Macaulay

Probability

The management of changes is the effort to convert certain possibles into

probables, in pursuit of agreed-on preferables.

Toffler, Alvin

Future Shock (p. 407)

It is probable that many things will happen contrary to probability.

Unknown

In all the ordinary affairs of l i e men are used to guide their actions by

this rule, namely to incline to that which is most probable and likely

when they cannot attain any clear unquestionable certainty.

Wilkins, John

Of the Principles and Duties of Natural Religion (p. 30)

PROBLEMS

I have yet to see any problem, however complicated, which, when you

looked at it in the right way, did not become still more complicated.

Anderson, Poul

Quoted in William Thorpe’s article

Reduction v. organicism

New Scientist

Volume 43, Number 66,25 September 1969 (p. 638)

Most problems have either many answers or no answer. Only a few

problems have a single answer.

Berkeley, Edmund C.

Computers and Automation

Right Answers-A Short Guide for Obtaining Them

September 1969

h i d e every large problem is a small problem struggling to get out.

Bloch, Arthur

Murphy’s Law

Hoare’s Law of Large Problems (p. 50)

Man is seen to be an enigma only as an individual, in mass, he is a

mathematical problem.

Chambers, Robert

Vestiges of the Natural History of Creation (p. 333)

It isn’t that they can’t see the solution. It is that they can’t see the problem.

Chesterson, Gilbert Keith

The Father Brown Omnibus

The Scandal of Father Brown

The Point of the Pin (p. 949)

. . . you’re either part of the solution or part of the problem.

Cleaver, Eldridge

Speech in San Francisco, 1968

187

QUALITY CONTROL

MTBF n. [Mean T i e Between Failure.] . . . Manufacturers have long

been aware that too high a value for the MTBF (measured, usually, in

decades or fractions of decades) leads to a stultifying sense of boredom

and complacency on the part of the user.

Kelly-Bootle, Stan

The Devil’s DP Dictionary

M’ITR n. [Mean T i i e To Repair. Origin: mean ”poor or inferior in grade

or quality” + repair ”to take off”: as, Let’s repair to the bar.] The possible

sum of the following series, for which there is no easy convergence test:

M-”F Mean T i e To Notice Fault

M’ITRTF Mean Time To React To Fault

MTTLFEPN Mean T i e To Locate Field Engineer’s Phone

Number

MTTCFE Mean T i e To Call Field Engineer

MTAFECB Mean Tiie Awaiting Field Engineer’s Call Back

MTTCSC Mean T i e To Check Service Contract

MTTCFES Mean Time To Call Field Engineer’s Superior

MTTLTFEDBS Mean T i e To Listen To Field Engineer’s Disclaimer

Blaming Software

MTTCA Mean Time To Call Attomey

MTFFETA Mean Tune For Field Engineer To Arrive

MTrD Mean T i e To Diagnose

MTTLTFEDBS Mean T i e To Listen To Field Engineer’s Disclaimer

Blaming Software

MTOOSCM x M# Mean T i e Ordering/Obtaining Software/Changing

Modules multiplied By Number of Modules

M’ITRB Mean T i e To ReBoot

MTTRRB Mean T i e To ReReBoot

Kelly-Bootle, Stan

The Devil‘s DP Dictionary

188

QUALZTY CONTROL 189

The fundamental difference between engineering with and without

statistics boils down ,to the difference between the use of a scientific

method based upon the concept of laws of nature that do not allow for

chance or uncertainty and a scientific method based upon the concepts

of laws of probability as an attribute of nature.

Shewhart, W.A.

University of Pennsylvania Bicentennial Conference

Without quality control you, as a producer or purchaser, are in the same

position as the man who bets on a horse racewith one exception, the

odds are not posted.

Steadman, Frank M.

Textile World

Quality Control Posts Mill-Production Odds

Volume 94, Jul-Dec 1944 (p. 63)

You can't inspect quality into a product.

Unknown

Wall Street indexes predicted nine out of the last five recessions I

Paul A. Samuelson - (See p. 156)

QUEUE

Hurry up and wait.

Old Army Saying

There is one habit which is clearly of British origin-that of queueing.

Unlike the British, they have no passion for queueing; they do not like

queueing for queueing’s sake. But they stick to the queueing etiquette,

form orderly queues at many places, and guard their rights with a morose

kind of vigilance.

Mikes, George

How to be an Alien

Israel (p. 121)

190

All the King’s horses and all the King’s men

Couldn’t put Humpty Dumpty in his place again.

Carroll, Lewis

The Complete Works of Lewis Carroll

Through the Looking Glass

Humpty Dumpty

What they appear to tell us is that nothing is so alien to the human mind

as the idea of randomness.

Cohen, John

Chance, Skill, and Luck

Chapter 2, Part IV (p. 42)

The kitten was an adorable mass of silver-grey fluff and was at first

named Fluffy Ruffles through an error in sex; she was a he. But he

demonstrated such lightening changes in mood, speed, and action that

Brian remarked, ”That kitten doesn’t have a brain; he just has a skull

full of random numbers, and whenever he bangs his head into a chair

or ricochets off a wall, it shakes up the random numbers and causes him

to do something else.”

Heinlein, Robert A.

To Sail Beyond the Sunset

Chapter 10 (p. 147)

Hardyman’s Truism. Random stomping seldom catches bugs.

Peers, John

1001 Logical Laws (p. 27)

A Million Random Digits with 100,000 Normal Deviates.

The RAND Corporation

Title of Book

191

192 STATISTICALLY SPEAKlNG

Iocustu. Nay, what should mortal fear, for whom the degree of fortune

are supreme, and who hath clear foresight of nothing? 'Tis best to live at

random, as one may.

Soph ocles

The Plays of Sophocles

Oedipus the King

1.997

Random is not haphazard

Unknown

and whenever he bangs his head into a chair or ricochets off

a wall, it shakes up the random numbers and causes him to

do something else.

Robert A. Heinlein - (See p. 191)

REASON

Pile up facts or observations as we may, we shall be none the wiser. To

learn, we must necessarily reason about what we have observed, compare

the facts and judge them by other facts used as controls.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 16)

How easy it is for unverified assumptions to creep into our reasoning

unnoticed!

Beveridge, W.I.B.

The Art of Scientific Investigation (p. 87)

Reason is the shepherd trying to corral life’s vast flock of wild

irrationalities.

Eldridge, Paul

Maxims for a Modern Man

2194

“Ah! my dear Watson, there we come into those realms of conjecture

where the most logical mind may be at fault.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Empty House

”I can see nothing,” said I, handing it back to my friend.

”On the contrary, Watson, you can see everything. You fail, however, to

reason from what you see. You are too timid in drawing your inferences.”

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Blue Carbuncle

193

194 STATISTICALLY SPEA KlNG

In solving a problem of this sort, the grand thing is to be able to reason

backward. This is a very useful accomplishment, and a very easy one,

but people do not practise it much . . . Most people, if you describe a

train of events to them, will tell you what the result would be. They

can put those events together in their minds, and argue from them that

something will come to pass. There are few people, however, who, if

you told them a result, would be able to evolve from their own inner

consciousness what the steps were which led up to the result. This power

is what I mean when I talk of reasoning backward . . .

Holmes, Sherlock

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

A Study in Scarlet

One of the difficulties arising out of the subjective view of probability

results from the principle of insuficient reasons. This principle . . . holds

that i f we are wholly ignorant of the different ways an event can occur and

therefore have no reasonable ground for preference, it is as likely to occur m e

way as another.

Kasner, Edward

Newman, James

Mathematics and lmagination (p. 229)

This kind of reasoning has weaknesses, of course, as do all forms of

reasoning. If the correspondence between two things compared is, not

complete, that is, if significant differences can be shown to exist, then the

argument collapses.

Minnick, Wayne C.

The Art of Persuasion (p. 16)

My Design in this Book is not to explain the Properties of Light by

Hypotheses, but to propose and prove by Reason and Experiments: In

order to which I shall premise the following Definitions and Axioms.

Newton, Sir Isaac

Opticks

Book One, Part I

Reasoning goes beyond the analysis of facts.

Romanoff, Alexis L.

Encyclopedia of Thoughts

Aphorisms

1973

REASON 195

His reasons are as two grains of wheat hid in two bushels of chaff you

shall seek all day ere you find them, and when you have them, they are

not worth the search.

Shakespeare, William

The Complete Works of William Shakespeare

The Merchant of Venice

Act I, Scene 1’1. 115

The concept of randomness arises partly from games of chance. The word

‘chance’ derives from the Latin cudentiu signifying the fall of a die. The

word ’random’ itself comea from the French rundir meaning to run fast

or gallop.

Spencer Brown, G.

Probability and Scientific Inference

Chapter VI1 (p. 35)

Like all Holmes’ reasoning the thing seemed simplicity itself when it was

once explained.

Watson, Dr.

in Arthur Conan Doyle’s

The Complete Sherlock Holmes

The Adventure of the Stockbroker’s Clerk

ELEMENTARY MY

WATSO~ - CLEARLY A

CASEOF SUICIDE 6YA v

CIRCUS KM I F€-THW€K.

RECURSION

recursive adj. See RECURSIVE.

Kelly-Bootle, Stan

The Devil’s DP Dictionary

Of all ideas I have introduced to children, recursion stands out as the

one idea that is particularly able to evoke an excited response.

Papert, Seymour

Mindstorm (p. 71)

To iterate is human, to recurse divine.

Unknown

196

REGRESSION

Where the line is to be drawn the important and the trivial cannot be

settled by a formula.

Cardozo, Benjamin N.

Jacob & Youngs v. Kent, 230 New York Reports 239,243, 1921

Most economists think of God as working great multiple regressions in

the sky.

Fiedler, Edgar R.

Across the Board

The Three Rs of Economic Forecasting-Irrational, Irrelevant and Irreverent

June 1977

Once upon a time, there was a sensible straight line who was hopelessly

in love with a dot.

Juster, Norton

The Dot and the Line

How did I get into this business? Well I couldn't understand multiple

regression in college, so I settled for this instead.

Caption on cartoon by unknown artist

Regression begins with the unknown and ends with the unknowable.

unknown

Like father, like son.

Unknown

You've got to draw the line somewhere.

Unknown

197

198 STATISTICALLY SPEAKlNG

The term “regression” is not a particularly happy one from the

etymological point of view, but it is so firmly embedded in statistical

literature that we make no attempt to replace it by an expression which

would more suitably express its essential properties.

Yule, G.U.

Kendall, M.G.

An Introduction to the Theory of Statistics (p. 230)

Rowe’s Rule: the odds me six to five that the light at the end of

the tunnel is the headlight of an oncoming train.

Paul Dick8on - (See p. 277)

RESEARCH

The way to do research is to attack the facts at the point of greatest

astonishment.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 1)

Research is a way of taking calculated risks to bring about incalculable

consequences.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 1)

”Research,” he said, ”is something that tells you that a jackass has two

ears.”

Lasker, Albert D.

Quoted in John Gunther’s

Taken at the Flood: The Story of Albert D. Lash (p. 96)

If you steal from one author, it’s plagiarism; if you steal from many, it’s

research.

Mizner, Wilson

Quoted in Alva Johnson’s

The Legendary Mizners

Chapter 4, The Sport (p. 66)

199

RESIDUALS

Almost all the greatest discoveries in astronomy have resulted from

the consideration of what we have elsewhere termed RESIDUAL

PHENOMENA, of a quantitative or numerical kind, that is to say, of

such portions of the numerical or quantitative results of observations as

remain outstanding and unaccounted for after subducting and allowing

for all that would result from the strict application of known principles.

Herschel, John

Outlines of Astronomy (p. 548)

in

Statistics show that seventy-four per cent of wives open letters,

with or without a teakettle.

Rex Stout - (See p. 258)

200

SAMPLE

After painstaking and careful analysis of a sample, you are always told

that it is the wrong sample and doesn’t apply to the problem.

Bloch, Arthur

Murphy’s Law

Fourth Law of Revision (p. 48)

A person’s opinion of an institution that conducts thousands of

transactions every day is often determined by the one or two encounters

which he has had with the institution in the course of several years.

Cochran, William G.

Sampling Techniques (p. 1 )

Our knowledge, our attitudes, and our actions are based to a very large

extent on samples.

Cochran, William G.

Sampling Techniques (p. 1)

Sampling is the science and art of controlling and measuring the

reliability of useful statistical information through the theory of

probability.

Deming, William Edwards

Some Theory of Sampling (p. 3)

A good sample-design is lost if it is not carried out according to plans.

Deming, William Edwards

Some Theory of Sampling (p. 241)

If the cost of classifying a sampling unit were zero, one could always

safely recommend fantastic plans of stratified sampling, with no worry

about costs. The fact is, though, that there is always a price to pay . . .

Deming, William Edwards

Sample Design in Business Research (p. 320)

201

202 STATISTICALLY SPEAKING

I've got a little list-I've got a little list . . .

I've got him on the list . . .

They never would be missed-they never would be missed!

Gilbert, W.S.

Sullivan, Arthur

The Complete Plays of Gilbert and Sullivan

The Mikado

Act I

He pointed to a heap of five or six hundred letters, and laughed

consumedly.

"Impossible to read them all, you know. It seemed to me that the fairest

thing would be to shake them together, stick my hand in, and take out

one by chance. If it didn't seem very promising, I would try a second

time."

Gissing, George

New Grub Street

The Way Hither (p. 62)

One does not have to read much of the current research literature in

psychology, particularly in individual and social psychology, to realize

that there exists a great deal of confusion in the minds of investigators

as to the necessity of obtaining a truly representative sample, describing

carefully how the sample was secured, and restricting generalizations to

the universe, often ill-defined, from which the sample was drawn.

McNemar, Quinn

Psychological Bulletin

Sampling in Psychological Research

Volume 37, Number 6, June 1940 (p. 33)

. . . weighting a sample appropriately is no more fudging the data than

is correcting a gas volume for barometric pressure.

Mosteller, F.

Journal of the American Statistical Association

Principles of Sampling

Volume 49, Number 265, 1954 (p. 33)

Everyone who has poured a highball into the nearest potted plant after

taking one sip has had some experience in sampling.

Slonim, Moms James

Sampling (p. 1)

Sampling is only one component, but undoubtedly the most important

one, of that broad based field of scientific method known as statistics.

Slonim, Moms James

Sampling (p. 7)

SAMPLE 203

Everybody’s taken samples. When you taste a bowl of soup, you take a

sample, but if you don’t stir it up, it won’t be a representative sample,

and if you’re the chef, this could yield undesirable results. It doesn’t have

to be a random sample, but it does have to be representative.

Unknown

The things directly observed are, almost always, only samples.

Whitehead;Alfred North

Science and the Modern World (p. 23)

Very dangerous things, theories.

Dorothy L. Sayem - (See p. 282)

SCIENCE

They who have handled the Sciences have been either Empirics or

Dogmatists. The Empirics, like the Ant, amass only and use: the latter,

like Spiders, spin webs out of themselves: but the course of the Bee lies

midway; she gathers materials from the flowers of the garden and the

field; and then by her own power t u m s and digests them.

Bacon, Francis

The Novum Organon

First Book, 95

The object of statistical science is to discover methods of condensing

information concerning large groups of allied facts into brief and

compendious expressions suitable for discussion. The possibility of doing

this is based on the constancy and continuity with which objects of the

same species are found to vary.

Galton, Francis

Inquiries into Human Faculty

Statistical Methods

Accordingly there are two main types of science, exact science . . .

and empirical science . . . seeking laws which are generalizations from

particular experiences and are verifiable (or, more strictly, 'probabilities')

only by observation and experiment.

Harris, Errol E.

Hypothesis and Perception

Prevalent Views of Science (p. 25)

I am a mere street scavenger of science. With hook in hand and basket

on my back, I go about the streets of science collecting whatever I find.

Magendie, Franfois

Quoted in Rent5 Dubos'

Louis Pasteur: Free Lance of Science (p. 363)

204

SCIENCE 205

Science does not aim, primarily, at high probabilities. It aims at a high

informative content, well backed by experience. But a hyIjothesis may

be very probable simply because it tells us nothing, or very little.

Popper, Karl R.

The Logic of Scient$c Discovery (p. 399)

Facts without theory is trivia. Theory without facts is bullshit.

Unknown - (See p. 282)

STATISTICAL

A knowledge of statistical methods is not only essential for those who

present statistical arguments it is also needed by those on the receiving

end.

Allen, R.G.D.

Statistics for Economists

Chapter I (p. 9)

Statistical tables are essentially specific in their meaning, and they require

data that are uniformly specific in the same kind and degree.

Bailey, W.B.

Cummings, John

Statistics (p. 33)

The statistical method is social mathematics par excellence.

Bell, Eric T.

The Development of Mathematics (p. 582)

Mankind in the mass is more despotically govemed by the laws of chance

than it ever was by the decrees of any tyrant. If our shambling race is

ever to get anything but suicidal destruction out of science, it may be

a necessary first step that half a dozen human beings in every hundred

thousand understand the mass-reactions of creatures who, as individuals,

occasionally show that they can stand erect and walk like men. To grasp

and analyze mass-reactions, whether of atoms or of human beings, a

mastery of the modem statistical method is essential.

Bell, Eric T.

The Development of Mathematics (p. 582)

If enough data is collected, anything may be proved by statistical

methods.

Bloch, Arthur

Murphy’s Law

William and Holland’s Law (p. 47)

206

STATISTICAL 207

In statistical work we should be able to presume upon honesty, fidelity,

and diligence.

Blodgett, James H.

Journal of the American Statistical Association

Obstacles to Accurate Statistics

New Series Number 41, March 1898 (p. 1)

We are far from having ”one statistical world”.

Boudreau, Frank G., MD

Kiser, Clyde V.

Problems in the Collection and Comparability of International Statistics (p. 5 )

Some of the common ways of producing a false statistical argument are

to quote figures without their context, omitting the cautions as to their

incompleteness, or to apply them to a group of phenomena quite different

to that to which they in reality relate; to take these estimates referring to

only part of a group as complete; to enumerate the events favorable to

an argument, omitting the other side; and to argue hastily from effect to

cause, this last error being the one most often fathered on to statistics.

For all these elementary mistakes in logic, statistics is held responsible.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 13)

A statistical estimate may be good or bad, accurate or the reverse; but in

almost all cases it is likely to be more accurate than a casual observer’s

impression, and the nature of things can only be disproved by statistical

methods.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 9)

A useful property of a test of significance is that it exerts a sobering

influence on the type of experimenter who jumps to conclusions on

scanty data, and who might otherwise try to make everyone excited

about some sensational treatment effect that can well be ascribed to the

ordinary variation in his experiment.

Cochran, William G.

Cox, Gertrude M.

Experimental Design (p. 5)

Since statistical significance is so earnestly sought and devoutly

wished for by behavioral scientists, one would think that the U priori

probability of its accomplishment would be routinely determined and

well understood. Quite surprisingly, this is not the case.

Cohen, Jacob

Statistical Power Analysis for the Behavioral Sciences (p. 1)

208 S TATIS TlCA L LY SPEAKING

Statistical methods of analysis are intended to aid the interpretation of

data that are subject to appreciable haphazard variability.

Cox, D.R.

Hinkley, D.V.

Theoretical Statistics (p. 1)

Operational research is the application of methods of the research

scientist to various rather complex practical operations . . . A paucity

of numerical data with which to work is a usual characteristic of the

operations to which operational research is applied.

Davies, J.T.

The Scientific Approach (p. 86)

The essence of life is statistical improbability on a colossal scale.

Dawkins, Richard

The Blind Watchmaker

Chapter 11

The method used by the scientist to find probable exact truth is what he

calls "the method of least squares".

de Leeuw, A.L.

Rambling through Science

Gambling (p. 88)

You need not be a mathematical statistician to do good statistical work,

but you will need the guidance of a first class mathematical statistician.

A good engineer, or a good economist, or a good chemist, already has a

good start, because the statistical method is only good science brought up

to date by the recognition that all laws are subject to the variations which

occur in nature. Your study of statistical methods will not displace any

other knowledge that you have; rather, it will extend your knowledge of

engineering, chemistry, or economics, and make it more useful.

Deming, William Edwards

Mechanical Engineering

Some Principles of the Shewhart Method of Quality Control

Volume 66, March 1944

The statistical method is more than an array of techniques. The statistical

method is a Mode of Thought; it is Sharpened Thinking; it is Power.

Deming, William Edwards

Paper presented at meeting of the Intemational Statistical Institute

September 1953

Statistical research is particularly necessary in the government service

because of the high level of quality and economy that the public has the

right to expect in government statistics.

Deming, William Edwards

Some Theory of Sampling (p. viii)

STATISTICAL 209

Statistical magic, like its primitive counterpart, is a mystery to the public;

and like primitive magic it can never be proved wrong . . . The oracle is

never wrong; a mistake merely reinforced the belief in magic.

Devons, Ely

Essays in Economics

Chapter 7 (p. 135)

There are those who are so impressed by the notion that ’quantification’

is the only form of scientific knowledge, that they see no danger in

the distorted, misleading, or simply ineffective picture that a statistical

description of events may give. To such people the statistical picture

is always to be preferred as the most meaningful and objective. It is

indeed because this view is so widespread, that an argument stated in

statistical terms has such a powerful influence in policy decision, and

induces everyone to try to impress their case on public attention by

peppering it with statistics.

Devons, Ely

Essays in Economics

Chapter 6 (p. 106)

Mr. Gradgrind sat writing in the room with the deadly statistical clock,

proving something no doubt-probably, in the main, that the Good

Samaritian was a bad economist.

Dickens, Charles

The Work of Charles Dickens

Hard Times

Book 11, Chapter XI1

I.

11.

III.

Iv.

V.

VI.

VII.

VIII. Ix.

X.

Thou shalt not hunt statistical sigruficance with a shotgun.

Thou shalt not enter the valley of the methods of inference

without an experimental design.

Thou shalt not make statistical inference in the absence of a

model.

Thou shalt honor the assumptions of the model.

Thou shalt not adulterate thy model to obtain significant results.

Thou shalt not covet thy colleague’s data.

Thou shalt not bear false witness against thy control-group.

Thou shalt not worship the 0.05 significance level.

Thou shalt not apply large-sample approximations in vain.

Thou shalt not infer causal relationships from statistical

significance.

Driscoll, Michael F.

The Amm’can Mathematical Monthly

The Ten Commandments of Statistical Inference

Volume 84, Number 8, 1977 (p. 628)

210 STATISTICALLY SPEAKING

”Try it yourself. When it asks for input, type in I, H, V, H and press the

ENTER key. But you may be disappointed. There are only twenty-four

possible permutations.”

”Holy Seraphim. What can you do with twenty-four names of God?

You think our wise men hadn’t made that calculation? Read the Sqer

Jesiruh, Chapter Four, Section Sixteen. And they didn’t have computers.

‘Two Stones make two Houses. Three Stones make six Houses. Four

Stones make twenty-four Houses. Five Stones make one hundred and

twenty Houses. Six Stones make seven hundred and twenty Houses.

Seven stones make five thousand and forty Houses. Beyond this point,

think of what the mouth cannot say and the ear cannot hear.’ You know

what this is called today? Factor analysis.”

Eco, Umberto

IZ pendolo di FoucauZt (p. 35)

There comes a time in the life of a scientist when he must convince

himself either that his subject is so robust from a statistical point of view

that the finer points of statistical inference he adopts are irrelevant or

that the precise mode of inference he adopts is satisfactory.

Edwards, A.W.F.

Likelihood (p. xi)

By applying the statistical method we cannot foretell the behavior of an

individual in a crowd. We can only foretell the chance, the probability,

that it will behave in some particular manner.

Einstein, Albert

The Evolution of Physics

Quanta (p. 299)

The primary function of a statistical consultant in a research organization

is to furnish advice and guidance in the collection and use of numerical

data to provide quantitative foundations for decisions.

Eisenhart, Churchill

The Amm’can Statistician

The Role of a Statistical Consultant in a Research Organization

Volume 2, Number 2, April 1948 (p. 6)

Although advice on how and when to draw graphs is available, we have

no theory of statistical graphics . . .

Fienberg, Stephen E.

The American Statistician

Graphical Methods in Statistics

Volume 13, Number 4, November 1979 (p. 165)

STATISTICAL 211

This rather tumultuous overflow of statistical techniques from the quiet

backwaters of theoretical methodology . . . into the working part of going

concems of the largest size, suggest that hidden causes have been at work . . . preparing men's minds, and shaping the institutions through which

they work. . .

Fisher, Sir Ronald A.

American Scientist Magazine

The Expansion of Statistics

Volume 42, Number 2, April 1954 (p. 277)

I may be permitted to say that I never felt such a glow of

loyalty and respect towards the sovereignty and magruficent sway of

mathematical analysis when his answer reached me confirming, by

purely mathematical reasoning, my various and laborious statistical

conclusions with far more minuteness than I had dared to hope, for

the original data ran somewhat roughly, and I had to smooth them out

with tender caution.

Galton, Francis

Quoted in Karl Pearson's

The Lge, Letters, and labours of Francis Galton

Volume IIIA (p. 13)

Approximately half the articles published in medical journals that use

statistical methods use them incorrectly.

Glantz, S.A.

Circulation

Biostatistics: How to Detect, Correct, and Prevent Errors in

the Medical Literature

Volume 61, 1980 (p. 1)

When people talk about 'the sanctity of the individual' they mean 'the

sanctity of the statistical norm'.

Green, Celia

The Decline and Fall of Science

Aphorisms (p. 4)

Sometimes a David felled a Goliath of a statistical difficulty with a

smooth stone. It might take a mathematician to prove how truly the

stone was aimed.

Greenwood, M.

Journal of the Royal Statistical Society

Discussion (p. 522) to the paper Some Aspects of the Teaching of Statistics

Volume 102,1939

212 STATISTICALLY SPEAKING

When we can’t prove our point through the use of sound reasoning, we

fall back upon statistical “umbo jumbo’ to confuse and demoralize our

opponents.

Habera, Audrey

Runyon, Richard P.

General Statistics

Chapter 1 (p. 3)

Oh, the hell with!-it did not change the statistical outcome.

Heinlein, Robert A.

Time Enoughfor Love (p. 208)

Statistical methods are essentially methods for dealing with data that

have been obtained by repetitive operations.

Hoel, P.G.

Introduction to Mathematical Statistics (p. 1)

Acceptability of a statistically sigrzificunt result of an experiment on

animal behavior in contradistinction to a result which the investigator

can repeat before a critical audience naturally promotes a high output of

publication. Hence, the argument that the techniques work has a tempting

appeal to young biologists.

Hogben, Lancelot

Statistical Theory (p. 27)

And when, in pursuit of the black cat of definitive truth, more refined

techniques of statistical analysis, factor analysis, and so forth, are

developed, the researcher is more and more distanced from the subject

of his pursuit, and the real human world in which it exists. He raises as

by a sort of mathematical levitation, into that other, finer sphere, where

black cats are clawless, mewless and abstract . . .

Hopkins, Harry

The Numbers Game: The Bland Totalitarianism

Chapter 7 (p. 141)

Confidence in the omnicompetence of statistical reasoning grows by what

it feeds on.

Hopkins, Harry

The Numbers Game: The Bland Totalitarianism

Chapter 6 (p. 132)

Research in statistical theory and technique is necessarily mathematical,

scholarly, and abstract in character, requiring some degree of leisure and

detachment, and access to a good mathematical and statistical library.

Hotelling, Harold

Memorandum to the Govemor of India

24 February, 1940

STATZSTlCAL 213

The purely random sample is the only kind that can be examined with

entire confidence by means of statistical theory, but there is one thing

wrong with it. It is so difficult and expensive to obtain for many uses

that sheer cost eliminates it.

Huff, Darrell

How to Lie with Statistics (p. 21)

The use of available statistical records requires, first, that the social

scientist be familiar with the better known sources of such data and that he

display some ingenuity in discovering less obvious material.

Jahoda, Marie

Deutsch, Morton

Cook, Stuart

Research Methods in Social Relations

Basic Process

Part I (p. 232)

Statistical laws enable the insurance company to function, and make

a profit for its shareholders. But what does statistics do for the

policyholder? Not one damn‘ thing!

Jones, Raymond F.

The Non-Statistical Man (p. 32)

Sarah Bascomb was well aware that she didn’t live in the same

world with her husband, and that made it rather nice, she thought.

It would have been exceedingly boring if they both talked of nothing

but expectancy tables and statistical probabilities, or the PTA and young

Chuck’s music lessons.

Jones, Raymond F.

The Non-Statistical Man (p. 10)

. . . statistical techniques are tools of thought, and not substitutes for

thought.

Kaplan, Abraham

The Conduct of Inquiry

Chapter VI, Section 29 (p. 257)

Monte Carlo method [Origin: after Count Montgomery de Carlo,

Italian gambler and random number generator (1792-1838)l. A method

of jazzing up the action in certain statistical and number-analytic

environments by setting up a book and inviting bets on the outcome

of a computation.

Kelly-Bootle, Stan

The Devil’s DP Dictionary

214 STATISTICALLY SPEAKING

The first mathematical discussion of the Latin Square known to modem

statisticians was given by Euler in 1882. Euler does not make any

specific references to previous work and merely mentions the problem

as having aroused interest, but since he entitled his paper "Recherche

sur une nouvelle espice de cant! magique" he seems to have been under

the impression that the problem was fairly new . . .

Kendall, Maurice G.

The Amm'can Statistician

Who Discovered the Latin Square?

Volume 11, Number 4, August 1948 (p. 13)

Archaeologists unearthed today in Babylon a remarkable set of clay

tablets recording the minutes of the 1242 annual meeting of the

Babylonical Statistical Association.

King, Willford

Journal of the American Statistical Association

Consolidating Our Gains

Volume 31, Number 193, March 1936 (p. 2)

It is all too easy to notice the statistical sea that supports our thoughts

and actions. If that sea loses its buoyancy, it may take a long time to

regain the lost support.

Kruskal, William

The Amm'can Statistician

Coordination Today: A Disaster or a Disgrace

Volume 37, Number 3, 1983 (p. 179)

The applicability in psychology of certain of Professor R.A. Fisher's

designs should be examined. Eventually, the analysis of variance

will come into use in psychological research. Thus we must

recognize, alongside of those natural laws which are based upon past

experience without exceptions and are predicted universally, empirical

generalizations admitting of possible or actual exception but nevertheless

having a certain probability in the individual case. Let us call these last

"statistical generalizations" since they are exhibited at their best when

supported by statistical procedures.

Lewis, Clarence Irving

Mind and the World-Order

Chapter X (pp. 334-5)

. . . the statistical prediction of the future from the past cannot be

generally valid, because whatever is future to any given past, is in tum

past for some future. That is, whoever continually revises his judgment of

the probability of a statistical generalization by its successively observed

STATISTICAL 215

verifications and failures, cannot fail to make more successful predictions

than if he should disregard the past in his anticipation of the future. This

might be called the "Principle of statistical accumulation".

Lewis, Clarence Irving

Mind and the World-Order

Chapter XI (p. 386)

The statistical method is of use only to those who have found it out.

Lippmann, Walter

A Prqace to Politics

The Golden Rule and After (p. 92)

No matter what the statistical problem may be, it must proceed according

to a plan. It is always a specific question which may be answered in

several more or less accurate ways. The end in view and the reasoning

which can be drawn upon will indicate in which manner and within

which limits the answer is to be given. According to the choice made, it

may be very simple or very complicated. But under all circumstances a

definite plan providing for all the detail is an absolute prerequisite.

Meitzen, August

History, Theory and Techniques of Statistics (p. 168)

No statistical judgment deals with the unit, but strictly and only with

the aggregate. The variable elements of persons and things otherwise

typical, that are enumerated, are always counted in a specific aggregate

and under certain specific circumstances. The qualities of the objects

themselves, so far as they are not typical, or the subject of the

investigation, are completely unknown.

Meitzen, August

History, Theory and Techniques of Statistics (p. 163)

Statistical methods serve as land marks which point to further improvement

beyond that deemed obtainable by experienced manufacturing

men. Hence, after all obvious correctives have been exhausted and all

normal logic indicates no further gain is to be made, statistical methods

still point toward a reasonable chance for yet further gains; thereby

giving the man who is doing trouble shooting sufficient courage of his

convictions to cause him to continue to the ultimate gain, in spite of

expressed opinion on all sides that no such gain exists.

Meyers, G.J., Jr.

Transactions, American Society of Mechanical Engineers

Discussion of E.G. Olds'

On Some of the Essentials of the Control Chart Analysis

Volume 64, July 1942

216 STATISTICALLY SPEAKlNG

A statistical analysis, properly conducted, is a delicate dissection of

uncertainties, a surgery of suppositions.

Moroney, M.J.

Facts from Figures

Statistics Undesirable (p. 3)

The organized charity, scrimped and iced,

In the name of a cautious, statistical Christ.

O’Reilly, John Boyle

In Bohemia

In Bohemia

It’s been estimated that, because of the exponential growth of the world’s

population, between 10 and 20 percent of all the human beings who

have ever lived are alive now. If this is so, does this mean that there

isn’t enough statistical evidence to conclusively reject the hypothesis of

immortality?

Paulos, John Allen

Innumeracy (p. 99)

[Florence Nightingale] Her statistics were more than a study, they were

indeed her religion. For her Quetelet was the hero as scientist, and

the presentation copy of his Physique sociale is annotated by her on

every page. Florence Nightingale befived-and in all the actions of

her life acted upon the belief-that the administrator could only be

successful if he were guided by statistical knowledge. The legislator-to

say nothing of the politician-too often failed for want of this knowledge.

Nay, she went further; she held that the universe-including human

communities-were evolving in accordance with a divine plan; that it

was man’s business to endeavour to understand this plan and guide his

actions in sympathy with it. But to understand God’s thoughts, she held

we must study statistics, for these are the measure of His purpose. Thus,

the study of statistics was for her a religious duty.

Pearson, Karl

Lqe, Letters and labours of Francis Galton

Volume I1 (p. 57)

There is much value in the idea of the ultimate laws being statistical

laws, though why the fluctuations should be attributed to a Lucretian

’Chance’, I cannot say. It is not an exactly dignhed conception of the

Deity to suppose him occupied solely with first moments and neglecting

second and higher moments!

Pearson, Karl

The History of Statistics in the 17th and 18th Centuries against the Changing

Background of Intellectual, Scientific, and Religious Thought (p. 160)

STATISTICAL 217

. . . it is a function of statistical method to emphasize that precise

conclusions cannot be drawn from inadequate data.

Pearson, E.S.

Hartley, H.Q.

Biometrika Tables for Statisticians

Volume I (p. 83)

Statistical knowledge, though in some degree searched after in the most

early ages of the world, has not till within these last 50 years become a

regular object of study.

Playfair, William

Statistical Brevia y

Pronouncing each word with great deliberateness, Rep. Resent asked,

“Are you now, or have you ever been, a member of the American

Statistical Association?”

Looking Rep. Resent straight in the eye, Minnie defiantly replied. “I

refuse to answer on the grounds that it might incriminate me.”

Proschan, Frank

Industrial Quality Control

Investigation of Latin Squares

Volume XI, Number 1, July 1954 (p. 31)

For the first five months they were virtually identical, but for the past

four, they showed an increasing difluence!

With shaking fingers, I worked out a Standard Deviation on the sets

of totals. There was no doubt: the difference between the Centre’s and

CPPL’s totals were significant.

Statistics don’t lie . . .

Puckett, Andrew

Bloodstains (p. 80)

“Why am I surrounded,” his usual understanding self today, ”by

statistical illiterates?”

Pynchon, Thomas

Gravity‘s Rainbow (p. 54)

That he must always be lovable, in need of her and never, as now, the

hovering statistical cherub who‘s never quite been to hell but speaks as

if he’s one of the most fallen.

Pynchon, Thomas

Gravity‘s Rainbuzu (p. 57)

218 STATZSTZCALLY SPEAK"

Since no scientific hypothesis is ever completely verified, in accepting a

hypothesis on the basis of evidence, the scientist must make the decision

that the evidence is sufichtly strong or that the probability is suficimtly

high to warrant the acceptance of the hypothesis. Obviously, the decision

with respect to the evidence and how strong is "strong enough is going

to be a function of the importance, in the typically ethical sense, of making

a mistake in accepting or rejecting the hypothesis.

Rudner, R.

Scient@ Monthly

Remarks on Value Judgment in Scientific Validation

Volume 79, September 1954 (p. 152)

The emergency room was a madhouse. The stormy holiday roads had

yielded more than the statistical expectation of traffic accidents.

Segal, Erich

Man, Woman and Child

Chapter 26 (p. 191)

You cannot escape the statistical method, so you may as well make

friends with it. You think it is cold and inhuman and impersonal, but, as

a matter of fact, it is fuller of red blood and human nature than half the

descriptive literature in the world.

Stamp, Josiah

Some Economic Factors in Modern Life

Chapter VI17 (p. 256)

It was demonstrated however very satisfactorily, that such a ponderous

mass of heterogeneous matter could not be congested and conglomerated

to the nose, whilst the infant was in Utero, without destroying the

statistical balance of the foetus, and throwing it plump upon its head

nine months before the time.

Steme, Laurence

Tristram Shandy

Book IV

But lo! men have become the tools of their tools.

Thoreau, Henry David

Walden

Economy

STATISTICAL 219

Factor analysis is useful especially in those domains where basic and

fruitful concepts are essentially lacking and where crucial experiments

have been difficult to conceive . . . They enable us to make only the

crudest first map of a new domain. But if we have scientific intuition

and sufficient ingenuity, the rough factorial map of a new domain will

enable us to proceed beyond the factorial stage to the more direct form

of psychological exploration in the laboratory.

Thurston, L.L.

Psychological Bulletin

Current Issues in Factor Analysis

Volume 37, April 1940 (p. 189)

It is not wise for a statistician who knows factor analysis to attempt

problems in a science which he has not himself mastered.

Thurston, L.L.

Psychological Bulletin

Current Issues in Factor Analysis

Volume 37, April 1940 (p. 235)

A sort of question that is inevitable is: “Someone taught my students

exploratory, and now (boo hoo) they want me to tell them how to assess

sigrhcance or confidence for all these unusual functions of the data.

(Oh, what can we do?)” To this there is an easy answer: TEACH them

the JACKKNIFE.

Tukey, John W.

The American Statistician

Volume 34, Number 1, February 1980 (p. 25)

The critical ratio is Z-ness,

But when samples are small, it is t-ness.

Alpha means a,

So does p in a way,

And it’s hard to tell a-ness from p-ness.

unknown

The problems of statistical physics are of the greatest in our time, since

they lead to a revolutionary change in our whole conception of the

universe.

von Mises, Richard

Probability, Statistics, and Truth (p. 219)

I should like to give a word of warning concerning the approach to tests

of sigrhcance adopted in this paper. It is very easy to devise different

tests which, on the average, have similar properties, i.e., they behave

satisfactorily when the null hypothesis is true and have approximately

220 STATISTICALLY SPEAKING

the same power of detecting departures from that hypothesis. Two such

tests may, however, give very different results when applied to a given

set of data. The situation leads to a good deal of contention amongst

statisticians and much discredit of the science of statistics. The appalling

position can easily arise in which one can get any answer one wants if

only one goes around to a large enough number of statisticians.

Yates, F.

Journal of the Royal Statistical Society

Discussion on the Paper by Dr. Box and Dr. Andersen

Series B, Volume 17, 1955 (p. 31)

Statistical thinking will one day be as necessary for efficient citizenship

as the ability to read and write.

Wells, H.G.

Quoted in Warren Weaver's article

Statistics

Scienti$c American

January 1952

VERY IhJfERESTlNB - \ She was reading birth

and death statistics.

Suddenly she turned to a

man near her and sadd,

"Do you know that every

time I breathe a man

dies?"

"Very interestAng," he

returned, "have you tried

toothpaste?"

Jamb M. Braude -

(See p. 237)

STATISTICIAN

While, therefore, tabulation is a final process, the formulation of the

scheme of tabulation should be the initial process, preceding even

the formulation of the schedule, which should be determined by

the character of the tables to be produced. Failure to observe this

fundamental principle in statistical practice, perhaps more than any other

characteristic, distinguishes the work of the amateur from that of the

expert, the work of the untrained social investigator from that of the

experienced scientific statistician.

Bailey, W.B.

Cummings, John

Statistics (p. 26)

He divided people into statisticians, people who knew about statistics,

and people who didn’t. He liked the middle group best. He didn’t like

the real statisticians much because they argued with him, and he thought

people who didn’t know any statistics were just animal life.

Balchin, Nigel

The Small Buck Room (p. 137)

The statistician was let loose.

Belloc, Hilaire

The Silence of the Sea

On Statistics (p. 172)

An utterly steady, reliable woman, responsible to the point of grimness.

Daisy was a statistician for the Gallup Poll.

Bellow, Saul

H-g (Pa 221)

221

222 S TATIS TlCA LLY SPEA KlNG

The individual statistician must scan closely the authority on which he

rests, and guard his statements with all the cautionary words which

imperfect knowledge requires, or some mere child will point out the

errors in his statements and his conclusions and set people wondering

of what value the rest of his work may be.

Blodgett, James H.

Journal of the American Statistical Association

Obstacles to Accurate Statistics

New Series Number 41, March 1898 (p. 19)

Perhaps statisticians themselves have not always fully recognized the

limitations of their work.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 13)

Years ago a statistician might have claimed that statistics deals with the

processing of data . . . to-day’s statistician will be more likely to say that

statistics is concemed with decision making in the face of uncertainty.

Chemoff, H.

Moses, L.E.

Elementa y Decision Theoy (p. 1)

[Statistics] We are constantly made aware of our awkward position; as

when we are reminded that the confidence coefficient refers, after all,

more to the ’lifework of the statistician’ than to any particular interval.

Of course sometimes we use such statements to describe how nice a job

we actually have, as when we tell our students, ”Look, you don’t really

have to be right, you must only be correct.” Yet every day we must live

with the non-zero probability that we might be that statistician who will

always base his conclusions on unusual assumptions.

These thoughts have prompted the following, not at all comforting,

definitions:

A statistician is a mathematician who, although he may know exactly

what he is talking about and what he says may be mathematically true,

may never make a correct decision.

Coole, W.P.

The AmPrican Statistician

Letters to the Editor

Volume 23, Number 1, February 1969 (p. 35)

STATZSTZCZAN 223

The statistician accepts in any engagement certain responsibilities and

obligations to his client and to the people that he works with. In the first

place, he is the architect of a survey or experiment. It is his business to

fit the various skills together to make them effective. It is important that

he clanfy the various responsibilities at the outset of the study.

Deming, William Edwards

Sample Design in Business Research (p. 10)

A statistician's responsibility is not confined to plans: he must also seek

assurance of cooperation in field and office, and maintain constant touch

with the work, also with the interpretation of the results.

Deming, William Edwards

Some Theory of Sampling (p. 8)

The minute a statistician steps into the position of the executive who

must make decisions and defend them, the statistician ceases to be a

statistician.

Deming, William Edwards

Sample Design in Business Research (p. 13)

It should be emphasized that the statistician is not necessarily abler

at handling data than his colleagues trained in economics, sociology,

engineering, physics, business, etc. However, because of the high

transferability of the statistician's mathematical techniques, and because

he acquires a broad knowledge in many fields, he is frequently adept at

discovering and measuring errors in data and determining the source of

the errors. He avoids drawing wrong conclusions from data whether the

data be good or bad.

Deming, William Edwards

The American Statistician

On the Classification of Statisticians

Volume 2, Number 2, April 1948 (p. 16)

The only useful function of a statistician is to make predictions, and thus

to provide a basis for action.

Deming, William Edwards

Journal of the Amm'can Statistical Association

Quoted in W.A. Wallis'

The Statistical Research Group, 1942-1945

Volume 75, Number 370, June 1980 (p. 321)

[Statistician] A figure head.

Esar, Evan

Esar's Comic Dictionary

224 STATISTICALLY S P E A K "

[Statistician] A matter-of-fact specialist.

Esar, Evan

Esar's Comic Dictiona y

[Statistician] A specialist who assembles figures and then leads them

astray.

Esar, Evan

Esar's Comic Dictiona y

[Statistician] A man who believes figures don't lie, but admits that under

analysis some of them won't stand up either.

Esar, Evan

Esar's Comic Dictiona y

Too often, in many fields of science, the statistician is regarded as

someone who comes on stage after data have been collected, performs

standard calculations, delivers a verdict 'Signrficant' or 'Not Signrficant',

and then departs.

Finney, D.J.

Statistics in Medicine

The Questioning Statistician

Volume' 1, 1982 (p. 5)

The statistician cannot evade the responsibility for understanding the

process he applies or recommends.

Fisher, Sir Ronald A.

The Design of Experiments (p. 1)

The statistician cannot excuse himself from the duty of getting his

head clear on the principles of scientific inference, but equally no other

thinking man can avoid a like obligation.

Fisher, Sir Ronald A.

The Design of Experiments (p. 2)

An Israeli statistician named Hare,

Had five factors he wished to compare,

Levels of each were nine,

So of course his design

Was a Hebro-Greco-Latin square.

Fleiss, Joseph L.

The Amm'can Statistician

Letters to the Editor

Volume 21, Number 4, October 1967 (p. 49)

STATlSTlClAN 225

There was a biometrician named Mabel,

Who’d never look at populations unstable.

Using intricate relations,

She’d find life expectations,

From the lx’s of the life table.

Fleiss, Joseph L.

The American Statistician

Letters to the Editor

Volume 21, Number 4, October 1967 (p. 49)

There was a statistician from Needham,

Who was so bright, his clients would heed him.

Yet his embarrassed confession

Was that, in linear regression,

He’d never subtract an extra degree of freedom.

Fleiss, Joseph L.

The American Statistician

Letters to the Editor

Volume 21, Number 4, October 1967 (p. 49)

There was a statistician from Knossus,

Who had a nonnormal neurosis.

With techniques of newness,

He’d measure the skewness,

And also the data’s kurtosis.

Fleiss, Joseph L.

The American Statistician

Letters to the Editor

Volume 21, Number 4, October 1967 (p. 49)

We are not concemed with the very poor. They are unthinkable, and only

to be appreciated by the statistician or the poet.

Forster, E.M.

Howards End

Chapter 6

Statistician-a term that is more or less equivalent to that of ”Statesman”.

Galton, Francis

Memories of My Life

Chapter XXI

226 STATlSTlCALLY SPEAKlNG

The mathematician, the statistician, and the philosopher do different

things with a theory of probability. The mathematician develops

its formal consequences, the statistician applies the work of the

mathematician and the philosopher describes in general terms what

this application consists in. The mathematician develops symbolic tools

without worrying overmuch what the tools are for; the statistician uses

them; the philosopher talks about them. Each does his job better if he

knows something about the work of the other two.

Good, I.J.

Science

Kinds of Probability

Volume 129, February 20,1959 (p. 443)

Increasingly, we find ourselves caught up in the new contemporary

dualism; there is the muddling-on, verbalising, impressionistic, human

old world down there, and there is that Other, Finer, Rational World to

which the better statisticians have already been called. Communications

between the two can be tenuous.

Hopkins, Harry

The Numbers Game: The Bland Totalitarianism

Chapter 6 (p. 134)

Magruder smiled and settled back in a chair opposite Bascomb. "You are

a blunt man, for a statistician," he said. "I find the uncertainties of their

profession ordinarily extends to their common speech."

Jones, Raymond F.

The Non-Statistical Mnn (p. 29)

The early statisticians of the present century were competent at

mathematics, but they were not great creative mathematicians. Karl

Pearson was trained in mathematics, but Edgeworth was a classical

scholar and Yule an engineer by training. Fisher, who wus a creative

mathematician, criticized his predecessors for the clumsiness of their

style; but even he wrote in the tradition of English mathematics, which

does not care much about extreme generalization or extreme rigor as long

as it gets the right answer to its problems. The consequence was that, with

few exceptions, theoretical statistics in the forties could be understood

by anybody with moderate mathematical attainment, say at the first year

undergraduate level. I deeply regret to say that the situation has changed

so much for the worse that the journals devoted to mathematical statistics

are now completely unreadable. Most statisticians deplore the fact, but

there is not very much they can do about it.

Kendall, Maurice G.

Statistical Papers in Honour of George Snedecor (p. 205)

STATISTICIAN 227

It is not primarily the responsibility of a statistician to make decisions

for other people-not in general at any rate . . . It is for someone else to

say what decisions should be made with [inferential] . . . information. In

other words, ideally, it is the statistician's job to inform not to decide.

Kemdge, D.F.

Journal of the Royal Statistical Society

Discussion on Paper by Dr. Marshall and Professor Olkin

Series B, Volume 30, 1968 (p. 440)

An occupational hazard to which we statisticians are exposed occurs in

the context of a social occasion, perhaps a dinner party. I am, let us say,

seated next to a charming lady whom I have just met, and, as an initial

conversational ice-breaking, she tums to me with a winning smile and

says: "Now tell me what is it you do?" We must tell the truth, of course,

so I reply that I am a statistician. That usually ruins a fine conversation,

for in 8.6 cases out of 10 the lady's smile disappears, she tums to my rival

on her other side, and I attack the fried chicken in lonely, misunderstood

dignity.

Kruskal, William

American Scientist Magazine

Statistics, Moliere, and Henry Adams

1967 (p. 416)

A couple of government statisticians recently threw dust on the wedding

ring business by coming right out with the fact that for every male there

are 1.03 females. It's about time they stop shoving the American taxpayer

behind decimal points.

Miksch, W.F.

Collier's

The AVERAGE STATISTICIAN

June 17,1950

The statistician's job is to draw general conclusions from fragmentary

data. Too often the data supplied to him for analysis are not only

fragmentary but positively incoherent, so that he can do next to nothing

with them. Even the most kindly statistician swears heartily under his

breath whenever this happens.

Moroney, M.J.

Facts from Figures

What Happens When We Take a Sample (p. 120)

There is more than a germ of truth in the suggestion that, in all society

where statisticians thrive, liberty and individuality are likely to be

emasculated.

Moroney, M.J.

Facts from Figures

Statistics Undesirable (p. 1)

228 STATIS TICALLY SPEAKING

I like to think of the constant presence in any sound Republic of two

guardian angels: the Statistician and the Historian of Science. The former

keeps his finger on the pulse of Humanity . . .

Sarton, George

Sarton on the History of Science

Quetelet (p. 241)

. . . as the job of finding the truth and explaining it continues to become

more complex and more difficult, management again casts a doubtful

eye at the statistician, for a different reason. Management's big question

is no longer "What can the statistician do for us that we can't do just

as well ourselves?"; the question now is, "Do our statisticians have the

tools and the capacity and the experience and the persistence and the

breadth of vision to seek the truth and to know it when they have found

it?"

Seaton, G.L.

The Amm'can Statistician

The Statistician and Modem Management

Volume 2, Number 6, December 1948 (p. 10)

The characteristic which distinguishes the present-day professional

statistician, is his interest and skill in the measurement of the fallibility

of conclusions.

Snedecor, G.W.

Journal of the American Statistical Association

On a Unique Feature of Statistics

(Presidential Address to the American Statistical Association, December 1948)

Volume 44, Number 245, March 1949

I sometimes think that statisticians do not deserve quite all the hard

things that are said about them. They are supposed to be cold,

unemotional, bloodless and steely-eyed. But, as a matter of fact, we are all

statisticians nowadays. We are either forming opinions on other people's

statistics, whether we like it or not, or we are providing the raw material

of statistics.

Stamp, Josiah

Some Economic Factors in Modern Life

Chapter VI11 (p. 253)

Most of you would as soon be told that you are cross-eyed or knockkneed

as that you are destined to be a statistician . . .

Stamp, Josiah

Some Economic Factors in Modern Life

Chapter VI11 (p. 253)

STATISTICIAN 229

Statisticians have an understandable penchant for viewing the whole of

the history of science as revolving around measurement and statistical

reasoning.

Stigler, Stephen M.

The History of Statistics

Introduction (p. 1)

Everyday life is influenced more and more each day by decisions

based on quantitative information. The scientific sequence-hypothesis,

experiment, and test hypothesis-is now a familiar approach to

problems. Only a few of all those who use it are known popularly as

scientists. The distinguishing characteristic of the true scientist is not the

fact that he employs scientific methodology, but rather his expertness

with it.

So it is with the statistician. Nearly everyone, scientists included, draws

conclusions from quantitative data. A mark of the true statistician is his

special expertness at arranging an investigation and analyzing the result

so as to yield the most reliable conclusions with minimum effect.

The Editors

The American Statistician

The Statistician and Everyday Affairs

Volume 11, Number 5,1948

The accounting department was working on a marketing plan for the

coming year, with most of the risk evaluation work done by two

employees. During a break, the subject of American history came up.

“I never realized before how close we came to losing the Revolutionary

War,” one commented to the other.

”What do you mean?”

“Well, they didn’t understand the risks,” the first one explained. ”If

they’d had the budget to hire a statistician, they never would have

declared independence.”

Thomsett, Michael C.

The Little Black Book of Business Statistics (p. 181)

Though statisticians in our time have never kept the score, Man wants a

great deal here below and Women even more.

Thurber, James

Further Fables of Our Times

The Godfather and His Godchild

230 STATlSTlCALLY SPEAKlNG

Too often the client (whether or not a social scientist) looks to the

statistician as a man who applies the final stamp of approval-perhaps

by saying, ”This result is significant”. TOO often the statistician looks

upon himself as a guardian of the proven truth . . .

Tukey, John W.

Quoted in Donald P. Ray’s

Trends in Social Science

Statistical and Quantitative Methodology (p. 86)

Predictions, prophecies, and perhaps even guidance-those who

suggested this title to me must have hoped for such-even though

occasional indulgences in such actions by statisticians has undoubtedly

contributed to the characterization of a statistician as a man who draws

straight lines from insufficient data to foregone conclusions!

Tukey, John W.

Journal of the American Statistical Association

Where do We Go From Here?

Volume 55, Number 289, March 1960 (p. 80)

(The experimental statistician dare not shrink from the war cry of the

analyst ”Only a fool would use it, but it’s better than we used to use!”)

Tukey, John W.

Journal of the American Statistical Association

Unsolved Problems of Experimental Statistics

Volume 49, Number 268, December 1954 (p. 718)

The most important maxim for data analysis to heed, and one which

many statisticians seem to have shunned is this: ’Far better an

approximate answer to the right question, which is often vague, than an

exact answer to the wrong question, which can always be made precise.’

Data analysis must progress by approximate answers, at best, since its

knowledge of what the problem really is will at best be approximate.

Tukey, John W.

Annals of M a t h t i c a l Statistics

The Future of Data Analysis

Volume 33, Number 1, March 1962 (pp. 13-4)

It is necessary to add that statisticians themselves are not infallible.

unknown

If there are three statisticians on a committee, there will be 4 minority

reports.

unknown

S TATZS TZCZAN 231

If all the statisticians in the world were laid end to end-it would be a

good thing.

Unknown

A biostatistician talks statistics to the biologist and biology to the

statistician, but when he meets another biostatistician, they just discuss

women.

Unknown

A statistician and the statistician’s wife were marooned on a remote

island. When the wife asked how they were going to escape the island

and get home, the statistician replied, ”Assuming we have a boat . . .”

Unknown

A statistician is a person who draws a mathematically precise line from

an unwarranted assumption to a foregone conclusion.

Unknown

”Multiple births are more frequent in larger families,” declares a

statistician. It’s mighty hard to fool these statisticians.

Unknown

Svetlana Manova, the tallest, most passionate statistician west of the

Vistula, was aroused from illicit daydreams of Graeco-Latin squares

by the husky voice of Bruce ”Log” Linear, the new, muscular (yet

intellectual) Aerobics instructor at the swank Goodness of Fit health club.

It was time to start working on Log Linear’s exercises, a task from which

she had been deviating randomly, for reasons she could not articulate.

She did not know the name of the transformation that had come over

her since meeting Log, any more than she could analyze the persistent

departures from normality in some of her dependants. The contrasts

between Log and her were quite orthogonal, really, but factors beyond

her analysis had taken possession of her life. Stretching her sleek limbs,

she joined the saturated models who already lounged on the exercise

floor. As the group moved through a series of unorthodox patterns on

the floor (for a session with Log Linear was not restricted to hierarchical

designs) she mused over the turbulent events of recent days.

Lately the relationships in her life-aside from a four-way interaction that

was almost impossible to interpret-had been lacking in significance.

Her last lover, the fabulously wealthy Italian recording tycoon “Disk”

Riminate, had been kind and generous when they were first associated,

but he had tumed cruel and selfish, apparently regressing toward the

mean. The other men she knew were structural zeros. Mean, square

232 STATISTZCALLY SPEAK”

errors, she termed them. She never had any trouble rejecting their

hypothesis, or eluding their predictably normal plots, but as time passed

she felt she was gradually losing her residual degrees of freedom, and,

as always happens in such cases, her life was becoming less significant.

And then Log had come into her life. He wasn’t like the others. There

was a skewness about his attitude, and at the same time a gentlemanly

kurtosy, that made her want to know what it would be like to know him

fully. Feeling his eyes on her as she obliquely rotated her lovely torso,

she wondered how it would feel to nest her effects within his, instead of

always crossing them . . .

Even then, unknown to Svetlana, Log was analyzing a related problem.

He had been devoting more time and attention to statistics (her statistics)

than he ever had anticipated doing. Short of doing her exercises for

her, he could not have been more attentive. He knew that he needed

a woman like her, but he didn’t know if he-or any other man-could

ever understand Manova. He feared that in the end he would be driven

to a breakdown.

Unknown

It is difficult to determine what a statistician is and what a statistician is

not.

Unknown

Flip a coin 100 times. Assume that 99 heads are obtained. If you ask a

statistician, the response is likely to be: ”It is a biased coin.” But if you

ask a probabilist, he may say: ”Wooow, what a rare event.’’

Wan& Chamont

Sense and Nonsense of Statistical lnfuences (p. 154)

. . . the movement of the last hundred years is all in favour of the

statistician.

Wells, H.G.

The Work, Wealth and Happiness of Mankind

Chapter 9, Part 10 (p. 391)

Behind the adventurer, the speculator, comes that scavenger of

adventurers, the statistician.

Wells, H.G.

The Work, Wealth and Happiness of Mankind

Chapter Nine, Part 10 (p. 390)

There is a story about two friends, who were classmates in high school,

talking about their jobs. One of them became a statistician and was

working on population trends. He showed a reprint to his former

STATZSTZCZAN 233

classmate. The reprint started, as usual with the Gaussian distribution

and the statistician explained to his former classmate the meaning of the

symbols for the actual population, for the average population, and so on.

His classmate was a bit incredulous and was not quite sure whether to

statistician was pulling his leg.

”How can you know that?” was his query. ”And what is this symbol

here?”

“Oh,” said the statistician, ”this is n.”

“What is that?”

”The ratio of the circumference of the circle to its diameter.”

”Well now you are pushing your joke too far,’’ said the classmate, “surely

the population has nothing to do with the circumference of the circle.”

Wiper, Eugene P.

Communications in Pure and Applied Mathematics

The Unreasonable Effectiveness of Mathematics in the Natural Sciences

Volume XIII, Number 1-4, February 1960

Since the statistician can seldom or never make experiments for himself,

he has to accept the data of daily experiences, and discuss as best he can

the relations of a whole group of changes . . .

Yule, G.U.

Journal of the Royal Statistical Society

On the Theory of Correlation

Volume LX, December 1897 (p. 812)

It is now proved beyond

doubt that smoking is one

of the leading causes of

statistics.

Fletcher Xaebel-

(See p. 248)

STATISTICS

Taking for granted that the altemative to art was arithmetic, he plunged

deep into statistics, fancying that education would find the surest bottom

there; and the study proved the easiest he had ever approached. Even the

Government volunteered unlimited statistics, endless columns of figures,

bottomless averages merely for the asking. At the Statistical Bureau,

Worthington Ford supplied any material that curiosity could imagine for

filling the vast gaps of ignorance, and methods for applying the plasters

of fact.

Adams, Henry

The Education of Henry Adams

Chapter 23 (p. 351)

No honest historian can take part with-or against-the forces he has to

study. To him even the extinction of the human race should be merely a

fact to be grouped with other vital statistics.

Adams, Henry

The Education of Henry Adams

Vis Interiae (p. 447)

History has never regarded itself as a science of statistics. It was the

Science of Vital Energy in relation with time; and of late this radiating

center of life has been steadily tending-together with every form of

physical and mechanical energy/-toward mathematical expression.

Adams, Henry

A ktter to Ame r i c a nTe achers of History (p. 115)

. . . and you thought 'impressive' statistics were 36-24-36.

Advertisement

Tke American Statistician

Volume 33, Number 4, November 1979 (p. 248)

234

STATZSTZCS

Statistics are the food of love.

235

Angell, Roger

Lute Innings: A Baseball Companion

Chapter 1 (p. 9)

"Organic chemist!" said Tilley expressively. "Probably knows no statistics

whatever."

Balchin, Nigel

The Small Back Room (p. 136)

[Statistics] I t is concerned with things we can count. In so far as

things, persons, are unique or ill-defined, statistics are meaningless and

statisticians silenced; in so far as things are similar and definit-o many

workers over 25, so many nuts and bolts made during December-they

can be counted and new statistical facts are born.

Bartlett, M.S.

Essays on Probability and Statistics (p. 11)

Like dreams, statistics are a form of wish fulfillment.

Baudrillard, Jean

Cool Memories

Chapter 4

It has long been

come under the

as that which is

recognized by public men of all kinds. . . that statistics

head of lying, and that no lie is so false or inconclusive

based on statistics.

Belloc, Hilaire

The Silence of the Sea

On Statistics (p. 170)

Before the curse of statistics fell upon mankind we lived a happy,

innocent life, full of merriment and go, and informed by fairly good

judgment.

Belloc, Hilaire

The Silence of the Sea

On Statistics (p. 171)

Statistics are the triumph of the quantitative method, and the quantitative

method is the victory of sterility and death.

Belloc, Hilaire

The Silence of the Sea

On Statistics (p. 173)

STATlSTlCALLY SPEAKING

As for statistics, they are given a great role in medicine, and they

therefore raise a medical question which we should examine here. The

first requirement in using statistics is that the facts treated shall be

reduced to comparable units. Now this is very often not the case in

medicine. Everyone familiar with hospitals knows what errors may mark

the definitions on which statistics are based. The names of diseases are

very often given haphazard, either because the diagnosis is obscure, or

because the cause of death is carelessly recorded by a student who has

not seen the patient, or by an employee unfamiliar with medicine. For

this reason pathological statistics can be valid only when compiled from

data collected by the statistician himself.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 136)

. . . statistics, which first secured prestige here by a supposedly

impartial utterance of stark fact, have enlarged their dominion over

the American consciousness by becoming the most powerful statement

of the ”ought”4isplacers of moral imperatives, personal ideals, and

unfulfilled objectives.

Boorstin, Daniel J.

The Decline of Radicalism

Chapter 1

The science of statistics is the chief instrumentality through which the

progress of civilization is now measured and by which its development

hereafter will be largely controlled.

Boorstin, Daniel J.

The Decline of Radicalism

Chapter I

. . . statistics have tended to make facts into norms.

Boorstin, Daniel J.

The Decline of Radicalism

Chapter I

So far I speak only of impersonal statistics, which will very largely be

drawn from the current facts of administration.

Booth, Charles

Charles Booth’s London (p. 375)

STATISTICS 237

Great numbers are not counted correctly to a unit, they are estimated;

and we might perhaps point to this as a division between arithmetic

and statistics, that whereas arithmetic attains exactness, statistics deals

with estimates, sometimes very accurate, and very often sufficiently so

for their purpose, but never mathematically exact.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 3)

A knowledge of statistics is like a knowledge of foreign languages or of

algebra; it may prove of use at any time under any circumstances.

Bowley, Arthur L.

Elements of Statistics

Part I, Chapter I (p. 4)

Statistics are for losers.

Bowman, Scotty

Sports Illustrated

A Lot More Where They Come From

April 2, 1973

She was reading birth and death statistics. Suddenly she tumed to a man

near her and said, “Do you know that every time I breathe a man dies?“

“Very interesting,” he returned, “have you tried toothpaste?”

Braude, Jacob M .

Complete Speaker’s and Toastmaster‘s Library

Business and Professional Pointmakers

There’s too much abstract willing, purposing,

In this poor world. We talk by aggregates,

And think by systems and being used to face

Our evils in statistics, are inclined

To cap them with unreal remedies

Drawn out in haste on the other side.

Browning, Elizabeth Barrett

The Complete Poetical Works of Elizabeth Barrett Browning

Aurora Leigh

Eighth Book, 1. 800

The science of statistics, which has only been tumed to proper account

in modem times, has the great honor of having proved the existence of

definite rules in a number of phenomena, which had hitherto been looked

upon as merely accidental or as owing their origin to an arbitrary power.

Buchner, Ludwig

Force and Matter

Free Will (p. 367)

238 STATlSTlCALLY SPEAKlNG

The fundamental gospel of statistics is to push back the domain of

ignorance, prejudice, rule-of-thumb, arbitrary or premature decisions,

tradition, and dogmatism and to increase the domain in which decisions

are made and principles are formulated on the basis of analyzed

quantitative facts.

Burgess, Robert W.

Journal of the American Statistical Association

The Whole Duty of the Statistical Forecaster

Volume 32, Number 200, December 1937 (p. 636)

No matter how much reverence is paid to anything purporting to be

"statistics," the term has no meaning unless the source, relevance, and

truth are all checked.

Burnan, Tom

The Dictionary of Misinformation

Statistics, use, misues, and abuse of (p. 244)

. . . the worship of statistics has had the particularly unfortunate result

of making the job of the plain, outright liar that much easier.

Burnan, Tom

The Dictionary of Misinformation

Statistics, use, misuse, and abuse of (p. 246)

So that I do not grossly err in facts,

Statistics, tactics, politics, and geography . . .

Byron, Lord

The Complete Poetical Works of Byron

Don Juan

Canto the Eighth, XXIV, 1. 588

Statistics is a science which ought to be honourable, the basis of many

most important sciences; but it is not to be carried on by steam, this

science, any more than others are; a wise hand is requisite for carrying it

on. Conclusive facts are inseparable from unconclusive except by a head

that already understands and knows.

Carlyle, Thomas

Critical and Miscellaneous Essays

Chartism, I1

Statistics, one may hope, will improve gradually, and become good for

something. Meanwhile, it is to be feared the crabbed satirist was partly

right, as things go: "A judicious man," says he, "looks at Statistics, not

to get knowledge, but to save himself from having ignorance foisted on

him."

Carlyle, Thomas

English and Other Critical Essays

Chartism, Chapter I1

STATISTICS 239

"And on the dead level our pace is-?" the younger suggested; for he

was weak in statistics, and left all such details to his aged companion.

Carroll, Lewis

The Complete Works of Lewis Carroll

A Tangled Tale

Knot I

Elsior

. . . statistics, though not quite scripture, can be quoted by the devil.

Changing Times

Defend Yourself Against Statistics

March 1956

Beginning softly, statistics has long been handmaid to these exact

sciences, apprenticed in the scullery, but now risen housekeeper, eating

with the family.

Coats, R.H.

Journal of the American Statistical Association

Science and society

Volume 34, Number 205, March 1939 (p. 3)

Statistics show that you have nothing to worry about.

Cogswell, Theodore R.

Quoted in Harry Harrison's

Astounding

Probability Zero (p. 329)

I have learned repeatedly, however, that the typical behavioral scientist

approaches applied statistics with considerable uncertainty (if not

actual nervousness), and requires a verbal-intuitive exposition, rich in

redundancy and with many concrete illustrations.

Cohen, Jacob

Statistical Power Analysis for the Behavioral Sciences

Preface to the Original Edition

Conversation and statistics. Really boring.

Crichton, Michael

Rising Sun (p. 254)

Statistics are proverbially dry-forgive me if I say they are far better dry

than "wet"-but to give them optimum moisture content is simply a

matter of mastering fundamentals that no one should hold in contempt.

Davis, Joseph S.

Journal of the American Statistical Association

Statistics and Social Engineering

Volume 32, Number 197, March 1937 (p. 6)

240 STATISTICALLY SPEAKING

Statistics are like the hieroglyphics of ancient Egypt, where the lessons

of history, the precepts of wisdom, and the secrets of the future were

concealed in mysterious characters.

de Jonnes, Moreau

k l h e n t s de Statistique (p. 5)

His passion was to count everything and reduce it to statistics.

de Solla Price, Derek John

Little Science, Big Science (p. 33)

Unfortunately and inadvertently, intellectual gulfs have grown up

between writers in statistics, least squares, and curve fitting. Each of the

three groups has gone its own way, rediscovering developments long

since discovered by the others, or-what is worse-not rediscovering

them.

Deming, William Edwards

Statistical Adjustment of Data (p. iv)

I cannot oscillate a time series or properly analyse a variance . .

Devons, Ely

Essays in Economics

Chapter 6 (p. 105)

The two most important characteristics of the language of statistics are

first, that it describes things in quantitative terms, and second, that it

gives this description an air of accuracy and precision.

Devons, Ely

Essays in Economics

Chapter 6 (p. 106)

The experience of falling in love could be adequately described in terms

of statistics. A record of heart beats per minute, the stammering and

hesitation in speech, the number of calories consumed per day, the

heightening of poetic vision, measured by the number of lines of poetry

written to the beloved-I won’t go on; no doubt you can think of further

measures.

Devons, Ely

Essays in Economics

Chapter 6 ( p . 105)

STATISTKS 241

How to use a language which by its very nature implies objectivity,

precision and accuracy, in such a way that the subjective element of

judgment, imprecision and inaccuracy are fully taken into account? It is

because this task is so difficult and so rarely achieved that statistics are

frequently referred to as ‘the hard facts’, and yet we talk of three kinds

of lies-’lies, damn lies, and statistics’.

Devons, Ely

Essays in Economics

Chapter 6 (p. 111)

. . . ’statistics are only for the statistician’, and even then, I might add,

only for the good statistician.

Devons, Ely

Essays in Economics

Chapter 6 (p. 118)

No Chancellor of the Exchequer could introduce his proposals for

monetary and fiscal policy in the House of Commons by saying ’I have

looked at all the forecasts, some go one way, some another; so I decided

to toss a coin and assume inflationary tendencies if it came down heads

and deflationary if it came down tails’ . . . And statistics, however

uncertain, can apparently provide some basis.

Devons, Ely

Essays in Economics

Chapter 7 (p. 134)

What more tempting facade of rationality than the portrayal of some

statistics that seem to point to policy in one direction rather than another?

Devons, Ely

Essays in Economics

Chapter 7 (p. 134)

This exaggerated influence of statistics resulting from willingness, indeed

eagemess, to be impressed by the ’hard facts’ provided by the ’figures’,

may play an important role in decision-making.

Devons, Ely

Essays in Economics

Chapter 7 (p. 134)

. . . there seems to be striking similarities between the role of economic

statistics in our society and some of the functions which magic and

divination play in primitive society.

Devons, Ely

Essays in Economics

Chapter 7 (p. 135)

242 STATlSTICALLY SPEAK"

Factual science may collect statistics, and make charts. But its predictions

are, as has been well said, but past history reversed.

Dewey, John

Art as Expm'ence

Chapter XIV (p. 346)

There are lies, damned lies, and church statistics.

Disraeli, Benjamin

Quoted in George Seldes'

The Great Quotations

In short, Statistics reigns and revels in the very heart of Physics.

Edgeworth, Francis Ysidro

Journal of the Royal Statistical Society

On the Use of the Theory of Probabilities in Statistics Relating to Society

January 1913 (p. 167)

On the other hand, the methods of statistics are so variable and uncertain,

so apt to be influenced by circumstances, that it is never possible to be

sure that one is operating with figures of equal weight.

Ellis, Havelock

The Dance of Life

Chapter VII, Conclusion, I (p. 273)

[Statistics] Fiction in its most uninteresting form.

Esar, Evan

Esar's Comic Dictiona y

[Statistics] Data of a numerical kind looking for an argument.

Esar, Evan

EsarS Comic Dictiona y

[Statistics] The science of producing unreliable facts from reliable figures.

Esar, Evan

Esar's Comic Dictiona y

[Statistics] The science that can prove everything except the usefulness

of statistics.

Esar, Evan

Esar's Comic Dictiona y

[Statistics] The only science that enables different experts using the same

figures to draw different conclusions.

Esar, Evan

Esar's Comic Dictionary

STATISTICS 243

You complain that your report would be dry. The dryer the better.

Statistics should be the dryest of all reading.

Fan; William

Journal of the Royal Statistical Society

Nightingale on Quetelet

Series A, 1981 (p. 144)

In the original sense of the word, 'Statistics' was the science of Statecraft:

to the political arithmetician of the eighteenth century, its function was

to be the eyes and ears of the central government.

Fisher, Sir Ronald A.

Sankhya

First Indian Statistical Conference, 1938

Volume 4, 1938 (p. 14)

Statistical procedure and experimental design are only two different

aspects of the same whole, and that whole is the logical requirements of

the complete process of adding to natural knowledge by experimentation.

Fisher, Sir Ronald A.

The Design of Experiments (p. 3)

"I was counting the waves," replied Amory gravely, "I'm going in for

statistics."

Fitzgerald, F. Scott

This Side of Paradise (p. 244)

We are all victims of statistics.

Freeman, Linton C.

Elementary Applied Statistics (p. 1)

I could prove God statistically.

Gallup, George

Omni

Volume 2, Issue 2, November 1979 (p. 42)

Some people hate the very name of statistics, but I find them full of

beauty and interest. Whenever they are not brutalized, but delicately

handled by the higher methods, and are warily interpreted, their power

of dealing with complicated phenomena is extraordinary. They are the

only tools by which an opening can be cut through the formidable thicket

of difficulties that bars the path of those who pursue the Science of man.

Galton, Francis

Natural Inheritance

Normal Variability (pp. 62-3)

244 STATISTICALLY SPEAKING

General impressions are never to be trusted. Unfortunately when they

are of long standing they become fixed rules of life, and assume a

prescriptive right not to be questioned. Consequently, those who are

not accustomed to original inquiry entertain a hatred and a horror

of statistics. They cannot endure the idea of submitting their sacred

impressions to cold-blooded verification.

Galton, Francis

Annals of Eugenics

Quote on page facing the Table of Contents

No, Mother dear, I do not hop into bed with every man I meet, despite

your nasty little secret thoughts, but I do very much enjoy a more than

occasional roll in the hay, which, if I have my statistics right, is a good

deal more often than the average wife enjoys.

Gann, Ernest K.

Brain 2000 (pp. 27-8)

. . . bits of jokes, bits of statistics, bits of foolery.

Gissing, George

New Grub Street

The Sunny Way (p. 498)

Most of us have some idea of what the word statistics means. We should

probably say that it has something to do with tables of figures, diagrams

and graphs in economic and scientific publications, with the cost of living

. . . and with a host of other seemingly unrelated matters of concem or

unconcem . . . Our answer would be on the right lines. Nor should we

be unduly upset if, to start with, we seem a little vague. Statisticians

themselves disagree about the definition of the word: over a hundred

definitions have been listed (W.F. Willcox, Rwue de l’lnstitut InternutionuIe

de Stutistique, vol. 3, p. 288, 1935).

Goodman, Richard

Modem Statistics (p. 11)

Statistics is ’hocuspocus’ with numbers.

Habera, Audrey

Runyon, Richard P.

General Statistics

Chapter 1 (p. 3)

Statistics is the refuge of the uninformed.

Habera, Audrey

Runyon, Richard P.

General Statistics

Chapter 1 (p. 3)

STATISTICS 245

Legal proceedings are like statistics. If you manipulate them, you can

prove anything.

Hailey, Arthur

Airport

Part 3, Chapter 11 (p. 385)

Oratory is dying; a calculating age has stabbed it to the heart with

innumerable dagger-thrusts of statistics.

Hancock, William Keith

Australia (p. 146)

Statistics has been likened to a telescope. The latter enables one to see

further and to make clear objects which were diminished or obscured by

distance. The former enables one to discem structure and relationships

which were distorted by other factors or obscured by random variation.

Hand, D.J.

Psychological Medicine

The Role of Statistics in Psychiatry

Volume 15, 1985 (p. 471)

In the everyday use of statistics in business, complicated statistical

methods rarely are necessary and always are to be avoided if possible.

Simplicity of treatment and presentation is a requisite in the making of

statistics useful in executive control.

Hayford, F. Leslie

Joiirnal of the American Statistical Association

Some Uses of Statistics in Executive Control

Volume 31, Number 193, March 1936 (p. 36)

-

. . . neither statistics nor the statistician can ordinarily give the executive

the final answer to his problems.

Hayford, F. Leslie

Journal of the American Statistical Association

Some Uses of Statistics in Executive Control

Volume 31, Number 193, March 1936 (p. 36)

In 1906 he started on statistics, probability, and chance by mail . . .

Heinlein, Robert A.

To Sail Beyond the Sunset

Chapter 10 (p. 147)

246 STATISTICALLY SPEAKING

”Let us sit on this log at the roadside,” says I, ”and forget the inhumanity

and ribaldry of the poets. It is in the glorious columns of ascertained

facts and legalized measures that beauty is to be found. In this very log

we sit upon, Mrs. Sampson,” says I, ”is statistics more wonderful than

any poem. The rings show it was sixty years old. At the depth of two

thousand feet it would become coal in three thousand years. The deepest

coal mine in the world is at Killingworth, near Newcastle. A box four

feet long, three feet wide, and two feet eight inches deep will hold one

ton of coal. If an artery is cut, compress it above the wound. A man’s

leg contains thirty bones. The Tower of London was bumed in 1841.”

”GO on Mr. Pratt,” says Mrs. Simpson. “Them ideas is so original and

soothing. I think statistics are just as lovely as they can be.”

Henry, 0.

Tales of 0. Heny

The Handbook of Hymen

”What you’ve got,” says Idaho, “is statistics, the lowest grade of

information that exists. They poison your mind . . .”

Henry, 0.

Tales of 0. Heny

The Handbook of Hymen

The word statistics has at least six different meanings in current use, four

in the context of statistical theory alone.

Hogben, Lancelot

Science in Authority

The Present Crisis in Statistical Theory (p. 95)

For the rational study of the law the black-letter man may be the man

of the present, but the man of the future is the man of statistics and the

master of economics.

Holmes, O.W., Jr.

The Harvard Law Review

Path of the Law

Volume 10,1897

Don’t waste time arguing about the merits or demerits of something if

you can gather some statistics that will answer the question realistically.

Hooke, Robert

Quoted in J.M. Tanur‘s

Statistics: A Guide to the Unknown

Statistics, Sports, and some Other Things

S TATlS TlCS 247

Do remember that your experiment is merely a hodgepodge of statistics,

consisting of those cases that you happen to remember. Because these are

necessarily small in number and because your memory may be biased

toward one result or another, your experience may be far less dependable

than a good set of statistics.

Hooke, Robert

Quoted in J.M. Tanur‘s

Statistics: A Guide to the Unknown

Statistics, Sports, and some Other Things

You can’t argue with statistics; generally you can’t even get at them.

Hopkins, Harry

The Numbers Game: The Bland Totalitarianism

The Sterile Circle (p. 232)

As they put it in Greek, we simply don’t COUNT. We consume.

Horace

The Satires and Epistles of Horace

Epistle I

To Lollius Maximus

A well-wrapped statistic is better than Hitler’s ”big lie”; it misleads, yet

it cannot be pinned on you.

Huff, Darrell

How to Lie with Statistics (p. 9)

The economy was never stronger in your lifetime. But statistics must not

be sedatives. Economic power is important only as it is put to human

use.

Johnson, Lyndon B.

Speech at United Automobile Worker’s Convention

Atlantic City, N.J.

23 March, 1964

There was a time when statistics as a tool in experimentation was

almost completely ignored by the experimenter; in fact, it was regarded

”introducing unnecessary confusion into otherwise plain issues”.

Johnson, Palmer 0.

The Scientific Monthly

Modem Statistical Science and its Function in

Educational and Psychological Research

June 1951 (p. 385)

Statistics can be used to support anything--especially statisticians.

Jones, Franklin P.

Woman’s Realm

248 STATISTICALLY S P E A K "

That was why statistics had to be invented-because people were so

unstable and irrational, taken one at a time.

Jones, Raymond F.

The Non-Statistical Man (p. 15)

In statistics, you look for the common factor in order to lump otherwise

dissimilar items in a single category.

Jones, Raymond F.

The Non-Statistical Man (p. 17)

The basic sequence, in ascending order, is: lies; statistics; damn statistics;

benchmarks; delivery promises; DP dictionary entries.

Kelly-Bootle, Stan

The Devil's DP Dictionary

Statistics is the branch of scientific method which deals with the data

obtained by counting or measuring the properties of populations of

natural phenomena. In this definition 'natural phenomena' includes all

the happenings of the extemal world, either human or not.

Kendall, Maurice G.

Stuart, A.

The Advanced Theory of Statistics

Volume I (p. 2)

It is now proved beyond doubt that smoking is one of the leading causes

of statistics.

Knebel, Fletcher

Reader's Digest

December 1961

Science. I'm afraid, Dr. Noitall, you do not have any understanding of

statistics.

Koshland, Daniel E., Jr.

Science

Editorial

14 January 1994

What is there about the word "statistics" that so often provokes strained

silence?

Kruskal, William

American Scientist Magazine

Statistics, Moliere, and Henry Adams (p. 416)

STATISTICS 249

Statistics is the art of stating in precise terms that which one does not

know.

Kruskal, William

American Scientist Magazine

Statistics, Moliere, and Henry Adams (p. 417)

. . . each of us has been doing statistics all his life, in the sense that each of

us has been busily reaching conclusions based on empirical observations

ever since birth.

Kruskal, William

American Scientist Magazine

Statistics, Moliere, and Henry Adams (p. 417)

Statistics are like alienists-they will testdy for either side.

LaGuardia, Fiorello

Liberty

The Banking Investigation

May 13,1933

He uses statistics as a drunken man uses lamp-posts-for support rather

than illumination.

Lang, Andrew

Quoted in Evan Esar’s

The Dictionary of Humerous Quotations

Statistics is a body of methods and theory applied to numerical evidence

in making decisions in the face of uncertainty.

Lapin, Lawrence

Statistics for Modern Business Decisions (p. 2)

“I’ve been reading some very interesting statistics,” he was saying to the

other thinker.

“Ah, statistics!’’ said the other, ”wonderful things, sir, statistics; very fond

of them myself.’’

Leacock, Stephen

Literary Lapses

A Force of Statistics (p. 74)

. . . all statistical devices are open to abuse and require constant

correction.

Lippmann, Walter

A Preface to Politics

The Golden Rule and After (p. 91)

250 STATISTICALLY SPEAKING

You and I are forever at the mercy of the census-taker and the census

maker. That impertinent fellow who goes from house to house is one

of the real masters of the statistical situation. The other is the man who

organizes the results.

Lippmann, Walter

A Prgace to Politics

The Golden Rule and After (p. 92)

Statistics then is no automatic device for measuring facts.

Lippmann, Walter

A Preface to Politics

The Golden Rule and After (p. 92)

Even the most refined statistics are nothing but abstractions.

Lippmann, Walter

A Preface to Politics

The Golden Rule and After (pp. 93-4)

You cannot feed the hungry on statistics.

Lloyd George, David

Advocating Tariff Reform

Speech 1904

If for medical joumals the 1960s and 1970s seem likely to be remembered

as the era when the importance of ethics was emphasized, the last 20

years of this century promise to be that of statistics.

Lock, S.

Statistics in Practice

Daniel’s a statistician. He sees numbers-fractions, equations, totalsand

they spell out the odds for him. God knows he’s brilliant at it; he’s

saved the lives of hundreds with those statistics.

Ludlum, Robert

The Parsifal Mosaic

Chapter 10 (p. 137)

I don‘t believe you. Not because you’re a poor liar, but because it doesn’t

conform with the facts. I work with statistics, Mr. Washbum, or Mr.

Bourne, or whatever your name is. I respect observable data and I can

spot inaccuracies; I’m trained to do that.

Ludlum, Robert

The Bourne Identity

Chapter 9 (p. 128)

STATISTICS

Death is a statistic for the computers.

251

Ludlum, Robert

The Bourne Identity

Chapter 29 (p. 401)

There are three major and perhaps a dozen minor rental agencies,

not counting the hotels, which we’ve covered separately. These are

manageable statistics, but, of course, the garages are not.’’

Ludlum, Robert

The Bourne Supremacy

Chapter 18 (p. 260)

Statistics are the straw out of which I, like every other economist, have

to make the bricks.

Marshall, A.

Quoted in Arthur L. Bowley’s

Elements of Statistics

Part I, Chapter I (p. 8)

If you are young, then I say: Leam something about statistics as soon

as you can. Don’t dismiss it through ignorance or because it calls for

thought . . . If you are older and already crowned with the laurels of

success, see to it that those under your wing who look to you for advice

are encouraged to look into this subject. In this way you will show that

your arteries are not yet hardened, and you will be able to reap the

benefits without doing overmuch work yourself. Whoever you are, if

your work calls for the interpretation of data, you may be able to do

without statistics, but you won’t do as well.

Moroney, M.J.

Facts from Figures

Statistics Desirable (p. 463)

Historically, Statistics is no more than State Arithmetic, a system of

computation by which differences between individuals are eliminated

by the taking of an average. It has been used-indeed, still is used-to

enable rulers to know just how far they may safely go in picking the

pockets of their subjects.

Moroney, M.J.

Facts from Figures

Statistics Undesirable (p. 1)

Well statistics prove that you’re far safer in a modem plane than in a

bathtub.

Mr. Gregory

In the movie Charlie Chan at Treasure Island

252 STATISTICALLY SPEAKlNG

. . . statistics refers to the methodology for the collection, presentation,

and analysis of data, and for the uses of such data.

Neter, John

Wasserman, William

Applied Statistics (p. 1)

Statistics was founded by John Graunt of London, a ”haberdasher of

small-wares” in a tiny book called Natural and Political Observations made

upon the Bills of Mortality.

Neuman, James R.

The World of Mathematics

Volume 3 ( p . 1416)

Nobody loves a fact man. Only if the figures prove so startling a thesis

that they become dramatized by their very revelation, can they be safely

employed. People are skeptical of statistics. They may prove anything.

The ninety-year-old patient sounded cogent enough when he assured the

doctor he would never die, because statistics prove few that few men die

over ninety.

Nizer, Louis

Thinking on Your Feet

Let Them In

Statistics were just as much a fantasy in their original version as in their

rectified version. A great deal of the time you were expected to make

them up out of your head. For example, the Ministry of Plenty’s forecast

had estimated the output of boots for the quarter at a hundred and fortyfive

millions pairs. The actual output was given as sixty-two million.

Winston, however, in rewriting the forecast, marked the figure down to

fifty-seven millions, so as to allow for the usual claim that the quota had

been overfilled. In any case, sixty-two millions was no nearer the truth

than fifty-seven millions, or a hundred and forty-five millions. Very likely

no boots had been produced at all. Likelier still, nobody knew how many

had been produced, much less cared.

Orwell, George

Nineteen Eighty-Four ( p p . 42-3)

The fabulous statistics continued to pour out of the telescreen. As

compared with last year there was more food, more clothes, more

houses, more furniture, more cooking pots, more fuel, more ships,

more helicopters, more books, more babies-more of everything except

disease, crime, and insanity.

Orwell, George

Nineteen Eighty-Four (p. 59)

STATISTICS 253

It is thus that statistics reveals more and more the inconstance and the

irregularity of much social phenomena, when in lieu of applying it to a

great nation altogether, one descends to a province, a town, a village.

Pemn, Jean

Quoted in Mary Jo Nye’s

Molecular Reality: A Perspective on the Scientific Work of Jean Perrin (p. 25)

No study is less alluring or more dry and tedious than statistics, unless

the mind and imagination are set to or that the person studying is

particularly interested in the subject; which last can seldom be the case

with young men in any rank of life.

Playfair, William

The Statistical Brmiary (p. 16)

“Statistics” as a plural means to us simply numbers, or more particularly,

number of things, and there is no acceptable synonym.

Porter, Theodore M.

The Rise of Statistical Thinking 1820-1900 (p. 11)

Statistics derives from a German term, Statistik, first used as a substantive

by the Gottingen professor Gottfried Achenwall in 1749.

Porter, Theodore M.

The Rise of Statistical Thinking 1820-1900 (p. 23)

As the statists thinks, the bell clinks!

Proverb

La estadistics, otra mas que nos engafia.

[Statistics, yet another mistress to deceive us.]

Proverb, Spanish

They were in monthly columns. I added them and then compared the

two tables.

Well, there was a difference, and a difference on the right side, more

blood packs had been separated in the Centre than plasma packs had

arrived in CPPL, but it wasn’t as large as I would have thought. I stared

at the figures for a moment, then I worked out a statistical error rate

on them. The difference between them was not significant; it could be

explained by random error.

Statistics don’t lie, not in the right hands.

Puckett, Andrew

Bloodstains (p. 79)

254 STATISTICALLY SPEAKING

"You got a ninety percent chance," he said.

Osno said quickly, "How do you get that figure?" He always did that

whenever somebody pulled a statistic on him. He hated statisticians.

Puzo, Mario

Fools Die: A Novel

Chapter 24 (p. 270)

"I" sorry. That's the Monte Carlo Fallacy. No matter how many have

fallen inside a particular square, the odds remain the same as they always

were. Each hit is independent of all the others. Bombs are not dogs. No

link. No memory. No conditioning."

Pynchon, Thomas

Gravity's Rainbow (p. 56)

The political practice of citing only agreeable statistics can never settle

economic arguments.

Ramsey, James B.

Economic Forecasting-Models or Market? (p. 77)

. . . statistics-whatever their mathematical sophistication and elegancecannot

make bad variables into good ones.

Reynolds, H.T.

Analysis of Nominal Data (p. 8 )

In this country the statistical side of criminology is very imperfectly

developed, and while the same cannot be said with equal force of

other English-speaking countries, it yet remains true that the statistical

terminology of this social science is characterized, so far as the English

language is concemed, by great vagueness and uncertainty.

Robinson, Lewis Newton

History and Organization of Criminal Statistics in the United States (p. 1)

The government keeps statistics on every known thing. But there is yet

to be a statistics on how many laws we are living under.

Rogers, Will

The Writings of Will Rogers

Volume IV-1 (p. 167)

Everything is figured out down to a Gnat's tooth according to some kind

of statistics.

Rogers, Will

The Writings of Will Rogers

Volume IV-3 (p. 254)

STATISTICS 255

Statistics, ideally, are accurate laws about large groups; they differ from

other laws only in being about groups, not about individuals.

Russell, Bertrand A.

The Analysis of Matter

Chapter XIX (p. 191)

After 17 years of interacting with physicians, I have come to realize that

many of them are adherents of a religion they call Statistics. Statistics

refers to the seeking out and interpretation of p values. Like any

good religion, it involves vague mysteries capable of contradictory and

irrational interpretation. It has a priesthood and a class of mendicant

friars. And it provides Salvation: Proper invocation of the religious

dogmas of Statistics will result in publication in prestigious joumals.

Salsburg, David S.

The American Statistician

The Religion of Statistics as Practiced in Medical Joumals

Volume 39, Number 3, August 1985 (p. 220)

[Statistics] The art of dealing with vagueness and with interpersonal

difference in decision situations.

Savage, L.J.

The Foundation of Statistics (p. 154)

History is statistics in a state of progression; statistics is history at a stand.

Schlozer, Ludwig

Westminster Review

Art. I1

Transactions of the Statistical Society of London

Footnote on page 72

Volume I, Part I

April-August 1838

History is for him continuous statistics, statistics stationary history.

Schlozer, Ludwig

Quoted ip August Meitzen’s

History, Theory, and Techniques of Statistics (p. 37)

256 STATISTICALLY SPEAKING

“How are you’ Mrs. Coleman?”

“Not too bad. How’s yer statistics?”

Segal, Erich

Man, Woman and Child

Chapter 1, (p. 8)

He tumed over on his side and picked up the American Jouml of

Statistics. Better than a sleeping pill. He idly leafed through a particularly

unoriginal piece on stochastic processes, and thought, Christ, I’ve said

this stuff a million times. And then he realized that he himself was the

author.

Segal, Erich

Man, Woman and Child

Chapter 5 (p. 42)

”I mean, here you are a professor of statistics.”

“So?”

”So you have one lousy affair in your whole life. For a few lousy

days. And you get a kid as evidence. Christ, what are the odds of that

happening to anybody?”

”Oh,” said Bob bitterly, ”about a billion to one.”

Segal, Erich

Man, Woman and Child

Chapter 13 (p. 109)

“My husband’s a professor at M.I.T.”

“Really? What’s his field?”

”Statistics.”

”Oh, a real brain. I’m always self-conscious when I meet that sort of

mind. I can barely add a column of figures.”

”Neither can Bob.” Shelia smiled. “That’s my job every month.”

Segal, Erich

Man, Woman and Child

Chapter 17 (p. 132)

“I am Professor Beckworth,” he pronounced in a kind of sopranbaritone.

”Would you like to ask me some statistics, sir?”

“Yes,” replied Bob. “What are the chances of this damn rain stopping

today, Professor?”

“Mmm,” said Jean-Claude, pondering eamestly, “You‘ll have to see me

tomorrow about that.”

Segal, Erich

Man, Woman and Child (p. 178)

STATISTICS 257

We ask for no statistics of the killed,

For nothing political impinges on

This single Casualty, or all those gone,

Missing or healing, sinking or dispersed,

Hundreds of thousands counted, millions lost.

Shapiro, Karl

Collected Poems 1940-1978

Elegy for a Dead Soldier

1.49-53

For I am one of the unpraised, unrewarded millions without whom

Statistics would be a bankrupt science. It is we who are bom, who marry,

who die, in constant ratios.

Smith, Logan Pearsall

Trivia

Book I1

Where Do I Come In?

Lawyers like words and dislike statistics.

Smith, Reginald H.

American Bar Association Journal

A Sequel: The Bar is Not Overcrowded

Volume 45, September 1959 (p. 945)

Statistics, like chloroform, lull many people to sleep in blissful ignorance.

Commenting upon this human frailty to rely too much upon the logic of

statistics, Dr. Jay B. Nash of New York University gives us the following

story.

An inebriate lay at night in a hotel which had a sprinkler system in the

room as a fire safety device, and under the glass on the dresser were

the statistics on how many people had slept with peace in the room, the

hours of sleep and all the other details. After reading this several times

he sauntered off to bed saying,

Now, I lay me down to sleep, statistics make my slumber sweet

If I die, I am not concerned,

I may get wet, but I won’t get bumed.

Look behind statistics! Find out how they’re made up and on what

definitions they are based. Don’t take them at face value.

Solomon, Ben

Quoted in M. Dale Baughman’s

Teacher‘s Treasu y of Stories for Every Occasion

Youth Leader Digest

258 STATlSTlCALLY SPEAKING

A single death is a tragedy, a million deaths is a statistic.

Stalin, Josef

cited by Anne Fremantle in

The New York Times Book Review

Unwritten Pages at the End of the Diary (p. 3)

September 28,1958

I propose that infinitely refutable statistics be declared the official

language of politics.

Stamaty, Mark Alan

Time

Washingtoon (p. 21)

September 25,1995

Statistics is the art of lying by means of figures.

Stekel, Wilhelm

Marriage at the Crossroads

Chapter I1 (p. 20)

. . . elementary statistics texts tell us that the method of least squares

was first discovered about 1805. Whether it had one or two or more

discoverers can be argued; still the method dates from no later than

1805. We also read that Sir Francis Galton discovered regression about

1885, in studies of heredity. Already we have a puzzle-a modem course

in regression analysis is concemed almost entirely with the method of

least squares and its variations. How could the core of such a course date

from both 1805 and 1885? Is there more than one way a sum of squared

deviations can be made small?

Stigler, Stephen M.

The History of Statistics

Introduction (p. 2)

There are two kinds of statistics, the kind you look up and the kind you

make up.

Stout, Rex

Death of a Doxy (p. 90)

Statistics show that seventy-four per cent of wives open letters, with or

without a teakettle.

Stout, Rex

Death of a Doxy (p. 120)

Statistics are the heart of democracy.

Strunsky, Simeon

Topics of the Times

November 30,1944

STATISTICS 259

Everything is quiet, peaceful and against it all is only the silent protest

of statistics. . .

Tchekhov, Anton

Tchekhov’s Plays and Stories

Gooseberries

The statistics mongers . . . have calculated to a nicety how many

quarter loaves, bars of iron, pigs of lead, sacks of wool, Turks, Quakers,

Methodists, Jews, Catholics, and Church-of-England men are consumed

or produced in the different countries of this wicked world.

Thackery, William M.

Character Sketches

Captain Rook and Mr. Pigeon

To some people, statistics is ”quartered pies, cute little battleships and

tapering rows of sturdy soldiers in diversified uniforms”. To others, it is

columns and columns of numerical facts. Many regard it as a branch of

economics. The beginning student of the subject considers it to be largely

mathematics.

The Editors

The American Statistician

Statistics, The Physical Sciences and Engineering

Volume 2, Number 4, August 1948

The president always led off meetings with a dizzying array of

projections. Future sales would skyrocket, profits would grow, and the

company would soon be a national success story. A new manager,

impressed with the apparent growth potential for the company, asked

one veteran executive how accurate the president’s statistics were. The

executive replied, ”Drop a few zeros off the sales figures and put a

negative sign in front of the profit projections-and you’ll get a pretty

good idea of where we’re going.”

Thomsett, Michael C .

The Little Black Book of Business Statistics (p. 6)

“This used to be a profitable company,” the president complained.

”But we’ve lost money for the last three years. What do I tell the

stockholders?”

“Well,“ one executive piped up, ”it’s true that our three-year average is

poor. But why cite performance? Let’s blame it on statistics.”

Thomsett, Michael C .

The Little BZuck Book of Business Statistics (p. 21)

260 STATlSTlCALLY SPEAKING

While he is racing to the hole, the shortstop is figuring: Based on the

speed of the runners and how hard the ball is hit, he probably has no

chance of a double play; he may have a little chance of a play at second;

and he almost certainly has no play at first. He throws to third because

the distance from the hole to the bag is short, his calculation of the

various probabilities led him to conclude that this was his ”percentage

play”.

Now not so much as a glimmer of any number entered the shortstop’s

head in this time, yet he wus thinking statistically.

Thorn, John

The Hidden Game of Baseball (p. 5)

I‘m a woman. I’m a black woman. I’m a poor woman. I’m a fat woman.

I’m a middle-aged woman. And I’m on welfare. In this country, if you’re

any one of those things you count less as a person. If you’re all those

things, you just don’t count, except as a statistic.

Tillmon, Johnnie

Quoted in Francine Klagsbrun’s

The First Ms. Reader

Welfare Is a Woman’s Issue (p. 51)

I am a statistic.

Tillmon, Johnnie

Quoted in Francine Klagsbrun’s

The First Ms. Reader

Welfare Is a Woman’s Issue (p. 51)

We have no statistics to tell us whether there be any such disproportion

in class where men do not die early from overwork.

Trollope, Anthony

The Eiistace Diamond

XXIV

As one of the legislators of the country I am prepared to state that

statistics are always false.

Trollope, Anthony

The Eustace Diamond

XXIV

Statistics is the science, the art, the philosophy, and the technique of

making inferences from the particular to the general.

Tukey, John W.

Research Operations in Industry

STATISTICS 261

I was deducing from the above that I had been slowing down steadily

in these hrty-six years, but I perceive that my statistics have a defect:

3,000 words in the spring of 1868, when I was working seven or eight

or nine hours at a sitting, has little or no advantage over the sitting

of today, covering half the time and producing half the output. Figures

often beguile me, particularly when I have the arranging of them myself;

in which case the remark attributed to Disraeli would often apply with

justice and force: ”There are three kinds of lies: lies, damned lies, and

statistics.”

Twain, Mark

The Autobiography of Mark Twain

Chapter 29

July 4. Statistics show that we lose more fools on this day than in all

the other days of the year put together.

Twain, Mark

Pudd‘nhead Wilson

Chapter XVII (p. 164)

Personally, I never care for fiction or story-books. What I like to read

about are facts and statistics of any kind.

Twain, Mark

Quoted in Rudyard Kipling’s

From Sea to Sea

An Interview with Mark Twain

Statistics can provide a ready proof

For doubtful facts which ought to stay aloof,

Unknown

Quoted in Alexis L. Romanoff‘s

Encyclopedia of Thoughts

If the statistics show a trend or change, they are probably wrong.

Unknown

This seems to be one of the many cases in which the admitted accuracy

of statistical processes is allowed to throw a wholly inadmissible

appearance of authority over the results obtained from them. Statistics

may be compared to a mill of exquisite workmanship, which grinds

you stuff of any degree of fineness; but, nevertheless, what you get out

depends on what you put in, and as the grandest mill in the world will

not extract wheat flour from peascods, so pages of formulas will not get

a definite result out of loose data.

Unknown

Paraphrase of Thomas Henry Huxley in

Quarterly Journal of Geological Society

Volume 25 1869

262 STATlSTlCA LLY S P E A K "

Statistics is the science which uses easy words for hard ideas.

Unknown

Nos numerus sumus et fruges consumere nati.

[We are just statistics, born to consume resources.]

Unknown

If I had only one day left to live, I would live it in my statistics class-it

would seem so much longer.

Unknown

Statistics must be based upon something, but I'm not certain what it is.

Unknown

The beginning of modem statistics is also the beginning of modern

Unknown

Calamity.

What statisticians have in their briefcases is terrifying.

Unknown

The Durbin-Whatzit statistics is used to test unknown assumptions.

Unknown

Statistics prove

Near and Far

That folks who

Drive like crazy

-Are!

Burma Shave

Unknown

Medical statistics are like a bikini. What they reveal is interesting but

what they conceal is vital.

Unknown

Quoted in

The Macmillan Dictionary of Quotations

Thinking has its place. . . but, only when one is confronted with known

facts and statistics. When you're in the unknown and the dark . . . you

surrender your thinking in trust to the feelings that come to you out of

the bush.

Van der Post, Laurens

A Far-off Place (p. 248)

STATISTICS 263

There are three kinds of lies: white lies, which are justifiable; common

lies-these have no justification; and statistics.

von Mises, Richard

Probability, Statistics and Truth

First Lecture (p. 1)

Statistics justify and scholars seize

The salients of colonial policy.

Walcott, Derek

Collected Poems

A Far Cry from Africa

1. 7-8

Statistics provides a quantitative example of the scientific process usually

described qualitatively by saying that scientists observe nature, study

the measurements, postulate models to predict new measurements, and

validate the model by the success of prediction.

Walker, Marshall

The Nature of Scientific Thought (p. 46)

Mathematical statistics provides an exceptionally clear example of

the relationship between mathematics and the extemal world. The

extemal world provides the experimentally measured distribution curve;

mathematics provides the equation (the mathematical model) that

corresponds to the empirical curve. The statistician may be guided by

a thought experiment in finding the corresponding equation.

Walker, Marshall

The Nature of Scientific Thought (p. 50)

As a matter of fact, the whole notion of ”statistical inference” often is

more of a plague and less of a blessing to research workers.

Wang, Chamont

Sense and Nonsense of Statistical Inference (p. 29)

Statistics as a science is to quantify uncertainty, not unknown.

Wang, Chamont

Sense and Nonsense of Statistical Inference (p. 29)

0 god thou has appointed three score years and ten as man’s allotted

span but 0 god statistics go to prove that comparatively few ever attain

that age. . .

Waugh, Evelyn

In Mark Amory’s

The Letters of Evelyn Waiigh

Letter to Laura Herbert, dated October 1935 (p. 99)

264 STATlSTlCALLY SPEAKING

The pretensions advanced for statistics by the student of it are

undoubtedly gaining increased authority with the public.

Westminster Review

Art I1

Transactions of the Statistical Society of London, Volume I, Part I

Volume 29, 1838 (p. 45)

Statistics has been called a science. It is said to connect its facts by a

chain of causation: if it did so, it would be a science, though even then

not a distinct and separate science. But the observations of astronomy

may be called the science of astronomy as properly as statistics may be

denominated a science. No mere record and arrangement of facts can

constitute a science.

Westminster Review

Art I1

Transactions of the Statistical Society of London, Volume I, Part I

Volume 29, 1838 (p. 69)

But statistics is not a science, and cannot be one. Studied as the statistical

council have decreed statistics shall be studied, no department of human

knowledge ever could become a science-a collection of theoriesbecause

they have put their veto on theorizing. But statistics is not even

a department of human knowledge; it is merely a form of knowledge-a

mode of arranging and stating facts which belong to various sciences.

Westminster Review

Art I1

Transactions of the Statistical Society of London, Volume I, Part I

Volume 29, 1838 (p. 70)

Just as data gathered by an incompetent observer are worthies-r by

a biased observer, unless the bias can be measured and eliminated from

the result-so also conclusions obtained from even the best data by one

unacquainted with the principles of statistics must be of doubtful value.

White, William F.

A Scrap-Book of Elementary Mathematics

The Mathematical Treatment of Statistics (p. 156)

There is a curious misconception that somehow the mathematical

mysteries of Statistics help Positivism to evade its proper limitation to the

observed past. But statistics tell you nothing about the future unless you

make the assumption of the permanence of statistical form. For example,

in order to use statistics for prediction, assumptions are wanted as to the

stability of the mean, the mode, the probable error, and the symmetry or

skewness of the statistical expression of functional correlation.

Whitehead, Alfred North

Adventures of Ideas

Cosmologies

Section IV

STATISTICS 265

Figures may not lie, but statistics compiled unscientifically and analyzed

incompetently are almost sure to be misleading, and when this condition

is unnecessarily chronic the so-called statisticians may be called liars.

Wilson, E.B.

Bulletin of the American Mathematical Society

Volume 18,1912

But in all cases remember that statistics is not a spectator sport.

Wonnacott, Ronald J.

Wonnacott, Thomas H.

Introductory Statistics (p. 5)

”Those Platonists are a curse,” he said,

“God’s fire upon the wan,

A diagram hung there instead,

More women bom than men.”

Yeats, William Butler

The Collected Poems of W.B. Yeats

Statistics

SURVEYS AND

QUESTIONNAIRES

A questionnaire is never perfect: some are simply better than others.

Deming, William Edwards

Some Theory of Sampling (p. 31)

A perfect survey is a myth.

Deming, William Edwards

Some Theory of Sampling (p. 24)

The only excuse for taking a survey is to enable a rational decision to be

made on some problem that has arisen and on which decision, right or

wrong, will be made.

Deming, William Edwards

Some Theory of Sampling (p. 545)

. . . neither the interviewer nor the instrument should act in any way upon

the situation. The question, ideally, should be so put and so worded as

to be unaffected by contextual contaminations. The interviewer must be

an inert agent who exerts no influence or response by tone, expression,

stance, or statement. The question must be unloaded in that it does not

hint in any way that one response is more desirable or more correct than

any other response. It must be placed in the sequence of the instrument

in such a way that the subject’s response is not affected by previous

queries or by his own previous responses.

Deutscher, I.

Quoted in S.Z. Nagi and R.G. Convin’s

The Social Contexts of Research

Public and Private Opinions: Social Situations and Multiple Realities

No aphorism is more frequently repeated with field trial, than that

we must ask Nature few questions or, ideally, one question at a time.

266

SURVEYS AND QUESTIONNAIRES 267

The writer is convinced that this view is wholly mistaken. Nature,

he suggests, will best respond to a logical and carefully thought out

questionnaire; indeed, if we ask her a single question, she will often

refuse to answer until some other topic has been discussed.

Fisher, Sir Ronald A.

Journal of the Ministry of Agriculture of Great Britain

Volume 33 (p. 511)

”But what is the purpose of your survey?” he asked.

”Does it need a purpose? I tell you, I just made it up.”

”But your numbers are too few to be significant. You can’t fair a curve

with so little data. Besides, your conditions are uncontrolled. your results

don’t mean anything.”

Heinlein, Robert A.

Beyond This Horizon (p. 6 )

The time of busy people is sometimes wasted by time-consuming

questionnaires dealing with inconsequential topics, worded so as to

lead to worthless replies, and circulated by untrained and inexperienced

individuals, lacking in facilities for summarizing and disseminating any

worthwhile information which they may obtain.

Norton, John K.

Quoted in Douglas R. Berdie and John F. Anderson’s

Questionnaires: Design and Use (p. ix)

A questionnaire is not just a list of questions or a form to be filled out. It

is essentially a scientific instrument for measurement and for collection of

particular kinds of data. Like all such instruments, it has to be specifically

designed according to particular specifications and with specific aims in

mind, and the data it yields are subject to error. We cannot judge a

questionnaire as good or bad, efficient or inefficient, unless we know

what job it was meant to do. This means that we have to think not

merely about the wording of particular questions, but first and foremost,

about the design of the investigation as a whole.

Oppenheim, Abraham Naffali

Questionnaire Design and Attitude Measurement (pp. 2-3)

Your sales last year just paralleled the sales of rum cokes in Rio de Janeiro,

as modified by the sum of the last digits of all new telephone numbers

in Toronto. So, why bother with surveys of your own market? Just send

away for the data from Canada and Brazil.

Strong, Lydia

Management Rm‘ew

Sales Forecasting: Problems and Prospects

September 1956 (p. 803)

SYMMETRY

Equiprobability in the physical world is purely a hypothesis. We may

exercise the greatest care and the most accurate of scientific instruments

to determine whether or not a penny is symmetrical. Even if we are

satisfied that it is, and that our evidence on that point is conclusive,

our knowledge, or rather our ignorance, about the vast number of other

causes which affect the fall of the penny is so abysmal that the fact of

the penny’s symmetry is a mere detail. Thus, the statement ”head and

tail are equiprobable” is at best an assumption.

Kasner, Edward

Newman, lames

I- =? r-

Mathematics and the Imagination.&. 251)

--=<T

km

Theory like mist on eye-

Charlie Chan -

(See p. 270) - glasses. Obscure facts.

268

TABLES

Tables are like cobwebs, like the sieve of the Danaides; beautifully

reticulated, orderly to look upon, but which will hold no conclusion.

Tables are abstractions . . . There are innumerable circumstances; and

one circumstance left out may be the vital one on which all tumed . . .

Conclusive facts are inseparable from inconclusive except by a head that

already understands and knows.

Carlyle, Thomas

English and other Critical Essays

Chartism

Chapter I1

The way statistics are presented, their arrangement in a particular way in

tables, the juxtaposition of sets of figures, in itself reflects the judgment

of the author about what is sigruficant and what is trivial in the situation

which the statistics portray.

Devons, Ely

Essays in Economics

Chapter 6 (p. 109)

. . . some witty comments made by A.L. Bowley . . .

Footnote: (a) The terms used in the headings and margins of the table

are all employed in a technical sense, known only to the officers who

compiled it, and which they are unable for official reasons to divulge.

(b) The sub-divisions of the table and the region to which it refers have

been changed since the last retum was published. (c) Before tabulation

the data have been subjected to numerous adjustments, allowances and

other corrections, of a kind to vitiate any tests of significance which the

reader may be tempted to apply to them.

Fisher, Sir Ronald A.

Sankhya

Presidential Address

First Indian Statistical Conference, 1938

Volume 4, 1938 (p. 15)

269

270 STATISTICA LLY SPEAK"

Worst of all, however, are joumals that publish tables giving the results,

mostly unintelligible, of multiple range tests, the said results receiving no

mention in the text. The last fault arises possibly from the misconceived

idea that the property of sigruficance resides in the data themselves, not

in the contrasts they estimate. Accordingly, if the data are "significant,"

the author is free to comment on any feature however trivial; if they are

not, interpretation is deemed impermissible.

Peirce, Charles Sanders

Quoted in Samuel Kotz and Norman L. Johnson's

Breakthroughs in Statistics

Volume I1 (p. 61)

Information that is imperfectly acquired, is generally as imperfectly

retained; and a man who has carefully investigated a printed table, finds,

when done, that he has only a very faint and partial idea of what he has

read; and that like a figure imprinted on sand, is soon totally erased and

defaced.

Playfair, William

The Commercial and Political Atlas (p. 3)

Education is an admirable thing, but it is well to remember from

time to time that nothing that is worth knowing can be taught.

Oscar Wilde - (See p. 272)

TEACHING

When an engineer apologetically approaches a statistician, graph in hand,

and asks how he should fit a straight line to these points, the situation is

not unlike the moment when one’s daughter inquires where babies come

from. There is a need for tact, there is a need for delicacy, but here is

opportunity for enlightenment and it must not be discarded casually-or

destroyed with the glib answer.

Acton, F.S.

National Bureau of Standards Report 12-10-51 (p. 1)

To teach doubt and Experiment

Certainly was not what Christ meant.

Blake, William

The Complete Writings of William Blake

The Everlasting Gospel

d, 1. 49

The teaching of probabilistic reasoning, so very common and important a

feature of modem science, is hardly developed in our educational system

before college.

Bruner, Jerome Seymour

The Process of Education (p. 45)

Statistics is not the easiest subject to teach, and there are those to whom

anything savoring of mathematics is regarded as for ever anathema.

Moroney, M.J.

Facts from Figures

Statistics Desirable (p. 458)

271

272 STATISTICALLY SPEAKING

It is hard to understand why he failed to appreciate the pedagogical value

of designing an experiment to illustrate a point of theory, predicting the

result, running the experiment, and then taking the consequences if it

tumed out wrong.

Olds, Edwin G.

Journal of the American Statistical Association

Teaching Statistical Quality Control for Town and Gown

Volume 44, 1949 (pp. 2234)

Two managers were taking a course in basic statistics. After an evening

in class, one said to the other, ”I’ve noticed that every time a new idea is

introduced, I have to look up three or four words just to make sense out

of the idea. Why do statisticians obfuscate their message with so much

terminology? Why can’t they simplify it instead?”

The second manager replied, “I’ll tell you, but only after I find out what

’obfuscate’ means.”

Thomsett, Michael C.

The Little Black Book of Business Statistics (p. 117)

Teaching data analysis is not easy, and the time allowed is always far

from sufficient.

Tukey, John W.

Annals of Mathematical Statistics

The Future of Data Analysis

Volume 33, Number 1, March 1962 (p. 11)

Education is an admirable thing, but it is well to remember from time to

time that nothing that is worth knowing can be taught.

Wilde, Oscar

Epigrams: Phrases and Philosophies for the Use of the Young

Sebastian Melmoth

TESTING

Rejection rules are not significance tests.

Anscombe, F.J.

Technometrics

Rejection of Outliers

Volume 2, 1960 (p. 126)

There is no more pressing need in connection with the examination of

experimental results than to test whether a given body of data is or is

not in agreement with any suggested hypothesis.

Fisher, Sir Ronald A.

Statistical Methods for Research Workers (p. 250)

Comparisons do ofttime great grievance.

Lydgate, John

Bochas

Book 111, Chapter VI11

No instrument smaller than the World is fit to measure men and women:

Examinations measure Examinees.

Raleigh, Sir Walter

Laughterfrom a Cloud

Some Thoughts on Examinations (p. 120)

In an examination those who do not wish to know ask questions of those

who cannot tell.

Raleigh, Sir Walter

Laughterfrom a Cloud

Some Thoughts on Examinations (p. 120)

Beware of the confounded effect!

Unknown

273

274 STATISTICALLY SPEAKlNG

Examinations are pure humbug from beginning to end.

Wilde, Oscar

Epigrams: Phrases and Philosophies for the Use of the Young

Oscariana

In examinations the foolish ask questions that the wise cannot answer.

Wilde, Oscar

Epigrams: Phrases and Philosophies for the Use of the Young

Phrases and Philosophies

W€DDED..

I

It is not nice to be wedded to anythug-not even t o a theory.

Samuel Butler - (See p. 276)

THEORY

The real beginning of the theory of probability goes back to 1654, when

Pascal and Fermat laid down the fundamental principles in a short

correspondence. Most mathematical disciplines have had respectable

enough parents; the progenitors (not Fermat and Pascal) of the theory of

probability were thoroughly disreputable.

Bell, Eric T.

Mathematics: Queen and Servant of Science (p. 377)

Shortly after they were married, one of Corde’s academic friends had

congratulated him, saying, ”Do you remember that old piece of business

from probability theory, that if a million monkeys jumped up and down

on the keys of typewriters for a million years one of them would compose

Paradise Lost?”

Bellow, Saul

The Dean‘s December

Chapter iv (p. 80)

The world is more complicated than most of our theories make it out to

be.

Berkeley, Edmund C.

Computers and Automation

Right Answers-A Short Guide for Obtaining Them

September 1969 (p. 20)

A theory is merely a scientific idea controlled by experiment.

Bernard, Claude

An Introduction to the Study of Experimental Medicine (p. 26)

That quantity which, when multiplied by, divided by, added to, or

subtracted from the answer you get, gives you the answer you should

have gotten.

Bloch, Arthur

Murphy’s Law

Skinner’s Constant (p. 36)

275

276 STATISTICALLY SPEAKING

Your theory is most excellent, and I shall endeavour to collect facts for

you with a view to its elucidation.

Buckland, Frank

Quoted in Karl Pearson’s

The Life, Letters, and Labours of Francis Galton

Volume I1 (p. 87)

It is not nice to be wedded to anything-not even to a theory.

Butler, Samuel

Samuel Butler’s Note-Books (p. 116)

For that theory [mathematical theory of statistics] is solely concemed

with working out the properties of the theoretical models, whereas

what matters-and what in one sense is most difficult-is to decide

what theoretical model best corresponds to the real world-situation to

which statistical methods must be applied. There is a great danger that

mathematical pupils will imagine that a knowledge of mathematical

statistics alone makes a statistician.

Champemowne, D.G.

Journal of the Royal Statistical Society

A Discussion on the Teaching of Mathematical Statistics at the University Level

Volume 118, 1955 (p. 203)

Theory like mist on eyeglasses. Obscure facts.

Chan, Charlie

In the movie Charlie Chan in Egypt

But Pop, I’ve got a theory.

Chan, Jimmy

In the movie Charlie Chan in Panama

A man warmly concemed with any large theories has always a relish for

applying them to any triviality.

Chesterson, Gilbert Keith

The Father Brown Omnibus

The Wisdom of Father Brown

The Absence of Mr. Glass

“I’d be glad to settle without the theory,” remarked Kimball, ”if I could

even understand what this thing i s - o r what it’s supposed to do.”

Clarke, Arthur C.

The Lost Worlds of 2001

Chapter 30

THEORY 277

”And that,” said Kaminski, ”reminds me of another quotation-one of

Niels Bohr’s. ’Your theory is crazy-but not crazy enough to be true.’”

Clarke, Arthur C.

The Lost Worlds of 2001

Chapter 30

Theory is worth little, unless it can explain its own phenomena, and

it must effect this with out contradicting itself; therefore, the facts are

sometimes assimilated to the theory, rather that the theory to the facts.

Colton, Charles Caleb

Lacon: or many things in a few words (p. 77)

Professors in every branch of the sciences prefer their own theories to

truth: the reason is, that their theories are privafe property, but truth is

common stock.

Colton, Charles Caleb

Lacon: or many things in a few words (p. 189)

. . . for without the making of theories I am convinced there would be

no observation.

Darwin, Charles

The Life and Letters of Charles Darwin

Volume I1

C . Darwin to C. Lye11

June 1st [1860] (p. 108)

. . . a theory arises from a leap of the imagination. . .

Davies, J.T.

The Scientific Approach (p. 11)

Theories are generalizations and unifications, and as such they cannot

logically follow only from our experiences of a few particular events.

Indeed we often generalize from a single event, just as a dog does

who, having once seen a cat in a certain driveway, looks eagerly around

whenever he passes that place in the future. Evidently this latter activity

is equivalent to testing the theory . . . that “there is always a cat in that

driveway”.

Davies, J.T.

The Scientific Approach (p. 11)

Rowe’s Rule: the odds are six to five that the light at the end of the tunnel

is the headlight of an oncoming train.

Dickson, Paul

Washingtonian

November 1978

278 STATlSTlCALLY SPEAKING

Schumper’s Observation of Scientific Theories. Any theory can be made

to fit the facts by means of appropriate additional assumptions.

Quoted in Paul Dickson’s

The Oficial Rules (S165)

We have found a strange footprint on the shores of the unknown. We

have devised profound theories, one after another to account for its

origin. At last, we have succeeded in reconstructing the creature that

made the footprint. And lo! It is our own.

Eddington, Sir Arthur Stanley

Space, Time and Gravitation (p. 131)

A theory can be proved by experiment; but no path leads from

experiment to the birth of a theory.

Einstein, Albert

The Sunday Times

18 July 1976

The possession of an original theory which has not yet been assailed must

certainly sweeten the temper of a man who is not beforehand ill-natured.

Eliot, George

The Impressions of Theophrasttrs Such

How We Encourage Research (p. 26)

About binomial theorem I’m teeming with a lot 0’ news-

With many cheerful facts about the square of the hypotenuse.

Gilbert, W.S.

Sullivan, Arthur

The Complete Plays of Gilbert and Sullivan

The Pirates of Penzance

Act I

Theories that go counter to the facts of human nature are foredoomed.

Hamilton, Edith

The Roman Way

Comedy’s Mirror

Facts are of not much use, considered as facts. They bewilder by their

number and their apparent incoherency. Let them be digested into

theory, however, and brought into mutual harmony, and it is another

matter. Theory is of the essence of facts. Without theory scientific

knowledge would be only worthy of the mad house.

Heaviside, Oliver

Electromagnetic Theory

Chapter I, Introduction (p. 12)

THEORY 279

And I believe that the Binomial Theorem and a Bach Fugue are, in the

long run, more important than all the battles of history.

Hilton, James

This Week Magazine

1937

One forms provisional theories and waits for time or fuller knowledge

to explode them. A bad habit, Mr. Ferguson, but human nature is weak.

Holmes, Sherlock

in Arthur Conan Doyle's

The Complete Sherlock Holmes

The Adventure of the Sussex Vampire

I don't mean to deny that the evidence is in some ways very strong

in favour of your theory, I only wish to point out that there are other

theories possible.

Holmes, Sherlock

in Arthur Conan Doyle's

The Complete Sherlock Holmes

Adventure of the Norwood Builder

No theory is sacred.

Hubble, Edwin

The Nature of Science and other Lectures

Experiment and Experience (p. 41)

A first-rate theory predicts; a second-rate theory forbids and a third-rate

theory explains after the event.

Kitaigordski, Aleksander Isaakovich

Lecture, ICU Amsterdam, August 1975

In the beginning there was de Moivre, Laplace, and many Bemoullis, and

they begat limit theorems, and the wise men saw that it was good and

they called it by the name of Gauss. Then there were new generations

and they said that it had experimental vigor but lacked in rigor. Then

came Chebyshev, Liapounov, and Markov and they begat a proof and

Polya saw that it was momentous and he said that its name shall be

called the Central Limit Theorem.

Then came Lindeberg and he said that it was elementary, for Taylor had

expanded that which needed expansion and he said it twice, but Levy

had seen that Fourier transforms are characteristic functions and he said

"Let them multiply and bring forth limit theorems and stable laws." And

it was good, stable, and sufficient, but they asked "Is it necessary"? Levy

answered, "I shall say verily unto you that it is not necessary, but the

time shall come when Gauss will have no parts except that they be in

280 STATISTICALLY SPEAKING

the image of Gauss himself, and then it will be necessary.’’ It was a

prophecy, and when Cramer announced that the time had come, and

there was much rejoicing and Levy said it must be recorded in the bibles

and he did record it, and it came to pass that there were many limit

theorems and many were central and they overflowed the chronicles

and this was the history of the central limit theorem.

LeCam, L.

Statistical Science

The Central Limit Theorem around 1935

Volume 1, Number 1, February 1986 (p. 86)

Three Indian women are sitting side by side. The first, sitting on a

goatskin, has a son who weighs 170 pounds. The second, sitting on a

deerskin, has a son who weighs 130 pounds. The third, seated on a

hippopotamus hide, weighs 300 pounds. What famous theorem does

this illustrate?

Naturally, the answer is that the squaw on the hippopotamus is equal

to the sons of the squaws on the other two hides.

Moger, Art.

The Complete Pun Book (pp. 23-4)

The argument seemed sound enough, but when a theory collides with a

fact, the result is a tragedy.

Nizer, Louis

My Life in Court

Proxy Battle (p. 433)

To refuse to consider any possibility is merely the old habit of making

theory the measure of reality.

Oman, John

The Natural and the Supernatural

Chapter XV (p. 269)

The theory of probabilities is simply the science of logic quantitatively

treated.

Peirce, Charles Sanders

Writings of Charles Sanders Peirce

Volume 3 (p. 278)

On another occasion I awoke covered in sweat. I had just dreamt

the obvious solution to my nightmare. Standing beside a huge

blackboard covered in equations, a mathematician was concluding his

demonstration, in front of a turbulent audience, that the celebrated

”Monte Carlo Theorem” was generalisable; that meant not just that a

roulette player placing his stake on a random number had just as much

THEORY 281

chance of winning as a martingale player systematically doubling his

stake on the same number on each loss in order to recoup eventually . . .

Perec, Georges

Life: A User’s Manual (p. 146)

Sir, please believe me, it’s the first time this has ever happened.

Have another try, don’t get upset. You know our Theorems are

GUARANTEED.

Petit, Jean-Pierre

Euclid Rules OK (p. 11)

Coincidences, in general, are great stumbling-blocks in the way of that

class of thinkers who have been educated to know nothing of the theory

of probabilities-that theory to which the most glorious objects of human

research are indebted for the most glorious of illustration.

Poe, Edgar Allen

Tales of Mystery and Imagination

The Murders in the Rue Morgue (p. 208)

But this is sufficient to show that a high probability cannot be one of the

aims of science. For the scientist is most interested in theories with a high

content. He does not care for highly probable trivialities but for bold and

severely testable (and severely tested) hypotheses. If (as Camap tell us)

a high degree of confirmation is one of the things we aim at in science,

then degree of confirmation cannot be identified with probability.

This may sound paradoxical to some people. But if high probability were

an aim of science, then scientists should say as little as possible, and

preferably utter tautologies only. But their aim is to ’advance‘ science,

that is to add to its content. Yet this means lowering its probability. And

in view of the high content of universal laws, it is neither surprising to

find that their probability is zero . . .

Popper, Karl R.

Conjectures and Refutations: The Growth of Scient@ Knowledge (p. 286)

The study of inductive inference belongs to the theory of probability,

since observational facts can make a theory only probable but wiU never

make it absolutely certain.

Reichenbach, Hans

The Rise of Scientific Philosophy (p. 231)

A theory is worthless without good supporting data.

Romanoff, Alexis L.

Encyclopedia of Thoughts

Aphorisms

2410

282 STATlSTlCALLY SPEAKlNG

Very dangerous things, theories.

Sayers, Dorothy L.

The Unpleasantness at the Bellona Club

Chapter 4

It is noteworthy that the etymological root of the word theatre is the

same as that of the word theory! namely a view. A theory offers us a

better view.

Seeger, Raymond J.

Journal of the Washington Academy of Sciences

Volume 36, 1946 (p. 286)

If you have to prove a theorem, do not rush. First of all, understand

fully what the theorem says, try to see clearly what it means. Then check

the theorem; it could be false. Examine the consequences, verify as many

particular instances as are needed to convince yourself of its truth. When

you have satisfied yourself that the theorem is true, you start proving it.

Unknown

The Treadmill Theorem states that every solution entails k GE. 1 new

problems.

unknown

The Dirty Data Theorem states that "real world" data tends to come from

bizarre and unspecifiable distributions of highly correlated variables

and have unequal sample sizes, missing data points, non-independent

observations, and an indeterminate number of inaccurately recorded

values.

Unknown

Why bother to make it elegant if it already works.

unknown

Facts without theory is trivia. Theory without facts is bullshit.

Unknown

The supreme misfortune is when theory outstrips performance.

Da Vinci, Leonard0

Notebooks

C

"Let us work without theorising," said Martin; "tis the only way to make

life endurable."

Voltaire

Candide

XXX

THEORY 283

Except perhaps for a few of the deepest theorems, and perhaps not even

these, most of the theorems of statistics would not survive in mathematics

if the subject of statistics itself were to die out. In order to survive the

subject must be more responsive to the needs of application.

Wolfowitz, J.

Essays in Probabilily and Statistics (p. 748)

Why bother to make it elegant if it already works.

Unknoe~n- (888 p. 282)

TRUTH

Approximate truth is the only truth attainable, but at least one must

strive for that, and not wade off into arbitrary falsehood.

Eliot, George

The George Eliot Letters

Volume IV (p. 43)

. . . in the statistical world you can multiply ignorance by a constant and

get truth.

Jones, Raymond F.

The Non-Statistical Man (p. 58)

There are certain statements which, though they are false as hell, must

be treated as though they were true gospel.

Trollope, Anthony

The Eustace Diamond

LXXVIII

284

VARIABILITY

McDougall's freedom was my variance. McDougall hoped that variance

would always be found in specdying the laws of behavior, for there

freedom might still persist. I hoped then-less wise than I think I am

now (it was 31 years ago)-that science would keep pressing variance

towards zero as a limit. At any rate this general fact emerges from this

example: freedom, when you believe it is operating, always resides in an

area of ignorance. If there is a known law, you do not have freedom.

Boring, E.G.

The Scientific Monthly

When is Human Behavior Predetermined

Volume 84, 1957 (p. 190)

It is clear that one who attempts to study precisely things that are

changing must have a great deal to do with measures of change.

Cooley, Charles

Journal of the Amm'can Statistical Association

Observations on the Measure of Change

New Series, Number 21, March 1893

Variety's the very spice of life,

That gives it all its flavour.

Cowper, William

Cowper: Poetical Work;

The Task

Book I1 (The Timepiece)

1. 606

The computer informed her that three spaces accounted for eighty-one

percent of variance.

Crichton, Michael

The Terminal Man

Chapter 6 (p. 47)

285

286 STATlSTZCALLY SPEAKZNG

Many laws regulate variation, some few of which can be dimly seen

. . . I will here only allude to what may be called correlated variation.

Important changes in the embryo or larva will probably entail changes in

the mature animal. . . Breeders believe that long limbs are almost always

accompanied by an elongated head . . . cats which are entirely white and

have blue eyes are generally deaf. . . it appears that white sheep and pigs

are injured by certain plants whilst dark-coloured individuals escape . . .

Darwin, Charles

The Origin of Species

Chapter I

Effects of Habit and the Use or Disuse of Parts

Before the inherent variability of the test-animals was appreciated,

assays were sometimes carried out on as few as three rabbits: as one

pharmacologist put it, those were the happy days.

Fieller, E.C.

Journal of the Royal Statistical Society

Volume vii (p. 3)

Two variable organs are said to be co-related when the variation of one

is accompanied on the average by more or less variation of the other,

and in the same direction.

Galton, Francis

Proceedings of the Royal Society of London

Co-relations and Their Measurements, Chiefly from Anthropometric Data

Volume 45, 1888

The incalculable number of petty accidents that concur to produce

variability among brothers, makes it impossible to predict the exact

qualities of any individual from hereditary data. But we may predict

average results with great certainty . . . and we can also obtain precise

information concerning the penumbra of uncertainty that attaches itself

to single predictions.

Galton, Francis

Natural Inheritance

Process in Heredity (pp. 16-7)

If we knew the little differences which divide one man from another,

even within the same family, we should have the key to most of life’s

riddles.

Galton, Francis

Quoted in Karl Pearson’s

The Lfe, Letters, and Labours of Francis Galton

Volume I (p. 55)

VARIABILITY 287

. . . to me the form of the egg has never appeared to have aught to do

with the engenderment of the chick, but to be a mere accident; and to

this conclusion I come the rather when I see the diversities in the shapes

of the eggs of different hens.

Harvey, William

Anatomical Exercises on the Generation of Animals

Exercise 59

Nothing so like as eggs; yet no one, on account of this appearing

similarity, expects the same taste and relish in all of them.

Hume, David

An Enqui y Concerning Human Understanding

Section IV (p. 35)

The student of anatomy is perfectly well aware that there is not a single

organ of the human body the structure of which does not vary, to a

greater or less extent, in different individuals.

Huxley, Thomas H.

Man's Place in Nature

I11 (p. 166)

There is nothing stable in the world; uproar's your only music.

Keats, John

Letters of John Keats

Letter to George and Thomas Keats

13 January, 1818

. . . there are never in nature two beings which are exactly alike . . .

Leibniz, Gottfried Wilhelm

Lzibniz: Discoiirse on Metaphysics

Monadology, 9

The starting point of Darwin's theory of evolution is precisely the existence

of those differences between individual members of a race or

species which morphologists for the most part rightly neglect. The first

condition necessary, in order that any process of Natural Selection may

begin among a race, or species, is the existence of differences among its

members; and the first step in an enquiry into the possible effect of a

selective process upon any character of a race must be an estimate of

the frequency with which individuals, exhibiting any given degree of

abnormality with respect to that character, occur. The unit, with which

288 STATlSTlCA L LY SPEAKlNG

such an enquiry must deal, is not an individual but a race, or a

statistically representative sample of a race; and the result must take

the form of a numerical statement, showing the relative frequency with

which the various kinds of individuals composing the race occur.

Pearson, Karl

Biometrika

Editorial, 1901 (p. 1)

jucunda vicissitudo rerum.

[Variety is the spice of life.]

Proverb

Variation is, of course, an important characteristic of populations that

individuals cannot have . . . A thousand exactly similar steel bearing

balls (if such were possible) would be no more than one ball multiplied

one thousand times. It is the quality of variation that makes it difficult

at first to carry in mind a population in its complexity.

Tippett, L.C.

The World of Mathematics

Sampling and Standard Error

Volume 3 (p. 1480)

Sunt certi denique tines quos ultra citraque nequit existere verum.

[All variates are limited in both directions.]

Unknown

Variance is what any two statisticians are at.

Unknown

Since no two events are identical, every atom, molecule, organism,

personality, and society is an emergent and, at least to some extent, a

novelty.

Wheeler, William Maston

Proceedings of the Sixth lnternational Congress of Philosophers

Emergent Evolution of the Social

Cambridge, Massachusetts

BIBLIOGRAPHY

Abbott, Edwin A. Flatland. Barnes & Noble, Inc., New York. 1963.

Abelson, Philip H. ‘Editorial‘ in Science. 4 February 1994.

Adams, Douglas. The Original Hitchhiker Radio Scripts. Crown Publishers,

Adams, Franklin. Tobogganing on Pamassus. Doubleday, Page &

Adams, Henry. A Letter to American Teachers of History. S.H. Furs & Co.,

Adams, Henry. The Education of Henry Adams. Random House, New York.

Advertisement. The American Statistician. Volume 33, Number 4.

Aeschylus. The Plays of Aeschylus. G. Bell, London. 1909.

Akenside, Mark. The Poetical Works of Mark Akenside and John Dyer. George

Routledge, New York. 1855.

Alcott, Louisa May. Little Women. The World Publishing Co., Cleveland.

1946.

Allen, Amold 0. Probability, Statistics, and Queueing Theory with Computer

Science Applica tions (Second Edition). Academic Press, Inc., Boston.

1990.

Allen, R.G.D. Statistics for Economists. Hutchinson & Co. Ltd., London.

1957.

Allibone, S. Austin. Prose Quotations from Socrates to Macaulay. J.B.

Lippincott Co., Philadelphia. 1903.

Ambler, Eric. A Coffin for Dimitrios. The Sun Dial Press, New York. 1939.

Anderson, Poul. New Scientist. 25 September 1969.

Angell, Roger. Late Innings: a Baseball Companion. Simon & Muster, New

Anscombe, F.J. ‘Rejection of Outliers’ in Technometrics. Volume 2. 1960.

Aquinas, Thomas. Summa Theologize. McGraw-Hill Book Co., New York.

Arbuthnot, John. Of the Laws of Chance. Benj. Matte, London. 1692.

Arago. ’Eulogy on Laplace’ in Smithsoniun Report. 1874.

Inc., New York. 1985.

Company, Garden City. 1918.

Baltimore. 1910.

1946.

November 1979.

York. 1982.

1975.

289

290 STATISTICALLY SPEAHNG

Aristotle. Metaphysics. Harvard University Press, Cambridge. 1947.

Aristotle. On Generation and Corruption. Translated by C.J.F. Williams.

Aristotle. On Interpretations. Harvard University Press, Cambridge. 1962.

Aristotle. On the Heavens (De caelo). Harvard University Press,

Aristotle. The Poets. Harvard University Press, Cambridge. 1939.

Aristotle. The Physics (Physica). Harvard University Press, Cambridge.

1957.

Aristotle. The Nicomachean Ethics ( E thica Nicomachea). Harvard University

Press, Cambridge. 1939.

Aristotle. The Art of Rhetoric (Rhetoricd. Harvard University Press,

Cambridge. 1959.

Amauld, htoine. The Art of Thinking: Port-Royal Logic. The Bobbs-Merrill

Co., Inc., Indianapolis. 1964.

Amold, Matthew. Discourses in America. Macmillan and Co., London.

1889.

Aron, Raymond. The Opium of the Intellectuals. Translated by Terence

Kilmartin. Greenwood Press Publications, Westport. 1955.

Arthur, T.S. Ten Nights in a Bar-Room and What I Saw There. Edited by

Donald A. Koch. The Belknap Press of Harvard University Press,

Cambridge. 1964.

Asimov, Isaac. Of Time and Space and Other Things. Avon Books, New

York. 1965.

Atherton, Gertrude. Senator North. John Wilson & Co., Cambridge. 1900.

Aurelius, Marcus. The Meditations of the Emperor Antoninus Marcus

Aurelius. Translated by George Long. Thomas Y. Crowell & Co., New

York. No date.

Oxford University Press, Oxford. 1982.

Cambridge. 1939.

Austen, Jane. Sense and Sensibility. E.P. Dutton & Co., New York. 1908.

Bacon, Francis. Advancement of Learning. Ginn E. Company Publishers.

Bacon, Francis. "I Atlantis. D. Van Nostrand Co., Inc., New York. 1942.

Bacon, Francis. The Novum Organon or A Trve Guide to the Interpretation of

Nature. The University Press, Oxford. 1855.

Baez, Joan. Daybreak. Dial Press, New York. 1968.

Bailey, Norman T.J. The Mathematical Approach to Biology and Medicine.

Bailey, Thomas D. 'Notable and Quotable' in Wall Street Jouml. 17

Bailey, William B. and Cummings, John. Statistics. A.C. McClurg & Co.,

Balchin, Nigel. The Small Back Room. Collins, London. 1943.

Barrie, J.M. The Greenwood Hat. Charles Schribner's Sons, New York. 1938.

No date.

John Wiley & Sons, London. 1967.

December 1962.

Chicago. 1917.

BIBLIOGRAPHY 291

Barry, Frederick. The Scientific Habit of Thought. Columbia University

Bartlett, M.S. ’Discussion on Professor Pratt’s Paper’ in Jouml of the Royal

Bartlett, M.S. Essays on Probability and Statistics. Methuen & Co., Ltd.,

Baudrillard, Jean. Cool Memories. Galilee, Paris. 1987.

Baughman, M. Dale. Teacher’s Treasury of Stories for Every Occasion.

Bell, Eric. The Development of Mathematics. McGraw-Hill Book Co., Inc.,

Bell, Eric. Mathematics: Queen & Servant of Science. McGraw-Hill Book Co.,

Belloc, Hilaire. More Beasts (for Worse Children). E. Amold, New York.

Belloc, Hilaire. The Silence of the Sea. Sheed & Wood, New York. 1940.

Bellow, Saul. Herzog. The Viking Press, New York. 1964.

Bellow, Saul. The Dean‘s December. Harper & Row, Publishers, New York.

Bennett, Amold. A Great Man. George H. Dorian Co., New York. 1911.

Berdie, Douglas A. Questionnaires: Design and Use. The Scarecrow Press,

Inc., Metuchen. 1974.

Bergson, Henri. Crea tive Evolution. Translated by Arthur Mitchell.

Random House, Inc., Canada. 1944.

Berkeley, Edmund C. ‘Right Answers-A Short Guide for Obtaining

Them’ in Computers and Automation. Volume 18, Number 10. September

1969.

Bemard, Claude. An Introduction to the Study of Experimental Medicine.

Henry Schuman, Inc., New York 1949.

Bemard, Frederick R. Printer’s Ink. Volume 138. 10 March 1927.

Beveridge, William Ian B. The Art of Scientific Investigation. Norton, New

York. 1957.

Bierce, Ambrose. The Devil’s Dictionary. Dover Publications, Inc., New

York. 1958.

Billings, Josh. Old Probability: Perhaps Rain-Perhaps Not. Literature

House, Upper Saddle River. 1970.

Blake, William. The Complete Writings of William Blake; with variant

readings. Edited by Geoffrey Keynes. Oxford University Press, Oxford.

1966.

Bloch, Arthur. Murphy’s LAW. Price/Stem/Sloan Publishers, Inc., Los

Angeles. 1979.

Blodgett, James H. ’Obstacles to Accurate Statistics’ in The Joumal of the

American Statistical Association. New Series Number 41. March 1898.

Bohm, D. Causality and Chance in Modern Physics. D. van Nostrand

Company, Inc., Princeton. 1957.

Press, New York. 1927.

Statistical Society.

London. 1962.

Prentice-Hall, Inc., Englewood Cliffs. 1958.

New York. 1940.

Inc., New York. 1951.

1897.

1982.

292 STATISTICALLY SPEAKING

Boole, George. ’An Investigation of the Laws of Thought’ in Collected

Logical Works. Volume 11. The Open Court Publishing Co., LaSalle.

1952.

Boorstin, Daniel J. The Decline of Radicalism. Vintage Books, New York.

1969.

Booth, Charles. Charles Booth’s London. Penguin Books, Middlesex. 1971.

Borel, Emile. Probability and Certainty. Dover Publications, Inc., New York.

Borel, Emile. Probabilities and Life. Translated by Maurice Baudin. Dover

Borges, Jorge Luis. Ficciones. Grove Press, Inc., New York. 1962.

Boring, E.G. ‘When is Human Behavior Predetermined?’ in The Scientific

Monthly. Volume 84. 1957.

Bom, Max. Natural Philosophy of Cause and Chance. Dover Publications,

Inc., New York. 1964.

Bostwick, Arthur E. ‘The Theory of Probabilities’ in Science. Volume 111,

Number 54. 10 January 1896.

Boswell, James. The Life of Samuel Johnson. E.P. Dutton Co., New York.

No date.

Boudreau, Frank G., MD and Kiser, Clyde V. Problems in the Collection and

Comparability of International Statistics. Milbank Memorial Fund, New

York. 1949.

Boulle, Pierre. The Bridge Over the River Kwai. Translated by Xan Fielding.

The Vanguard Press, Inc., New York. 1954.

Bowley, Arthur L. Elements of Statistics. Staples Press Limited, London.

1946.

Bowley, Arthur L. The Mathematical Gazette. Volume 12, Number 77, July

1925.

Bowman, Scotty. ‘A Lot More Where They Come From’ in Sports

Illustrated. 2 April 1973.

Box, G.E.P. ‘Use and Abuse of Regression’ in Technometrics. Volume 8,

Number 4. November 1966.

Box, G.E.P. ’Discussion’ in Joumal of the Royal Statistical Society. Series B.,

18. 1956.

Bradley, F.H. The Principles of Logic. Oxford University Press, London.

1883.

Braude, Jacob M. Complete Speaker’s and Toastmaster’s Library. Prentice-

Hall, Inc., Englewoods Cliffs. 1967.

Browning, Elizabeth Barrett. The Complete Poetical Works of E.B.B.

Houghton, Mifflin & Co., New York. 1900.

Browning, Robert. The Poems and Plays of Robert Browning. Random

House, Inc., New York. 1961.

Browning, Robert. The Ring and the Book. Oxford University Press,

London. 1912.

1964.

Publications, New York. 1962.

BIBLIOGRAPHY 293

Bruner, Jerome S. The Process of Education. Harvard University Press,

Buchner, Ludwig. Force and Matter. Truth Seeker Company, New York.

Bulwer, Lytton E.G. Eugene Arum. Collier, New York. 1901.

Burgess, Robert W. ’The Whole Duty of the Statistical Forecaster’ in

Journal of the American Statistical Association. Volume 32, Number 200.

December 1937.

Buman, Tom. The Dictionary of Misinformation. Thomas Y. Crowell Co.,

New York. 1975.

Bumey, Frances. Camilla. Oxford University Press, London. 1972.

Bums, Robert. The Complete Poetical Works of Robert Burns. Houghton,

Butler, Joseph. The Analogy of Religion. J.M. Dent & Co., London. 1906.

Butler, Samuel. Erewhon or Over the Range. University of Delaware Press,

Butler, Samuel. Hudibras. The Clarendon Press, Oxford. 1967.

Butler, Samuel. Samuel Butler’s Note-Books. Selections edited by Geoffrey

Butler, Samuel. The Poetical Works. Volume 11. Bell and Daldy, York Street,

Byron, Lord. Don juun. Edited by Truman Guy Steffon and Willis W.

Byron, Lord. The Complete Poetical Works of Byron. Houghton Mifflin &

Cambridge. 1965.

1950.

Mifflin & Co., Boston. 1897.

Newark. 1981.

Keynes and Brian Hill. Jonathan Cape, London. 1951.

London. 1854.

Pratt. University of Texas Press, Austin. 1957.

Co., Boston. 1933.

Cage, John. Silence 2961. Wesleyan University Press, Middletown. 1961.

Cahier, Charles. Quelques Six Mille Proverbes. Julien, Lanier et cie, Paris.

Camus, Albert. The Fall. Vintage Books, New York. 1956.

Cardozo, Benjamin N. ’Mr. Justice Holmes’ in Harvard LAW Rwiew.

Cardozo, Benjamin. The Growth of LAW. Yale University Press, New

Carlyle, Thomas. English and other Critical Essays. Dutton, New York. 1964.

Carlyle, Thomas. Sartor Resartus. C. Scriber’s Sons, New York. 1921.

Carrel, Alexis. Man The Unknown. Harper & Brothers Publishers, New

Carroll, Lewis. The Complete Works of Lewis Carroll. The Modem Library,

Carroll, Lewis. Alice’s Adventures in Wonderland. Heirloom Library,

Cervantes, Miguel de. The Ingenious Gentleman Don Quixote de la Manchu.

1856.

Volume 4.4, March 1931.

Haven. 1924.

York. 1939.

New York. 1936.

London. 1949.

The Viking Press, New York. 1949.

294 STATISTICALLY SPEAKlNG

Chambers, Robert. Vestiges of the Natural History of Creation, with extensive

additions and emendations (Second Edition). J. Churchill, London. 1844.

Chamfort, Sebastien Roch. Maximes et pens2es. Le livre de poche, Paris.

1970.

Champemowne, D.G. Journal of the Royal Statistical Society. Volume 118.

1955.

Chappell, Edwin. The Tangier Papers of Samuel Pepys. Printed for the Navy

Records Society, London. 1935.

Chaucer, Geoffrey. Troylus & Cryseyde. Centaur Press, Ltd, London. No

date.

Chemoff, Herman and Moses, Lincoln E. Elementary Decision Theory. John

Wiley & Sons, Inc., New York. 1959.

Chesterson, G.K. The Father Brown Omnibus. Dodd, Mead & Co., Inc.,

New York. 1951.

Chesterson, G.K. The Wisdom of Father Brown. Dodd, Mead & Co., New

York. 1930.

Chestov, Leon. 'Look Back and Struggle' in Forum Philosocum. Volume 1,

Number 1. 1930.

Churchill, Winston S. The Story of the Malakand Field Force. W.W. Norton

& Co., New York. 1990.

Cicero. Cicero: De Senectute, De Amicitiu, De Divinatione. Translated by

William Armistead Falconer. Harvard University Press, Cambridge.

1959.

Cicero. Epistolae ad atticum. Belles Lettres, Paris. 1984.

Cicero. Orationes Philippicae. University of North Carolina Press, Chapel

Clark, Arthur C. The Lost Worlds of2001. Gregg Press, Boston. 1979.

Clark, Ronald W. Einstein: The Life and Times. The World Publishing Co.,

New York. 1971.

Coats, R.H. 'Science and Society' in J o u m l of the American Statistical

Society. Volume 34, Number 205. March 1939.

Coates, Robert M. 'The Law' in The World of Mathematics, Volume IV by

James R. Newman. Simon and Schuster, New York. 1956.

Cochran, William G. and Cox, Gertrude M. Expen'mental Designs. John

Wiley & Sons, Inc., New York. 1957.

Cochran, William G. Sampling Techniques. John Wiley & Sons Co., New

York. 1977.

Cohen, Jacob. Statistical Power Analysis of the Behavioral Sciences (Second

Edition). Lawrence Erlbaum Associates, Publishers, New Jersey. 1988.

Cohen, Jerome. 'Tense Triangle-What to Do About Taiwan' in Time. 7

June 1971.

Cohen, John. Chance, Skill, and Luck. Penguin Books, Baltimore. 1960.

Cohen, Morris R. 'The Statistical View of Nature' in J o u m l of the American

Cohen, Morris R. A Prqface to Logic. Meridian Books, New York. 1944.

Hill. 1985.

Statistical Association. Volume 31, Number 194. June 1936.

BIBLIOGRAPHY 295

Colton, Charles. Lacon or Many Things in A Few Words. William Gowan,

Comfort, Alex. Darwin and the Naked Lady: Discursive Essays on Biology

Conrad, Joseph. Lord Jim. Doubleday, Doran and Co., Inc. for Wm. H.

Cook, Robin. Mortal Fear. G.P. Putnam's Sons, New York. 1988.

Coole, W.P. 'Letters to the Editor' in The American Statistician. Volume

23, Number 1. February 1969.

Cooley, Charles. 'Observations on the Measure of Change' in Joumal of the

American Statistical Association. New Series, Number 21. March 1893.

Copemicus, Nicolaus. On the Revolutions of the Heavenly Spheres.

Translated by Charles Glenn Wallis. Encyclopaedia Britannica, Inc.

1939.

New York. 1849.

and Art. George Braziller, New York. 1962.

Wise & Co., Garden City. 1928.

Cort, David. Social Astonishments. The Macmillan Co., New York. 1963.

Cowper, William. Cowper: Poetical Works. Oxford University Press,

Cox, D.R. and Hinkley, D.V. Theoretical Statistics. Chapman and Hall,

Crawford, Marion F. Don Orsino. Macmillan, New York. 1914.

Crichton, Michael. Rising Sun. Alfred A. Knopf, New York. 1992.

Crichton, Michael. Sphere. Ballantine Books, New York. 1987.

Crichton, Michael. The Terminal Man. Alfred A. Knopf, New York. 1974.

Crick, Francis. Life Itself, Its Original Nature. Simon Schuster, New York.

Cronbach, L.J. 'The Two Disciplines of Scientific Psychology' in The

Crothers, Samuel McChord. The Gentle Reader. Books for Libraries Press,

London. 1967.

London. 1974.

1981.

American Psychologist. Volume 12. November 1957.

Freeport. 1972.

da Vmci, Leonardo. The Notebooks of Leonardo Da Vinci. Edited by Edward

MacCurdy. George Braziller, New York. 1939.

Dampier-Whetham, William. A History of Science: Its Relation with

Philosophy and Religion. Cambridge University Press, London. 1930.

Dampier-Whetham, William. Science and the Human Mind. Longman,

Green, and Co., London. 1912.

Dante, Alighieri. The Divine Comedy of Dante Alighieri. Harvard University

Press, Cambridge. 1918.

Darwin, Charles. The Life and Letters of Charles Darwin. Volume I. D.

Appleton and Co., New York. 1888.

Dm-in, Charles. The Life and Letters of Charles Darwin. Volume 11. D.

Appleton and Co., New York. 1888.

Darwin, Charles. The Origin of Species by Means of Natural Selection. D.

Appleton, New York. 1896.

Davies, J.T.T he Scientific Approach. Academic Press, New York. 1973.

296 STATISTICALLY SPEAKING

Davies, Robertson. The Diary of Samuel Marchbank. Clark, Irwin & Co.,

Ltd, Toronto. 1947.

Davis, Joseph S. ’Statistics and Social Engineering’ in Joumal of the

American Statistical Association. Volume 32, Number 197. March 1937.

Dawkins, Richard. The Blind Watchmaker. Norton, New York. 1986.

de Finetti, B. Theory of Probability. Wiley, Chichester. 1974.

de Jonnes, Moreau. Elhents de Statistique (Second Edition). Paris. 1856.

de Jouvenel, Bertrand. The Art of Conjecture. Basic Books, New York. 1967.

de Leeuw, A.L. Rumbling through Science. Whittlesey House, New York.

de Moivre, A. The Doctrine of Chances. Chelsea Publishing Co., New York.

de Morgan A. A Budget of Paradoxes. The Open Court Publishing Co.,

de Solla Price, Derek John. Little Science, Big Science. Columbia University

de Spinoza, Benedict. Ethics. J.M. Dent & Sons, Ltd., London. 1941.

De Vries, Peter. Ruben, Ruben. Little, Brown and Co., Boston. 1964.

Deming, William Edwards. Out of the Crisis. Massachusetts Institute of

Technology, Cambridge. 1991.

Deming, William Edwards. Sample Design in Business Research. John Wiley

& Sons, Inc., New York. 1960.

Deming, William Edwards. Some Theory of Sampling. John Wiley & Sons,

Inc., New York. 1950.

Deming, William Edwards. Statistical Adjustment of Data. J. Wiley & Sons,

Inc., New York. 1943.

Deming, William Edwards. ‘Some Principles on the Shewhart Methods

of Quality Control’ in Mechanical Engineering. Volume 66. March 1944.

Deming, William Edwards. ’On the Classification of Statistics’ in The

American Statistician. Volume 2, Number 2. April 1948.

Deming, William Edwards. ‘On the Presentation of the Results of

Sample Surveys as Legal Evidence‘ in Journal of the American Statistical

Association. Volume 49, Number 268, December 1954.

Deming, William Edwards. ’On a Classification of the Problems of

Statistical Inference’ in Journal of the American Statistical Association.

Volume 37, Number 218. June 1942.

Descartes, Ren6. Discourse on the Method of Rightly Conducting the Reason

and Seeking Truth in Sciences. The Open Court Publishing Co., Inc.,

Chicago. 1907.

Descartes, Ren6. Rulesfor the Direction of the Mind. The Bobbs-Merrill Co.,

Inc., Indianapolis. 1961.

Deutscher, I. ’Public and Private Opinions: Social Situations and Multiple

Realities’ in The Social Contexts ofReseurch. Edited by S.Z. Nagi and R.G.

Corwin. Wiley, London. 1972.

1932.

1967.

Chicago. 1915.

Press, New York. 1986.

Devons, Ely. Essay on Economics. Greenwood Press, Westport. 1961.

BIB LZOGRAPHY 297

Dewey, John. Logic: The Theory ofZnquiry. Irvington Publishers, Inc., New

Dewey, John. Art as Experience. George Allen & Unwin, Ltd., London.

Dickens, Charles. The Work of Charles Dickens. Charles Scribner’s Sons,

Dickson, Paul. The Oficial Rules. Dalcorte Press, New York. 1978.

Disney, Dorothy. Crimson Friday. Dell, New York. 1946.

Disraeli, Benjamin. Sybil or The Two Nations. T.A. Contall, Ltd., Edinburgh.

Doyle, Sir Arthur Conan. The Complete Sherlock Holmes. Doubleday & Co.,

Driscoll, Michael F. ’The Ten Commandments of Statistical Inference’ in

Dryden, John. The Poetical Works of Dryden. Edited by George R. Noyse.

Dubos, Red. Louis Pasteur: Free Lance of Science. Charles Scribner’s Sons,

Duckworth, George E. The Complete Roman Drama, Volume Two. Random

Durand, David. ‘A Dictionary for Statismagicians’ in The American

York. 1982.

1934.

New York. 1902.

1927.

Inc., Garden City. 1927.

The American Mathematical Monthly. Volume 84, Number 8. 1977.

Houghton Mifflin Co., Boston. 1950.

New York. 1976.

House, New York. 1966.

Statistician. Volume 24, Number 3. June 1970.

Eco, Umberto. Zl pendolo di Foucault. Translated by William Weaver.

Harcourt Brace Jovanovich, San Diego. 1989.

Eddington, A.S. New Pa thways in Science. Cambridge University Press,

Cambridge. 1935.

Eddington, A.S. The Nature of the Physical World. The Macmillan Co., New

York. 1930.

Eddington, AS. Space, Time and Gravita tion. Cambridge University Press,

Cambridge. 1920.

Edge, David 0. and Mulkay, Michael J. Astronomy Transformed. John

Wiley & Sons, New York. 1976.

Edgeworth, Francis Ysidro. ’The Philosophy of Chance’ in Mind. Volume

9. 1884.

Edgeworth, Francis Ysidro. ’On the Use of the Theory of Probabilities in

Statistics Relating to Society’ in Joumal of the Royal Statistical Society.

January 1913.

Edgeworth, Francis Ysidro. Jouml of the Royal Statistical Society. Volume

53. 1890.

Edgeworth, Francis Ysidro. ’On the Representation of Statistics by

Mathematical Formula (concluded)’ in Jouml of the Royal Statistical

Society. Volume XLII. 1899.

Edwards, A.W.F. Likelihood. Cambridge University Press, cambridge.

1972.

298 STATISTICALLY SPEAKING

Ehrenberg, A.S.C. Data Reduction. John Wiley & Sons, New York. 1975.

Einstein, Albert. Sidelights on Relativity. Methuen & Co., Ltd., London.

1922.

Einstein, Albert and Infield, Leopold. The Evolution ofphysics. Simon and

Schuster, New York. 1938.

Eisenhart, Churchill. ‘The Role of a Statistical Consultant in a Research

Organization’ in The American Statistician. Volume 2, Number 2. April

1948.

Eldridge, Paul. Maxims for a Modern Man. Thomas Yoseloff Publisher,

New York. 1965.

Eliot, George. Daniel Deronda. Volume 1. J.M. Dent & Sons Ltd., London.

1964.

Eliot, George. The George Eliot Letters. Edited by Gordon S. Haight.

Volume II. Yale University Press, New Haven. 1954.

Eliot, George. The George Eliot Letters. Edited by Gordon S. Haight.

Volume IV. Yale University Press, New Haven. 1954.

Eliot, George. The Mill on the Floss. The Clarendon Press, Oxford. 1980.

Eliot, George. ‘Impressions of Theophrastus Such’ in The Complete Works

of George Eliot. The Kelmscott Society Publisher, New York. No date.

Ellis, Havelock. The Dance of Life. Houghton Mifflin Co., Boston. 1923.

Ellison, Harlon. Dangerous Visions. Berkley Books Publishing Group, New

York. 1967.

Boston. 1883.

Boston. 1886.

Emerson, Ralph Waldo.

Emerson, Ralph Waldo.

Emerson, Ralph Waldo.

Essays. 1st Series. Houghton Mifflin & Co.,

Essays. 2nd Series. Houghton Mifflin & Co.,

Lectures and Biographical Sketches. Houghton,

Mifflin & do., New York. 1884.

1861.

House, Inc., New York. 1960.

Group, Inc., New York. 1943.

1974.

Dutton & Co., New York. 1906.

1946.

Emerson, Ralph Waldo. The Conduct of Life. Ticknor and Fields, Boston.

Emerson, Ralph Waldo. The Joumals of Ralph Waldo Emerson. Random

Esar, Evan. Esar’s Comic Dictionary. Bantam Doubleday Dell Publishing

Ettorre, Barbara. Harper’s Magazine. Volume 249, Number 1491. August

Euripides. The Plays of Euripides. Translated by Shelly Dean Milman. E.P.

Evans, Bergen. The Natural History of Nonsense. A.A. Knopf, New York.

Fabing, Howard and Marr, Ray. Fischerisms. The Science Press Printing

Co., Lancaster. 1937.

Farr, William. See Marion Diamond and Mervyn Stone, ’Nightingale on

Quetelet’ in Journal of the Royal Statistical Society. Series A, Number

BlBLlOGRAPHY 299

144. 1981.

Feller, William. An Introduction to Probability Theory and Its Applications.

Volume 1. John Wiley & Sons, Inc., New York. 1960.

Feynman, Richard P., Leighton, Robert B. and Sands, Matthew. The

Feynmn Lectures on Physics. Volume I. Addison-Wesley Publishing Co.,

Reading. 1963.

Fiedler, Edgar R ’The Three Rs of Economic Forecasting-Irrational,

Irrelevant and Irreverent’ in Across the Board. June 1977.

Fienberg, Stephen E. ’Graphical Methods in Statistics’ in The American

Statistician. Volume 13, Number 4. November 1979.

Finney, D.J. ‘The Questioning Statistician’ in Statistics in Medicine. Volume

I. 1982.

Fischer, Robert B. Science, Man and Society. W.B. Saunders Co.,

Philadelphia. 1971.

Fisher, Sir Ronald A. Statistical Methodsfor Research Workers. Hafner Press,

New York. 1970.

Fisher, Sir Ronald A. The Design of Experiments. Oliver and Boyd,

Edinburgh. 1937.

Fisher, Sir Ronald A. ’The Expansion of Statistics’ in American Scientist

Magazine. Volume 42, Number 2. April 1954.

Fisher, Sir Ronald A. ’Student’ in Annals of Eugenics. Volume 9. 1939.

Fisher, R.A. ’The Design of Field Experiments’ in Joumal of the Ministry

Fisher, Sir Ronald A. ‘Statistical Methods and Scientific Induction’ in

Fisher, Sir Ronald A. Sankyu. Volume 4. 1938.

Fitzgerald, F. Scott. This Side of Paradise. Charles Scribner’s Sons, New

York. 1948.

Fleiss, Joseph L. ’Letters to the Editor’ in The American Statistician. Volume

21, Number 4. October 1967.

Flesch, Rudolf. The New Book of Unusual Quotations. Harper & Row, New

York. 1966.

Forbes, J.D. ‘On the Alleged Evidence for a Physical Connection between

Stars Forming Binary or Multiple Groups, Deduced from the Doctrine

of Chances’ in The London, Edinburgh and Dublin Philosophical Magazine

and Joumal of Science. Volume 37. December, 1850.

Forster, E.M. Hwards End. Holmes & Meier Publishers, Inc. New York.

1973.

FOSS, Sam Walter. Back Country Poems. Lee & Shepard, Boston. 1894.

Fourier, Jean Baptiste Joseph. Analytical Theory of Heat. Translated, with

notes, by Alexander Freeman. The University Press, Cambridge. 1878.

Fox, Russell, Garbuny, Max and Robert Hooke. The Science of Science.

Walker and Co., New York. 1963.

Freeman, Linton C. Elementary Applied Statistics in Behavioral Science. John

Wiley & Sons Co., New York. 1965.

of Apiculture of Great Britain. Volume 33. 1926.

Joumal of the Royal Statistical Society. Series B, Number 17. 1955.

300 STATISTICALLY SPEAKlNG

Freeman, R. Austin. A Certain Doctor Thomdyke. Hodder & Stoughton,

Freidman, Martin. ’Irresponsible Monetary Policy’ in Newsweek. 10

Freud, Sigmund. ’On Narcissism’ in Collected Papers. Volume II.

Friedman, Thomas L. From Beirut to Jerusalem. Anchor Books, New York.

Froude, James Anthony. Short Studies on Great Subjects. Charles Scribner’s

Fry, Thomton C. Probability and Its Engineering Uses. D. Van Nostrand

London. 1944.

January 1972.

Translated by Cecil M. Baines. The Hogarth Press, London.

1989.

Sons, New York. 1892.

Co., Princeton. 1965.

Galsworthy, John. End of the Chapter. Charles Scribner’s Sons, New York.

Galton, Francis. Hereditary Genius: An Inquiry into Its Laws and

Galton, Francis. Inquiries into Human Faculty and Its Development. J.M.

Galton, Francis. Memories of M y Life. Methuen & Co., London. 1908.

Galton, Francis. Natural Inheritance. Macmillan and Co., New York. 1889.

Galton, Francis. ’Kinship and Correlation’ in North American Review.

Volume 150. 1890.

Galton, Francis. ’Co-relations and Their Measurements, Chiefly from

Anthropometric Data’ in Proceedings of the Royal Society of London.

Volume 45. 1888.

1937.

Consequences. Macmillan and Co., Ltd., London. 1914.

Dent & Co., London. 1908.

Gann, Emest K. Brain 2000. Doubleday & Co., Inc., Garden City. 1980.

Garson, Barbara. MacBird. Grassy Knoll Press, Berkeley. 1966.

Gay, John. John Gay: Poetry and Prose. Volume 11. The Clarendon Press,

Geary, R.C. ’Testing for Normality’ in Biometrika. Volume 34. 1947.

Gibbon, Edward. Autobiography. E.P. Dutton, New York. 1932.

Gibbon, Edward. The Decline of the Roman Empire. Modem Library, New

York. 1932.

Gilbert, W.S. and Sullivan, Arthur. The Complete Plays of Gilbert and

Sullivan. Garden City Publishing Co., Inc., Garden City. 1938.

Gilbert, William. On the Loadstone and Magnetic Bodies and on the Great

Mugnet the Earth. Translated by P. Fleury Mottelay. Edwards Brothers,

Inc., Ann Arbor. 1941.

Gilman, Charlotte. Human Work. McClure, Phillips & Co., New York.

1904.

Ginsberg, Allen. America. The Coach House Press, Toronto. 1972.

Gissing, George. New Grub Street. The Modem Library, New York. 1926.

Glantz, S.A. ‘Biostatistics: How to Detect, Correct and Prevent Errors in

Oxford. 1974.

the Medical Literature’ in Circulation. Volume 61. 1980.

B IBLIOGRAPHY 301

Gleick, James. Chaos. Viking Penguin, Inc., New York. 1987.

Godwin, William. St. Leon: A Tale of the Sixteenth Century. McGrath

Goldwyn, Samuel. ‘Obituary’ in New York Times. 1 February 1974.

Good, I.J. ’Kinds of Probability’ in Science. Volume 129.20 February 1959.

Goodman, Richard. Modern Statistics. ARC Books, Inc., New York. 1964.

Greedman, D.A. and W.C Navidi. ’Regression Models for Adjusting the

Green, Celia. The Decline and Fall of Science. Hamilton, London. 1976.

Greenwood, M. ’Discussion to the paper Some Aspects of the Teaching

of Statistics’ in Joumal of the Royal Statistical Society. Volume 102. 1939.

Publishing Co., New York. 1972.

1980 Census’ in Statistical Science, Volume 1, Number 1. 1986.

Greer, Scott. The Logic of Social Inquiry. Aldine Pubfishing Co., Chicago.

1973.

Guest, Judith. Ordinary People. The Viking Press, New York. 1976.

Guillen, Michael. Bridges to Infinity. Jeremy P. Tarcher, Inc., Los Angeles.

1983.

Gunther, John. Taken at the Flood: The Story of Albert D. L a s h . Harper &

Brothers Publishers, New York. 1960.

Habera, Audrey and Runyon, Richard P. General Statistics. Addison-

Hacking, Ian. The Emergence of Probability. Cambridge University Press,

Hailey, Arthur. Airport. Doubleday, Garden City. 1968.

Haldeman, H.R. The Ends of Power. Times Books, New York. 1978.

Hamilton, Edith. The Roman Way. W.W. Norton & Co., Inc., New York.

1960.

Hamming, Richard. The Art of Probability for Scientists and Engineers.

Addison-Wesley Publishing Co., Redwood City.

Hammond, Kenneth and Adelman, Leonard. ’Science, Values, and

Human Judgment’ in Science. Volume 194, Number 4263. 22 October

1976.

Wesley Publishing Co., Inc., Reading. 1973.

Cambridge. 1975.

Hancock, William Keith. Australia. London. 1930.

Hand, D.J. ‘The Role of Statistics in Psychiatry’ in Psychological Medicine.

Hardy, Thomas. Tess of the d‘Urbervilles. A.L. Burt Co., New York. 1919.

Harris, Errol E. Hypothesis and Perception. George Allen & Unwin Ltd.,

Harrison, Harry. Astounding. Random House, New York. 1973.

Harte, Francis Bret. Two Men of Sandy Bar. Collier & Son, New York. 1904.

Hayford, F. Leslie. ’Some Uses of Statistics in Executive Control’ in Joumal

of the American Statistical Association. Volume 31, Number 193. March

1936.

Heaviside, Oliver. Electromagnetic Theory. D. Van Nostrand, New York.

1893.

Volume 15, 1985.

London. 1970.

302 S TATIS TICA LLY SPEAKING

Heinlein, Robert A. Time Enoughfor Love. G.P. Putnam’s Sons, New York.

Heinlein, Robert A. To Sail Beyond the Sunset. G.P. Putnam’s Sons, New

Heise, David R. Causal Analysis. John Wiley & Sons, New York. 1975.

Heisenberg, Werner. The Physical Principles of the Quantum Theoy. Dover

Helvetius, C.A. On Mind. Burt Franklin, New York. 1970.

Henry, 0. Tales of 0. Heny. Doubleday & Co., Inc., Garden City. 1969.

Herbert, Nick. Quantum Reality. Anchor Press, Garden City. 1985.

Herodotus. The History of Herodotus. Volume 11. E.P. Dutton & Co., Inc.,

Herschel, John F.W. Outlines of Astronomy. Longman & Green, London.

Heyward, DuBose. Carolina Chansons. Macmillan Publishing Co., New

Heyworth, Sir Geoffrey. ’Inaugural Address’ in Joumal of the Royal

Hobbes, Thomas. Leviathan. E.P. Dutton & Co., Inc., New York. No date.

Hoel, Paul G. Introduction to Mathematical Statistics (Third Edition). John

Hoffer, Eric. The True Believer: thoughts on the nature of mun’s movement.

Hogben, L. Statistical Theory. Allen and Unwin, London. 1957.

Hogben, Lancelot. Science in Authority. Unwin University Books, London.

Holmes, O.W. The Complete Poetical Works of Oliver Wendell Holmes.

Holmes, O.W. Pagesfrom an Old Volume of Life. Houghton, Mifflin and

Holmes, O.W. The Professor at the Bre@ast Table. J.C. Holten, London.

Holmes, O.W. The Autocrat of the Breakfast Table. Houghton, Mifflin and

Holmes, O.W., Jr. Collected Legal Papers. Harcourt, Brace and Howe, Inc.

Holmes, O.W., Jr. ’Natural Law‘ in Harvard Law Review. Volume 82.1918.

Holmes, O.W., Jr. ’Path of the Law’ in Harvard Law Rm‘ew. Volume 10.

Homer. The Iliad of Homer. Translated by H. Hailstone. Relfe Brothers,

Hood, Thomas. Miss Kilmansegg 6 Her Precious Legs; A Golden Legend. E.

Hopkins, Harry. The Numbers Game: The Bland Totalitarianism. Martin

1973.

York. 1987.

Publications, Inc., New York. 1930.

New York. No date.

1828.

York. 1922.

Statistical Society. Volume 113, Number 4. 1950.

Wiley & Sons, Inc., New York. 1962.

Perennial Library, New York. 1951.

1963.

Houghton, Mifflin and Co., Boston. 1881.

Co., Boston. 1890.

1869.

Co., Boston. 1894.

1920.

1897.

London. 1882.

Moxon & Sons, London. 1870.

Secker & Warburg Ltd, London. 1973.

BZBLZOGRAPHY 303

Horace. 'The Golden Mean' in The Complete Works of Horace. Translated

by Herbert Wetmore Wells. Random House, Inc., New York. 1936.

Horace. The Satires and Epistles of Horace. Translated by Smith Palmer

Bovie. The University of Chicago Press, Chicago. 1959.

Howe, E.W. Sinner Sermons. Halderman-Julius Co., Girard. 1926.

Howitt, Mary. The Poems of Mary Howitt. Hurst & Co., Publishers, New

Hoyle, F. Galaxies, Nuclei, and Quasars. Heinemann, London. 1965.

Hubbard, Elbert. The Philistine: A Periodical of Protest. Volume X I . Society

Hubble, Edwin. The Nature of Science and other Lectures. Greenwood Press,

Huff, Darrell. How to Lie with Statistics. W.W. Norton & Co., Inc., New

Hugo, Victor. Les Mistrables. Translated by Isabel F. Hapgood. T.Y.

Hume, David. An Enquiry Concerning Human Understanding. The Open

Hume, David. A Treatise of Human Nature. Penguin Books, Baltimore.

Hunter, Evan. The Paper Dragon. Dell Publishing Co., Inc. 1966.

Huxley, Aldous. Brave New World. Harper & Row, Publishers, New York.

Huxley, Aldous. Literature and Science. Harper & Row, Publishers, New

Huxley, Aldous. Proper Studies. Chatto & Windus, London. 1949.

Huxley, Aldous. Stories, Essays, and Poems. J.M. Dent & Sons, Ltd.,

London. 1949.

Huxley, Aldous. Time Must Have a Stop. Harper & Brothers Publishers,

New York. 1944.

Huxley, Thomas H. Man's Place in Nature. The University of Michigan

Press, Ann Arbor. 1959.

Huxley, Thomas. Method and Results. D. Appleton and Co., New York.

1896.

Huxley, Thomas. Collected Essays. 'On Descartes' "Discourse Touching

the Method of Using One's Reason Rightly and of Seeking Scientific

Truth"'. Volume I. Macmillan and Co., Limited. London 1904.

Huxley, Thomas. Collected Essays, 'Biogenesis and Abiogenesis'. Volume

VIII. M a d a n and Co., Limited. London 1908.

Huygens, Christiaan. Treatise on Light. Rendered into English by Silvanus

P. Thompson. Macmillan & Co., London. 1912.

York.

of Philistine, East Aurora. July 1900.

Publishers, Westport. 1977.

York. 1954.

Crowell & Co., New York. 1887.

Court Publishing Co., Chicago. 1921.

1969.

1946.

York. 1963.

Inge, William Ralph. Outspoken Essays. Longman Green Co., London.

1920.

304 STATISTICALLY SPEAKING

Jacobs, Joseph. ’The Middle American’ in American Magazine. Volume 63,

Jahoda, Marie, Morton, Deutsch and Cook, Stuart W. Research Methods in

James, Henry. The Spoils of Poynton. W. Heinemann, London. 1897.

James, P.D. Death ofan Expert Witness. Charles Scribner’s Sons, New York.

James, William. The Principles of Psychology. Dover Publications, New

James, William. ’The Dilemma of Determinism’ in Unitarian Review and

Jeans, James. Physics and Philosophy. Dover Publications, Inc., New York.

Jeans, J.H. The New Background of Science. Cambridge University Press,

Jefferys, Harold. ‘Probability and Scientific Method’ in Proceedings of the

Jevons, W.S. The Principles of Science. Macmillan and Co., New York. 1887.

Johnson, Palmer 0. ’Modern Statistical Science and its Function in

Educational and Psychological Research’ in The Scientific Monthly. June

1951.

Johnson, Samuel. ’The Idler and the Adventurer’ in The Yale Edition of the

Works of Samuel Johnson. Yale University Press, New Haven. 1958.

Johnston, Alva. The Legendary Mizners. Farrar, Strauss & Young, New

York. 1953.

Jones, Raymond F. The Non-Statistical Man. Belmont Productions, Inc.,

New York. 1964.

Jonson, Ben. Volpone. Chandler Publishing Co., San Francisco. 1961.

Juster, Norton. The Dot and the Line; a romance in lower mathematics.

Juster, Norton. The Phantom Tollbooth. Epstein & Carroll Associates, Inc.,

March 1907.

Social Relations. Volume 1. Dryden Press, New York. 1951.

1977.

York. 1918.

Religious Magazine. Volume XXII, Number 3. September, 1884.

1981.

Cambridge. 1934.

Royal Statistical Society, Series A, Volume 146. 1934.

Random House, New York. 1963.

New York. 1962.

Kac, Mark. Probability and Related Topics in Physical Science. Interscience

Publishers, Inc., New York. 1959.

Kac, Mark. ’Statistical Independence in Probability Analysis and Number

Theory’ in The Carus Mathematical Monograph, Number Twelve. The

Mathematical Association of America. 1959.

Kadane, Joseph. ’Comment’ in Statistical Science. Volume 1, Number 1,

February 1986.

Kadanoff, Leo P. ’Complete Structure from Simple Systems’ in Physics

Today. March 1991.

Kant, Immanuel. ‘The Critique of Judgment’ in Philosophical Writings.

Edited by Emst Behler. Continuum, New York. 1986.

BIBLIOGRAPHY 305

Kapitza, Peter Leonidovich. ’Science East and West: Reflections of Peter

Kaplan, Abraham. The Conduct oflnquiry. Chandler Publishing Co., San

Karpansky, L. High School Education. New York. 1912.

Kasner, Edward and Newman, James. Mathematics and the Imagination.

Keats, John. Letters ofJohn Keats. With an introduction by Hugh 1’Aanson

Keegan, John. The Face of Battle. The Viking Press, New York. 1976.

Keeney, Ralph L. and Raiffa, Howard. Decisions with Multiple Objectives:

Preferences and Value Tradeofis. John Wiley & Sons, New York. 1976.

Kelly-Bootle, Stan. The Devil’s DP Dictionary. McGraw-Hill Book Co., Inc.,

New York. 1981.

Kendall, M.G. ’The History and Future of Statistics’ in Statistical Papers

in Honor of George Snedecor. Edited by T.A. Bancroft. Iowa State

University Press, Ames. 1972.

Kendall, M.G. and Stuart, A. The Advanced Theory of Statistics. Volume I.

C. Griffin, London. 1947.

Kendall, Maurice G. ’Hiawatha Designs an Experiment’ in The American

Statistician. Volume 13, Number 5. December 1959.

Kendall, Maurice G. ‘Who Discovered the Latin Square?’ in The American

Statistician. Volume 11, Number 4. August 1948.

Kerridge, D.F. ’Discussion on Paper by Dr. Marshall and Professor Olkin’

in Journal of the Ruyal Statistical Society. Series B, Volume 30. 1968.

Keynes, John Maynard. A Treatise on Probability. Macmillan and Co.,

Limited, London. 1979.

King, Willford. ’Consolidating Our Gains’ in Joumal of the American

Statistical Association. Volume 31, Number 193. March 1936.

Kipling, Rudyard. From Sea to Sea. Doubleday, Page & Co., Garden City.

1913.

Kipling, Rudyard. Rudyard Kipling‘s Verse. Doubleday and Co., Inc., New

York. 1940.

Klagsbrun, Francine. The First Ms Reader. Wamer Paperback Library, New

York. 1973.

Kneale, W.C. Probability and Induction. The Clarendon Press, Oxford. 1952.

Knebel, Fletcher. Reader’s Digest. December 1961.

Kolmogorov, A.N. Foundations of the Theory of Probability. Chelsea

Koshland, Daniel E., Jr. ’Editorial’ in Science. 14 January 1994.

Kotz, Samuel and Johnson, Norman L. (Editors). Breakthroughs in

Kratovil, Robert. Real Estate Law. Prentice Hall, Englewood Cliffs. 1952.

Krishnamurti, J. From Darkness to Light. Harper & Row, Publishers, San

Kapitza’ in Nature. Volume 288. 11 December 1980.

Francisco. 1964.

Simon and Schuster, New York. 1967.

Fausset. Thomas Nelson and Sons, Ltd., London. No date.

Publishing Co., New York. 1956.

Statistics. Volume 11. Springer-Verlag, New York. 1993.

Francisco. 1980.

306 STATISTICALLY SPEAKING

Kruskal, William. ’Coordination Today: A Disease or a Disgrace’ in The

Kruskal, William. ’Statistics, Molitke, and Henry Adams’ in American

Krutch, Joseph Wood. Human Nature and the Human Condition. Random

Kyburg, Jr., H.E. and Smokler, H.E. (Editors). Studies in Subjective

American Statistician. Volume 37, Number 3. 1983.

Scientist Magazine. Volume 55. 1967.

House, New York. 1959.

Probability. Wiley, New York. 1964.

Lang, Andrew. Lost Leaders. Long”, Green, and Co., New York. 1889.

Lapin, Lawrence L. S tu tis ticsfor Modem Business Decisions. Harcourt Brace

Jovanovich, Inc., New York. 1973.

Laplace, Pierre-Simon. Essui Philosuphique sur les Probabilitds. Courcier,

Paris. 1814.

Laplace, Pierre-Simon. Philosophical Essay on Probabilities. Translated from

the fifth French edition of 1825 by Andrew I Dale. Springer-Verlag

New York, Inc., New York. 1995.

Laterius, Diogenes. The Lives of Eminent Philosophers. Harvard University

Press, Cambridge. 1958.

Laut, Agnes. The Conquest of the Great Northwest. Musson Book Co.,

Toronto. 1908.

Leacock, Stephen. Literay Lapses. John Lane Co., New York. 1914.

Leacock, Stephen. ’Mathematics for Golfers’ in The World of Mathemutics.

Volume 4. By James R. Newman. Simon and Schuster, New York. 1956.

LeCam, L. ’The Central Limit Theorem around 1935’ in Statistical Science.

Volume 1, Number 1. February 1986.

Lee, Hannah Famham Sawyer. The Log Cabin, or, The World Before You.

Appleton, Philadelphia. 1844.

Leibniz, Gottfried Wilhelm. Leibniz: Discourses on Metaphysics. Translated

by George Montgomery. The Open Court Publishing Co., Chicago.

1902.

Leibniz, Gottfried Wilhelm. Leibniz: Philosophical Papers and Letters.

LeSage, Alan Red. The Adventures of Gil Blus of Suntillme. Translated by

Lewis, Clarence Irving. Mind and the World Order: Outline o f a Theoy of

Lewis, C.S. The Pilgrim’s Regress: An Allegorical Apology for Christianity,

Lewis, C.S. Christian Reflections. Edited by Walter Hooper. Eerdmans,

Lewis, Don and Burke, C.J. ’The Use and Misuse of the Chi-square Test’

Lichtenberg, Georg. Lichtenberg: Aphorisms & Letters. Translated by Franz

Volume I. University of Chicago Press, Chicago. 1956.

Tobias Smollett. George Routledge and Sons, Ltd. London. 1881.

Knowledge. Charles Scribner’s Sons, New York. 1929.

Reason and Romanticism. Geoffrey Bles, London. 1933.

Grand Rapids. 1967.

in Psychological Bulletin. Volume 46, Number 6. November 1949.

Mautner and Henry Hatfield. Jonathan Cape, London. 1959.

BIBLIOGRAPHY 307

Lieber, Lillian R. The Education of T.C. MITS. W.W. Norton & Co., Inc.,

Lindley, Dennis V. 'Comment: A Tale of Two Wells' in Statistical Science.

Lipmann, Walter. A Preface to Politics. The University of Michigan Press,

Locke, John. An Essay Conceming Human Understanding. The Clarendon

Longair, M.S. 'Quasi-stellar Radio Sources' in Con temporary Physics.

Longfellow, Henry Wadsworth. The Poems of Longfellow. Random House,

Lonsdale, James and Lee, Samuel. The Works of Virgil. Macmillan and Co.,

Lorenz, Konrad. On Aggression. Translated by Marjorie Kerr Wilson.

Lover, S. R o y O'More. Little, Brown & Co., Boston. 1901.

Lucretius. Lucretius on the Nature of Things. Translated by Cyril Bailey.

Ludlum, Robert. The Boume Identify. Richard Marek Publishers, New

Ludlum, Robert. The Bourne Supremacy. Random House, New York. 1986.

Ludlam, Robert. The Parsifal Mosaic. Random House, New York. 1982.

New York. 1944.

Volume 2, Number 1. February 1987.

AM Arbor. 1962.

Press, Oxford. 1956.

Volume 8. 1967.

Inc., New York. 1944.

London. 1883.

Harcourt, Brace & World, Inc., New York. 1963.

The Clarendon Press, Oxford. 1950.

York. 1980.

MacDonald, John D. Condominium. J.B. Lippincott Co., Philadelphia. 1977.

Macy, Arthur. Poems. W.B. Clarke & Co., Boston. 1905.

Maier, N.R.F. 'Maier's Law' in The Amm'can Psychologist. March 1960.

Malcolm, Andrew H. 'Data-Loving Japanese Rejoice on Statistics Day' in

Mallarm&, Stbphane. Poems. Translated by Roger Fry. Chatto & Windus,

Maloney, Russell. 'Inflexible Logic' in The World of Matlzematics. Volume

Manners, William. Patience and Fortitude. Harcourt Brace Jovanovich,

Marlowe, Christopher. Christopk Marlowe's Doctor Faustus. Broadview

Marlowe, Christopher. Tumburlaine the Great. Part the First. American

Martin, Thomas L., Jr. Malice in Blunderland. McGraw-Hill Book Co., New

Mason, Alpheus T. Brandies: A Free Man's Life. The Viking Press, New

Masters, Dexter. The Accident. Alfred A. Knopf, New York. 1955.

Mauldin, Bill. Up Front. Henry Holt and Co., New York. 1945.

The New York Times. 26 October 1977.

London. 1951.

4. By James R. Newman. Simon and Schuster, New York. 1956.

New York. 1976.

Press, Peterborough. 1991.

Book Co., New York. 1912.

York. 1973.

York. 1946.

308 STATISTICALLY SPEAKING

May, R.M. ’Simple Mathematical Models with very Complicated

Dynamics’ in Nature. Volume 261. 1976.

McNemar, Quinn. ‘Sampling in Psychological Research’ in Psychological

Bulletin. Volume 37, Number 6. June 1940.

Meitzen, August. History, Theory, and Technique of Statistics. Translated by

Roland P. Falkner. American Academy of Political and Social Science.

1891.

Mellor, J.W. Higher Mathematics for Students of Chemistry and Physics.

Dover Publications, New York. 1955.

Meredith, Owen. Lucile. Houghton Mifflin Co., Boston. 1882.

Metcalf, James J. Poems. Bantam Doubleday Dell Publishing Group, Inc.,

Meyer, Agnes. Education for a New Morality. Macmillan, New York. 1957.

Meyers, C.J., Jr. Discussion of E.G. Olds, ‘On Some of the Essentials of the

Control Chart Analysis’ in Transactions, American Society of Mechanical

Engineers. Volume 64. July 1942.

Michelmore, Peter. Einstein: Profile of the Man. Dodd, Mead & Co., New

York. 1962.

Mikes, George. How to be an Alien. Basic Books, Inc., New York. 1964.

Miksch, W.F. ’The AVERAGE STATISTICIAN’ in Collier’s. 17 June 1950.

Mill, John Stuart. Autobiography in The Harvard Classics. Volume 25. P.F.

Mill, John Stuart. On Liberty. Appleton-Century-Crofts, New York. 1947.

Mill, John Stuart. System of Logic. Longmans, Green, Reader & Dyer,

Miller, Henry. Black Spring. Grove Press, Inc., New York. 1963.

Milne, A.A. Winnie-the-Pooh. E.P. Dutton & Co., Inc., New York. 1961.

Milton, John. Comus. Charles Little and James Brown, Boston. 1845.

Milton, John. Paradise Lost. Cambridge University Press, Cambridge.

Milton, John. Poetical Works of John Milton. Porter and Coates,

Minnick, Wayne C. The Art of Persuasion. Houghton Mifflin Co., Boston.

Moger, Art. The Complete Pun Book. The Citadel Press, Secaucus. 1979.

Montaigne, Michel Eyquem de. The Essays of Michel Eyquem de Mon taigne.

Moroney, M.J. Facts from Figures. Penguin Books. London. 1951.

Mosteller, F. ’Principles of Sampling’ in Joumal of the American Statistical

Mynors, R.A.B. Collected Works of Erasmus. Adages I1 vii 1 to I11 iii 100.

New York.

Collier & Son Corp., New York. 1937.

London. 1868.

1972.

Philadelphia. No date.

1957.

Limited Edition Club, New York. 1946.

Association. Volume 49, Number 265. 1954.

University of Toronto Press, Toronto. 1992.

Nagi, S.Z. and R.G. Corwin. The Social Contexts of Research. John Wiley &

Sons., Inc., New York. 1972.

BIBLIOGRAPHY 309

Newton, Sir Isaac. Mathematical Principles of Natural Philosophy. Translated

by Florian Cajori. University of California Press, Berkeley. 1960.

Newton, Sir Isaac. Opticks. Dover Publications, Inc., New York. 1952.

Nietzsche, Friedrich. ‘The Joyful Wisdom’ in The Complete Works of

Friedrich Nietzsche. Volume 10. T.N. Foulis, Edinburgh. 1910.

Nightingale, Florence. Notes on Nursing. Appleton and Co., New York.

1860.

Nixon, Richard M. The N m York Times. 10 November 1972.

Nizer, Louis. My Life in Court. Doubleday & Co., Inc., Garden City. 1944.

Nizer, Louis. Thinking on Your Feet, adventures in speaking. Liveright

Nye, Mary Jo. Molecular Reality: A Perspective on the Scientific Work of Jean

Publishing Corporation, New York. 1940.

Perrin. Macdonald, London. 1972.

Olds, Edwin G. and howler, Lloyd A. ’Teaching Statistical Quality

Control for Town and Gown’ in Journal of the American Statistical

Association. Volume 44. 1949.

Oman, John. The Natural and the Supernatural. The Macmillan Co., New

York. 1931.

ONeil, W.M. Fact and Theory. Sydney University Press, Sydney. 1967.

Oppenheim, Abraham Naffali. Questionnaire Design and Attitude Measure-

Oppenheimer, Julius Robert. ’The Tree of Knowledge’ in Harper’s

O’Rielly, John. In Bohemia. The Pilot Publishing Co., Boston. 1886.

Orwell, George. Nineteen Eighty-Four. Harcourt, Brace & World, Inc., New

OShaughnessy, Arthur. Ode. Greenwood Press, Publishers, Westport.

Ovid. Fasti. Translated by Sir James George Frazer. Harvard University

Ovid. Metamorphoses. Duke University Press, Durham. 1968.

ment. Basic Books, New York. 1966.

Magazine. Volume 217. October 1958.

York. 1949.

1979.

Press, London. 1959.

Paley, William. Paley’s Natural Theology. Harper & Brother Publisher, New

Papert, Seymour. Mindstomzs. Basic Books, Inc., New York. 1980.

Parker, Tom. Rules of Thumb. Houghton Mifflin Co., Boston. 1983.

Parrish, Randall. M y Lady of the South. A.C. McClurg & Co., Chicago.

Pascal, Blaise. Pascal’s Penstes. Translated by H.F. Stewart. Pantheon

Pascal, Blaise. Scientific Treatise. Encyclopedia B. 1952.

Pascal, Blaise. The Thoughts of Blaise Pascal. Greenwood Press, Publishers,

Paulos, John Allen. Innumeracy. Hill and Wang, New York. 1988.

York. 1855.

1908.

Books Inc., New York. 1950.

Westport. 1975.

310 STATISTICALLY SPEAKING

Peacock, E.E. Medical World News. 1 September 1972.

Pearl, Judea. Probabilistic Reasoning in Intelligent Systems. Morgan

Kaufman Publishing, San Mateo. 1988.

Pearson, E.S. 'The Choice of Statistical Test Illustrated on the

Interpretation of Data Classed in a 2 x 2 Table' in Biometrika. Volume

34, Number 35. 1947.

Pearson, E.S. and Hartley, H.O. Biometrika Tables for Statisticians. Volume

1. Biometrika Trust, University College, London. 1984.

Pearson, Karl. The History ofstatistics in the 27th and 28th Centuries against

the Changing Background of Intellectual, Scientific, and Religious Thought.

Macmillan Publishing Co., Inc., New York. 1978.

Pearson, Karl. 'Editorial' in Biometrika. 1901.

Peers, John. 2,002 Logical Laws. Doubleday & Co., Inc., Garden City. 1979.

Peirce, Benjamin. 'Criterion for the Rejection of Doubtful Observations'

in The Astronomical Journal. Number 45. 24 July 1852.

Peirce, Benjamin. 'Linear Associative Algebra' in American Joumal of

Mathematics. Volume 4. 1881.

Peirce, C.S. Philosophical Writings of Peirce. Selected and edited with an

introduction by Justus Buchler. Dover Publications, Inc., New York.

1955.

Peirce, C.S. Writings of Charles Sanders Peirce. Volume 3, 1872-1878.

Indiana University Press, Bloomington. 1958.

Penjer, Michael. The New York Times. 1 September 1989.

Perec, Georges. Life, A User's Manual. D.R. Godine, Boston. 1987.

Peter, Lawrence J. 'Peter's People' in Human Behavior. August 1976.

Petit, Jean-Pierre. Euclid Rules OK? Translated by Ian Stewart. John

Murray (Publishers), Ltd, London. 1982.

Pettie, George. A Petite Pallace of Pettie His Pleasures Containing Many

Petie Histories by Him Set Forth in Comely Colours and Most Delightfully

Discoursed. Volume I. AMs Press, New York. 1970.

Pirandello, Luigi. The Rules of the Game, The Life I Gave You [andl Lazarus.

Penguin Books, Middlesex. 1959.

Planck, Max. A Survey of Physics. Methuen & Co., Ltd., London. 1925.

Plato. Ctr'to. Translated by B. Jowett. W.J. Black, New York. 1942.

Plato. Gorgius. Translated with notes by Terence Irwin. The Clarendon

Plato. Phaedo. Translated by B. Jowett. W.J. Black, New York. 1942.

Plato. The Laws. Translated with an introduction by A.E. Taylor. Dent

Plato. The Republic. Translated with an Introduction by H.D.P. Lee.

Plato. Timueus. Translated by Francis M. Cornford. Liberal Arts Press,

Plautus. Aululariu. Edited by E.G. Thomas. Clarendon Press, Oxford.

Press, Oxford. 1979.

Publishing, London. 1960.

Penguin Books. 1955.

New York. 1959.

1913.

BIBLIOGRAPHY 311

Playfair, William. The Commercial and Political Atlas. London. 1786.

Playfair, William. The Statistical Breviary. T. Bensley, London. 1801.

Plotinus. The Six Enneads. Translated by Stephen MacKenna. Larson

Plutarch. Plutarch’s Lives. Translation called Dryden’s. Volume IV. Little,

Poe, Edgar Allen. Tules of Mystery and Imagination. Castle, New Jersey.

Pohl, Frederik. The Coming ofthe Quantum Cats. Bantam, New York. 1986.

Poincark, Henri. The Founda tions of Science. The Science Press, New York.

Polya, G. Puttems of Plausible Inference. Princeton University Press, New

Polybius. The Histories. Harvard University Press, Cambridge. 1960.

Pomfret, John. The Poetical Works of John Pomfret: with the Life of the Author.

The Apollo Press, Edinburgh. 1779.

Pope, Alexander. The Complete Poetical Works of POPE. Edited by Henry

W. Boynton. Houghton Mifflin and Co., Boston. 1931.

Popper, Karl R. Conjectures and Refutations. Harper and Row, Publishers,

New York. 1965.

Popper, Karl R. The Logic of Scientific Discovery. Basic Books, Inc., New

York. 1959.

Popper, Karl R. Realism and the Aim of Science. Rowman & Littlefield,

Ottawa. 1956.

Porter, Theodore M. The Rise of Statistical Thinking. Princeton University

Press, Princeton. 1986.

Prakash, Satya. Founders of Sciences in Ancient India. The Research Institute

of Ancient Scientific Studies, New Delhi. 1965.

Pratchett, Terry. The Dark Side of the Sun. St. Martin’s Press, New York.

1976.

Price, Lucien. Dialogues of Alfred North Whitehead. Little, Brown and Co.,

Boston. 1954.

Prior, Matthew. The Literary Works of Matthew Prior. Volume I. Edited

by H. Bunker Wright and Monroe K. Spears. The Clarendon Press,

Oxford. 1959.

Proschan, Frank. ’Investigation of Latin Squares’ in Industrial Quality

Control. Volume XI, Number 1. July 1954.

Puzo, Mario. Fools Die. Putnam, New York. 1978.

Pynchon, Thomas. Gravity’s Rainbow. The Viking Press, Inc., New York.

Pynchon, Thomas. Slow Learner. Little Brown & Co., Boston. 1984.

Publications, Burdette. 1992.

Brown, and Co., Boston. 1882.

1985.

1913.

Jersey. 1954.

1973.

Queneau, Raymond. Exercises in Style. Translated by Barbara Wright. A

New Directions Paperback, New York. 1981.

312 STATISTICALLY SPEAKlNG

Quetelet, Adolphe. Du s y s t h e social et des lois qui le regissent. Guillaumin,

Quetelet, Adolphe. A Treatise on Man and the Development of His Faculties.

Paris. 1848.

Scholar’s Facsimiles & Reprints, Gainsville. 1969.

Rader, L.T. ’Putting Quality into Quantity’ in American Machinist. Volume

87. 28 October 1943.

Raleigh, Walter. Laughter from a Cloud. Constable and Co., Ltd., London.

1923.

Ramsey, Frank Plumpton. The Foundations of Mathematics and other Logical

Essays. Routledge & Kegan Paul Ltd., London. 1954.

Ramsey, James B. Economic Forecasting: Models or Markets? Sat0 Institute,

San Francisco. 1980.

Ray, Donald P. Trends in Social Science. Philosophical Library, New York.

1961.

Read, Herbert. Icon and Idea: The Function of Art in the Development of

Human Consciousness. Harvard University Press, Cambridge. 1955.

Reade, Charles. A Tmible Temptation: a story of the day. Chapman and

Hall, London. 1871.

Redfield, Roy A. Factors of Growth in a Law Practice. Callaghan & Co.,

Mundelein. 1962.

Reichenbach, Hans. The Rise of Scientific Philosophy. University of

California Press, Berkeley. 1953.

Reid, Thomas. Essays on the Intellectual Power ofMan. M a d a n and Co.,

Limited, London. 1941.

Reynolds, Henry T. Analysis of Nominal Data. SAGE Publications, Beverly

Hills. 1977.

Richardson, Samuel. The History of Sir Charles Grandison, in a series of

letters. Routledge, London. No date.

Rickover, H.C. ’The World of the Uneducated’ in The Saturday Evening

Post. 28 November 1959.

Ritsos, Yannis. Erotica. Translated from the Greek by Kimon Friar. Sachm

Press, Old Chatham. 1982.

Roberts, Nora. Without a Trace. MIRA Books, Ontario. 1990.

Robertson, John R. ‘Transactions of the Statistical Society of London, Vol.

Robertson, Louis Newton. History and Organization of Criminal Statistics

Roche, James Jeffrey. Life of John Boyle O’Reilly. The Mershon Co., New

Rogers, Will. The Will Rogers Book. Compiled by Paula McSpadden Love.

Rogers, Will. The Writings of Will Rogers. Volume IV. Oklahoma State

1, part 1’ in Westminster Review. Volume 29. 1838.

in the United States. Patterson Smith, Montclair. 1969.

York. 1891.

Texian Press, Waco. 1972.

University Press, Stillwater. 1980.

BIBLIOGRAPHY 313

Rohault, Jacques. Rohuult’s System of Natural Philosophy. Johnson Reprint

Romanoff, Alexis L. Encyclopedia of Thought. Ithaca Heritage Books,

Ross, JoAnn. Tempting Fate. MXRA Books, Ontario. 1987.

Rousseau, Jean Jacques. The Social Contract. Translated by G.D.H. Cole.

Royce, Joshiah. The World and the Individual. Dover Publications, Inc.,

Rudner, R. ’Remarks on Value Judgment in Scientific Validation’ in

Rumanoff, Alexis L. Encyclopedia of Thoughts, aphorisms, couplets and

Runyon, Damon. ‘A Nice Place’ in Collier’s. 8 September 1934.

Russell, Bertrand. Nightmares of Eminent Persons. Simon and Schuster,

Russell, Bertrand. Principles of Mathematics. W.W. Norton & Co., Inc.,

Russell, Bertrand. The Analysis of Matter. Dover Press, New York. 1954.

Russell, Bertrand. The Scientific Outlook. W.W. Norton & Co., Inc., New

York. 1931.

Russell, E.J. ’Field Experiments: How They are Made and What They

Are’ in Journal ofthe Ministry of Agriculture of Great Britain. Volume 32.

1926.

Corporation, New York. 1969.

Ithaca. 1975.

E.P. Dutton & Co., New York. 1950.

New York. 1959.

Scientific Monthly. Volume 79. September 1954.

epigrams. Ithaca Heritage Books, Ithaca. 1975.

New York. 1955.

New York. 1938.

Salsburg, David S. ’The Religion of Statistics as Practiced in Medical

Joumals’ in The American Statistician. Volume 39, Number 3. August

1985.

Samuelson, Paul A. ’Science and Stocks’ in Newsweek. 19 September 1966.

Santayana, George. The Life ofReason. Charles Scribner’s Sons, New York.

Sarton, George. Sarton on the History of Science. Harvard University Press.,

Sartre, Jean-Paul. The Philosophy of Exis ten tialism. Philosophical Library,

Savage, L.J. The Foundations of Statistics. John Wiley & Sons, New York.

Sayers, Dorothy L. The Unpleasantness at the Bellonu Club. Harper & Row,

Schlozer, Ludwig. Westminsfer Review. Volume I, Part I. 1838.

Schiller, Friedrich von. Wallensfein: A Historical Drama in Three Parts.

Translated by Charles E. Possage. Frederick Unger Publishing Co.,

New York. 1958.

Schopenhauer, Arthur. Parerga and Paralipomenu: Short Philosophical

Essays. Translated by E.F.J. Payne. The Clarendon Press, Oxford. 1974.

1953.

Cambridge. 1962.

Inc., New York. 1965.

1954.

New York. 1956.

314 STATlSTICALLY SPEAKING

Schumacher, E.F. Good Work. Harper & Row, New York. 1979.

Scott, Sir Walter. The Fortunes of Nigel. Adam and Charles Black, London.

Seaton, G.L. 'The Statistician and Modem Management' in The American

Seeger, Raymond J. Joumal of the Washington Academy of Sciences. Volume

Segal, Erich. Man, Woman and Child. Harper and Row, Publishers. New

Seldes, George. The Great Quotations. A Caesar-Stuart Book, Lyle Stuart,

Seuss, Dr. The Cat in the Hat. Houghton Mifflin, Boston. 1957.

Shaffer, Peter. Two Plays by Peter S h - m . Athenaeum, New York. 1974.

Shapere, Dudly. Philosophical Problems of Natural Science. The Macmillan

Shapiro, Karl. Collected Poems 1940-1978. Random House, New York.

Shaw, George Bemard. Back to Methuselah. Brentans, New York. 1921.

Shaw, George Bemard. 'Great Catherine' in Complete Plays with Prefaces.

Volume IV. Dodd, Mead & Co., New York. 1963.

Shaw, George Bemard. 'The Vice of Gambling and the Virtue of

Insurance' in The World of Mathematics. Volume 3. By James R.

Newman. Simon and Schuster, New York. 1956.

Shelley, Percy Bysshe. The Poems of Percy Bysshe Shelley. Methuen and

Co., Ltd., London. 1911.

Sherman, Susan. With Anger/With Love. Mulch Press, Amherst. 1974.

Shewhart, W.A. 'Contributions of Statistics to the Science of Engineering'

in University of Pennsylvania Bicentennial Confmence. Volume on Fluid

Mechanics and Statistical Methods. University of Pennsylvania Press,

Philadelphia. 1941.

Simon, Herbert. Models of Man: Social and Rational. Wiley, New York. 1957.

Simpson, Thomas. 'A Letter to the Right Honorable George Earl of

Macclesfield, President of the Royal Society, on the Advantage

of Taking the Mean of a Number of Observations, in Practical

Astronomy' in Philosophical Transactions of the Royal Society of London.

Volume 49. 1755.

Skinner, B.F. Walden Two. Macmillan Publishing Co., Inc., New York.

1976.

Slonim, Morris James. Sampling. Simon and Schuster, New York. 1960.

Smedley, Frank. Frank Fairlegh. A. Hall, Virtue, and Co., London. 1850.

Smith, Logan. Trivia. Doubleday Press, New York. 1917.

Smith, Reginald H. 'A Sequel: The Bar is Not Overcrowded' in American

Bar Association Journal. Volume 45, September 1959.

Smollett, Tobias. The Life and Adventures of Sir Launcelot Greaves. Oxford

University Press, London. 1973.

1898.

Statistician. Volume 2, Number 6. December 1948.

36. 1946.

York. 1980.

New York. 1960.

Co., New York. 1965.

1978.

BlBLlOGRAPHY 315

Snedecor, G.W. 'On a Unique Feature of Statistics' in lournal of the

American Statistical Association. Volume 44, Number 245. March 1949.

Snedecor, G.W. Statistical Papers in Honor of George W. Snedecor. Edited

by T.A. Bancroft. The Iowa State University Press, Ames. 1972.

Sophocles. The Plays of Sophocles. Translated by Thomas Franklin. G.

Routledge & Sons, London. 1893.

Spearman, Charles. Psychology Down the Ages. Volume I. Macmillan and

Co., Ltd., London. 1937.

Spencer-Brown, George. Probabilify and Scientijic Inference. Longmans,

Green, London. 1957.

Stamaty, Mark Alan. 'Washingtoon' in Time. 25 September 1995.

Stamp, Josiah. Some Economic Factors in Modem Life. P.S. King & Son, Ltd.,

Orchard House. 1929.

Steadman, Frank M. 'Quality Control Posts Mill-Production Odds' in

Textile World. Volume 94. Jul-Dec 1944.

Stekel, Wilhelm. Marriage at the Crossroads. Translated by Allen D.

Gorman. W. Godwin, Inc., New York. 1931.

Steme, Laurence. Tristram Shandy. J.M. Dent & Sons, Ltd., London. 1964.

Stewart, Alan. 'Averages' in Times. 4 January 1954.

Stewart, Ian. Does God Play Dice? Basil Blackwell Inc., Cambridge. 1990.

Stigler, Stephen M. The History of Statistics: The Measurement of

Uncertainty b#ore 1900. The Belknap Press of Harvard University Press,

Cambridge. 1986.

Stone, Irving. Clarence DUYYOWfo r the Dqense. Doubleday, Garden City.

1975.

Stoppard, Tom. Night and Day. Faber and Faber Ltd, London. 1978.

Stoppard, Tom. Rosencranfz and Guildenstem are Dead. Grove Press, Inc.

Stout, Rex. Death o f a Doxy. The Viking Press, New York. 1966.

Streatfield, Geoffrey. 'Sayings of the Week' in The Observer. 19 March

Strong, Lydia. 'Sales Forecasting: Problems and Prospects' in Management

Strunsky, Simeon. Topics of the Times. 30 November 1944.

Suidas. Collected Works of Erasmus. Translated and Annotated by R.A.B.

Mynars. University of Toronto Press, Toronto. 1992.

Swift, Jonathan. Gulliver's Travels. Rinehart, New York. 1948.

Swift, Jonathan. Satires and Personal Writings. Oxford University Press,

Swift, Jonathan. The Portable Swift. Edited by Carl Van Doren. The Viking

Sylvester, J.J. Philosophical Magazine. Volume 24. 1844.

Szilard, Leo. Leo Szilard: His Version of the Facts: Selected Recollections &

Correspondence. Edited by Spencer R. Weart & Gertrude Weiss Szilard.

The MIT Press, Cambridge. 1978.

New York. 1967.

1950.

Re-uiew. September 1956.

New York. 1932.

Press, New York. 1966.

316 S TATlS TICALLY SPEAKING

Tanur, Judith, Mosteller, Frederick, Kruskal, William H., Lehmann, Erich

L., Link, Richard F., Piters, Richard S. and Rising, Gerald R. Statistics:

A Guide to the Unknown. Wadsworth Inc., Belmont. 1989.

Tarbell, Ida M. The Ways of Woman. The Macmillan Co., New York. 1916.

Tchekhov, Anton. Tchekhov’s Plays and Stories. Translated by S.S.

Tennyson, Alfred Lord. The Poems and Plays of Alfied Lord Tmnyson. The

Terence. Adelphoe. Eldradge, Philadelphia. 1874.

Thackery, William M. The Books of Snobs; and Sketches and Travels in London.

The Editors. ‘Statistics, The Physical Sciences and Engineering’ in The

The Editors. ’The Statistician and Everyday Affairs’ in The American

The RAND Corporation. A Million Random Digits with 100,000 Noma1

Thiery, Paul Henri, Baron d’Holbach. The System of Nature. Volume I.

Thompson, D’Arcy. On Growth and Fom. Volume I. Cambridge

Thompson, William (Lord Kelvin). Popular Lectures and Addresses.

Thomsett, Michael C. The Little Black Book of Business Statistics. American

Thoreau, Henry David. Walden. Bramhall House, New York. 1970.

Thoreau, Henry David. Winter. Houghton, Mifflin Co., Boston. 1888.

Thom, John and Palmer, Peter. The Hidden Game of Baseball. Doubleday,

Thucydides. Thucydides: The History of the Peloponnesian War. E.D. Dutton,

Thurber, James. Further Fables for Our Time. Simon and Schuster, New

Thurber, James. Lanterns and Lances. Harper Publishing, New York. 1961.

Thurston, L.L. ’Current Issues in Factor Analysis’ in Psychological Bulletin.

Volume 37. April 1940.

Tippett, L.C. ’Sampling and the Standard Error’ in The World of

Mathematics. Volume 3. By James R. Neuman. Simon and Schuster,

New York. 1956.

Tippett, L.H.C. The Method of Statistics. Williams and Norgate, Ltd. 1931.

Toffler, Alvin. Future Shock. Random House, New York. 1970.

Tolstoy, Leo. War and Peace. Carlton House, New York. No date.

Trollope, Anthony. The Eustace Diamond. Oxford University Press, Oxford.

Koteliansky. E.P. Dutton and Co., Inc., New York. 1962.

Modem Library, New York. 1938.

Smith Elder, London. 1869.

American Statistician. Volume 11, Number 4. August 1948.

Statistician. Volume 11, Number 5. 1948.

Deviates. The Free Press, Publishers, Glenco. 1955.

Garland Publishing, Inc., New York. 1984.

University Press, London. 1959.

Macmillan and Co., London. 1891.

Management Association, New York. 1990.

New York. 1983.

New York. 1910.

York. 1956.

1983.

BlBLlOGRAPHY 317

Tsu, Chuang. Inner Chapters. Translated by Gia-Fu Feng and Jane English.

Alfred A. Knopf, New York. 1974.

Tsu, Lao. Tao Te Ching. Translated by Gia-Fu Feng and Jane English.

Alfred A. Knopf, New York. 1974.

Tufte, Edward R. The Visual Display of Quantitative lnfomuztion. Graphics

Press, Connecticut. 1983.

Tukey, John W. ’Statistical and Quantitative Methodology’ in Trends in

Social Science. Edited by Donald P. Ray. Philosophical Library, New

York. 1961.

Tukey, John W. ‘The Future of Data Analysis’ in Annals ofMathemuticu1

Statistics. Volume 33, Number 1. March 1962.

Tukey, J.W. ‘We Need both Exploratory and Confirmatory’ in The

American Statistician. Volume 34. 1980.

Tukey, John W. ’Where Do We Go From Here?’ in Journal ofthe American

Statistical Association. Volume 55, Number 268. March 1960.

Tukey, John W. ’Unsolved Problems of Experimental Statistics’ in

Journal of the American Statistical Association. Volume 49, Number 268.

December 1954.

Turgenev, Ivan. Father and Sons. Translated by Alexandria Tolstoy.

Bantam Books, New York. 1981.

Twain, Mark. Adam’s Dia y. Harper’s Magazine. Volume 102, Number 611.

April 1901.

Twain, Mark. Huckleberry Finn. Clarkson & Potter, Inc., New York. 1981.

Twain, Mark. Mark Twain Laughing. University of Tennessee Press,

Twain, Mark. Pudd’nhead Wilson. Harper & Brothers Publishers, New

Twain, Mark. The Autobiography of Mark Twain. Edited by Charles Neider.

Knoxville. 1985.

York. 1899.

Harper & Row, Publishers, New York. 1959.

Unknown. Adventures of Sylvia Hughes. Garland Publishing, Inc., New

York. 1975.

Van der Post, Laurens. A Far off Place. Hogarth Press, London. 1974.

Venn, J. ‘On the Nature and Uses of Averages’ in Jouml of the Royal

Venn, J. The Logic of Chance. Macmillan, London. 1888.

Villon, Francois. The Poems of Franpis Villon. Translated by ,H.B.

Volkart, Edmund H. The Angel’s Dictionary. Franklin Watts, Inc., New

Voltaire. ’Philosophical Dictionary’ in The PortabZe Voltaire. The Viking

Voltaire. ‘Candide’ in Candide and Other Writings. Random House, Inc.

Statistical Society. Volume 54. 1891.

McCaskie. Cresset Press, London. 1946.

York. 1986.

Press, New York. 1965.

1956.

318 STATISTICALLY SPEAKlNG

von Clausewitz, Karl. On War. Edited and translated by Michael Howard

von Mises, Richard. Mathematical Theory of Probability and Statistics. Edited

von Mises, Richard. Probability, Statistics and Truth. Academic Press, New

and Peter Paret. Princeton University Press, Princeton. 1976.

by Hilda Geiringer. Academic Press, New York. 1964.

York. 1964.

Walcott, Derek. Collected Poems. Farrar, Strauss & Giroux, New York. 1986.

Walker, Marshall. The Nature of Scientific Thought. Prentice-Hall, Inc., New

Jersey. 1963.

Waller, Robert. The Bridges ofMadison County. Warner Books, New York.

1992.

Wallis, W.A. 'The Statistical Research Group, 1942-1945' in J o u m l of the

American Statistical Association. Volume 75, Number 370. June 1980.

Walsh, John E. Handbook of NonParametric Statistics. Volume I. Van

Nostrand Co., Inc., Princeton. 1962.

Walton, Izaak. The Complete Angler. T.N. Foulis, London. 1913.

Wang, Chamont. Sense and Nonsense of Statistical Inference: Controversy,

Misuse, and Subtlety. Marcel Dekker, Inc., New York. 1993.

Waugh, Evelyn. The Letters of Evelyn Waugh. Edited by Mark Amory.

Ticknor & Fields, New York. 1980.

Wellman, Francis. The Art of Cross-Examination. Macmillan Publishing Co.,

New York. 1924.

Wells, H.G. Mankind in the Making. Chapman & Hall, London. 1904.

Wells, H.G. The Work, Wealth and Happiness of Mankind. William

West, Jessamyn. The Quaker Reader. The Viking Press, New York. 1962.

West, Nathaniel. Miss Lonelyhearts. Farrar, Strauss and Giroux, New Y:-+

Weyl, Her". The Theory of Groups ~ : t t i Quantum Mechanics. Dover

White, E.B. The Trumpet of the Swan. Harper & Row, New York. 1970.

Whitehead, Alfred North. Adventures of Ideas. The Free Press, New York.

1967.

Whitehead, Alfred North. An Introduction to Mathematics. Oxford

University Press, London. 1972.

Whitehead, Alfred North. Process and Reality. The Humanities Press, New

York. 1929.

Whitehead, Alfred North. Science and the Modem World. The Macmillan

Co., New York. 1967.

Whyte, Lancelot Law. Essays on Atomism: from Democritus to 1960.

Wesleyan University Press, Middletown. 1961.

Wigner, Eugene P. 'The Unreasonable Effectiveness of Mathematics in the

Natural Sciences' in Communications in Pure and Applied Mathematics.

Volume 13. 1960.

Heinemann, Ltd., London. 1932.

1971.

Publications, Inc., New York. 1950.

BIBLIOGRAPHY 319

Wilde, Oscar. Epigrams: Phrases and Philosophies for the Use of the Young.

A.R. Keller & Co., Inc. New York. 1907.

Wilde, Oscar. Oscar Wilde’s Plays, Prose Writings, and Poems. J.M. Dent &

Sons, Ltd., London. 1966.

Wilde, Oscar. The Importance of Being Eamest: A Trivial Comedy for Serious

People. William Heineman, London. 1949.

Wilde, Oscar. The Picture of Dorian Gray. The World Publishing Co.,

Cleveland. 1946.

Wilder, Thomton. The Eighth Day. Harper & Row, Publishers, New York.

1967.

Wilkins, John. Of the Principles & Duties of Natural Religion. Johnson

Reprint Corp., New York. 1969.

Williams, Monier. The Story of Nala. The Clarendon Press, Oxford. No

date.

Wilson, E.B. Bulletin of the American Mathematical Association. Volume 18.

1912.

Wittgenstein, Ludwig. Tractatus Logico-Philosophicus. Translated by D.F.

Pears and B.F. McGuinness. Humanities Press Inc., New York. 1961.

Wolfowitz, J. ’Reflections on the Future of Mathematical Statistics’ in

Essays in Probability and Statistics. Edited by R.C. Bose et al. University

of North Carolina Press, Chapel Hill. 1969.

Wonnacott, Ronald J. and Wonnacott, Thomas H. Introducto ry Statistics.

John Wiley & Sons, Inc., New York. 1969.

Woodward, Robert. Probability and Theory of Errors. John Wiley & Sons,

Inc., New York. 1906.

Wordsworth, William. Wordsworth’s Poetry and Prose. The Clarendon

Press, Oxford. 1921.

Wright, William Aldis. The Complete Works of William Shakespeare.

Doubleday Doran & Co., Inc. 1936.

Wright, Jim. ’Second Thought’ in The Dallas Moming News. 9 September

1969.

Yates, F. ’(Discussion)’ in Joumal of the Royal Statistical Society. Series B,

Yeates, W.B. The Collected Poems of W.B. Yeats. The Macmillan Co., New

Youden, W. J. Experimentation and Measurement. National Science Teachers

Yule, George U. An Introduction to the Theory of Statistics. Hafner Pub. Co.,

Yule, G.U. ‘On the Theory of Correlation’ in Joumal of the Royal Statistical

Volume 17. 1955.

York. 1961.

Association, Washington, D.C. 1962.

New York. 1950.

Association. December 1897.

PERMISSIONS

Grateful acknowledgement is made to the following for their kind

permission to reprint copyright material. Every effort has been made to

trace copyright ownership but if, inadvertently, any mistake or omission

has occurred, full apologies are herewith tendered.

Full references to authors and the titles of their works are given under

the appropriate quotation.

1,001 LOGICAL LAWS by John Peers. Copyright 1979. Reprinted by

permission of the publisher, Doubleday & Company. Garden City,

New Jersey.

AN ESSAY CONCERNING HUMAN UNDERSTANDING by John

Locke. Copyright 1956. Reprinted by permission of the publisher, The

Clarendon Press. Oxford, UK.

AN INTRODUCTION TO MATHEMATICS by Alfred North Whitehead.

Copyright 1972. Reprinted by permission of the publisher, Oxford

University Press. Oxford, UK.

TIONS by William Feller. Copyright 1960. Reprinted by permission of

the publisher, John Wiley & Sons, Inc. New York.

A PHILOSOPHICAL ESSAY ON PROBABILITIES by Marquis de Pierre

Simon Laplace. Copyright 1995. Reprinted by permission of the

publisher, Springer-Verlag New York, Inc. New York.

ASTRONOMY TRANSFORMED by David 0. Edge and Michael J.

Mulkay. Copyright 1976. Reprinted by permission of the publisher,

John Wiley & Sons, Inc. New York.

BLACK SPRING by Henry Miller. Copyright 1963. Reprinted by

permission of the publisher, Grove Press, Inc. New York.

BRAIN 2000 by Earnest K. Gann. Copyright 1980. Reprinted by

permission of the publisher, Doubleday & Company, Inc. Garden City,

New Jersey.

AN INTRODUCTION TO PROBABILITY THEORY AND ITS APPLICA-

320

PERMISSIONS 321

BREAKTHROUGHS IN STATISTICS edited by Samuel Kotz and Norman

L. Johnson. Copyright 1993. Reprinted by permission of the publisher,

Springer-Verlag New York, Inc. New York.

BURNS POETICAL WORKS edited by J. Logie Robertson. Copyright

1966. Reprinted by permission of the publisher, Oxford University

Press. Oxford, UK.

CAMILLA by Frances Bumey. Copyright 1972. Reprinted by permission

of the publisher, Oxford University Press. Oxford, UK.

CAROLINA CHANSONS by DuBose Heywood. Copyright 1922.

Reprinted by permission of the publisher, Macmillan Publishing

Company. New York.

CHANCE, SKILL, AND LUCK by John Cohen. Copyright 1960.

Reprinted by permission of the publisher, Penguin Books. Baltimore,

Maryland.

CHARLES BOOTH’S LONDON by Charles Booth. Copyright 1971.

Reprinted by permission of the publisher, Penguin Books Ltd. London,

UK.

CLARENCE DARROW FOR THE DEFENSE by Irving Stone. Copyright

1941. Reprinted by permission of the publisher, Doubleday, Doran &

Company, Inc. Garden City, New Jersey.

COLLECTED POEMS 1940-1978 by Karl Shapiro. Copyright 1986.

Reprinted by permission of the publisher, Wiesner & Wiesner, Inc.

New York.

COMPLETE SPEAKERS AND TOASTMASTERS LIBRARY by Jacob M.

Braude. Copyright 1967. Reprinted by permission of the publisher,

Prentice Hall/A Division of Simon & Schuster. New York.

COMPLETE WRITINGS by William Blake. Copyright 1972. Reprinted by

permission of the publisher, Oxford University Press. Oxford, UK.

‘Consolidating our Gains’ by Willford King. Copyright 1936. Reprinted

by permission of the publishers, Joumal of the American Statistical

Associa tion.

COWPER POETICAL WORKS by William Cowper. Copyright 1967.

Reprinted by permission of the publisher, Oxford University Press.

Oxford, UK.

DIALOGUES OF ALFRED NORTH WHITEHEAD by Lucien Price.

Copyright 1954. Reprinted by permission of the publisher, Little,

Brown and Company. Boston, Massachusetts.

‘Discussion’ by G.E.P. Box. Copyright 1956. Reprinted by permission of

Joumal of the Royal Statistical Society.

322 S TATlS TICA L LY SPEAKING

’Discussion on a Paper by Dr. Marshall and Professor O h ’ by D.F.

Kemdge. Copyright 1968. Reprinted by permission of the publisher,

Journal of the Royal Statistical Society.

‘Discussion on the paper Some Aspects of the Teaching of Statistics’

by M. Greenwood. Copyright 1939. Reprinted by permission of the

publisher, Joumal of the Royal Statistical Society.

DOES GOD PLAY DICE by Ian Stewart. Copyright 1990. Reprinted by

permission of the publisher, Blackwell Publishers. Oxford, UK.

ELEMENTARY APPLIED STATISTICS by Linton Freeman. Copyright

1965. Reprinted by permission of the publisher, Linton Freeman.

ELEMENTARY DECISION THEORY by Herman Chemoff and Lincoln

E. Moses. Copyright 1959. Reprinted by permission of the publisher,

Herman Chemoff and Lincoln E. Moses.

EREWHON OR OVER THE RANGE by Samuel Butler. Copyright 1981.

Reprinted by permission of the publisher, the University of Delaware

Press. Newark, New Jersey.

ESSAYS IN PROBABILITY AND STATISTICS edited by R.C. Bose et al.

Copyright 1969. Reprinted by permission of the publisher, University

of North Carolina Press. Chapel Hill, North Carolina.

EXPERIMENTAL DESIGNS by William Cochran and Gertrude M. Cox.

Copyright 1957. Reprinted by permission of the publisher, John Wiley

& Sons, Inc. New York.

FASTI by Ovid. Translated by Sir James George Frazer. Copyright 1959.

Reprinted by permission of the publisher, Harvard University Press,

and the Leob Classical Library. Cambridge, Massachusetts.

FICCIONES by Luis Borges. Copyright 1962. Reprinted by permission of

the publisher, Grove Press, Inc. New York.

FUTURE SHOCK by Alvin Toffler. Copyright 1970. Reprinted by

permission of the publisher, Random House, Inc. New York.

GORGIAS by Plato. Translated with notes by Terrence Irwin. Copyright

1979. Reprinted by permission of the publisher, The Clarendon Press.

Oxford, UK.

HOW TO LIE WITH STATISTICS by Darrell Huff. Copyright 1954.

Reprinted by permission of the publisher, W.W. Norton & Company,

Inc. New York.

HUDIBRAS by Samuel Butler. Copyright 1967. Reprinted by permission

of the publisher, The Clarendon Press. Oxford, UK.

PERMISSIONS 323

HUMAN NATURE AND THE HUMAN CONDITION by Joseph Wood

Krutch. Copyright 1959. Reprinted by permission of the publisher,

Random House, Inc. New York.

ICON AND IDEA: THE FUNCTION OF ART IN THE DEVELOPMENT

OF HUMAN CONSCIOUSNESS by Herbert Read. Copyright 1955.

Reprinted by permission of the publisher, Harvard University Press.

Cambridge, Massachusetts.

'Inaugural Address' by Sir Geoffrey Heyworth. Copyright 1950.

Reprinted by permission of the publisher, Journal of the Royal Statistical

Society.

INTRODUCTION TO MATHEMATICAL STATISTICS by Paul G. Hoel.

Copyright 1962. Reprinted by permission of the publisher, John Wiley

& Sons, Inc. New York.

INTRODUCTORY STATISTICS by Ronald J. Wonnacott and Thomas H.

Wonnacott. Copyright 1985. Reprinted by permission of the publisher,

John Wiley & Sons, Inc. New York.

JOHN GAY POETRY AND PROSE by John Gay. Volume 11. Copyright

1974. Reprinted by permission of the publisher, The Clarendon Press.

Oxford, UK.

LEO SZILARD: HIS VERSION OF THE FACTS by Leo Szilard. Copyright

1978. Reprinted by permission of the publisher, The MIT Press.

Cambridge, Massachusetts.

LICHTENBERG: APHORISMS & LETTERS by George Lichtenberg.

Translated, edited and introduced by Franz H. Maunter and Henry

Hatfield. Copyright 1959. Reprinted by permission of the publisher,

Jonathan Cape. London, UK.

LIKELIHOOD by A.W.F. Edwards. Copyright 1972. Reprinted by

permission of the publisher, Cambridge University Press. New York.

LUCRETIUS ON THE NATURE OF THINGS. Translated by Cyril

Bailey. Copyright 1950. Reprinted by permission of the publisher, The

Clarendon Press. Oxford, UK.

MATHEMATICS AND THE SEARCH FOR KNOWLEDGE by Morris

Kline. Copyright 1985. Reprinted by permission of the publisher,

Oxford University Press. Oxford, UK.

METAMORPHOSES by Ovid. Translated by Frank Justus Miller.

Reprinted by permission of the publisher, Harvard University Press,

and the Leob Classical Library. Cambridge, Massachusetts.

MODELS OF MAN: SOCIAL AND RATIONAL by Herbert Simon.

Copyright 1957. Reprinted by permission of the publisher, Herbert

R. Simon.

324 STATISTICALLY SPEAKlNG

NATURAL PHILOSOPHY OF CAUSE AND CHANCE by Max Bom.

Copyright 1964. Reprinted by permission of the publisher, Dover

Publications, Inc. New York.

NEW ATLANTIS by Francis Bacon. Copyright 1942. Reprinted by

permission of the publisher, D. Van Nostrand Co., Inc. New York.

’Nightingale on Quetelet’ by Marion Diamond and Mervyn Stone.

Copyright 1981. Reprinted by permission of the publisher, Joumal of

the Royal Statistical Society.

NINETEEN EIGH’IY-FOUR by George Orwell. Copyright 1949.

Reprinted by permission of the publisher, Harcourt, Brace & World,

Inc. New York.

’Observations on the Measure of Change’ by Charles Cooley. Copyright

1893. Reprinted by permission of the publishers, Joumal of the American

Statistical Association.

’Obstacles to Accurate Statistics’ by James H. Blodgett. Copyright 1898.

Reprinted by permission of the publisher, Joumal of the American

Statistical Association.

’On a Classification of the Problems of Statistical Inference’ by William

Edwards Deming. Copyright 1942. Reprinted by permission of the

publisher, Jouml of the American Statistical Association.

’On a Unique Feature of Statistics’ by G.W. Snedecor. Copyright 1949.

Reprinted by permission of the publisher, Joumal of the American

Statistical Associa tion.

ON AGGRESSION by Konrad Lorenz. Translated by Majorie Kerr

Wilson. Copyright 1963. Reprinted by permission of the publisher,

Harcourt, Brace & World, Inc. New York.

’On the Nature and Uses of Averages’ by J. Venn. Copyright 1891.

Reprinted by permission of the publisher, Jouml of the Royal Statistical

Society.

‘On the Presentation of the Results of Sample Surveys as Legal

Evidence’ by William Edwards Deming. Copyright 1954. Reprinted

by permission of the publisher, Jouml of the American Statistical

Association.

’On the Representation of Statistics by Mathematical Formula (concluded)’

by Francis Ysidro Edgeworth. Copyright 1899. Reprinted by

permission of the publisher, Journal of the Royal Statistical Soci~ty.

’On the Theory of Correlation’ by G.U. Yule. Copyright 1897. Reprinted

by permission of the publisher, Jouml of the Royal Statistical Society.

PERMISSIONS 325

’On the Use of the Theory of Probabilities in Statistics Relating to

Society’ by Francis Ysidro Edgeworth. Copyright 1913. Reprinted by

permission of the publisher, Journal of the Royal Statistical Society.

OPTICKS by Sir Isaac Newton. Copyright 1952. Reprinted by permission

of the publisher, Dover Publications, Inc. New York.

OUT OF THE CRISIS by William Edwards Deming. Copyright 1986.

Reprinted by permission of the publisher, MIT and the W. Edwards

Deming Institute. Published by MIT, Center for Advanced Educational

Services. Cambridge, Massachusetts.

PARERGA AND PARALIPOMENA: SHORT PHILOSOPHICAL ESSAYS

by Arthur Schopenhauer. Translated by E.F.J. Payne. Copyright 1974.

Reprinted by permission of the publisher, The Clarendon Press.

Oxford, UK.

PATIENCE AND FORTITUDE by William Manners. Copyright 1976.

Reprinted by permission of the publisher, Harcourt Brace Jovanovich.

New York.

PHILOSOPHICAL WRITINGS OF PEIRCE by C.S. Peirce. Copyright

1955. Reprinted by permission of the publisher, Dover Publications,

Inc. New York.

PHYSICS AND PHILOSOPHY by James Jeans. Copyright 1981.

Reprinted by permission of the publisher, Dover Publications, Inc.

New York.

’Principles of Sampling’ by F. Mosteller. Copyright 1954. Reprinted

by permission of the publisher, Joumal of the American Statistical

Association.

PROBABILITY AND CERTAINTY by Emile Borel. Copyright 1964.

Reprinted by permission of the publisher, Dover Publications, Inc.

New York.

PROBABILITY AND INDUCTION by W.C. Kneals. Copyright 1952.

Reprinted by permission of the publisher, The Clarendon Press.

Oxford, UK.

PROBABILITY AND LIFE by Emile Borel. Copyright 1964. Reprinted by

permission of the publisher, Dover Publications, Inc. New York.

REAL ESTATE LAW by Robert Kratovil. Copyright 1952. Reprinted by

permission of the publisher, Prentice-Hall/A Division of Simon &

Schuster. Englewood Cliffs, New Jersey.

RESEARCH METHODS IN SOCIAL RELATIONS by Marie Jahoda,

Morton Deutsch and Stuart W. Cook. Volume I. Copyright 1951.

Reprinted by permission of the publisher, Dryden Press. New York.

326 S TATIS TIC ALLY SPEAKING

RISING SUN by Michael Crichton. Copyright 1993. Reprinted by

permission of the publisher, Random House, Inc. New York.

ROSENCRANTZ AND GUILDENSTERN ARE DEAD by Tom Stoppard.

Copyright 1967. Reprinted by permission of the publisher, Grove

Press, Inc. New York.

RUBEN, RUBEN by Peter De Vries. Copyright 1964. Reprinted by

permission of the publisher, Little, Brown and Company. Boston,

Massachusetts.

RULES OF THUMB by Tom Parker. Copyright 1983. Reprinted by

permission of the publisher, Houghton Mifflin Co. New York.

SAMPLE DESIGN IN BUSINESS RESEARCH by William Edwards

Deming. Copyright 1960. Reprinted by permission of the publisher,

John Wiley & Sons, Inc. New York.

SAMUEL BUTLERS NOTE-BOOKS by Samuel Butler. Edited by

Geoffrey Keynes and Brian Hill. Copyright 1951. Reprinted by

permission of the publisher, Jonathan Cape. London, UK.

SATIRES AND PERSONAL WRITINGS by Jonathan Swift. Copyright

1932. Reprinted by permission of the publisher, Oxford University

Press. Oxford, UK.

'Science and Society' by R.H. Coats. Copyright 1939. Reprinted by

permission of the publisher, Journal of the American Statistical

Association.

SCIENCE AND THE MODERN WORLD by Alfred North Whitehead.

Copyright 1967. Reprinted by permission of the publisher, Macmillan

Publishing Company. New York.

SENSE AND NONSENSE OF STATISTICAL INFERENCE by Chamont

Wang. Copyright 1993. Reprinted by permission of the publisher,

Marcel Dekker, Inc. New York.

SLOW LEARNER by Thomas Pynchon. Copyright 1984. Reprinted by

permission of the publisher, Little, Brown and Company. Boston,

Massachusetts.

SOME THEORY OF SAMPLING by William Edwards Deming.

Copyright 1950. Reprinted by permission of The Estate of W. Edwards

Deming.

'Some Uses of Statistics in Executive Control' by Leslie F. Hayford.

Copyright 1936. Reprinted by permission of the publishers, Jouml

of the American Statistical Association.

STATISTICAL ADJUSTMENT OF DATA by William Edwards Deming.

Copyright 1943. Reprinted by permission of The Estate of W. Edwards

Deming.

P E m " N s 327

'Statistical Methods and Scientific Induction' by Sir Ronald A. Fisher.

Copyright 1955. Reprinted by permission of the publisher, Journal of

the Royal Statistical Society.

STATISTICAL PAPERS IN HONOUR OF GEORGE SNEDECOR by M.G.

Kendall. Copyright 1972. Reprinted by permission of the publisher,

Iowa State University Press. Ames, Iowa.

'Statistics and Social Engineering' by Joseph S. Davis. Copyright 1937.

Reprinted by permission of the publisher, Journal of the American

Statistical Association.

STATISTICS FOR MODERN BUSINESS DECISIONS by Lawrence L.

Lapin. Copyright 1973. Reprinted by permission of the publisher,

Harcourt Brace Jovanovich, Inc. New York.

STUDIES IN SUBJECTIVE PROBABILITY by H.E. Kyburg, Jr., and H.E.

Smokler. Copyright 1959. Reprinted by permission of Henry Kyburg.

TEACHERS TREASURY OF STORIES FOR EVERY OCCASION by M.

Dale Baughman. Copyright 1958. Reprinted by permission of the

publisher, Simon & Schuster. Englewood Cliffs, New Jersey.

'Teaching Statistical Quality Control for Town and Gown' by Edwin

G. Olds. Copyright 1949. Reprinted by permission of the publisher,

lournal of the American Statistical Association.

Shay Arthur, edited by Donald A. Koch. Copyright 1964. Reprinted by

permission of the publisher, The Belknap Press of Harvard University

Press. Cambridge, Massachusetts.

THE ANALYSIS OF MATTER by Bertrand Russell. Copyright 1954.

Reprinted by permission of the publisher, Dover Publications, Inc.

New York.

THE ANGEL'S DICTIONARY by Edmund Volkart. Copyright 1986.

Reprinted by permission of the publisher, Franklin Watts, Inc.

Danbury, Connecticut.

THE ART OF CROSS-EXAMINATION by Francis Wellman. Copyright

1924. Reprinted by permission of the publisher, Macmillan Publishing

Company. New York.

THE ART OF PERSUASION by Wayne Minnick. Copyright 1957.

Reprinted by permission of the publisher, Houghton Mifflin

Company. Boston, Massachusetts.

THE BLIND WATCHMAKER WHY THE EVIDENCE OF EVOLUTION

REVEALS A UNIVERSE WITHOUT DESIGN by Richard Dawkins.

Copyright 1987. Reprinted by permission of the publisher, W.W.

Norton & Company, Inc. New York.

TEN NIGHTS IN A BAR-ROOM AND WHAT I SAW THERE by Timothy

328 STATISTICALLY SPEAKlNG

THE COMPLETE ROMAN DRAMA by George Duckworth. Copyright

1966. Reprinted by permission of the publisher, Random House, Inc.

New York.

THE DEVIL’S DICTIONARY by Ambrose Bierce. Copyright 1958.

Reprinted by permission of the publisher, Dover Publications, Inc.

New York.

THE DOT AND THE LINE: A ROMANCE IN LOWER MATHEMATICS

by Norton Juster. Copyright 1963. Reprinted by permission of the

publisher, Random House, Inc. New York.

THE EDUCATION OF HENRY ADAMS by Henry Adams. Copyright

1946. Reprinted by permission of the publisher, Random House, Inc.

New York.

THE EDUCATION OF T. C. MrrS by Lillian R. Lieber. Copyright 1944.

Reprinted by permission of the publisher, Harold Ober Associates,

Inc. and W.W. Norton & Company, Inc. New York.

THE ENDS OF POWER by H.R. Haldeman. Copyright 1978. Reprinted

by permission of the publisher, New York Times Books. New York.

THE EUSTACE DIAMOND by Anthony Trollope. Copyright 1983.

Reprinted by permission of the publisher, Oxford University Press.

Oxford, UK.

’The Future of Data Analysis’ by John W. Tukey. Copyright 1962.

Reprinted by permission of the publisher, Annals of Mathematical

Statistics.

THE HIDDEN GAME OF BASEBALL by John Thom and Peter Palmer.

Reprinted by permission of John Thom. Published by Bantam

Doubleday Dell. New York.

TAINTY BEFORE 1900 by Stephen M. Stigler. Copyright 1986.

Reprinted by permission of the publisher, The Belknap Press of Harvard

University Press. Cambridge, Massachusetts.

THE LETTERS OF EVELYN WAUGH edited by Mark Amory. Copyright

1980. Reprinted by permission of the publisher, Houghton Mifflin

Company. New York.

THE LIFE AND ADVENTURES OF SIR LAUNCELOT GREAVES by

Tobias Smollett. Copyright 1973. Reprinted by permission of the

publisher, Oxford University Press. Oxford, UK.

THE LITERARY WORKS OF MATTHEW PRIOR by Matthew Prior.

Volume I. Edited by H. Bunker Wright and Monroe K. Spears.

Copyright 1959. Reprinted by permission of the publisher, The

Clarendon Press. Oxford, UK.

THE HISTORY OF STATISTICS: THE MEASUREMENT OF UNCER

PERMISSIONS 329

THE MATHEMATICAL APPROACH TO BIOLOGY AND MEDICINE

by Norman Bailey. Copyright 1967. Reprinted by permission of the

publisher, John Wiley & Sons. Chichester, UK.

THE MILL ON THE FLOSS by George Eliot. Copyright 1980. Reprinted

by permission of the publisher, The Clarendon Press. Oxford, UK.

THE NATURE OF SCIENCE AND OTHER LECTURES by Edwin Powell

Hubble. Copyright 1977. Reprinted by permission of The Huntington.

San Marino, California.

THE PARSIFAL MOSAIC by Robert Ludlum. Copyright 1982. Reprinted

by permission of the publisher, Random House, Inc. New York.

THE PHYSICAL PRINCIPLES OF QUANTUM THEORY by Wemer

Heisenberg. Reprinted by permission of the publisher, Dover

Publications, Inc. New York.

THE PROCESS OF EDUCATION by Jerome S. Bruner. Copyright 1960.

Reprinted by permission of the publisher, The Belknap Press of

Harvard University Press. Cambridge, Massachusetts.

THE ROMAN WAY by Edith Hamilton. Copyright 1932. Reprinted by

permission of the publisher, W.W. Norton & Company, Inc. New York.

THE SMALL BACK ROOM by Nigel Balchin. Copyright 1943. Reprinted

by permission of the publisher, Collins Publishing. London, UK.

THE SOCIAL CONTEXTS OF RESEARCH by S.Z. Nagi and R.G. Corwin.

Copyright 1972. Reprinted by permission of the publisher, John Wiley

and Sons. New York.

THE STORY OF NALA by Monier Williams. Reprinted by permission of

the publisher, The Clarendon Press. Oxford, UK.

THE THEORY OF GROUPS AND QUANTUM MECHANICS by

Hermann Weyl. Copyright 1950. Reprinted by permission of the

publisher, Dover Publications, Inc. New York.

‘The Whole Duty of the Statistical Forecaster’ by Robert W. Burgess.

Copyright 1937. Reprinted by permission of the publisher, Joumal of

the American Statistical Association.

THE WORLD AND THE INDIVIDUAL by Josiah Royce. Copyright 1959.

Reprinted by permission of the publisher, Dover Publications, Inc.

New York.

UP FRONT by Bill Mauldin. Copyright 1945. Reprinted by permission

of the publisher, Henry Holt and Company. New York.

’Unsolved Problems of Experimental Statistics’ by John Tukey. Copyright

1954. Reprinted by permission of the publisher, Journal of the American

Statistical Association.

330 STATETICALLY SPEAK"

'Where do We Go From Here?' by John Tukey. Copyright 1960. Reprinted

by permission of the publisher, Journul of the American Statistical

Association.

SUBJECT BY AUTHOR INDEX

-Aactuaries

Unknown

actuary

Karpansky, L.

Actuaries are funny people, 1

Analytical and graphical

treatment of statistics

is employed by ... the

ac tuary... with the most

surprising results ..., 1

unknown ... the actuary is in the back seat

screaming directions ..., 1

Someone once asked an actuary

how much 2 plus 2 was, 1

American Statistical Association

Proschan, Frank

Are you now, or have you

ever been, a member of

the American Statistical

Association?, 217

analysis

Allen, R.G.D.

Not even the most subtle

and skilled analysis can

overcome completely the

unreliability of basic data, 2

Bell, Eric T.

The technical analysis of any

large collection of data is a

task for a highly trained and

expensive man..., 2

Cardozo, Benjamin N.

The repetition of a catchword

can hold analysis in fetters

for fifty years and more, 2

Holmes, O.W., Jr.

... by their very felicity, delay

further analysis for fifty

years, 3

Laplace, Pierre-Simon

... if moreover it were vast

enough to submit these data

to analysis ..., 4

Unknown

It always helps to know the

answer when you are

working toward the solution

of a problem, 5

analysis of the instances

Keynes, John Maynard

But to argue, without analysis

of the instances ..., 3

analysis of the obvious

Whitehead, Alfred North

It requires a very unusual mind

to undertake the analysis of

the obvious, 5

analysis, age of

Sherman, Susan

The age of analysis, 4

331

332 STATISTICALLY SPEAKlNG

analysis, data

Tukey, John W.

done ..., 5

If data analysis is to be well

analysis, excellence of

Mill, John Stuart

The very excellence of analysis ...,

4

analysis, habit of

Mill, John Stuart

The habit of analysis has a

tendency to wear away the

feelings, 4

analysis, method of

Newton, Sir Isaac

As in mathematics, so in

natural philosophy, the

investigation of difficult

things by the method of

analysis, ought to precede

the method of composition,

4

analysis, Murphy's Laws of

Deakly, C.G.

... the figures that are obviously

correct contain errors, 3

analysis, probability

Thomsett, Michael C.

"Oh, you mean he used

probability analysis ..., 5

analyst

Keeney, Ralph and Raiffa, Howard

... be wary of analysts that try to

quanhfy the unquantifiable,

3

analytic

Butler, Samuel

He was in Logic, a great

critic, Profoundly skill'd in

Analytic;, 2

analytical reasoner

Holmes, Sherlock

... the impression of a woman

mav be more valuable

than the conclusion of an

analytical reasoner, 3

analytics

Marlowe, Christopher

ravish'd me ..., 4

Sweet Analytics, 'tis thou hast

Ashley-Perry Statistical Axioms

Dickson, Paul

Numbers are tools, not rules,

128

assessed probability

Durand, David

One manipulated by the Intemal

Revenue Service, 60-1

assignable cause

Durand, David

The cause that takes the rap

when the process runs

amok, 60

assumptions

Kadane, Joseph

I believe that assumptions

are useful in statistical

practice .... See Bayesians

average

Alderson, M.H.

If at first you don't succeed,

your running about average,

6

Atherton, Gertrude

... but they are more hysterical

than the average ..., 6

Billings, Josh

...p reserve a good average, 7

Britmica, The Encyclopaedia

Expectation in the general sense

may be considered as a kind

of average, 15

Byron, Lord

A daily plague, which in the

aggregate may average on

the whole with parturition,

8

Froude, lames Anthony

SUBJECT BY AUTHOR INDEX 333

... sixteen gold gods of average

size, 9

... the average of one

generation ..., 9

Galton, Francis

An Average is but a solitary

fact ..., 9

Harte, Francis Bret

Give me a man that is

capable of a devotion to

anything, rather than a cold,

calculating average of all the

virtues, 10

Heller, Walter

... on the average, he's

comfortable, 10

Henry, 0.

They had on average, about a

quarter of a suit of clothes ...,

10

Holmes, O.W.

But an average ... is one of the

most extraordinary subjects

of observation and study, 10

Hooke, Robert

On the average, bunting with a

man on first loses a lot of

runs, 10

Huxley, Aldous

...y ou get an average of nearly

eleven thousand brothers

and sisters ..., 11

Krutch, Joseph Wood ... what is "normal" and what

is "usual", "average", or

"statistically probable.", 12

Leacock, Stephen

After careful comparison of

your case with the average

modem standard ..., 12

From this Latin word derives

our modem word average,

13

Moroney, M.J.

Pynchon, Thomas

... it suggests Haverie-average,

you know ..., 13

Redfield, Roy A.

Make sure that the real average

is what you are dealing

with, 14

Shaffer, Peter

Slonim, Morris James

... the Average made lethal, 14

... the average age of women

over forty is under for ty...,

14

Stamp, Josiah

15

Stoppard, Tom

... there isn't exactly an average,

The equanimity of your average

tosser of coins ..., 15

Tsu, Lao

The average student hears of

the Tao and gives it thought

now and again, 15

Twain, Mark

... the average was more than

3,000 words a day ..., 16

... we can afford to be perfectly

indifferent to the fate ... of the

individuals which compose

the average, 16

How can a single introduction of

our own ...p ossibly take the

place of many values ..., 17

Venn, J.

Voltaire

... man in generaLon the

average, does not live above

two-and-twenty years, 17

average ability

Bailey, Thomas D.

There must be such a thing as a

child with average abili ty...,

6

average American

Nixon, Richard M.

STATISTICALLY SPEAKlNG

The average American is just

like the child in the family,

13

average civilized man

Twain, Mark

The only very marked difference

between the average

civilized man and the

average savage is ..., 16

average education

Leacock, Stephen ... nobody has an average

education, 12

average family

Juster, Norton

“Oh, we‘re just the average

family,” ..., 11

average human nature

Hardy, Thomas

... it is scomed by average human

nature, and it therefore does

not mend the matter, 10

average intellect

Dickens, Charles

... the average intellect of average

men..., 8

average intelligence

Atherton, Gertrude

The average intelligence is

always shallow ..., 6

average intelligence of scientists

Carrel, Alexis

The best way of increasing

the [average] intelligence

of scientists would be to

reduce their number, 8

average man

Foss, Sam Walter

Hubbard, Elbert

... the average man is curled ..., 8

The average man believes a

thing first ..., 11

Inge, William Ralph

...p ublic opinion ... makes life

unpleasant for anyone who

is not content to be the

average man, 11

The average man is rich enough

when he has a little more

than he has got ..., 11

What does this mean for The

Lieber, Lillian R.

Average Man?, 13

Quetelet, Adolphe

Twain, Mark

the average man, 13

The average man don’t like

trouble and danger, 16

average minds

Rickover, H.G.

... average minds discuss

events ..., 14

average rate

Freidman, Martin

... the average rate for the year

as a whole ..., 8

average value

Galton, Francis

The knowledge of an average

value is a meager piece of

information, 9

average, arithmetic

Bowley, Arthur L.

Of itself an arithmetic average is

more likely to conceal than

to disclose important facts ...,

7

average, concept of

Cohen, Morris R.

The concept of average was

developed in Rhodian

laws ..., 8

average, proper

Wilde, Oscar

... the number of engagements

that go on seems to me

considerably above the

proper average ..., 17

average, statistical

Krutch, Joseph Wood

SUBIECT BY AUTHOR INDEX 335

... the question “How many legs

does a normal man have?”

should be answered by

finding a statistical average,

12

averages

Bemard, Claude

Another very frequent

application to biology is the

use of averages ..., 7

Bowley, Arthur L.

Great numbers and the averages

resulting from them ..., 7

Brandies, Louis D.

I abhor averages, 7

Froude, James Anthony

We have to consider the million,

not the units, 9

Juster, Norton

But averages aren’t re al... they’re

just imaginary, 12

Nightingale, Florence

...an inveterate habit of taking

averages ..., 13

Venn, J.

Why do we resort to averages at

all?, 17

averages, chemical

Bemard, Claude

Chemical averages are also often

used, 7

averages, law of

Keegan, John

...’ hitting the target’ ,... is

henceforth to be left to the

law of averages, 12

“You can’t fight the law of

Snood, Grover

averages,“ ..., 14

Stewart, Alan

The only remedy would seem

to be to repeal the law of

averages, 15

Stoppard, Tom

The law of averages, ..., means

that if six monkeys were

thrown up in the air..., 15

averages, statistical

Russell, Bertrand A.

Scientific laws ... are always,

at least in physics, either

differential equations, or

statistical averages, 14

-BBabylonical

Statistical

Association

King, Willford

... clay tablets recording the

minutes of the 1242 annual

meeting of the Babylonical

Statistical Association, 214

Bayesians

Bartlett, M.S.

Bayesians should also take care

to distinguish their various

denominations ..., 18

There might also be some

Luchenbruch, Peter

specialized terminology for

Bayesians, but I have not

seen any, 18

Wang, Chamont

... there are at least 46,656

varieties of Bayesians, 18

Bernoulli

Harris, Sidney

see?, 72

Which Bernoulli do you wish to

Kelly-Bootle, Stan

Bernoulli’s theorem

Kneale, W.

A mathematician in Reno ..., 72

A misunderstanding of

Bemoulli’s theorem is

responsible for one of the

commonest fallacies in the

estimation of probabilities,

72

336 STATISTICALLY SPEAKING

best estimate

Durand, David

...an estimate having optimum

qualities ..., 60

Binary

Pynchon, Thomas

But a hardon, that’s either there,

or it isn’t, 74

biometrician

Fleiss, Joseph L.

There was a biometrician named

Mabel, ..., 225

biostatistician

Unknown

A biostatistician talks statistics

to the biologist ..., 231

blunders

Hugo, Victor

Great blunders are often make,

like large ropes, of a

multitude of fibers, 79

-Ccausalities

Disraeli, Benjamin

But great things spring from

causalities, 21

causality

Russell, Bertrand

But we are not likely to find

science retuming to the

crude form of causality

believed in by Fijians ..., 27

Unknown

causation

Heise, David R.

I am not a heretic, 28

Causation depends on an

extraordinary tuming of

rea lity..., 23

cause

Akenside, Mark

cause ..., 19

Give me to leam each secret

Bergson, Henri

... what is found in the effect was

already in the cause, 20

Every effect becomes a cause, 20

There is no result in nature

without a cause ..., 21

Buddhist Maxim

Da Vinci, Leonard0

De Spinoza, Benedict

By CAUSE of itself, I understand

that, whose essence involves

existence ..., 21

cause an effect necessarily

follows ..., 21

Froude, James Anthony

Holmes, O.W.

From a given determinate

Every effect has its cause, 23

But he who, blind to universal

laws, Sees but effects,

unconscious of the c a u s e ,

23

Hume, David

... every effect is a distinct event

from its cause, 24

It is universally allowed that

nothing exists without a

cause ..., 24

Matthew

Wherefore by their fruits ye

shall know them, 28

... every fact which has a

Mill, John Stuart

beginning has a cause ..., 25

Ovid

Pascal, Blaise

The cause is hidden ..., 26

They saw the thing, but not the

cause, 26

Pettie, George

Sutch as the cause of everything

is, sutch wilbe the effect, 26

Plotinus

On the assumption that all

happens by Cause ..., 26

Polybius

SUBIECT BY AUTHOR INDEX 337

... every event ... must have some

cause, 26

Proverb, Latin

The cause being taken away, the

effect is removed, 27

Rohault, Jacques

Cause, 27

Rousseau, Jean Jacques

Every Effect Presupposes some

... for no more by the law of

reason than by the law of

nature can anything occur

without a cause, 27

Shakespeare, William

For this effect defective comes

It is the cause, 28

Thou art the cause ..., 28

... the impulse to seek cause is

by cause, 27

Tolstoy, Leo

innate in the soul of man, 28

Unknown

The cause is the same with a

Barmter ..., 29

cause and effect

Aurelius, Marcus

In the series of things those

which follow are always

aptly fitted to those which

have gone before ..., 20

Cause and effect are two sides

Cause and effect, means and

Cause and effect, the chancellors

Do not clutch at sensual

Emerson, Ralph Waldo

of one fact, 22

ends ..., 22

of God, 22

sweetness until it is ripe on

the slow tree of cause and

effect, 22

Effect, 22

effect, 23

I prefer to play at Cause and

Strong men believe in cause and

H u e , David

This is as perfect an instance

of the relations of cause

and effect as any which we

know either by sensation or

reflection, 24

James, William

... the first morning of creation

wrote What the last dawn of

reckoning shall read, 25

Pure mathematics ... cannot touch

the question of cause and

effect ..., 25

Kant, Immanuel

Prakash, Satya

If the law of the relation of

effect and cause does not

exist ..., 26

Proverb, Latin

After this, therefore because of

this, 27

Tsu, Chuang

cause to effect

Holmes, Sherlock

Everything can be a “that“, 28

... that severe reasoning from

cause to effect ..., 23

cause, law of

Atherton, Gertrude

The law of cause and effect does

not hide in the realm of the

unexpected ..., 20

cause, secret

Dryden, John

Happy the man, who studying

Nature’s laws, Through

known effects can trace the

secret cause-, 22

causes

Aristotle

Thus every action must be due

to one or other of seven

causes ..., 19

Arthur, T.S.

338 STATISTICALLY SPEAKING

Only a few look at causes, and

trace them to their effects, 20

The end of our foundation is the

knowledge of causes ..., 20

The Causes of events are ever

more interesting than the

events themselves, 20

The most important events are

often determined by very

trivial causes, 21

Colton, Charles Caleb

Bacon, Francis

Cicero

We know the effects of many

things, but the causes of

few ..., 21

De Spinoza, Benedict

... man is bom ignorant of the

causes of things ..., 21

Hume, David

All effects follow not with

like certainty from their

supposed causes, 24

From causes which appear

similar we expect similar

effects, 24

James, William

As in the night all cats are

gray, so in the darkness of

metaphysical criticism all

causes are obscure, 25

Lee, Hannah Farnham

Causes are often

disproportionate to effects,

25

Lichtenberg, Georg

Man is a creature who searches

for causes ..., 25

Shakespeare, William

There is occasions and causes

why and wherefore in all

things, 27

Taylor, J.P.

Looking for long-term causes of

things ..., 28

Virgil

Happy, who has the skill to

understand Nature’s hid

causes ..., 29

causes, first

Bemard, Claude

First causes are outside the

realm of science ..., 20

causes, primary

Fourier, Jean Baptiste Joseph

Primary causes are unknown to

us ..., 23

certain

Butler, Samuel

Galsworthy, John

There is one thing certa in..., 30

If one thing is more certain than

another-which is extremely

doubtful-, 31

Hoffer, Eric

We can be absolutely certain

only about things we do not

understand, 31

Jeans, James Hopwood

certain ..., 32

... we can know nothing .. .for

Leibniz, Gottfried Wilhelm

... it may be taken as morally

certain, 32

Walker, Marshall

... some predictions have such a

high probability that one

tends to regard them as

certain, 33

certainties

Bacon, Francis

...if a man will begin with

certainties he shall end in

doubts ..., 30

Hesiod

He is a fool who leaves

certainties for uncertainties,

31

certainty

Dampier-Whetham, William

SUBJECT BY AUTHOR INDEX 339

... the infinite probability of

certainty is never reached,

30

Froude, James Anthony

Certa inty... is the same in

kind wherever and

by whomsoever it is

experienced, 31

It was not a PERHAPS, 30

Heads I win, Tails you lose, 31

But certainty generally is

illusion, and repose is not

the destiny of man, 31

Certitude is not the test of

certainty, 31

Holmes, O.W.

Holmes, O.W., Jr.

Johnson, Samuel

When speculation has done its

worst, two and two still

make four, 32

Locke, John

... the highest probability

amounts not to ce rtainty...,

32

Mansfield, Lord

As mathematical and absolute

certainty is seldom to be

attained in human affairs ...,

32

Shakespeare, William

Not a resemblance, but a

certainty, 32

Shaw, George Bemard

chance

Ambler, Eric

I must have certainty, 32

A Fren chman... once said that

chance was a nickname for

Providence, 34

Astaire, Fred

fate, 35

Chance is the fool’s name for

Bell, Eric T.

Games of chance are probably

as old as human desire ..., 35

Blake, William

Every night and every mom

Some to misery are bom ...,

35

Bogart, Humphrey

Of all the gin joints in all the

towns in all the world, she

walks into mine!, 35

What we still designate as

Buchner, Ludwig

chance, merely depends

on a concatenation of

circumstances ..., 36

I’ve heard cunning stagers

Butler, Samuel

Say fools for arguments

use wagers, 36

We ... ascribe much both of a

man’s character and actions

to chance, or luck, or

fortune ..., 36

Chamfort, Sebastien Roch

Providence, 36

Chance is a nickname of

Cicero

...b ut things that happen by

chance cannot be certain, 37

Surely nothing is so at variance

with reason and stability as

chance, 37

Colton, Charles Caleb

... the balls are constantly

producing effects from mere

chance ..., 37

Cowper, William

A fool must now and then be

right, by chance, 37

Crick, Francis Harry Compton

Chance is the only source of

true novelty, 37

Darwin, Charles

... left to the working out of what

we may call chance, 38

340 STATISTICALLY SPEAKING

When we look at the plants

and bushes clothing an

entangled bank, we are

tempted to attribute their

proportional numbers and

kinds to what we call

chance, 38

De Moivre, Abraham

... some of the Problems about

Chance having a great

appearance of Simplicity,

the Mind is easily drawn

into a belief, that their

Solution may be attained by

the meer Strength of natural

good Sense, 38

Democritus

Nothing can come into being

from that which is not, or

pass away into what is not,

38

Dryden, John

Eddington, Sir Arthur Stanley

... Chance rules all above ..., 39

... I shall certainly hit on a tune,

39

Eldridge, Paul

Value depends upon price and

price upon chance and

caprice, 39

Euripides

... it is chance that rules the

mortal sphere, 39

Galsworthy, John

It’s all chance, but we can’t stop

now, 40

Guest, Judith

... it is chance and not perfection

that rules the world, 40

... chance, that is, an infinite

number of events, with

respect to which our

ignorance will not permit us

to Derceive their causes..., 41

Helvetius, C.A.

If chance be generally

acknowledged to be the

author of most discoveries

in almost all the arts ..., 41

Therefore tum, and charge at

the foe, to stand or fall as is

the game of war ..., 41

Though there be no such thing

as Chance in the world ..., 41

Homer

Hume, David

Johnson, Samuel

Nothing was ever said with

uncommon felicity, but by

the cooperation of chance ...,

42

Jonah

... and the lot fell upon Jonah, 48

Longfellow, Henry Wadsworth

I shot an arrow into the air,

It fell to earth 1 know not

where ..., 42

Masters, Dexter

I should estimate ... that there is

one chance in ten nothing

will happen with the

bomb ..., 42

There wasn’t more

than one chance in

God-knows-what ..., 42

Milton, John

Chance govems all, 43

The power which erring men

call chance, 42

Nietzsche, Friedrich

No conqueror believes in

chance, 43

Paley, William

There must be chance in the

midst of design, 43

Pascal, Blaise

A game is being played at the

extremity of this infinite

distance where heads or

tails will tum up ..., 43

SUBJECT BY AUTHOR INDEX 341

Cleopatra’s nose had it been

shorter ..., 43

Pasteur, Louis

... chance favors only the

prepared mind, 43

Peers, John

All things considered, life is 9 to

5 against, 43

Plato

...in human affairs chance is

almost everything, 43-4

Both kinds of causes should

be acknowledged ... but a

distinction made between

those which are endowed

with mind...and those which

are deprived of intelligence

and always produce chance

effects without order or

design, 44

neither, for they cannot

make a man either wise or

foolish, and whatever they

do is the result of chance, 44

They say that the greatest and

fairest things are the work

of nature and of chance ..., 44

But in reality they can do

Pohl, Frederik

... there is a five-tenths chance

that the cat’s alive, 44

Poincare, Henri

And first, what is chance?, 44-5

Chance is only the measure of

our ignorance, 45

The greatest bit of chance is the

birth of a great man, 45

If such a mind existed, we could

not play with it any game of

chance, 45

Pope, Alexander

All chance, direction, which

thou canst not see ..., 45

... the race is not to the swift ..., 48

Proverbs

Runyon, Damon

Schiller, Friedrich

... life is 6 to 5 against, 46

There’s no such thing as chance,

46

Schopenhauer, Arthur

Consider that chance, which,

with error, its brother ..., 46

Chance will not do the work ...,

Scott, Sir Walter

46

Shakespeare, William

... the lottery of my destiny ..., 47

As things done by chance, 47

Come, bring me unto my

chance, 47

Give up yourself merely to

chance and hazard ..., 47

If chance will have me King...,

47

You must take your chance ..., 47

Fate, Time, Occasion, Chance

Of Fate, and Chance, and God,

Shelley, Percy Bysshe

and Change ..., 48

and Chaos old ..., 48

Tennyson, Alfred Lord

chance ..., 48

And grasps the skirt of happy

Terence

...thing s happen that we

wouldn’t even dare hope

for, 48

d’Holbach, P.H.T.

... chance is an empty word

without sense ..., 49

Thiery, Paul Henri, Baron

Thuc ydides

... we usually blame chance for

whatever does not happen

as we expected, 49

But what is chance?, 49

Tolstoy, Leo

Unknown

342 S TATlS TICAL LY S P E A K "

Age at death is a chance

variable, 49

Heads or Tails, 42

No more chance than a snowball

in Hell, 49

Wisdom liketh not chance, 46

Chance sways all, 49

Vir$

chance, 50-50

Harvey, Paul

If there is a 50-50 chance that

something can go wrong,

then 9 times out of 10 it

will, 41

chance, appearance of

Paley, William

The appearance of chance will

always bear a proportion

to the ignorance of the

observer, 43

chance, Chinaman's

Disney, Dorothy

chance, 38

chance, conception of

Bom, Max

She hadn't a Chinaman's

The conception of chance enters

into the very first steps of

scientific activi ty..., 36

chance, laws of

Borel, Emile

chance, slaves of

Shakespeare, William

Can there be laws of chance?, 35

... we profess ourselves to be the

slaves of chance and flies ...,

48

chance, whimsical effects of

Galton, Francis

The whimsical effect of chance

in producing stable results

are common enough, 40

chances

... rational action is merely a

question of calculating the

chances, 35

Butler, Samuel

... man's body is what it is

through having been

molded into its present

shape by the chances and

changes of an immense

time ..., 36

Chesterson, Gilbert Keith

... the chances are twenty to one

that it has nothing to do

with them, 36-7

Fermi, Enrico

A general is a man who takes

chances, 39

Herodotus

... it is well to bear in mind that

chances rule men, and not

men chances, 41

Unknown

chances, disastrous

Shakespeare, William

You have two chances ..., 74

Wherein I spake of most

disastrous chances ...,

47

chances, doctrine of

De Moivre, Abraham

... the Doctrine of Chances has a

Tendency to promote Play ...,

38

chi-square

Lewis, Don

It has been increasingly apparent

over a period of several

years that psychologists,

taken in the aggregate,

employ the chi-square test

incorrectly, 73

chunk

Deming, William Edwards

A chunk is a convenient slice of

Aron, Raymond a population, 60

SUBJECT BY AUTHOR INDEX 343

coincidence

Holmes, Sherlock

The odds are enormous against

its being a coincidence, 24

commode

Durand, David

Term applied to each mode of a

bimodal distribution, 60

common sense

Amauld, Antoine

common, 50

Common sense is not really so

Belloc, Hilaire

... at last a sufficiency of statistics

comes very near to common

sense, 50

Bennett, Arnold

And then he knew that

something within him more

powerful than his common

sense would force him to

stake that five-franc piece,

50

Bialac, Richard N.

Statistics are no substitute for

common sense, 51

Crofton, M.W.

... a definiteness and precision of

which these crude, though

sound, appreciations of

common sense were till then

devoid, 51

Einstein, Albert

... common sense is nothing more

than a deposit of prejudices

laid down in the mind

before you reach eighteen,

51

Howe, E.W.

What is common sense?, 51

What is the thing we call

Common Sense?, 154

Common sense tells us that

Keynes, John Maynard

are stronger than others ...,

51

Laplace, Pierre-Simon

... the theory of probabilities

is basically only common

sense reduced to calculus, 51

confounded effect

Unknown

Beware of the confounded

effect!, 273

conjecture

Holmes, Sherlock

... we come into those realms of

conjecture where the most

logical mind may be at fault,

193

correlation

Aron, Raymond

There is no correlation between

the cause and the effect, 52

Balchin, Nigel

... there's a positive correlation

between penetration and

height of the man firing, 52

Birds of a feather flock together,

Carroll, Lewis

52

Cook, Robin

Reading the twenty-sixth chart,

one correlation suddenly

occurred to Jason, 52-3

Fisher, Sir Ronald A.

The futile elaboration of

innumerable measure of

correlation, 53

Galton, Francis

...c orrelation. ..i s a phrase much

used in biology ..., 54

Unknown

The quantity of the correlation

is inversely proportional to

the density of the control, 54

Correlation, index of

some inductive arguments Galton, Francis

344 STATlSTlCALLY SPEAKlNG

... such a thing existed as an

”Index of Correlation” ..., 54

correlation, laws of

Galton, Francis

... there is a vast field of topics

that fall under the laws of

correlation ..., 54

Correlation, statistical

Dickson, Paul

There is a statistical correlation

between the number of

initials in an Englishman’s

name and his social class ...,

53

correlational method

Cronbach, L.J.

The correlational method, for its

part, can study what man

has not learned to control,

53

correlations

Pearson, Karl

Biological phenomena in

their numerous phases,

economical and social,

were seen to be only

differentiated from the

physical by the intensity of

their correlations, 54

counted

Enarson, Harold L.

It does not follow that because

something can be counted it

therefore should be counted,

56

critical ratio

Unknown

curve

Unknown

The critical ratio is Z-ness ..., 219

When you get an 8 on the

midterm, there ain’t a curve

in the world that can save

-Ddata

Berkeley, Edmund E.

There is no substitute for honest,

thorough, scientific effort to

get correct data ..., 55

Deming, William Edwards

Anyone can easily misuse good

data, 55

Scientific data are not taken for

museum purposes ..., 56

There is only one kind of

whiskey, but two broad

classes of data, good and

bad, 55

Durand, David

Ehrenberg, A.S.C.

Deified numbers, 60

Data are often presented in a

form that is not immediately

clear, 56

Fisher, Sir Walter A.

No human mind is capable of

grasping in its entirety the

meaning of any considerable

quantity of numerical data,

56

Freeman, R. Austin

I can only suggest that, as we

are practically without data,

we should endeavor to

obtain some, 56

Galton, Francis

Holmes, Sherlock

My data were very lax..., 56

... it is an error to argue in front

Data! Data! Data!, 57

It is a capital mistake to theorize

No data yet ..., 57

If you can’t have an experiment,

of your data, 56

before one has the data, 57

Hooke, Robert

you, 74 - do the best you c& with

SUBJECT BY AUTHOR INDEX 345

whatever data you can

gather ..., 57

Hoyle, Fred

... radio data serves like a good

dog on a hunt, 57

Russell, Bertrand

When a man of science speaks

of his "data" ..., 58

lippett, L.C. ... it is necessary to have some

data on which to calculate

probabilities, 58

Unknown

Accept them as they are or deny

If at first you don't succeed,

their existence, 58

transform your data set, 58

data, limited

Mellor, J.W.

By no process of sound

reasoning can a conclusion

drawn from limited data

have more than a limited

application, 57

data, scientific

Thurber, James

We have no scientific data

whatever on clock-eating ...,

58

define

Voltaire

degrees of freedom

Durand, David

Define your terms ..., 63

The number of fetters on the

statistician, 64

lippett, L.C.

The conception of degrees of

freedom is not altogether

easy to attain, 64

design of experiment

Carroll, Lewis

65

I think that will be the best plan,

We will consider the problem of

designating an experiment

by means of which this

assertion can be tested, 65

Hooke, Robert

If you're trying to establish

cause-and-eff ect

relationships, do try to do

so with a properly designed

experiment, 65

Peacock, E.E.

"Do you have any controls?",

65-6

Pope, Alexander

A mighty maze! but not without

a plan, 66

Russell, E.J.

The chief requirement is

simplici ty..., 66

The Bible

For which of you intending to

build a tower ... counteth

the cost, whether he have

sufficient to finish it?, 66

diagrams

Fisher, Sir Ronald A.

The preliminary examination of

most data is facilitated by

the use of diagrams, 113

dice

Bierce, Ambrose ... to put the dice into the box for

another throw, 67

Cicero

Four dice are cast and a Venus

throw results ..., 67

Dryden, John

Einstein, Albert

'lis fate that flings the dice ..., 67

But there should be statistical

laws with definite solutions,

i.e., laws which compel God

to throw the dice in each

Fisher, Sir Ronald A. individual case..., 68

346 STATISTICALLY SPEAKING

I, at any rate, am convinced that

He does not throw dice, 68

Eldridge, Paul

Emerson, Ralph Waldo

loaded ..., 68

loaded, 68

... as the dice of chance decree, 68

... Nature's dice are always

The dice of God are always

Hawking, S.

It therefore seems that Einstein

was doubly wrong when he

said that God does not play

dice, 68

Heyward, DuBose

Hood, Thomas (1789-1845)

Roll dem bones ..., 41

For dice will run the contrary

way ..., 69

Lang, Andrew

Men permitted themselves to eat

only every second day, and

tried to forget their hunger

by playing at draughts and

dice, 69

Mallarmb, StCphane

-it A Throw of the Dice Will

Never Abolish Chance, 69

I of dice possess the science ..., 70

... the dice are loaded!, 69

... who cast the dice on the

bathroom tiles?, 69

Milman, H.H.

Polya, G.

Ritsos, Yannis

Suidas

Midas on the dice gives the best

advice, 70

Wilder, Thomton

We were shaken into existence

like dice out of a box, 70

die

Bierce, Ambrose

a die ..., 59

A cube of cheese no larger than

Plutarch

The die is cast, 69

Shakespeare, William

And by the hazard of the

spotted die ..., 70

And I will stand the hazard of

the die ..., 70

differences

Galton, Francis

If we knew the little differences

which divide one man from

another ... we should have

the key to most of life's

riddles, 286

distribution

Aristotle

... it is necessary that it either

should or should not take

place to-morrow, 71

If the prior distribution,

Hamming, Richard

at which I am frankly

guessing ..., 72

Unknown

Monique is exponentially

distributed, 75

diversities

Harvey, William

... the diversities in the shapes of

the eggs of different hens,

287

doubt

Gilbert and Sullivan

Of what there is no manner of

doubt ..., 184

-Eeffect

Nietzsche, Friedrich

Before the effect one believes in

other causes than after the

effect, 26

enquiry

De Moivre, Abraham

Let the Reader chuse, 71

SUBJECT BY AUTHOR INDEX 347

equiprobability

Kasner, Edward

Equiprobability in the

physical world is purely a

hypothesis ..., 171

err

Adams, Franklin

I err in company with Hume ...,

76

Hobbes, Thomas

err‘d

Pomfret, John

Nature itself cannot err, 79

He’s more than mortal that ne’er

err’d at all, 80

erroneous reading

Anscombe, F.J.

One sufficiently erroneous

reading can wreck the whole

of a statistical analysis ..., 76

error

Butler, Samuel

76

Error and mistake are infinite ...,

Cage, John

An error is simply a failure to

adjust ..., 77

Carroll, Lewis

No error at all!, 77

Colton, Charles Caleb

... error is always more busy than

ignorance, 77

Cowper, William

Man, on the dubious waves of

error toss’d, 77

Da Vinci, Leonard0

0 mathematicians, throw light

on this error, 77

Edgeworth, Francis Ysidro

However we define error, the

idea of calculating its extent

may appear paradoxical, 78

Erasmus, Desiderius

Error is Prolific, 78

Evans, Bergen

No error is harmless, 78

No vehement error can exist in

Froude, James Anthony

this world with impunity, 79

Gilbert and Sullivan

An error?, 79

Reagan, Ronald

... no one bats a thousand, 81

Russell, Cheryl

Always expect to find at

least one error when

you proofread your own

statistics, 81

Whitehead, Alfred North

There is great room for error

here, 82

error, law of

Galton, Francis

The primary objects of the

Gaussian Law of Error were

exactly opposed ... to those to

which I applied them, 71

error, law of frequency of

Galton, Francis

It has been objected ... that I

pushed the application of

the Law of Frequency of

Error somewhat too far, 71

error, possible

Tukey, John W.

The calibration of the weight is

valuable just because its

possible error is known, 81

error, probable

Peirce, Charles Sanders

... no man of self-respect ever

now states his results

without affixing to it its

probable error, 80

error, problem of

Borel, Emile

The problem of error has

preoccupied philosophers

since the earliest antiqui ty...,

76

348 STATISTICALLY SPEAKING

error, standard

Deming, William Edwards

Precision is expressed by an

international standard, vis.,

the standard error, 77-8

A standard error is just as bad

as any other error, 81

Watson, Alfred N.

error, type 111

Unknown

A Type 111 error is a good

solution to the wrong

problem, 81

error, type IV

Unknown

A Type IV error is a wrong

solution to the wrong

problem, 81

errors

Chappell, Edwin

Their errors were subsequently

found to be very

considerable, 77

Dryden, John

Errors, like straws, upon surface

flow ..., 78

Huxley, Thomas H.

... irrationally held truths may be

more harmful than reasoned

errors, 80

truth has been erected ... by

the help of scientific errors,

79

Jeavons, W.S.

... the attainment of scientific

...qu antities which are called

errors in one case, may

really be most important

and interesting phenomena

in another investigation, 80

... the errors are not the art, but

Newton, Sir Isaac

in the artifiers, 80

Poincare, Henri

We know not to what are due

the accidental errors ..., 73

Thoreau, Henry David

errors ..., 81

One cannot too soon forget his

errors of the second kind

Fisher, Sir Ronald A.

The phrase “Errors of the

Second Kind” ..., 78

errors, theory of

Fisher, Sir Ronald A.

It is doubtful if ”Student” ever

realized the full importance

of his contribution to the

Theory of Errors, 78-9

Poincar6, Henri

errors, 80

A final word about the theory of

examination

Raleigh, Sir Walter

In an examination those who

do not wish to know ask

questions of those who

cannot tell, 273

examinations

Raleigh, Sir Walter

Examinations measures

Examinees, 273

Wilde, Oscar

Examinations are pure humbug

from beginning to end, 274

In examinations the foolish

ask questions that the wise

cannot answer, 274

expected value

Durand, David

One that the sample average

will almost never equal, 60

experiment

Bacon, Francis

But the method of experiment

which men now make use

of is blind and stupid ..., 83

Bloch, Arthur

SUBIECT BY AUTHOR INDEX 349

If an experiment works,

something has gone wrong,

83

considered a success if..., 83

The experiment may be

Browning, Robert

Just an experiment for candour’s

sake, 83

Cahier, Charles

Experiment is the mother of

science, 83

Carroll, Lewis

This is a most interesting

experiment ..., 8 3 4

Cox, Gertrude

The statistician who supposes

that his main contribution

to the planning of an

experiment will involve

statistical the0 ry..., 84

If you knew some of the

Darwin, Charles

experiments ... which I am

trying, you would have a

good right to sneer.. ., 84

Those who fear muddy feet will

Eldridge, Paul

never discover new paths,

85

Emerson, Ralph Waldo

Fisher, Sir Ronald A.

All life is an experiment, 85

Every experiment may be said

to exist only in order to

give the facts a chance

of disproving the null

hypothesis, 85

He can perhaps say what the

experiment died of, 85

Godwin, William

No experiment can be more

precarious than that of a

half-confidence, 85

Green, Celia ... experiment is measurement, 61

Hume, David

... it being justly esteemed an

unpardonable temerity to

judge the whole course

of nature from one single

experiment ..., 85

Hunter, John

Why think? Why not try the

experiment?, 86

Huxley, Thomas H.

Ancient traditions, when tested

by the severe process of

modem investigation ..., 86

...in the full tide of successful

Jefferson, Thomas

experiment ..., 86

Kapitza, Pyetr Leonidovich

... theory is a good thing but

a good experiment lasts

forever, 86

Kendall, Maurice G.

Hiawatha Designs an

Experiment, 86

Paracelsus, Philippus Aureolus

Every experiment is like a

weapon ..., 86

Planck, Max

If one wishes to obtain a definite

answer from nature one

must attack the question

from a more general and

less selfish point of view, 86

Experiment is the sole source of

Poincark, Henri

truth, 87

Rutherford, Ernest

If your experiment needs

statistics ..., 87

The Bible

Unknown

Prove all things, 87

Diversity of treatment has been

responsible for much of the

criticism leveled against the

experiment, 88

350 STATlS TICA L LY SPEAKING

If an experiment is not worth

doing at all, it is not worth

doing well, 88

complete failure, 88

equipment if an experiment

works, 88

No experiment is ever a

You must be using the wrong

Whitehead, Alfred North

... experiment is nothing else

than a mode of cooking the

facts ..., 88

experiment, eleven phases of an

Unknown

experimental

Plato

Wild enthusiasm ..., 88

... there are many arts among

mankind which are

experiment al..., 87

experimenter

Weyl, H e r "

Allow me to express now ... my

deepest respect for the work

of the experimenter ..., 88

experimenting

Twain, Mark

The other animals are glad,

for she was always

experimenting with them ...,

87

experiments

Poincark, Henri

It is often said that experiments

must be made without

preconceived idea, 87

explanation

Fabing, Harold

When there is no explanation,

they give it a name ..., 61

-Ffact

Alcott, Louisa May

Entrenching himself behind an

undeniable fact, 89

A fact is no simple thing, 90

To an ordinary person a fact is a

Barry, Frederick

fact ..., 90

Bemard, Claude

Browning, Robert

Budgell, Eustace

A fact is nothing in itse lf..., 91

This plain, plump fact, 91

Plain matters of fact are terrible

stubborn things, 91

Emerson, Ralph Waldo

... no fences avail to keep a fact a

fact, 94

A little fact is worth a whole

limbo of dreams ..., 94

Gilbert and Sullivan

fact ..., 96

Her taste exact for faultless

Holmes, Sherlock

... a single fact in all its

... when a fact appears to be

bearings ..., 97

opposed to a long train of

deductions ..., 98

There is nothing more deceptive

than an obvious fact, 97

... he had one eye upon fact, and

the other on Genesis, 98

Those who refuse to go beyond

fact rarely get as far as fact,

98

James, Henry

Laut, Agnes C.

Huxley, Thomas H.

The fatal futility of Fact, 98

The ultimate umpire of all

things in Life is-Fact, 99

The fact speaks for itself, 100

Nothing is more interesting to

Phrase, Latin

Planck, Max

the true theorist than a fact

SUBJECT BY AUTHOR INDEX 351

which directly contradicts a

the0 ry..., 101

A fact is a fact, 101

But it was a fact ..., 102

A mere fact will never stop an

Poincare, Henri

Roberts, Nora

Shaw, George Bemard

Englishman, 103

Matters of fact ... are very

stubbom things, 103

Tindall, Matthew

Whatley, Richard

No matter of fact can

be mathematically

demonstrated ..., 104

Whitehead, Alfred North

But a fact 'contrary' is

It was an ultimate fact, 104

There is nothing in the real

consciousness in ge rm..., 104

world which is merely an

inert fact ..., 105

They remain 'stubbom fact' ...,

104

factor analysis

Eco, Umberto

You know what this is called

today? Factor analysis, 210

Thurston, L.L.

Factor analysis is useful

especially in those domains

where basic and fruitful

concepts are essentially

lacking ..., 219

It is not wise for a statistician

who knows factor analysis

to attempt problems in a

science which he has not

himself mastered, 219

facts

Abbott, Edwin A.

From dreams I proceed to facts,

89

Adams, Henry

The facts seemed certa in...,8 9

... with a true view all the data

harmonize, but with a false

one the facts soon clash, 89

Aristotle

Arnold, Matthew

Deny the facts altogether, I

think, he hardly can, 89

"Am I supposed to give all the

"Well facts are facts," said T i y

Balchin, Nigel

facts...", 90

sulkily, 89

Barrie, Sir J.M.

Facts were never very pleasing

to him, 90

Barry, Frederick

Facts are to begin with, coercive,

90

Belinski, Vissarion Grigorievich

... facts without ideas are just the

sweepings of the brain and

memory, 90

Bemard, Claude

Facts are neither great or small

in themselves, 90

If the facts used as the

basis for reasoning are

ill-established or erroneous,

everything will crumble or

be falsified ..., 90

Browning, Robert

But facts are facts and flinch not,

91

Buchner, Ludwig

...in the long run there is no

contending against facts ...,

91

Bums, Robert

91

But enough of facts!, 91

Facts are chiels that winna ding ...,

Carlyle, Thomas

more ..., 92

I grow to honor facts more and

352 STATlSTlCALLY SPEAKING

Carroll, Lewis

92

Facts ..., 92

Clearly more Facts were needed,

First accumulate a mass of

Clarke, Arthur C.

Some facts are so incredible that

they are believed at once.. .,

92

Cohen, Jerome

Every lawyer knows that

the name of the game is

what label you succeed in

imposing on the facts, 92

Conrad, Joseph

The language of facts ..., 92

They demand facts from him,

as if facts could explain

anything, 92

Crawford, F. Marion

Facts make life long-not years,

92

Crothers, Samuel McChord

The trouble with facts is that

there are so many of them,

93

Dickens, Charles

Facts and Figures! Put 'em

In this life we want nothing but

Now, what I want are facts ..., 93

The labors of others have raised

for us an immense reservoir

of important facts, 93

down, 93

Facts ..., 93

Eddington, Sir Arthur Stanley

With fuller knowledge we

should sweep away the

references to probability and

substitute the exact facts, 93

Einstein, Albert

I am absolutely convinced that

one will eventually arrive

at a theory in which the

objects connected by laws

are not probabilities, but

conceived facts, 93

Eldridge, Paul

Combining superstition with

fact is often as efficacious as

breaking rocks with fists, 94

Facts only emphasize that men

are guided by fancies, 94

We hew and saw and plane

facts to make them dovetail

with our prejudices ..., 93

You seem to have a decided

Eliot, George

faculty for digesting facts as

evidence, 94

Eliott, Ebenezer

Emerson, Ralph Waldo

Facts are stubbom things, 94

I distrust the facts and the

No facts are to me sacred ..., 94

Facts are not science ..., 94

Facts are no longer looked in

Facts can be accurately known

inferences, 94

Fabing, Harold

Froude, James Anthony

the face ..., 95

to us only by the most rigid

observation ..., 95

It is through a conviction of

the inadequacy of all

formulas to cover the facts

of na ture..., 95

The necessitarian fall back upon

the experienced reality of

facts, 95

casuistry can explain away,

95

We may make our own

opinions, but facts were

made for us ..., 95

These are facts which no

Garson, Barbara

Let's get the facts. Let's go and

watch TV, 95

SUBIECT BY AUTHOR INDEX 353

Gilman, Charlotte P.

Heaviside, Oliver

The acts and facts of to-day..., 96

Facts are not much use,

considered as facts, 278

Heinlein, Robert A.

Get the facts!, 96

Heyworth, Sir Geoffrey

The more facts one has, the

better judgment one can

make ..., 96

Holmes, O.W.

Absolute, preemptory facts are

bullies ..., 97

All generous minds have

a horror of what are

commonly called ”facts”, 96

honor in conversation ..., 97

Facts always yield the place of

Holmes, Sherlock

...y ou do find it very hard to

A further knowledge of facts is

If you will find the facts,

tackle the facts, 97

necessa ry..., 98

perhaps others may find the

explanation, 97

Facts are ventriloquists’

Facts do not cease to exist

Huxley, Aldous

dummies, 98

because they are ignored, 98

I have to forge every sentence in

James, William

the teeth of irreducible and

stubbom facts, 98

Kipling, Rudyard

Just statin’ eevidential facts

beyon’ all argument, 99

Kratovil, Robert

An impartial and reliable

research substitutes facts for

hunches, 99

LaSage, Alan Rene

Facts are stubbom thines. 99

Maier, N.R.F.

If the facts do not conform to

the theory, they must be

disposed of, 99

psychologists as scientists

dispose of facts is of special

interest, 99

Meredith, Owen

Nightingale, Florence

The method of how

To all facts there are laws ..., 99

What you want are facts, not

opinions, 99

OMalley, Austin

Facts are carpet-tacks under the

pneumatic tires of theory,

100

Oppenheimer, Julius Robert

... when technical people talk

they always emphasize the

facts that they are not sure,

100

Ovid

Ozick, Cynthia

Pavlov, Ivan

Believe the facts, 100

I’m not afraid of facts, 100

Learn, Compare, collect facts,

100

Peers, John

Pirandello, Luigi

friend, 101

Facts are not all equal, 100

The facts are to blame my

Plautus

Poincare, Henri

Facts speak for themselves, 101

... the most interesting facts are

those which may serve

many times ..., 101

Science is built up with facts ...,

101

The facts of greatest outcome are

those we think simple ..., 101

U , Queneau, Raymond

354 STATISTICALLY SPEAKING

I beg to advise you of the

following facts of which I

happen to be the equally

impartial and horrified

witness, 102

Romanoff, Alexis L.

Ross, JoAnn

Russell, Bertrand A.

With solid facts on hand ..., 102

Fact were facts ..., 102

Science ... is a knowledge of a

certain kind...which seeks

general laws connecting a

number of particular facts,

102

Shapere, Dudly

Shaw, George Bemard

Smollett, Tobias

103

Stoppard, Tom

... account for the facts ..., 102

In Russia we face facts, 103

Facts are facts, as the saying is,

Comment is free but facts are on

expense, 103

Streatfield, Mr. Justice Geoffrey

Facts speak louder than

statistics, 103

Terence

Twain, Mark

Unknown

Let us look at the facts, 103

Get your facts first ..., 104

My mind is made up, do not

confuse me with facts,

104

West, Jessamyn

We want the facts to fit the

preconceptions, 104

Whitehead, Alfred North

A chain of facts is like a barrier

reef, 105

Wilde, Oscar

Facts fled before philosophy like

frightened things, 105 forecast, 108

faith

Bierce, Ambrose

fakt

Billings, Josh

figure

Moroney, M. J.

Belief without evidence ..., 59

It is a statistikal fakt ..., 91

The words figure and fictitious

both derive from the same

Latin root ..., 62

forecast

Fiedler, Edgar R.

...m ake your forecast by asking a

carefully selected probability

sample of 300 others who

don’t know the answer

either, 107

He who lives by the crystal ball

soon learns to eat ground

glass, 107

often, 107

know you’re going to be

wrong ..., 107

If you have to forecast, forecast

The moment you forecast you

Henry, Patrick

I know of no way of judging the

future but by the past, 107

Hippocrates

It appears a most excellent

thing for the physician to

cultivate ..., 107

Mellor, J.W.

Nearly every inference we

make with respect to any

future event is more or less

doubtful, 108

Proverb, Greek

He who guesses right is the

prophet, 108

Strong, Lydia

A forecast is a forecast is a

SUBJECT BY AUTHOR INDEX 355

Business will improve, he

says ... unless it takes a tum

for the worse, 109

The correct prediction will strike

suddenly ..., 109

Will he ever be able to correlate

all these facts into one

forecast that makes sense?,

109

Voltaire

It is said that the present is

pregnant with the future,

110

Walker, Marshall

Men have always valued the

ability to predict future

events ..., 110

forecaster

Strong, Lydia

Two plus two is four? Not to

this forecaster, 109

forecasters

Fiedler, Edgar R.

The herd instinct among

forecasters makes sheep

look like independent

thinkers, 107

forecasting

De Jouvenel, Bertrand

Forecasting in economics is an

activity fully licensed in the

City of Action ..., 106

Forecasting is very difficult,

Fiedler, Edgar R.

especially about the future,

106

Thomsett, Michael C.

Our president respected the guy

you’re replacing and had

great faith in his forecasting

abilities, 109

forecasts

Penjer, Michael

We are making forecasts with

bad numbers ..., 108

Strong, Lydia

He’s fed in enough data for a

dozen forecasts ..., 108

His forecasts could have been

presented at the deadline

data ..., 108

foreknowledge

&on, Raymond

Foreknowledge of the future

makes it possible to

manipulate both enemies

and supporters, 106

foresee

Poincark, Henri

It is far better to foresee even

without certainty than not

to foresee at all, 108

foresight

Compte, Auguste

The aim of every science is

foresight, 156

-Ggamblers

Puzo, Mario

As gamblers believed mystically

in their luck so Gronevelt

believed in percentages, 112

gambling

Booth, Charles

Gambling is increasing beyond

what you could imagine,

111

Kasner, Edward

In moderation, gambling

possesses undeniable

virtues, 111

Lichtenberg, Georg

People don’t like to choose #1

in a lottery, 111

There are three roads to

ruin... the quickest is with

aamblina .... 111

Pompidou, Georges

356 STATISTICALLY SPEAKlNG

God

Einstein, Albert

In our scientific expectation we

have grown antipodes. You

believe in God playing and

I in perfect laws ..., 39

graph

Advertisement

Bemard, Frederick, R.

Every picture tells a story, 113

One picture is worth ten

thousand words, 113

Moroney, M.J.

It pays to keep wide awake in

studying any graph, 114

Proverb, Chinese

A picture is worth more than

ten thousand words, 114

You must never tell a thing. You

Rogers, Will

must illustrate it, 114

Dost thou love pictures?, 114

A sketch tells me as much in a

glance as a dozen pages of

print, 116

Shakespeare, William

Tugenev, Ivan

graph points

Crichton, Michael

You can draw a lot of curves

through three graph points,

113

graphic

Crichton, Michael

I'll give you a graphic display ...,

113

graphical integrity

Tufte, Edward R.

Graphical integrity is more

likely to result if these six

principles are followed ...,

115

graphing

Albinak, Marvin J.

When graphing a function ..., 113

graphs

Pearl, Judea

Despite the prevailing use of

graphs as metaphors for

communicating ..., 114

Play fair, William

As to the propriety and justness

of representing sums of

money, and time, by parts

of space ..., 114

-Hharuspex

Cicero

How could one haruspex look

another in the face without

laughing?, 106

hazard

Dante

When the game of hazard is

broken up, he who loses

remains sorrowful ..., 37

hyperexponential

Unknown

Keep your hyperexponential

away from me!, 74

hypotheses

Copemicus, Nicolaus

Since the newness of the

hypotheses of this work ...,

118

Newton, Sir Isaac

... notwithstanding any contrary

hypotheses that may be

imagined ..., 120

I frame no hypotheses ..., 120

hypothesis

Asquith, Herbert

A pretty hypothesis which

explains many things, 117

Barry, Frederick

Hypothes is... is an inference

based on knowledge ..., 117

Bruner, Jerome Seymour

SUBJECT BY AUTHOR INDEX 357

The shrewd guess, the fertile

hypothes is..., 117

Carroll, Lewis

Would you tell me, please,

which way I ought to go

from here?, 117

Cohen, Morris R.

There is ... no genuine progress

in scientific insight through

the Baconian method of

accumulating empirical facts

without hypothesis ..., 118

But suspicion is a thing very few

people can entertain without

letting the hypothesis

tum...into fact, 118

Cort, David

Evans, Bergen

An honorable man will not be

We see what we want to see,

bullied by a hypothesis, 118

and observation conforms to

hypothesis, 118

Fabing, Harold

Many confuse hypothesis and

theory, 118

Freud, Sigmund

... it is incumbent upon us...to

work out any hypothesis to

its logical conclusion ..., 119

... our hypothesis may gradually

become a solution, 119

Holmes, Sherlock

Huxley, Thomas H.

... it is the first duty of

a hypothesis to be

intelligible.. ., 119

... the slaying of a beautiful

hypothesis by an ugly fact,

119

Lewis, C.S.

Hypothesis, my dear young

friend, established itself by

a cumulative process ...,

119

Loren, Konrad

It is a good exercise for a

research scientist to discard

a pet hypothesis every day

before breakfast, 119

Newton, Sir Isaac

We are to admit no more causes

of natural things than

such as are both true and

sufficient to explain their

appearances, 119

Pascal, Blaise

For sometimes an obvious

absurdity follows from its

negation, and then the

hypothesis is true and

certa in..., 120

It is the nature of an

hypothesis ..., 120

So then I said that our

hypothesis had not

included the entire scope of

probabilities.. ., 121

Steme, Laurence

Thomsett, Michael C.

Unknown

121

Something murdered by facts,

hypothesis, false

Dampier-Whetham, William

A false hypothesis, may ... be as

useful, or more useful than,

a truer one ..., 118

hypothetical

Baez, Joan

...h ypothetical questions get

hypothetical answers, 117

-Iimpossibility

Chestov, Leon

A round square or a wooden

iron is an absurdity

and consequently an

impossib ility..., 123

358 S TATIS TICALLY S P E A K "

De Morgan, Augustus

... a thermometer of probability,

with impossibility at one

end ..., 125

Sheynin, O.B.

A likely impossibility is

always preferable to an

unconvincing possibility,

123

impossible

Adams, Douglas

It is impossible to import things

into an infinite area ..., 122

Borel, Emile

Events with a sufficiently small

probability never occur, or

at least we must act ... as if

they were impossible, 122

Why, sometimes I've believed

as many as six impossible

things before breakfast ...,

122

Carroll, Lewis

Clarke, Arthur C.

The only way to find the limits

of the possible is by going

beyond them into the

impossible, 123

I'll tell you in two

Goldwyn, Samuel

words-im-possible, 123

Huxley, Aldous

Except under controlled

conditions ...any kind

of accurate foresight is

impossible, 123

Juster, Norton

... so many things are possible

just as long as you don't

know they're impossible,

123

Shakespeare, William

Well, I'll have her and if it

be a match, as nothing is

impossible-, 123

Tertullian

The fact is certain because it is

impossible, 123

Thurber, James

All things, as we know, are

impossible in this most

impossible of all impossible

worlds, 124

Man can believe the

impossible ..., 124

Wilde, Oscar

indecision

Bierce, Ambrose

The chief element of success ...,

60

inference

Plonk, Phineas

A mysterious process allowing

us to reach a conclusion that

is desired, 62

infinite

Adams, Douglas

... there's an infinite number of

monkeys outside who want

to talk to us about this script

for Hamlet they've worked

out, 158

Borges, Jorge Luis

The ignorant suppose that

infinite number of drawings

require an infinite amount

of time..., 125

infinity

Box, G.E.P.

In addition to those functions

studied there are an infinity

of others ..., 125

information

Berkeley, Edmund C.

information, 55

Lots of people bring you false

Harrison, Harry

And of what possible use is that

information?, 96

Playfair, William

SUBJECT BY AUTHOR INDEX 359

Information that is imperfectly

acquired, is generally as

imperfectly retained ..., 270

innumerancy

Paulos, John Allen

...an inability to deal comfortably

with the fundamental

notions of numbers ..., 62

interviewer

Deutscher, I.

... neither the interviewer nor the

instrument should act in any

way upon the situation, 266

-Jjackknife

Tukey, John W.

219

TEACH them the JACKKNIFE,

-Kknowledge

Fischer, Robert B. ... the scientist must recognize

the statistical aspect of much

of his knowledge ..., 126

We have ... to content ourselves

with partial knowledge ...,

126

Jevons, W.S.

Skinner, B.F.

We give them an excellent

survey of the methods and

techniques of thinking..., 126

Sophocles

Nay, Knowledge must come

through action ..., 141

knowledge, common

Barry, Frederick

Common knowledge is ... nothing

else than the raw material

whi &...has served as the

basic substance of its vastly

elaborated synthesis, 59

-Llabeling

Eliot, George

The mere fact of naming

an object tends to give

definiteness to our

conception of it ..., 3

Latin Square

Kendall, Maurice G.

The first mathematical

discussion of the Latin

Square known to modern

statisticians was given by

Euler in 1882, 214

law

Bloch, Arthur

Negative expectations yield

negative results, 127

Law means a rule ..., 130

... the law of measure and

numbers rules in the

changeful hosts of the stars

as it does in man’s thinking

brain, 130-31

Rhodes, Charles E.

Huxley, Thomas H.

Krass, F.

When any principle, law,

tenet ..., 132

Whitehead, Alfred North

If the law states a precise result,

almost certainly it is not

precisely accurate ..., 133

law of averages

Boulle, Pierre

It’s not a question of training,

but the law of averages, 127

Coates, Robert M.

... the Law of Averages had

never been incorporated

into the body of federal

jurisprudence ..., 128

Mauldin, Bill

I feel like a fugitive from th’ law

of averages, 131

360 STATISTICALLY SPEAKlNG

law of causation

Mill, John Stuart

The Law of Causation ... is but

the familiar truth..., 131

law of deviations

Galton, Francis

They are determined by the

assured law of deviations

from the average, 129

law of errors

Edgeworth, Francis Ysidro

The Gree ks...if they had known

of the law of errors, would

have personified and deified

it ..., 129

law of frequency of error

Galton, Francis

I know of scarcely anything

so apt to impress the

imagination as the

wonderful form of cosmic

order expressed by the

"Law of Frequency of

Error", 129-30

law of large numbers

Bemard, Claude

But physicians have nothing to

do with what is called the

law of large numbers ..., 127

law of probable disposal

Osbom, Don

Whatever hits the fan will not

be evenly distributed, 131

laws

De Jouvenel, Bertrand

I believe neither in chance nor

in miracle, but only in

phenomena regulated by

laws, 128

Kadanoff, Leo P.

... all the richness of structure

observed in the natural

world is not a consequence

of the complexity of physical

law ..., 130 Gibbon, Edward

Kaplan, Abraham

... laws serve to explain events

and theories to explain

laws ..., 130

Price, Richard

... we have reason for believing

that there are in the

constitution of things fixed

laws according to which

events happen ..., 131

Tolstoy, Leo

... history will take the discovery

of laws as its problem, 132

We must discover the laws on

which our profession rests,

and not invent them, 133

Laws are statements of observed

Unknown

Whitehead, Alfred North

facts, 133

laws of chance

Bohm, D.

... the laws of chance are just as

necessary as the causal laws

themselves, 127

Bom, Max

[in quantum mechanics] we

have the paradoxical

situation that observable

events obey laws of

chance ..., 127

laws of mathematics

Einstein, Albert

As far as the laws of

mathematics refer to reality,

they are not certa in..., 129

laws of probability

Freeman, R. Austin

It was totally opposed to the

laws of probability, 129

Froude, James Anthony

... ignorance of the laws of

probab ility..., 129

The laws of probability, so true

in general, so fallacious in

particular, 130

Meyer, Agnes

The law of probability gives

to natural and human

science ... the unity of life we

seek, 131

laws, scientific

Deming, William Edwards

It would be splendid if all

action ... could be based on

scientific laws ..., 128

Scientific laws ... are different

Russell, Bertrand A.

in form from the

common-sense rules which

have exceptions ..., 132

least squares, method of

Stigler, Stephen M.

... elementary statistics texts tell

us that the method of least

squares was first discovered

about 1805,258

likelihood

Crichton, Michael

The likelihood of its occurring

by chance is astronomically

small, 134

De Vries, Peter

Mopworth always took a

seat at a window already

cracked ... banking on the

Law of Probability to reduce

the likelihood of another

rock coming in..., 134

Dickens, Charles

There was always some ground

of probability and likelihood

mingled with his absurd

behavior, 134

Eliot, George

... and some disgust might have

been felt for a real author

who made comDarativelv

so shabby an appearance of

likelihood, 134

Jefferys, Harold

I have no objection to the study

of likelihood as such, 135

A professor's enthusiasm for

teaching introductory

courses varies inversely

with the likelihood of his

having to do it, 135

Martin, Thomas L., Jr.

Queneau, Raymond

There was not much likelihood

now that a third encounter

would take place ...,

135

Thomsett, Michael C.

Based on the specific

assumptions applied to our

test, there is a reasonable

likelihood that response will

fall within our range of

expectations, 135

The likelihood of a thing

happening is inversely

proportional to its

desirability, 135

Wright, Jim

list

Gilbert

logistic equation

May, Robert M.

I've got a little list ..., 202

I would therefore urge that

people be introduced to

[the logistic equation]

early in their mathematical

education, 73

lucky

Comfort, Alex

One has to be extraordinarily

lucky ... to meet one

nymphomaniac in a lifetime,

37

SUBJECT BY AUTHOR INDEX 361

A ,

362 STATISTICALLY SPEAKING

-Mmap

139

Kelly-Bootle, Stan Unknown

know something about it ...,

The imponderable If you don’t measure it, it won’t

correspondence between happen, 139

two sets ..., 62 measured

mean The Bible

Aristotle

Horace 137

Pascal, Blaise

Who hath measured the waters

...t he mean is proper pride ..., 6 in the hollow of his hand ...,

here is a meun in things ..., 10

... a mean between nothing and

Wordsworth, William

side ..., 139

I’ve measured it from side to

everything, 13 measurement

Shakespeare, William Deming, William Edwards

It is important to realize that it

is not the one measurement,

alone, but its relation to the

rest of the sequence that is

of interest, 136

It is no mean happiness

therefore, to be seated in the

me an..., 14

measure

Chaucer, Geoffrey

mesure, 136

Kaplan, Abraham

In eveV\*ing, 1 WOO^! the‘ l ~ t h Dewey, John Insistence upon numerical

measurement.. ., 137

Measurement has meaning

only if we can transmit the

information ..., 137

... Fox, Russell I would say that whether we

can measure something

depends ... on how we have

conceptualized it ..., 137

We are ourselves the measure of

Kaplan, Abraham

Lichtenberg, Georg ... he looked me straight in the

eye and asked, “How many

times?”, 137

Measurement ... always has an

element of error in it, 137

the miraculous ..., 138

Peter, Lawrence J.

If you can’t measure it, I’m not

interested, 138 Krutch, Joseph Wood

Read, Herbert We are committed to the

scientific method and

as we so often conceive it measurement.. ., 138

nowadays, as an ideal of

humanity, but as measure.. ., Crude measurement usually

138 yields misleading, even

Beauty had not been born, not,

Reynolds, H.T.

Shakespeare, William

Measure for Measure, 138

Thompson, William [Lord Kelvin] ... when you can measure what

erroneous conclusions ..., 138

Russell, Bertrand A.

Measurement demands some

one-one relations ..., 138

you are speaking about ...y ou Spearman, Charles

SUBJECT BY AUTHOR INDEX 363

This further and crucial method

is that of measurement, 139

measurements

unknown

What the measurement will not

do, is to get you out of the

crisis you are already in, 139

measures

Asimov, Isaac ... we must remember that

measures were made for

man and not man for

measures, 136

Sophocles

Nay, if these measures give any

ground of confidence, we

think that thy design is not

amiss, 139

medium

Froude, James Anthony

method of least squares

De Leeuw, A.L.

There is no medium at sea, 9

The method used by the scientist

to find probable exact truth

is what he calls “the method

of least squares”, 208

middle American

Jacobs, Joseph

Such is the past career, present

condition, and certain future

of the Middle American, 11

middle road

unknown

Always choose the middle

road ... See average

mistake

Darrow, Clarence

If someone made a mistake he

would drawl, ”Hell that’s

why they make erasers”, 77

Huxley, Thomas H.

There is no greater mistake

than the hasty conclusion

that opinions are worthless

because they are badly

argued, 79

Manners, William

...” When I make a mistake, it’s a

beaut”, 80

model

Eigen, Manfred

A model has a third possibility:

it may be right, but

irrelevant, 140

Kaplan, Abraham

The words ”model” and ”mode”

have ... the same root ..., 140

models

Greedman, D.A.

Models are often used to decide

issues in situations marked

by uncertainty, 140

Karlin, Samuel

The purpose of models is not to

fit the data but to sharpen

the questions, 140

The sciences do not try to

Unknown

expl &...they mainly make

models, 141

Monte Carlo Fallacy

Pynchon, Thomas

That’s the Monte Carlo Fallacy,

254

Monte Carlo method

Kelly-Bootle, Stan

A method of jazzing up the

action in certain statistical

and number-analytic

environments ..., 213

Monte Carlo Theorem

Perec, Georges

... the celebrated Monte

Carlo Theorem was

generalisable ..., 280-1

MTBF

Kelly-Bootle, Stan

364 STATISTICALLY SPEAK"

Dickens, Charles are too ready to dogmatize

... leads to a stultifying sense of

boredom and complacency

on the part of the user, 188

MTTR

Kelly-Bootle, Stan

poor or inferior in grade or

quality + to take off ..., 188

-Nnonparametric

Walsh, John E.

A precise and universally

acceptable definition of the

term 'nonparametric' is not

presently available, 63

normal approximation

Lippmann, G.

Everybody believes in the

[normal approximation] ...,

73

normal law

Kac, Mark

... there must be something

mysterious about the normal

law ..., 72

normal law of error

Youden, W.J.

normality

Geary, R.C.

The normal law of error ..., 75

Normality is a my th..., 72

-0-

observation

Aurelius, Marcus

Consider that everything which

happens, happens justly,

and if thou observest

carefully, thou wilt find it to

be so, 142

Bemard, Claude

Observation, then, is what

shows facts ..., 142

The bearing of this observation

lays in the application on it,

143

Greer, Scott

... the link between observation

and formulation is one of

the most difficult and crucial

in the scientific enterprise,

144

Macy, Arthur

I drink a little more when the

wind's off shore ..., 145

The important thing to know is

when one is on the more

solid ground of observation

and when one is on the ice,

145

ONeil, W.M.

Proverb, German

No answer is also an answer,

146

Schumacher, E.F.

Well I don't know how many I

saw but one looks mimsey,

146-7

Seuss, Dr.

Swift, Jonathan

147

You will see something new, 147

That was excellently observ'd ...,

Whitehead, Alfred North

'lis here, 'tis there. 'TIS gone,

147

observation, Ettore's

Ettore, Barbara

144

observations

Anscombe, F.J.

The Other Line moves faster,

No observations are absolutely

trustworthy, 142

Aristotle

... those ... unobservant of the facts

SUBJECT BY AUTHOR INDEX 365

on the basis of a few

observations, 142

Fabing, Harold

You must acquire the

ability to describe your

observations ..., 144

Longair, M.S. ... the implications of the

observations are far from

clear, 145

Pope, Alexander

To observations which ourselves

we make ..., 146

Popper, Karl R.

Thus there is no reason why

I should not admit that

some may get their ideas by

observing or by repeating

observations, 146

... he hath strange places

Shakespeare, William

cram”d with

observations ..., 147

observe

Berra, Yogi

You can observe a lot by just

watching, 143

Blake, William

A fool sees not the same tree

that a wise man sees, 143

Box, G.E.P.

To find out what happens to a

system when you interfere

with it you have to interfere

with it ..., 143

Carlyle, Thomas

... we are creatures that look

before and after ..., 143

A man should look for what is,

and not for what he thinks

should be ..., 144

Einstein, Albert

Holmes, Sherlock

Never trust impressio ns..., 145

You see, but you do not observe,

144

Howitt, Mary

... I have many curious things to

show when you are there...,

145

Jonson, Ben

I do love to note and to observe,

145

Poincare, Henri

Proverb, Spanish

little ..., 146

... to observe is not enough, 146

Of what you see, believe very

The Bible

Seeing many things, but thou

observest not ..., 145

observer

Darwin, Charles

Heisenberg, W.

... he is a good observer ..., 143

... the interaction between

observer and object causes

uncontrollable and large

changes in the system being

observed ..., 144

observers

Shakespeare, William

The observed of all observers ...,

147

odds

Froude, James Anthony

The odds are forty-nine to

one against my taking a

particular way ..., 40

Harrison, Harry

The odds are still about five to

one against hitting the right

combination ..., 40

operational research

Davies, J.T.

Operational research is the

application of methods of

the research scientist to

366 STATISTICALLY SPEAKlNG

various rather complex

practical operations, 208

order

De Moivre, Abraham

Those Irregularities will bear

no proportion to the

recurrency of that Order

which naturally results from

ORIGINAL DESIGN, 148

The order is rapidly fading ...,

Dylan, Bob

148

Eddington, Sir Arthur Stanley

The order will never come

back ..., 148

Pope, Alexander

Osbom’s Law

Osbom, Don

Order is heaven‘s first law, 149

Variables won’t, constants

aren’t, 129

outlier

Anscombe, F. J.

An observation with an

abnormally large residual

will be referred to as an

outlier, 59

Green, Celia

The fact that something is far

fetched is no reason why it

should not be true..., 150

I don’t see the logic of rejecting

data just because they seem

incredible, 150

Hoyle, Fred

Peirce, Benjamin

In almost every true series of

observations, some are

found, which differ so

much from the others as

to indicate some abnormal

source of error ..., 150

The folly of rejecting an

Unknown

extreme observation was

demonstrated.. .on the

moming of December 7,

1941 ..., 150

-Ppercent

Bames, Michael R.

There’s a 50 percent chance of

anything ..., 151

Bloch, Arthur

Ninety per cent of everything is

crap, 151

Crichton, Michael

They were about plus or minus

two minutes for ninety-nine

percent, 151

ninety-five percent

confidence intervals how the

people feel, 151

We are telling you with

Davies, Robertson

... 76 percent of adults have bad

breath, 151

De Solla Price, Derek John ... we can say that between 80

and 90 percent of all the

scientists that have ever

lived are alive now, 152

Haldeman, H.R.

He would say there was a 60

percent chance of a Soviet

strike on China ..., 152

Huff, Darrell

But I mix them 50-50. One

horse, one rabbit, 152

Jeans, James Hopwood

We can only say that there is a

20 percent probability of its

being bom in London ..., 152

Parry, Thomas

When the weather predicts 30

percent chance of ra in..., 152

... there was a 50 percent chance

Paulos, John Allen

of rain for Saturday ..., 152

SUBJECT BY AUTHOR INDEX 367

Sturgeon, Theodore

That would be a little like saying

‘102 percent normal’ ..., 153

... I increased the population by

Twain, Mark

1 percent, 153

Poisson

unknown

Poisson distribution

Unknown

Socrates took Poisson, 75

... I handle ’em with Poisson

distributions, 74

Poisson equation

Pynchon, Thomas

polynomials

Cochran and Cox

She’s almost got it, 74

...p olynomials are notoriously

untrustworthy when

extrapolated, 136

posit

Reichenbach, Hans

A posit is a statement which we

treat as true..., 62

posterior probability

Durand, David

A result arrived at by the

application of an elegant

mathematical formula ..., 60

prayer

Fiedler, Edgar R.

errors, 154

Thank God for compensating

Plato

... to bring us to the heaven of

probability, 154

Lord, please find me a

unknown

one-armed statistici an..., 154

praying

Tukey, John W.

The physical sciences are used

to ”praying over” their

data ..., 154-5

predict

Hacking, Ian

Cutting up fowl to predict is... a

kind of randomization, 156

Kaplan, Abraham

...if we can predict

successfully ... we have good

reason ... for accepting the

explanation, 156

Samuelson, Paul A.

Wall Street indexes predicted

nine out of the last five

recessions, 156

Unknown

To predict is one thing. To

predict correctly is another,

157

prediction

Poincar6, Henri

No matter how solidly founded

a prediction may appear to

us, we are never absolutely

sure that experiment will

not contradict it ..., 176

probabilists

Lindley, Dennis

probabilities

Austen, Jane

Are we probabilists ..., 173

Are no probabilities to be

accepted, merely because

they are not certain?, 159

...all is to them a dull round

of probabilities and

possibilities, 160

Blake, William

Borel, Emile

Probabilities must be regarded

as analogous to the

measurement of physical

magnitudes ..., 160

It is easier to make true

Bostwick, Arthur E.

misleading statements in the

368 STATlSTlCA L LY SPEAKING

subject of probabilities than

anywhere else, 161

Bulwer, Lytton E.G.

Fate laughs at probabilities, 161

Cardozo, Benjamin N.

... the logic of probabilities ..., 161

Chesterson, Gilbert Keith

Speaking within modern

probabilities ..., 162

Crichton, Michael

We must guess at every single

one of these probabilities,

163

Darwin, Charles

... every man must judge for

himself between conflicting

vague probabilities, 163

De Jouvenel, Bertrand

We defined the art of

conjecture ... as the art of

evaluating as exactly as

possible the probabilities of

things ..., 164

Deming, William Edwards

The statistician’s report to

management should not talk

about Probabilities, 164

I hope that you flourish in

Edgeworth, Francis Ysidro

Probabilities, 179

Eliot, George ... ignorance gives one a large

range of probabilities, 166

Fear is almost always haunted

by terrible dramatic scenes,

which recur in spite of the

best-argued probabilities

against them ..., 166

The most we can know is in

terms of probability, 167

Feynman, Richard P.

Forbes, J.D.

Probabilities have no absolute

signhcance with reference

to an event which has

occurred ..., 167

Freeman, R. Austin

It is a question of probabilities ...,

167

Freeman, Thomas L.

The balance of probabilities is in

favor of that view, 167

Froude, James Anthony

Philosophy goes no further than

probabilities ..., 167

Gracian, Balthasar

... mature meditation on

the possibilities and

probabilities of future

events ..., 168

Wisdom does not trust to

probabilities ..., 168

Holmes, O.W.

No priest or soothsayer that ever

lived could hold his own

against Old Probabilities,

169

Hooker, Richard

Huxley, Aldous

As for probabilities ..., 169

Magic and devils offend our

sense of probabilities, 170

James, P.D.

None of these nasty

mathematical probabilities

we’re so fond of, 171

Jefferson, Thomas

Perhaps an editor might begin a

reformation in some way as

this..., 171

Leibniz, Gottfried Wilhelm

... the art of weighing

probabilities is not yet even

partly explained ..., 173

Lewis, Clarence Irving

... empirical knowledge is

exclusively a knowledge of

probabilities ..., 173

Ludlum, Robert

SUBIECT BY AUTHOR INDEX 369

It was a desperate strategy,

based on probabilities ..., 174

Masters, Dexter

... the only procedure consistent

with man’s development

was to follow where the

probabilities led, 174

Pearl, Judea

Probabilities are summaries of

knowledge ..., 175

Peirce, Charles Sanders

... it may be doubtful if there

is a single extensive

treatise on probabilities in

existence which does not

contain solutions absolutely

indefensible, 175

... these arguments from

Plato

probabilities are impostors ...,

1 76

Proverb, Italian

A thousand probabilities does

not make one fact, 178

Reade, Charles

Sartre, Jean-Paul

I feign probabilities, 178

When we want something, we

always have to reckon with

probabilities, 178

It is better to be satisfied

Schiller, Friedrich

with probabilities than to

demand impossibilities and

starve, 179

Voltaire

Almost all human life depends

He who has heard the

on probabilities, 180

thing told by twelve

thousand eye-witnesses,

has only twelve thousand

probabilities ..., 180

Von Clausewitz, Karl

... there is an interplay of

possibilities, probabilities,

good luck and bad that

weaves its way throughout

the length and breadth of

the tapestry, 180

probabilities, calculus of

Arago

The calculus of

probabilities ... ought to

interest.. . the mathematician,

the experimentalist, and the

statesman, 159

Poincar6, Henri

The very name of calculus of

probabilities is a paradox,

1 76

probabilities, theory of

Woodward, Robert S.

The theory of probabilities and

the theory of errors now

constitute a formidable body

of knowledge ..., 182

probabilitiz

Billings, Josh

The probabilitiz that the abuv

probabilitz will assimilate

themselfs tew the principal

probabilitiz in the case, 160

probability

Adams, Douglas

158

Arbuthnot, John

Probability factor one to one ...,

I believe the Calculation of the

Quantity of Probability

might be improved to a

very useful and pleasant

Speculation ..., 158

Aristotle

A Probability is a thing that

usually happens ..., 159

Amould, Antoine

To judge what one must do

to obtain a good or avoid

370 STATISTICALLY SPEAKING

an evil, it is necessary to

consider not only the good

and the evil in itself, but

also the probability that

it happens or does not

happen ..., 159

Atkins, Russell

Yard, 159

Bagehot, Walter

159

Bartz, Wayne R.

Probability and Birds in the

Life is a school of probability,

The more ridiculous a belief

system, the higher the

probability of its success,

160

Bayley, Barrington

Boole, George

Luck was not probab ility..., 160

Probability is expectation

founded upon partial

knowledge, 160

... I can judge with great

probability how he will act

in any case ..., 161

Boswell, James

Bradley, F.H.

Probability tells us what we

ought to believe ..., 161

... with scruples of probability,

Bumey, Fanny

161

Butler, Joseph

...p robability is the very guide

to life, 161

Coats, R.H.

Cohen, John

... smear of probability, 162

... every probability evaluation is

a probability evaluation ...,

162

Considine, Bob

... the probability of an error

being made will be in

direct proportion to the

embarrassment it will cause,

162

Crichton, Michael

It’s a probability equation, 162-3

Dampier-Whetham, William C.D.

... the intellectual basis of all

empirical knowledge may

be said to be a matter of

probability, 163

De Finetti, B.

... PROBABILITY DOES NOT

De Montaigne, Michel Eyquem

EXIST, 163-4

... to incline and be swayed by

probab ility..., 164

Deifield, Ronald H.

The probability of a young

man meeting a desirable

receptive young female ...,

164

Deming, William Edwards

genius, 164-5

Mathematical probability, not

Durand, David

An erudite measure of

ignorance, 60

Eddington, Sir Arthur Stanley

In most modem theories of

physics probability seems to

have replaced aether as “the

nominative of the verb ’to

undulate’ ”, 165

strength of belief as a

measure of probability is

that an expectation of belief

has partly a subjective bias,

165

probability attached to any

event ..., 165

One difficulty in employing

There can be no unique

Edgeworth, Francis Ysidro

Probability may be described ... as

SUBJECT BY AUTHOR INDEX 371

importing partial incomplete

belief, 166

Eliot, George

But I see no probability of

my being able to be with

you before your other

Midsummer visitors arrive,

166

Still there is a possibility-even

a probability-the other

way, 166

Ellis, David

If the probability of success is

almost one, then it is damn

near zero, 166

Feller, William

All possible “definitions” of

probability fall short of the

actual practice, 167

Probability is a mathematical

discipline with aims akin

to those ... of geometry or

analytical mechanics, 166

Fry, Thomton C.

But if probability measures the

importance of our state of

ignorance it must change its

value whenever we add

new knowledge, 167

Gay, John

Let men suspect your tale

untrue, Keep probability in

view, 168

Gilbert, William ... they must be made to quit

the sort of learning that

comes only from books,

and that rests only on vain

arguments from probability

and upon conjecture, 168

Gissing, George ... the probability is that half a

dozen people will at last

begin to shout that you

have been monstrously

neglected.. ., 168

Gumperson, R.F.

... the contradictory of a welcome

probab ility..., 169

The outcome of a given desired

probability will be inverse

to the degree of desirability,

169

Hamming, Richard W.

Probability is too important to

be left to the experts, 169

Harris, Errole E.

Probability is truth in some

degree, 169

Herbert, Nick

Howe, E.W.

probability = (possibility)\*, 169

A reasonable probability is the

only certainty, 169

Hume, David

All knowledge resolves itself

into probability, 170

Huygens, Christiaan

... a degree of probability which

very often is scarcely less

than complete proof, 170

To the author the main chain of

probability theory lies in the

enormous variability of its

applications, 171

Keynes, John Maynard

It is difficult to find an

Kac, Mark

intelligible account of the

meaning of ‘probability’ ...,

172

measurement is concemed,

closely analogous to

similarity, 171

Probability is, so far as

Kyburg, H.E., Jr.

... there is no problem about

probab ility..., 172

Laplace, Pierre-Simon

372 STATlSTlCALLY S P E A K ”

... a science that began by

considering games of chance

should itself be raised

to the rank of the most

important subject of human

knowledge, 172

Probability has reference partly

to our ignorance ..., 172

The most important questions of

life are...only problems of

probability, 172

Lewis, C.S.

We may not be able to get

certainty, but we can get

probab ility..., 173

Lewis, Clarence Irving

A ”poor evaluation’’ of the

probability of anything may

reflect ignorance of relevant

data which ”ought” to be

known ..., 173

There is no such thing as the

probability of four aces in

one hand ..., 173

Lincoln, Abraham

The probability that we may fall

in the struggle ought not to

deter us ..., 173

Locke, John

Probability is likeness to be

Probability is the appearance

true..., 174

of agreement upon fallible

proofs, 174

The mind ought to examine all

grounds of probab ility..., 174

It wasn’t a probability anymore,

Ludlum, Robert

it was a reality, 174

MacDonald, John D.

Can you work any equations of

probability of one hitting

here?, 174

Minnick, Wayne C.

Even scientific truth is a matter

of probabi lity..., 175

The probability is, I suppose

that the Monarchy has

become a kind of ersatz

religion, 175

Muggeridge, Malcolm

Pascal, Blaise

Take away probability, and you

can no longer please the

world ..., 175

Pearson, E.S.

Hitherto the user has been

accustomed to fccept the

function of propability

theory laid down by the

mathematicians.. ., 175

Peirce, Charles Sanders

The idea of probability

essentially belongs to a

kind of inference which is

repeated indefinitely,

1 76

This branch of mathematics is

the only one ...in which good

writers frequently get results

entirely erroneous, 175

Pohl, Frederik

... I project a nine-nines

probabi lity..., 176

... by the mathemagic of

probab ility..., 177

I can’t pretend to understand

probability math, 177

Probability math predicts the

future ..., 177

We now understand

probab ility..., 177

You haven’t heard of probability

math?, 177

Pratchett, T.

Prior, Matthew

In this case probability must

atone for want of Truth,

178

Ramsey, Frank Plumpton

... the probability relation

between the proposition in

question and the things I

know for certain, 178

We must for the most part be

Rohault, Jacques

content with probability, 46

... we can take it that we are not

held within un-, sub- or

supematural forces after all,

in all probability, that is, 179

Stoppard, Tom

Thurber, James

A pinch of probability is worth

a pound of perhaps, 180

... moral certainty be sometimes

Tollotson, John

taken for a high degree of

probab ility..., 180

Unknown

...if a man uses one of the end

urinals his probability of

being pissed on is reduced

by 50 percent, 180

... skepticism increases, and

Voltaire

probability diminishes ..., 180

Von Mises, Richard

...if one talks of the probability

that the two poems ... have

the same author ..., 181

Walker, Marshall

... a considerable probability

of being occupied by

octopus ..., 181

Waller, Robert James

... the high probability of the

improbable, 181

Whitehead, Alfred North

There is no probability as to the

future within the doctrine of

Positivism, 181

Whyte, Lancelot Law

If the universe is a mingling of

probability clouds ..., 182

Only a certain probability

remains of a one-to-one

association of any spatial

feature now with a similar

feature a moment later, 181

Wilde, Oscar

No ignoble consideration of

probabi lity..., 182

Wilde, Thomton

He drew up charts analyzing the

elements of probabili ty...,

182

probability, barometer of

Keynes, John Maynard

probability, laws of

Hunter, Evan

... a barometer of probability, 171

...in much the same way that

there are laws goveming

our society, there are also

laws goveming chance, and

these are called the laws of

probab ility..., 170

Shewhart, W.A.

... engineering with and without

statistics boils down to ... the

laws of probability, 189

probability, mathematics of

Redfield, Roy A.

The long time winner is

the man who ... trusts

in the mathematics of

probabi lity..., 178

Shaw, George Bemard

And nobody can get ... far

without at least an

acquaintance with

the mathematics of

probability.. ., 179

probability, students of

Russell, Bertrand A.

There is a sDecia1 deDartment

SUBJECT BY AUTHOR INDEX 373

374 STATISTICALLY SPEAKING

of hell for students of

probability, 178

probability, theory of

Crofton, M.W.

The mathematical theory of

probability is a science

which aims at reducing to

calculation ... the amount of

credence due to propositions

or statements ..., 163

Fry, Thomton C.

... without the experiment .. .there

would be no reason for a

theory of probability, 167

Kolmogorov, Andrei N.

The theory of probabi lity... can

be axiomated in exactly the

same sense as Geometry

and Algebra, 172

Popper, Karl R.

The most important application

of the theory of probability

is to what we may call

'chance-like' or random

events, or occurrences, 176-7

Von Mises, Richard

The theory of probability can

never lead to a definite

statement concerning a

single event, 181

probable

Barry, Frederick ... while they persist they are

never more than probable,

1 83

Bleckley, Logan E.

... it is always probable that

something improbable will

happen, 183

Cicero

... many sensations are

probable ..., 183

De Leeuw, A.L.

The laws of chance tell us what

is probable ..., 183

Gibbon, Edward

Such fact is probable, but

undoubtedly false, 184

Which is of probables the

Hammond, Henry

most ..., 184

Lewis, Clarence Irving

...all empirical knowledge is

probable only, 184

The dictionary tells me that

Moroney, M. J.

'probable' means 'likely',

184

Pascal, Blaise

But is it probable that

probability gives assurance?,

184

Plato ... we ought to accept the tale

which is probable and

enquire no further ..., 184

Predicted facts ... can only be

Poincark, Henri

probable, 185

Popper, Karl R.

... we are never justified in

saying that we know that

they are 'true' or 'more

or less certain' or even

'probable', 185

Reichenbach, Hans

To say that observations of the

past are certain, whereas

predictions are merely

probable, is not the ultimate

answer to the question of

induction ..., 185

Sartre, Jean-Paul

185

All views are only probable ...,

Shakespeare, William

probable ..., 186

thinking, 185

'Es pretty sure, and very

'Ti probable and palpable to

SUBJECT BY AUTHOR INDEX 375

How probable, I do not know ...,

It may be probable she lost it ...,

Most probable ..., 185

Which to you shall seem

186

185

probable ..., 186

unknown

It is probable that many things

will happen contrary to

probability, 186

Wilkins, John

In all the ordinary affairs of life

men are used to guide their

actions by this rule, namely

to incline to that which is

most probable ..., 186

probables

Toffler, Alvin

The management of changes is

the effort to convert certain

possibles into probables ...,

186

problem

Anderson, Poul

I have yet to see any

problem ... which.. .did

not become still more

complicated,

187

Berkeley, Edmund C.

Most problems have either

many answers or no answer,

187

Bloch, Arthur

Inside every large problem is a

small problem struggling to

get out, 187

Chesterson, Gilbert Keith

problem, 187

It is that they can’t see the

Cleaver, Eldridge

...y outre either part of the

solution or part of the

problem, 187

problem, mathematical

Chambers, Robert

Man is seen to be an enigma

only as an individual, in

mass, he is a mathematical

problem, 187

prophesy

The Bible

For we know in part, and we

prophesy in part, 179

-Qquality

Unknown

You can’t inspect quality into a

product, 189

quality control

Steadman, Frank M.

Without quality control you ... are

in the same position as the

man who bets on a horse

race ..., 189

questionnaire

Deming, William Edwards

A questionnaire is never

perfect ..., 266

Fisher, Sir Ronald A.

Nature ... will best respond to a

logical and carefully thought

out questionnaire ..., 266-7

Oppenheim, Abraham Naffali

of questio ns..., 267

A questionnaire is not just a list

questionnaires

Norton, John K.

The time of busy people

is sometimes wasted

by time-consuming

questionnaires ..., 267

queue

Old Army Saying

queueing

Mikes. George

Hurry up and wait, 190

376 STATISTICALLY SPEAKING

There is one habit which

is clearly of British

origin-that of queueing,

190

-Rrandom

Carroll, Lewis

Couldn’t put Humpty Dumpty

in his place again, 191

Random stomping seldom

catches bugs, 191

Peers, John

Sophocles

The RAND Corporation

’Tis best to live at random ..., 192

A Million Random Digits with

100,000 Normal Deviates,

191

unknown

random normal deviate

Durand, David

random numbers

Heinlein, Robert A.

Random is not haphazard, 192

A contradiction in terms ..., 61

That kitten doesn’t have a brain,

he just has a skull full of

random numbers ..., 191

randomness

Brown, Spencer

The concept of randomness

arises partly from games of

chance, 195

Cohen, John ... nothing is so alien to the

human mind as the idea of

randomness, 191

reason

Bemard, Claude

To leam, we must necessarily

reason about what we have

observed ..., 193

Bierce, Ambrose

To weigh probabilities in the

scales of desire, 60

Eldridge, Paul

Reason is the shepherd trying

to corral life’s vast flock of

wild irrationalities, 193

Holmes, Sherlock

... the grand thing is to be able to

reason backward, 194

You fail ... to reason from what

you see, 193

Newton, Sir Isaac

My design in this book is ... to

propose and prove by

reason and experiments ...,

194

reasoning

Beveridge, W.I.B.

How easy it is for unverified

assumption to creep into

our reasoning unnoticed!,

193

Minnick, Wayne C.

This kind of reasoning has

weakness ..., 194

Romanoff, Alexis L.

Reasoning goes beyond the

analysis of facts, 194

Watson, Dr.

Like all Holmes’ reasoning the

thing seemed simplicity

itself when it was once

explained, 195

reasons

Kasner, Edward

...p rinciple of insufficient

reasons, 194

Shakespeare, William

His reasons are as two grains of

wheat hid in two bushels of

chaff ..., 195

recurse

Unknown

To iterate is human, to recurse

divine, 196

SUBJECT BY AUTHOR INDEX 377

recursion

Papert, Seymour

Of all ideas I have introduced to

children, recursion stands

out as the one idea that is

particularly able to evoke an

excited response, 196

recursive

Kelly-Bootle, Stan

See recursive, 196

regression

Cardozo, Benjamin N.

Where the line is to be drawn

the important and the trivial

cannot be settled by a

formula, 197

Juster, Norton

Once upon a time, there was a

sensible straight line who

was hopelessly in love with

a dot, 197

Unknown

Like father, like son, 197

Regression begins with the

unknown and ends with the

unknowable, 197

somewhere, 197

You’ve got to draw the line

Yule, G.

The term “regression” is not a

particularly happy one...,

198

regression fallacy

Durand, David

The naive belief that regression

analysis is a cure all, 61

regression, multiple

unknown

... I couldn’t understand multiple

regression in college ..., 197

regressions, multiple

Fiedler, Edgar R.

Most economists think of God

as working great multiple

regressions in the sky, 197

research

Green, Celia

Research is a way of taking

calculated risks ..., 199

The way to do research is to

attack the facts at the point

of greatest astonishment,

199

Lasker, Albert D.

Research is something that tells

you a jackass has two ears,

199

Misner, Wilson

...if you steal from many, it’s

research, 199

residuals

Herschel, John

Almost all the greatest

discoveries in astronomy

have resulted from the

consideration of RESIDUAL

PHENOMENA ..., 200

risks

Abelson, Philip H.

He emphasized that one in a

million is a very remote

risk, 34

-Ssample

Bloch, Arthur

After painstaking and careful

analysis of a sample ..., 201

Cochran, William G.

A person’s opinion of an

institution. ..is often

determined by one or two

encounters ..., 201

Gissing, George

It seemed to me that the fairest

thing would be to shake

them together, stick my

hand in, and take out one

by chance, 202

McNemar, Quinn

378 STATISTICALLY SPEAKlNG

... there exists a great deal of

confusion in the minds

of investigators as to the

necessity of obtaining a truly

representative sample ..., 202

Mosteller, F. ... weighting a sample

appropriately ..., 202

sample-design

Deming, William Edwards

A good sample-design is lost

if it is not carried out

according to plans, 201

samples

Cochran, William G.

Our knowledge ... our actions are

based to a very large extent

on samples, 201

unknown

Whitehead, Alfred North

Everybody’s taken samples, 203

The things directly observed

are, almost always, only

samples, 203

sampling

Deming, William Edwards

Sampling is the science and

art of controlling and

measuring ..., 201

Slonim, Morris James

Everyone who has poured a

highball into the nearest

potted plant after taking one

sip has had some experience

in sampling, 202

Sampling is only one

component ... of that broad

based field of scientific

method known as statistics,

202

sampling unit

Deming, William Edwards

If the cost of classlfyrng a

sampling unit were zero...,

201

sampling units

Deming, William Edwards

We must know also the

procedure by which to draw

the sampling units ..., 85

scatterbrain

Durand, David

A Bayesian whose beliefs have

been randomized ..., 61

science

Harris, Errole E.

... there are two main types of

science, exact science ... and

empirical science ..., 204

Science does not aim, primarily,

at high probabilities, 205

Popper, Karl R.

science, scavenger of

Magendie, Franqois

I am a mere street scavenger of

science, 204

second law of thermodynamics

Russell, Bertrand A.

There is, however, one

supremely important law

which is only statistical, 132

sequential analysis

Durand, David

A systematic procedure for

generating second guesses,

61

soothsayer

Scott, Sir Walter

Hold your peace, old

soothsayer ..., 157

standard deviation

Kelly-Bootle, Stan

A sexual activity formerly

considered perverted ..., 61-2

statistic

Huff, Darrell

A well wrapped statistic is

better than Hitler’s ”big

lie” ..., 247

Ludlum, Robert

SUBJECT BY AUTHOR INDEX 379

Death is a statistic for the

computers, 251

Puzo, Mario

He always did that whenever

somebody pulled a statistic

on him, 254

Stalin, Josef

... a million deaths is a statistic,

258

Ti’ilmon, Johnnie

If you’re all those things, you just

I am a statistic, 260

don’t count, except as a

statistic, 260

statistical

Robinson, Lewis Newton

In this country the statistical

side of criminology is very

imperfectly developed ..., 254

statistical analysis

Hopkins, Harry

And when, in pursuit of the

black cat of definitive truth,

more refined techniques

of statistical analysis. ..are

developed ..., 212

Moroney, M.J.

A statistical analysis, properly

conducted, is a delicate

dissection of uncertainties ...,

216

statistical argument, false

Bowley, Arthur L.

Some of the common ways

of producing a false

statistical argument are to

quote figures without their

context ..., 207

statistical balance

Steme, Laurence

... without destroying the

statistical balance of the

foetus ..., 218

statistical cherub

Pynchon, Thomas

... the hovering statistical cherub

who’s never quite been to

he ll..., 217

statistical Christ

O’Reilly, John Boyle

In the name of a cautious,

statistical Christ, 216

statistical clock

Dickens, Charles

209

statistical conclusions

Galton, Francis

... the deadly statistical clock ...,

... my various and laborious

statistical conclusions.. ., 211

statistical consultant

Eisenhart, Churchill

The primary function of a

statistical consultant in a

research organization is to ...,

210

statistical devices

Lippmann, Walter

...all statistical devices are open

to abuse ..., 249

statistical difficulty

Greenwood, M.

Sometimes a David felled a

Goliath of a statistical

difficulty with a smooth

stone, 211

statistical estimate

Bowley, Arthur L.

A statistical estimate may be

good or bad ..., 207

statistical evidence

Paulos, John Allen

... does this mean there isn’t

enough statistical evidence

to conclusively reject the

hypothesis of immortality?,

216

statistical expectations

Segal, Erich

380 STATISTICALLY SPEAKING

The stormy holiday roads had

yielded more than the

statistical expectation of

traffic accidents, 218

statistical generalizations

Lewis, Clarence Irving

Let us call these last "statistical

generalizations" since

they are exhibited at their

best when supported by

statistical procedures, 214

statistical graphics

Fienberg, Stephen E.

graphics ..., 210

... we have no theory of statistical

Tufte, Edward R.

... statistical graphics.. .are only

as good as what goes into

them, 115

Excellence in statistical graphics

consists of complex ideas

communicated with clarity,

precision, and efficiency, 115

statistical illiterates

Pynchon, Thomas

Why am I surrounded by

statistical illiterates?, 217

statistical improbability

Dawkins, Richard

The essence of life is statistical

improbability on a colossal

scale, 208

statistical inference

Wang, Chamont

... the whole notion of "Statistical

inference" often is more of a

plague and less of a blessing

to research workers, 263

statistical inference, ten

commandments of

Driscoll, Michael F.

The Ten Commandments of

Statistical Inference, 209

statistical judgment

Meitzen, August

No statistical judgment deals

with the unit ..., 215

statistical knowledge

Playfair, William

Statistical knowledge ... has not

till within these last 50 years

become a regular object of

study, 217

statistical laws

Jones, Raymond F.

Statistical laws enable the

insurance company to

function ..., 213

Pearson, Karl

There is much value in the idea

of the ultimate laws being

statistical laws, 216

statistical magic

Devons, Ely

Statistical magic ... is a mystery to

the public ..., 209

statistical method

Bell, Eric T.

The statistical method is social

mathematics par excellence,

206

mass-reactions.. .a mastery

of the modern statistical

method is essential, 206

The statistical method is more

To grasp and analyze

Deming, William Edwards

than an array of techniques,

208

Einstein, Albert

By applying the statistical

method we cannot

foretell the behavior of an

individual in a crowd, 210

The statistical method is of use

only to those who have

found it out, 215

Lippmann, Walter

Pearson, E.S.

SUBIECT BY AUTHOR INDEX 381

... it is a function of statistical

method to emphasize that

precise conclusions cannot

be drawn from inadequate

data, 217

Stamp, Josiah

You cannot escape the statistical

method ..., 218

statistical methods

Allen, R.G.D.

A knowledge of statistical

methods is not only

essential for those who

present statistical arguments

it is also needed by those on

the receiving end, 206

Bloch, Arthur

If enough data is collected,

anything may be proved by

statistical methods, 206

Statistical methods of analysis

are intended to aid the

interpretation of data ..., 208

Cox, D.R.

Glantz, S.A.

Approximately half the

articles published in

medical joumals that use

statistical methods use them

incorrectly, 211

Statistical methods are

Hoel, P.G.

essentially methods for

dealing with data that have

been obtained by repetitive

operations, 212

Meyers, G.J., Jr.

Statistical methods serve as land

mar ks..., 215

statistical mumbo jumbo

Habera, Audrey

... we fall back upon statistical

'mumbo jumbo' to confuse

and demoralize our

opponents, 212

statistical norm

Green, Celia

... the sanctity of the statistical

norm, 211

statistical outcome

Heinlein, Robert A.

outcome, 212

statistical physics

Von Mises, Richard

... it did not change the statistical

The problems of statistical

physics are of the greatest in

our time..., 219

statistical point of view

Edwards, A.W.F.

... his subject is so robust from a

statistical point of view ...,

210

statistical prediction

Lewis, Clarence Irving

... the statistical prediction of the

future from the past cannot

be generally valid ..., 2145

statistical probabilities

Jones, Raymond F.

It would have been exceedingly

boring if they both talked

of nothing but expectancy

tables and statistical

probabilities ..., 213

statistical problem

Meitzen, August

No matter what the statistical

problem may be, it must

proceed according to a plan,

215

statistical procedure

Fisher, Sir Ronald A.

Statistical procedure and

experimental design are

only two different aspects of

the same whole ..., 243

statistical reasoning

Ho~kinsH, arrv

382 STATISTICALLY SPEAKlNG

Confidence in the

omnicompetence of

statistical reasoning grows

by what it feeds on, 212

statistical records

Jahoda, Mane

The use of available statistical

records requires first that the

investigator be familiar with

the better known sources of

such data ..., 213

statistical research

Deming, William Edwards

Statistical research is particularly

necessary in the govemment

service ..., 208

statistical science

Galton, Francis

The object of statistical science

is to discover methods of

condensing information

concerning large groups of

allied facts ..., 204

statistical sea

Kruskal, William

... the statistical sea that supports

our thoughts and actions,

214

statistical significance

Cohen, Jacob

Since statistical sigmfmnce is

so earnestly sought and

devoutly wished for by

behavioral scientists ..., 207

statistical situation

Lippmann, Walter

... the real masters of the

statistical situation, 250

statistical tables

Bailey, W.B.

Statistical tables are essentially

specific in their meaning ...,

206

statistical techniques

Fisher, Sir Ronald A.

This rather tumultuous overflow

of statistical techniques from

the quiet backwaters of

theoretical methodolo gy...,

21 1

Kaplan, Abraham

... statistical techniques are tools

of thought ..., 213

statistical theory

Hotelling, Harold

Research in statistical theory and

techniques is necessarily

mathematic al..., 212

The purely random sample

Huff, Darrell

is the only kind that can

be examined with entire

confidence by means of

statistical the0 ry...,

213

statistical thinking

Wells, H.G.

Statistical thinking will one day

be as necessary for efficient

citizenship as the ability to

read and write, 220

statistical work

Blodgett, James H.

In statistical work we should

be able to presume upon

honesty, fidelity, and

diligence, 207

statistical world

Boudreau, Frank G., MD

We are far from having "one

statistical world", 207

statistically

Gallup, George

243

I could prove God Statistically,

statistically significant result

Hogben, Lancelot

Acceptability of a statistically

sigruficant result of an

experiment ..., 212

SUBJECT BY AUTHOR INDEX 383

statistician

Bailey, W.B.

Failure to observe

this fundamental

principle in statistical

practice ... distinguishes ... the

work of the untrained social

investigator from that of

the experienced scientific

statistician, 221

Belloc, Hilaire

221

The statistician was let loose,

Bellow, Saul

Daisy was a statistician for the

Gallup Poll, 221

Blodgett, James H.

The individual statistician must

scan closely the authority on

which he rests ..., 222

Years ago a statistician might

Chemoff, H.

have claimed that statistics

deals with the processing of

data ..., 222

Coole, W.P.

... lifework of the statistician ...,

222

Deming, William Edwards

A statistician’s responsibility is

not confined to plans ..., 223

It should be emphasized that the

statistician is not necessarily

abler at handling data ..., 223

The minute a statistician steps

into the position of the

executive.. . the statistician

ceases to be a statistician,

223

The only useful function of

a statistician is to make

predictions ..., 223

The statistician accepts in

any engagement certain

responsibilities ..., 223

Esar, Evan

A figure head, 223

A man who believes figures

don’t lie..., 224

A matter of fact specialist, 224

A specialist who assembles

figures and then leads them

astray, 224

Finney, D.J.

... the statistician is regarded as

someone who comes on

stage after data have been

collected ..., 224

Fisher, Sir Ronald A.

The statistician cannot evade

the responsibility for

understanding the process

he applies or recommends,

224

The statistician cannot excuse

himself from the duty of

getting his head clear on

the principles of scientific

inference ..., 224

Fleiss, Joseph L.

An Israeli statistician named

There was a statistician from

There was a statistician from

Hare, ..., 224

Knossus, ..., 225

Meedham, ..., 225

Forster, E.M.

We are not concemed with

the very poor. They are

unthinkable, and only

to be appreciated by the

statistici an..., 225

Galton, Francis ... a term that is more or less

equivalent to that of

“Statesman”, 22.5

The mathematician, the

Statistician, and the

philosopher do different

Good, I.J.

things with a theory of

probability, 226

Jones, Raymond F.

You are a blunt man, for a

statistici an..., 226

Kerridge, D.F.

It is not primarily the

responsibility of a

statistician to make

decisions for other people,

227

Kruskal, William

An occupational hazard to

which we statisticians

are exposed occurs in

the context of a social

occasion ..., 227

Moroney, M.J.

The statistician's job is to draw

general conclusions from

fragmentary data, 227

... as the job of finding the

truth and explaining it

continues to become more

complex and more difficult,

management again casts

a doubtful eye at the

statistici an..., 228

The characteristic which

distinguishes the

present-day professional

statistician, is his

interest and skill in the

measurement of the

fallibility of conclusions, 228

Seaton, G.L.

Snedecor, G.W.

Stamp, Josiah

Most of you would as soon

be told that you are

cross-eyed ... as that you are

destined to be a statistician,

228

The Editors (of The American

384 STATISTICALLY SPEAK"

statistician) . . ~~

So it is with the statistician, 229

If they'd had the budget to

hire a statistician, they

never would have declared

independence, 229

... the characterization of a

Thomsett, Michael C.

Tukey, John W.

statistician as a man who

draws straight lines from

insufficient data to foregone

conclusions, 230

The experimental statistician

dare not shrink from the

war cry of the analyst ..., 230

Too often the client ... looks to the

statistician as a man who

applies the final stamp of

approv al..., 230

A statistician and the

Unknown

statistician's wife were

marooned on a remote

island ..., 231

A statistician is a person who

draws a mathematically

precise line from an

unwarranted assumption to

a foregone conclusion, 231

It is difficult to determine what

a statistician is and what a

statistician is not, 232

If you ask a statistician, the

response is likely to be "It is

a biased coin", 232

Wang, Chamont

Wells, H.G.

... that scavenger of adventurers,

the statistician, 232

The movement of the last

hundred years is all in favor

of the statistician, 232

Wiper, Eugene P.

One of them became a

statistician.. . , 232-3

SUBJECT BY AUTHOR INDEX 385

Yule, G.U.

Since the statistician can seldom

or never make experiments

for himself ..., 233

statistician, mathematical

Deming, William Edwards

You need not be a mathematical

statistician to do good

statistical work ..., 208

statisticians

Balchin, Nigel

He divided people into

statisticians, people who

knew about statistics, and

people who didn't, 221

Perhaps statisticians themselves

Bowley, Arthur L.

have not always fully

recognized the limitations of

their work, 222

Hopkins, Harry

... there is that Other, Finer,

Rational World to which

the better statisticians have

already been called, 226

The early statisticians of the

present century were

competent at mathematics ...,

226

Kendall, Maurice G.

Miksch, W.F.

A couple of govemment

statisticians recently threw

dust on the wedding ring

business ..., 227

...in all society where

Moroney, M.J.

statisticians thrive, liberty

and individuality are likely

to be emasculated, 227

Stamp, Josiah

I sometimes think that

statisticians do not deserve

quite all the hard things that

are said about them, 228

Stigler, Stephen M.

Statisticians have an

understandable penchant

for viewing the whole

of the history of science

as revolving around

measurement and statistical

reasoning, 229

Thurber, James

Though statisticians in our time

have never kept the score ...,

229

Tukey, John W.

The most important

max imum... which many

statisticians seem to have

shunned ..., 230

Unknown

... statisticians are not infallible,

230

If all the statisticians in the

world were laid end to

end-it would be a good

thing, 231

If there are three statisticians on

a committee, there will be 4

minority reports, 230

It's mighty hard to fool these

statisticians, 231

What statisticians have in their

briefcases is terdying, 262

Yates, F.

the appalling position can easily

arise in which one can get

any answer one wants if

only one goes around to a

large enough number of

statisticians, 219-20

statistics

Adams, Henry

... the extinction of the human

race should be merely a fact

to be grouped with other

vital statistics, 234

386 STATlSTlCALLY SPEAKlNG

History has never regarded itself

as a science of statistics, 234

Taking for granted that the

alternative to art was

arithmetic, he plunged deep

into statistics ..., 234

Advertisement

... and you thought "impressive"

statistics were 36-24-36, 234

Angell, Roger

235

Balchin, Nigel

Statistics are the food of love,

Probably knows no statistics

whatever, 235

Bartlett, M.S.

It is concemed with things we

can count, 235

Baudrillard, Jean

Like dreams, statistics are a

form of wish fulfillment, 235

Belloc, Hilaire

... statistics come under the

heading of lying ..., 235

Before the curse of statistics fell

upon mankind we lived a

happy, innocent life ..., 235

quantitative method ..., 235

Statistics are the triumph of the

Bemard, Claude

As for statistics, they are given a

great role in medicine ..., 236

... statistics have tended to make

... statistics ... displacers of moral

Boorstin, Daniel J.

facts into norms, 236

imperatives ..., 236

Booth, Charles

So far I speak only of impersonal

statistics ..., 236

... statistics deals with

Bowley, Arthur L.

estimates ..., 237

A knowledge of statistics is like

a knowledge of foreign

languages ..., 237

Bowman, Scotty

Braude, Jacob M.

Statistics are for losers, 237

She was reading birth and death

statistics.. ., 237

Browning, Elizabeth Barrett

We talk by aggregates, and

think by systems and being

used to face our evils in

statistics.. ., 237

Burgess, Robert W.

The fundamental gospel of

statistics is to push back the

domain of ignorance ..., 238

Bumman, Tom

... statistics, the term has no

meaning unless the source,

relevance, and truth are all

checked out, 238

Byron, Lord

So that I do not grossly err

in facts, Statistics, tactics,

politics ..., 238

Carlyle, Thomas

Statistics is a science which

ought to be honourable ...,

238

Statistics, one may hope, will

improve gradually ..., 238

... for he was weak in statistics ...,

Carroll, Lewis

239

Coats, R.H.

... statistics has long been

handmaid to these exact

sciences ..., 239

Cogswell, Theodore, R.

Statistics show that you have

nothing to worry about, 239

Cohen, Jacob

... the typical behavioral

scientist approaches applied

SUBJECT BY AUTHOR INDEX 387

statistics with considerable

uncertainty..., 239

Crichton, Michael

Conversation and statistics.

Really boring, 239

Davis, Joseph S.

239

Statistics are proverbially dry...,

De Jonnes, Moreau

Statistics are like the

hieroglyphics of ancient

Egypt ..., 240

De Solla Price, Derek John

His passion was to count

everything and reduce it to

statistics, 240

Deming, William Edwards

... intellectual gulfs have grown

up between writers in

statistics ..., 240

Devons, Ely

...’ statistics are only for the

statistician’. .., 241

... I cannot oscillate a time

series ..., 240

... induces everyone to try to

impress their case on public

attention by peppering it

with statistics, 209 ... statistics are frequently

referred to as ‘the hard

facts’ ..., 241

... the portrayal of some statistics

that seem to point to policy

in one direction rather than

another?, 241

similarities between the role

of economic statistics ... and

some of the functions which

magic and divination play

in primitive society, 241

uncertain, can apparently

... there seems to be striking

And statistics, however

The experience of falling in

love could be adequately

described in terms of

statistics, 240

The two most important

characteristics of the

language of statistics are...,

240

statistics ..., 241

This exaggerated influence of

Dewey, John

Factual science may collect

statistics, and make charts,

242

Disraeli, Benjamin

There are lies, damned lies, and

church statistics, 242

Durand, David

Edgeworth, Francis Ysidro

A form of lying ..., 61

... Statistics reigns and revels in

the very heart of Physics,

242

Esar, Evan

Data of a numerical kind

looking for an argument,

242

Fiction in its most uninteresting

form, 242

The only science that enables

different experts ... to draw

different conclusions, 242

unreliable facts from reliable

figures, 242

everything except the

usefulness of statistics, 242

The science of producing

The science that can prove

Farr, William

Statistics should be the dryest of

all reading, 243

Fisher, Sir Ronald A.

In the original sense of the

word, ’Statistics’ was the

provide some basis, 241 science of Statecraft ..., 243

388 STATlSTlCALLY SPEAKING

Fitzgerald, F. Scott

Freeman, Linton C.

I'm going in for statistics, 243

We are all victims of statistics,

243

Galton, Francis

... those who are not accustomed

to original inquiry entertain

a hatred and a horror of

statistics, 244

Some people hate the very name

of statistics ..., 243

Gann, Emest K.

I do very much enjoy a more

than occasional roll in the

hay, which if I have my

statistics right, is a good

deal more often than the

average wife enjoys, 244

... bits of jokes, bits of statistics,

Gissing, George

bits of foolery, 244

Goodman, Richard

Most of us have some idea of

what the word statistics

means, 244

Gregory, Mr.

Well statistics prove that you're

far safer in a modem plane

than in a bathtub, 251

Statistics is 'hocuspocus' with

Statistics is the refuge of the

Habera, Audrey

numbers, 244

uninformed, 244

Hailey, Arthur

Legal proceedings are like

statistics, 245

Hancock, William Keith

... a calculating age has stabbed

it to the heart with

innumerable dagger-thrusts

of statistics, 245

Hand, D.J.

Statistics has been likened to a

telescope, 245

Hayford, F. Leslie

... neither statistics nor the

statistician can ordinarily

give the executive the final

answer to his problems, 245

In the everyday use of statistics

in business, complicated

statistical methods rarely are

necess ary..., 245

Heinlein, Robert A.

In 1906 he started on statistics ...,

245

Henry, 0. ... statistics, the lowest grade of

information that exists, 246

I think statistics are just as

lovely as they can be, 246

Hogben, Lancelot

The word statistics has at least

six different meaning in

current use ..., 246

Holmes, O.W., Jr.

... the man of the future is the

man of statistics ..., 246

Hooke, Robert

Do remember that your

experiment is merely a

hodgepodge of statistics ...,

247

Don't waste time arguing...if

you can gather some

statistics ..., 246

Hopkins, Harry

247

You can't argue with statistics ...,

Horace

We are just statistics, bom to

consume resources, 262

Johnson, Lyndon B.

... statistics must not be

sedatives ..., 247

Johnson, Palmer 0.

There was a time when

statistics ... was almost

completely ignored by the

experimenter ..., 247

Jones, Franklin P.

Statistics can be used to support

anything ..., 247

Jones, Raymond F.

In statistics, you look for the

common factor ..., 248

That was why statistics had to

be invented ..., 248

Kelly-Bootle, Stan

The basic sequence, in ascending

order, is lies, statistics ..., 248

Kendall, Maurice G.

Statistics is the branch of

scientific method which

deals with the data

obtained by counting or

measuring the properties

of populations of natural

phenomena, 248

Knebel, Fletcher

... smoking is one of the leading

causes of statistics, 248

I’m afraid, Dr. Noitall, you do

Koshland, Daniel E., Jr.

not have any understanding

of statistics, 248

Kruskal, William

... each of us has been doing

Statistics is the art of stating in

statistics all his life..., 249

precise terms that which one

does not know, 249

“statistics” that so often

provokes strained silence?,

248

What is there about the word

LaGuardia, Fiorello

Lang, Andrew

Statistics are like alienists ..., 249

He uses statistics as a drunken

Lapin, Lawrence

Statistics is a body of methods

and theory applied to

numerical evidence ..., 249

Leacock, Stephen

I’ve been reading some very

interesting statistics ..., 249

Lippmann, Walter

Even the most refined statistics

are nothing but abstractions,

250

device for measuring facts,

250

Statistics then is no automatic

Lloyd George, David

You cannot feed the hungry on

statistics, 250

Lock, S .

... the last 20 years of this

century promise to be that

of statistics, 250

... he’s saved the lives of

hundreds with those

statistics, 250

I work with statistics ..., 250

These are manageable

statistics ..., 251

Malcolm, Andrew H.

Ludlum, Robert

... no nation ranks higher in

its collective passion for

statistics, 114

Marshall, A.

Statistics are the straw out of

which I...have to make the

brick, 251

Moroney, M. J.

Learn something about statistics

as soon as you can, 251

Statistics is no more than State

Arithmetic ..., 251

... statistics refers to the

Neter, John

SUBJECT BY AUTHOR INDEX 389

man uses lamp-posts ..., 249 methodology for the

390 STATISTICALLY SPEAKlNG

collection, presentation, and

analysis of data ..., 252

Statistics was founded by John

Graunt of London ..., 252

People are skeptical of statistics,

Neuman, James R.

Nizer, Louis

252

Orwell, George

Statistics were just as much a

fantasy in their original

version as in their rectified

version, 252

The fabulous statistics continued

to pour out of the telescreen,

252

Pearson, Karl

Her statistics were more than a

study ..., 216

Perrin, Jean

... statistics reveals more and

more the inconstance and

the irregularity of much

social phenomena ..., 253

For no study is less alluring or

more dry and tedious than

statistics ..., 253

Porter, Theodore M.

Playfair, William

”Statistics” as a plural means to

us simply numbers ..., 253

Statistics derives from a German

term, Statistik ..., 253

Proverb, Spanish

Statistics, yet another mistress to

deceive us, 253

Puckett, Andrew

Reynolds, H.T.

Statistics don’t lie ..., 217, 253

... statistics ... cannot make bad

variables into good ones,

254

Rogers, Will

Everything is figured out down

to a Gnat’s tooth according means of figures, 258

to some kind of statistics,

254

on every known thing, 254

The govemment keeps statistics

Russell, Bertrand

Statistics ...are accurate laws

about large groups ... not

about individuals, 255

... a religion they call Statistics,

Salsburg, David S.

255

Savage, L.J.

... the art of dealing with

vagueness ..., 255

Schlozer, Ludwig

History is statistics in a state of

progression ..., 255

Segal, Erich

”Would you like to ask me some

How’s yer statistics?, 256

My husband’s a professor at

statistics, sir?”, 256

M.I.T, 256

Shapiro, Karl

We ask for no statistics of the

killed ..., 257

Smith, Logan Pearsall

For I am one of the unpraised,

unrewarded millions

without whom Statistics

would be a bankrupt

science, 257

Smith, Reginald H.

statistics, 257

Lawyers like words and dislike

Solomon, Ben

Stamaty, Mark Alan

Look behind statistics!, 257

I propose that infinitely refutable

statistics be declared the

official language of politics,

258

Stekel, Wilhelm

Statistics is the art of lying by

Stout, Rex

Statistics show that seventy-four

percent of wives open letters

with or without a teakettle,

258

There are two kinds of

statistics ..., 258

Strunsky, Simeon

Statistics are the heart of

democracy, 258

Tchekhov, Anton

... the silent protest of statistics ...,

259

Thackery, William M.

The Editors (of The American

The statistics mongers ..., 259

Statistician)

“quartered pies” ..., 259

To some people, statistics is

Thomsett, Michael C.

A new manager ... asked one

veteran executive how

accurate the president’s

statistics were, 259

Let’s blame it on statistics, 259

... statistics are always false, 260

We have no statistics to tell us

Trollope, Anthony

whether ... men do not die

early from overwork, 260

Tukey, John W.

Statistics is the science ... of

making inferences from the

particular to the general, 260

Twain, Mark

Statistics show that we lose

more fools on this day ..., 261

There are three kinds of lies:

lies, damned lies, and

statistics, 261

What I like to read about are

facts and statistics of any

kind, 261

... statistics is not a science, and

cannot be one, 264

... statistics ... can be quoted by the

dev il..., 239

He had been devoting more

time and attention to

statistics (her statis tics).. .,

231-2

If the statistics show a trend or

change, they are probably

wrong, 261

Medical statistics are like a

bikini, 262

Statistics can provide a ready

proof ..., 261

Statistics has been called a

science, 264

Statistics is the science which

uses easy words for hard

ideas, 262

Statistics may be compared to a

mill..., 261

Statistics must be based upon

something ..., 262

The beginning of modem

statistics is also the

beginning of modem

calamity, 262

The pretensions advanced for

statistics ..., 264

Van der Post, Laurens

Thinking has its place ... but, only

when one is confronted with

known facts and statistics,

262

Volkhart, Edmund H.

The collection, analysis, and

interpretation of numerical

data ..., 63

Von Mises, Richard

There are three kinds of

lies: white lies ... common

lies ... and statistics, 263

Walcott, Derek

SUBJECT BY AUTHOR INDEX 391

unknown Statistics jus tdy..., 263

392 STATISTICALLY SPEAKING

Walker, Marshall

Statistics provides a quantitative

example of the scientific

process ..., 263

Wang, Chamont

Statistics as a science is to

quanhfy uncertainty, not

unknown, 263

Waugh, Evelyn

0 god statistics go to prove that

comparatively few ever

attain that age ..., 263

... conclusions obtained from

even the best data by

one acquainted with the

principles of statistics must

be of doubtful value, 264

There is a curious misconception

White, Ailliam F.

Whitehead, Alfred North

that somehow the

mathematical mysteries of

Statistics help Positivism to

evade its proper limitation

to the observed past, 264

Wilson, E.B.

... statistics compiled

unscientifically.. .are almost

sure to be misleading ..., 265

Wonnacott, Ronald J.

sport, 265

Yeats, William Butler

... statistics is not a spectator

More women bom than men,

265

statistics class

unknown

If I had only one day left to

live, I would live it in my

statistics class, 262

statistics course

Thomsett, Michael C.

Two managers were taking a

course in basic statistics ...,

272

statistics, agreeable

Ramsey, James B.

The political practice of citing

only agreeable statistics

can never settle economic

arguments, 254

Statistics, American Journal of

Segal, Erich

He tumed over on his side and

picked up the American

Journal of Statistics, 256

statistics, Durbin-Whatzit

Unknown ... used to test unknown

assumptions, 262

statistics, Indian

Stamp, Josiah

... when you are a bit older,

you will not quote

Indian statistics with that

assurance, 58

statistics, mathematical

Walker, Marshall

Mathematical statistics provides

an exceptionally clear

example of the relationship

between mathematics and

the extemal world, 263

statistics, methods of

Ellis, Havelock

... the methods of statistics are

so variable ... that it is never

possible to be sure that one

is operating with figures of

equal weight, 242

statistics, professor of

Segal, Erich

I mean, here you are a professor

of statistics, 256

statistics, science of

Boorstin, Daniel J.

The science of statistics is

the chief instrumentality

through which the progress

SUBJECT BY Al JTHOR INDEX 393

of civilization is now

measured ..., 236

Buchner, Ludwig

The science of statistics ... has

the great honor of having

proved the existence of

definite rules in a number of

phenomena ..., 237

statisticulation

Huff, Darrell

Misinforming people by use of

statistical mate rial..., 61

statists

Proverb

As the statists thinks, the bell

clinks!, 253

strongenough

Rudner, R.

... how strong is ”strong enough’’

is going to be a function of

the importance ... of making a

mistake ..., 218

summation convention

Kelly-Bootle, Stan

sure

Belloc, Hilaire

A mathematician’s shindig ..., 61

Oh! let us never doubt What

nobody is sure about!, 30

... we’re not sure, we can’t be

Camus, Albert

sure, 30

survey

Deming, William Edwards

A perfect survey is a myth, 266

The only excuse for taking a

survey is to enable a rational

decision to be made ..., 266

Heinlein, Robert A.

But what is the purpose of your

survey?, 267

surveys

Strong, Lydia

So, why bother with surveys of

your own market?, 267

symmetry

Kasner, Edward

... the fact of the penny’s

symmetry is a mere detail,

268

-Ttables

Carlyle, Thomas

Devons, Ely

Tables are like cobwebs ..., 269

The way statistics are

presented ...in a particular

way in tables ..., 269

Fisher, Sir Ronald A.

The terms used in the headings

and margins of the tables

are all employed in a

technical sense ..., 269

Peirce, Charles Sanders

Worst of all, however, are

joumals that publish tables

giving the results ... of

multiple range tests, the

said results receiving no

mention in the text, 270

taught

Wilde, Oscar

... nothing that is worth knowing

can be taught, 272

teach

Blake, William

To teach doubt and

Experiment ..., 271

Statistics is not the easiest

Moroney, M. J.

subject to tea ch..., 271

It is hard to understand why

he failed to appreciate

the pedagogical value of

designing an experiment ...,

272

teaching

Acton, F.S.

Olds, Edwin G.

394 STATlSTlCA L LY SPEAKING

When an engineer

apologetically approaches a

statistici an... and asks how

he should fit a straight line

to these points, the situation

is not unlike the moment

when one’s daughter

inquires where babies come

from, 271

Bruner, Jerome Seymour

The teaching of probabilistic

reasoning ... is hardly

developed in our

educational system before

college, 271

Tukey, John W.

Teaching data analysis is not

easy ..., 272

test

Fisher, Sir Ronald A.

There is no more pressing need

in connection with the

examination of experimental

results than to test whether

a given body of data

is ...in agreement with any

suggested hypothesis, 273

Comparisons do ofttime great

Lydgate, John

grievance, 273

test of significance

Cochran, William G.

A useful property of a test of

sigruficance is that it exerts

a sobering influence on the

type of experimenter who

jumps to conclusions on

scanty data ..., 207

tests

Anscombe, F.J.

Rejection rules are not

sigruficance tests, 273

theorem

Hilton, James

And I believe that the Binomial

Theorem and a Bach Fugue

are...more important than all

the battles of history, 279

What famous theorem does this

Moger, Art.

illustrate?, 280

Unknown

If you have to prove a theorem,

do not rush, 282

The Dirty Data Theorem, 282

The Treadmill Theorem, 282

Why bother to make it elegant if it

theorem, binomial

Gilbert, W.S.

theorem, central limit

LeCam, L.

already works, 282

About binomial theorem ..., 278

... and this was the history of

the central limit theorem,

279-80

theorems

Petit, Jean-Pierre

You know our Theorems are

Guaranteed, 281

theorems of statistics

Wolfowitz, J.

... most of the theorems of

statistics would not survive

in mathematics if the subject

of statistics itself were to die

out, 283

theories

Berkeley, Edmund C.

The world is more complicated

than most of our theories

make it out to be, 275

Chesterson, Gilbert Keith

A man warmly concemed with

any large theories ..., 276

Colton, Charles Caleb

Professors in every branch of

the sciences prefer their own

theories to truth, 277

SUBJECT BY AUTHOR INDEX 395

Darwin, Charles ... for without the making of

theories I am convinced

there would be no

observation, 277

Davies, J.T.

Theories are generalizations and

unifications ..., 277

Eddington, Sir Arthur Stanley

We have devised profound

theories ..., 278

Hamilton, Edith

Theories that go counter to the

facts of human nature are

foredoomed, 278

Holmes, Sherlock

... I only wish to point out that

there are other theories

possible, 279

One forms provisional

theories ..., 279

Popper, Karl R.

For the scientist is most

interested in theories with a

high content, 281

Sayers, Dorothy L.

Very dangerous things, theories,

282

theorising

Voltaire

Let us work without

theorising ..., 282

theory

Bellow, Saul

Do you remember that old piece

of business from probability

the0 ry..., 275

Bernard, Claude

A theory is merely a scientific

idea controlled by

experiment, 275

Skinner’s Constant, 275

Bloch, Arthur

Buckland, Frank

Your theory is most excellent ...,

276

Butler, Samuel

It is not nice to be wedded to

anything-not even to a

theory, 276

Champemowne, D.G.

For that theory is solely

concemed with working

out the properties of the

theoretical models ..., 276

Theory like mist on eyeglasses,

Chan, Charlie

276

Chan, Jimmy

Clarke, Arthur C.

But Pop, I’ve got a theory, 276

I’d be glad to settle without the

Your theory is crazy-but not

the0 ry..., 276

crazy enough to be true, 277

Colton, Charles Caleb

Theory is worth little, unless

it can explain its own

phenomena ..., 277

The supreme misfortune is

Da Vinci, Leonard0

when theory outstrips

performance, 282

Davies, J.T. ... a theory arises from a leap of

the imagination ..., 277

Dickson, Paul

Einstein, Albert

Rowe’s Rule, 277

A theory can be proved by

experiment ..., 278

Eliot, George

The possession of an original

the0 ry..., 278

Hubble, Edwin

Kitaigordski, Aleksander

No theory is sacred, 279

Isaakovich

A first rate theory predicts ..., 279

396 STATISTICALLY SPEAKING

Nizer, Louis

... when a theory collides with a

fact, the result is a tragedy,

280

Oman, John

... the old habit of making theory

the measure of reality, 280

A theory is worthless without

good supporting data, 281

Romanoff, Alexis L.

Seeger, Raymond J.

A theory offers us a better view,

282

Unknown

Any theory can be made to fit

Theory without facts is bullshit,

the facts ..., 278

282

theory of probabilities

Peirce, Charles Sanders

The theory of probabilities is

simply the science of logic

quantitatively treated, 280

Poe, Edgar Allen

Coincidences ... are great

stumbling blocks in the way

of that class of thinkers who

have been educated to know

nothing of the theory of

probabilities, 281

theory of probability

Bell, Eric T.

The real beginning of the theory

of probability goes back to

1654..., 275

Reichenbach, Hans

The study of inductive inference

belongs to the theory of

prob ability..., 281

theory, probability

Borel, Emile

Incomplete knowledge must

be considered as perfectly

normal in probability

the0 ry..., 126

things

Green, Celia

There are some things that are

sure to go wrong as soon as

they stop going right, 85

thinking statistically

Thom, John

Now not so much as a glimmer

of any number entered the

shortstop's head in this

time, yet he was thinking

statistically, 260

threshold number

Borel, Emile

One grain of wheat does not

constitute a pile ..., 136

tools

Thoreau, Henry David

But lo! men have become the

true gospel

Trollope, Anthony

tools of their tools, 218

There are certain statements

which...must be treated

as though they were true

gospel, 284

truth

Eliot, George

Approximate truth is the only

truth attainable ..., 284

Jones, Raymond F.

...in the statistical world you can

multiply ignorance by a

constant and get truth, 284

Twyman's Law

Unknown

...any figure that looks

interesting or different is

usually wrong, 133

-Uuniformly

Lidberg, A.A.

Distribute dissatisfaction

uniformly, 73

SUBJECT BY AUTHOR INDEX 397

-Vvariability

Fieller, E.C.

Before the inherent variability

of the test animals was

appreciated ..., 286

Galton, Francis

... there is truth in the theory that

variability is much the same

kind, 54

petty accidents that concur

to produce variability

among brothers ..., 286

Nothing so like as eggs ..., 287

The starting point of Darwin’s

theory of evolution is

precisely the existence of

those differences between

individual members of a

race..., 287-8

Wheeler, William Maston

identical ..., 288

The incalculable number of

Hume, David

Pearson, Karl

Since no two events are

variable

Galton, Francis

Two variable organs are said to

be co-related when ..., 286

There is nothing stable in the

Keats, John

world ..., 287

Leibniz, Gottfried Wilhelm

... there are never in nature two

beings which are exactly

alike ..., 287

variance

Boring, E.G.

McDougall’s freedom was my

variance, 285

Cooley, Charles

... one who attempts to study

precisely things that are

changing must have a great

deal to do with measures of

change, 285

Crichton, Michael

The computer informed her

that three spaces accounted

for eighty-one percent of

variance, 285

Unknown

Variance is what any two

statisticians are at, 288

variates

Unknown

All variates are limited in both

directions, 288

variation

Darwin, Charles

286

Many laws regulate variation ...,

Tippett, L.C.

Variation is ...an important

characteristic of populations

that individuals cannot

have ..., 288

variety

Cowper, William

Proverb

vary

Huxley, Thomas H.

Variety’s the spice of life ..., 285

Variety is the spice of life, 288

...t here is not a single organ

of the human body the

structure of which does not

vary..., 287

AUTHOR BY SUBJECT INDEX

-AAbbott,

Edwin A. (1838-1926)

facts, 89

Abelson, Philip H. (1913-?)

risk, 34

Acton, F.S. ( - )

teaching, 271

Adams, Douglas (1952-?)

impossible, 122

infinite, 158

probability, 158

err, 76

facts, 89

statistics, 234

Advertisement

statistics, 234

Akenside, Mark (1721-1770)

cause, 19

Albinak, Marvin J. (1928-?)

graphing, 113

Alcott, Louisa May (1832-1888)

fact, 89

Alderson, M.H. ( - )

average, 6

Allen, R.G.D. ( - )

analysis, 2

statistical methods, 206

chance, 34

Adams, Franklin (1881-1960)

Adams, Henry (1838-1918)

Ambler, Eric (1909-?)

Anderson, Poul (1926-?)

problem, 187

Angell, Roger (1920-?)

statistics, 235

Anscombe, F.J. ( - )

erroneous reading, 76

observations, 142

outlier, 59

tests, 273

causes, 19

chance, 34

probability, 158

probabilities, calculus of, 159

accidental, 34

causes, 19

chance, 34/35

dice, 67

distribution, 71

facts, 89

impossibility, 122

mean, 6

observations, 142

probability, 159

common sense, 50

probability, 159

facts, 89

Aquinas, Thomas (1225?-1274)

Arbuthnot, John (1667-1735)

Arago ( - )

Aristotle (384-322 B.C.)

Amauld, Antoine (1612-1694)

Amold, Matthew (1822-1888)

Aron, Raymond (1905-1983)

398

AUTHOR BY SUBJECT INDEX 399

chances, 35

correlation, 52

foreknowledge, 106

Arthur, T.S. (1809-1895)

causes, 20

Asimov, Isaac (1920-1992)

measures, 136

Asquith, Herbert (1852-1928)

hypothesis, 117

Astaire, Fred (1899-1987)

chance, 35

Atherton, Gertrude (1857-1948)

average, 6

average intelligence, 6

cause, law of, 20

Atkins, Russell ( - )

probability, 159

Aurelius, Marcus (121-180)

cause and effect, 20

observation, 142

Austen, Jane (1775-1817)

probabilities, 159

-BBacon,

Francis (1561-1626)

causes, 20

certainties, 30

experiment, 83

sciences, 204

Baez, Joan (1941-?)

hypothetical, 117

Bagehot, Walter (1826-1877)

probability, 159

Bailey, Thomas D. ( - )

average ability, 6

Bailey, W.B. ( - )

statistical tables, 206

statistician, 221

correlation, 52

facts, 89, 90

statisticians, 221

statistics, 235

Balchin, Nigel (1908-1970)

Barnes, Michael R ( - )

percent, 151

facts, 90

fact, 90

facts, 90

hypothesis, 117

knowledge, common, 59

probable, 183

Bartlett, M.S. ( - )

Bayesians, 18

statistics, 235

Bartz, Wayne R. (193&?)

probability, 160

Baudrillard, Jean ( - )

statistics, 235

Bayley, Barrington J. ( - )

probability, 160

Belinski, Vissarion Grigorievich

Barrie, Sir J.M. (1860-1937)

Barry, Frederick (1876-1943)

(1811-1848)

facts, 90

analysis, 2

chance, 35

statistical method, 206

theory of probability, 275

Belloc, Hilaire (1870-1953)

common sense, 50

statistician, 221

statistics, 235

sure, 30

statistician, 221

theory, 275

common sense, 50

cause, 20

data, 55

information, 55

problem, 187

theories, 275

averages, 7

Bell, Frederick (1876-1943)

Bellow, Saul (1915-?)

Bennett, Arnold (1867-1931)

Bergson, Henri (1859-1941)

Berkeley, Edmund C. ( - )

Bemard, Claude (1813-1878)

400 S TATIS TICALLY SPEAKING

averages, chemical, 7

causes, first, 20

fact, 91

facts, 90

law of large numbers, 127

observation, 142

reason, 193

statistics, 236

theory, 275

Berra, Yogi (1925-?)

observe, 143

Beveridge, W.I.B. (1908-?)

reasoning, 193

Bialac, Richard N. ( - )

common sense, 51

Bierce, Ambrose (1842-1914?)

dice, 67

die, 59

faith, 59

indecision, 60

reason, 60

average, 7

fakt, 91

probabilitiz, 160

chance, 35

observe, 143

probabilities, 160

teach, 271

probable, 183

experiment, 83

law, 127

percent, 151

problem, 187

sample, 201

statistical methods, 206

theory, 275

Blodgett, James H. ( - )

statistical work, 207

statistician, 222

chance, 35

Billings, Josh (1818-1885)

Blake, William (1757-1827)

Bleckley, Logan E. (1827-1907)

Bloch, Arthur (194&?)

Bogart, Humphrey (1899-1957)

Bohm, D. (1917-?)

laws of chance, 127

statistics, 236

gambling, 111

statistics, 236

Borel, Emile (1871-1956)

chance, laws of, 35

error, problem of, 76

impossible, 122

probabilities, 160

theory, probability, 126

threshold number, 136

infinite, 125

variance, 285

chance, conception of, 36

laws of chance, 127

Bostwick, Arthur E. (1860-1942)

probabilities, 161

Boswell, James (1740-1795)

probability, 161

Boudreau, Frank G., MD ( - )

statistical world, 207

Boulle, Pierre (1912-?)

law of averages, 127

Bowley, Arthur L. (1869-?)

average, arithmetic, 7

averages, 7

statistical argument, false, 207

statistical estimate, 207

statisticians, 222

statistics, 237

statistics, 237

Boorstin, Daniel J. (1914-?)

Booth, Charles (1840-1916)

Borges, Jorge Luis (1899-1986)

Boring, E.G. (1886-1968)

BO^, Mm (1882-1970)

Bowman, Scotty (1933-?)

BOX, G.E.P. (1919-?)

infinity, 125

observe, 143

probability, 161

statistics, 237

Bradley, F.H. (1846-1924)

Braude, Jacob M. (1896-?)

AUTHOR BY SUBJECT INDEX 401

Brown, Spencer ( - )

randomness, 195

Browning, Elizabeth Barrett

(1806-1861)

statistics, 237

experiment, 83

fact, 91

facts, 91

hypothesis, 117

teaching, 271

chance, 36

facts, 91

statistics, science of, 237

Buckland, Frank ( - )

theory, 276

Buddhist Maxim

cause, 20

Budgell, Eustace (1686-1787)

fact, 91

Bulwer, Lytton, E.G. (1803-1873)

probabilities, 161

Burgess, Robert W. (1887-1969)

statistics, 238

Buman, Tom ( - )

statistics, 238

Bumey, Fanny (1752-1840)

probability, 161

Bums, Robert (1759-1796)

facts, 91

Butler, Joseph (1692-1752)

probability, 161

Butler, Samuel (1612-1680)

analytic, 2

certain, 30

chance, 36

chances, 36

error, 76

theory, 276

average, 8

statistics, 238

Browning, Robert (1773-1858)

Bruner, Jerome Seymour (1915-?)

Buchner, Ludwig (1824-1899)

Byron, Lord (1788-1824)

-CCage,

John (1912-1992)

Cahier, Charles (1807-1882)

Camus, Albert (1913-1960)

Cardozo, Benjamin N. (1870-1938)

error, 77

experiment, 83

sure, 30

analysis, 2

probabilities, 161

regression, 197

facts, 92

observe, 143

statistics, 238

tables, 269

average intelligence of scientists,

Carlyle, Thomas (1795-1881)

Carrel, Alexis (1873-1944)

8

Carroll, Lewis (1832-1898)

correlation, 52

design of experiment, 65

error, 77

experiment, 83-4

facts, 92

hypothesis, 117

impossible, 122

random, 191

statistics, 239

Chambers, Robert (1802-1871)

problem, mathematical, 187

Chamfort, Sebastien Roch

(1741-1 794)

chance, 36

Champemowne, D.G. ( - )

theory, 276

Chan, Charlie

theory, 276

Chan, Jimmy

theory, 276

Chappell, Edwin ( - )

errors, 77

Chaucer, Geoffrey (1342-1400)

measure, 136

Chemoff, H. (1923-?)

402 STATlSTlCA L LY S PEA KlNG

statistician, 222

(1874-1936)

Chesterson, Gilbert Keith

chances, 36-7

probabilities, 162

problem, 187

theories, 276

Chestov, Leon (1866-1938)

impossibility, 123

Cicero (106-43 B.C.)

causes, 20, 21

chance, 37

dice, 67

haruspex, 106

probable, 183

facts, 92

impossible, 123

theory, 276, 277

Cleaver, Eldridge (1935-?)

problem, 187

Coates, Robert M.

law of averages, 128

Coats, R.H. (1897-1973)

probability, 162

statistics, 239

Cochran and Cox

polynomials, 136

Cochran, William G. (1909-?)

sample, 201

samples, 201

test of significance, 207

statistics, 239

statistical sigruficance, 207

statistics, 239

Cohen, Jerome (1935-?)

facts, 92

Cohen, John ( - )

probability, 162

randomness, 191

average, concept of, 8

hypotheses, 118

Clarke, Arthur C. ( - )

Cogswell, Theodore R. (1918-?)

Cohen, Jacob (1923-?)

Cohen, Morns R. (1880-1947)

Colton, Charles Caleb (1780?-1832)

causes, 21

chance, 37

error, 77

theories, 277

theory, 277

Comfort, Alex (1920-?)

lucky, 37

Compte, Auguste (1798-1857)

foresight, 156

Conrad, Joseph (1857-1924)

facts, 92

Considine, Bob (1906-1975)

probability, 162

Cook, Robin (194&?)

correlation, 52-3

Coole, W.P. ( - )

statistician, 222

Cooley, Charles (1864-1929)

variance, 285

Copernicus, Nicolaus (1473-1543)

hypotheses, 118

Cort, David (1904-?)

hypothesis, 118

Cowper, William (1731-1800)

chance, 37

error, 77

variety, 285

statistical methods, 208

experiment, 84

facts, 92

graph points, 113

graphic, 113

likelihood, 134

percent, 151

probabilities, 163

probability, 162-3

statistics, 239

variance, 285

COX, D.R. ( - )

Cox, Gertrude M. ( - )

Crawford, F. Marion (1854-1909)

Crichton, Michael (1942-?)

Crick, Francis Harry Compton

(1916-?)

AUTHOR BY SUBJECT lNDEX 403

chance, 37

common sense, 51

probability, theory of, 163

Cronbach, L.J. (1916-?)

correlational method, 53

Crothers, Samuel McChord

Crofton, M.W. ( - )

(1857-1927)

facts, 93

-DDampier-

Whetham, William

(1867-1953)

certainty, 30

hypothesis, false, 118

probability, 163

Dante (1265-1321)

hazard, 37

Darrow, Clarence (1857-1938)

mistake, 77

Darwin, Charles (1809-1938)

chance, 38

experiment, 84

observer, 143

probabilities, 163

theories, 277

variation, 286

operational research, 208

theories, 277

theory, 277

percent, 151

cause, 21

error, 77

theory, 282

Davis, Joseph S. (1885-1975)

statistics, 239

Dawkins, Richard (1941-?)

statistical improbability, 208

Deakly, G.C. ( - )

analysis, Murphy’s Laws of, 3

De Cervantes, Miguel (1547-1616)

probabilitv, 163

Davies, J.T. (1924-?)

Davies, Robertson (1913-?)

Da Vinci, Leonard0 (1452-1519)

De Finetti, B. ( - )

Deifield, Ronald H. ( - )

De Jonnes, Moreau ( - )

De Jouvenel, Bertrand (1903-1987)

probability, 163-4

probability, 164

statistics, 240

forecasting, 106

laws, 128

probabilities, 164

method of least squares, 208

probable, 183

De Leeuw, A.L. (1899-?)

Deming, William Edwards

(1900-1995)

chunk, 60

data, 55, 56

error, standard, 77-8

laws, scientific, 128

measurement, 136

probabilities, 164

probability, 164-5

questionnaire, 266

sample-design, 201

sampling unit, 201

sampling units, 85

statistical method, 208

statistical research, 208

statistician, 223

statistician, mathematical, 208

statistics, 240

survey, 266

chance, 38

chance, 38

chances, doctrine of, 38

enquiry, 71

order, 148

sampling, 201

Democritus (46&370 B.C.)

De Moivre, Abraham (1667-1754)

De Montaigne, Michel Eyquem

(1533-1592)

probability, 164

impossibility, 125

De Morgan, Augustus (1806-1871)

404 STATISTICALLY SPEAKING

errors, 78 laws of mathematics, 129

Descartes, RenC (1596-1650)

observe, 143

probable, 183

De Solla Price, Derek John

(1922-1983)

percent, 152

statistics, 240

cause, 21

causes, 21

interviewer, 266

statistical magic, 209

statistics, 209, 240, 241

tables, 269

De Vries, Peter (1910-1993)

likelihood, 134

Dewey, John (1859-1952)

measurement, 137

statistics, 242

average intellect, 8

facts, 93

likelihood, 134

observation, 143

statistical clock, 209

Dickson, Paul ( - )

Ashley-Perry Statistical Axioms,

128

correlation, statistical, 53

theory, 277

Disney, Dorothy (1903-?)

chance, chinaman’s, 38

Disraeli, Benjamin (1 804-1 88 1 )

causalities, 21

statistics, 242

statistical inference, ten

Dryden, John (1631-1700)

De Spinoza, Benedict (1632-1677)

Deutscher, I. (1907-1967)

Devons, Ely ( - )

Dickens, Charles (1812-1870)

Driscoll, Michael F. ( - )

commandments of, 209

cause, secret, 22

chance, 39

dice, 67

Durand, David (1950-?)

assessed probability, 60

assignable cause, 60

best estimate, 60

commode, 60

data, 60

degrees of freedom, 64

expected value, 60

posterior probability, 60

probability, 60

regression fallacy, 61

scatterbrain, 61

sequential analysis, 61

statistics, 61

order, 148

Dylan, Bob (1941-?)

-EE

C ~U, m berto (1932-?)

factor analysis, 210

Eddington, Sir Arthur Stanley

(1882-1944)

chance, 39

facts, 93

order, 148

probability, 165

theories, 278

Edgeworth, Francis Ysidro

(1845-1926)

error, 78

law of errors, 129

probability, 166

statistics, 242

statistical point of view, 210

data, 56

model, 140

common sense, 51

dice, 68

facts, 93

God, 39

Edwards, A.W.F. (1935-?)

Ehrenberg, A.S.C. ( - )

Eigen, Manfred (1927-?)

Einstein, Albert (1879-1955)

AUTHOR BY SUBJECT INDEX 405

observe, 144

statistical method, 210

theory, 278

Eisenhart, Churchill (1913-?)

statistical consultant, 210

Eldridge, Paul (1888-1982)

chance, 39

dice, 68

experiment, 85

facts, 93, 94

reason, 193

facts, 94

labeling, 3

likelihood, 134

probabilities, 166

probability, 166

theory, 278

truth, 284

Eliott, Ebenezer (1781-1849)

facts, 94

Ellis, David (1933-?)

probability, 166

Ellis, Havelock (1859-1939)

statistics, method of, 242

Emerson, Ralph Waldo

(1803-1882)

Eliot, George (1819-1880)

cause and effect, 22, 23

dice, 68

experiment, 85

fact, 94

facts, 94

counted, 56

error, 78

statistician, 223, 224

statistics, 242

observation, Ettore’s, 144

chance, 39

error, 78

Enarson, Harold L. (1919-?)

Erasmus, Desiderius (1466-1536)

E s ~ E, v an ( - )

Ettore, Barbara ( - )

Euripides (484-406 B.C.)

Evans, Bergen (1904-1978)

hypothesis, 118

-FFabing,

Harold and Mar, Ray

explanation, 61

facts, 94

hypothesis, 118

observations, 144

Farr, William (1807-1883)

statistics, 243

Feller, William (1906-1970)

probability, 166, 167

Fermi, Enrico (1901-1954)

chances, 39

Fiedler, Edgar R. (1943-?)

forecast, 107

forecasters, 107

forecasting, 106

prayer, 154

regressions, multiple, 197

Fieller, E.C. ( - )

variability, 286

Fienberg, Stephen E. (1942-?)

statistical graphics, 210

Finney, D.J. (1917-?)

statistician, 224

Fischer, Robert B. (1920-?)

knowledge, 126

Fisher, Sir Ronald A. (1890-1962)

correlation, 53

data, 56

design of experiment, 65

diagrams, 113

errors of the second kind, 78

errors, theory of, 78-9

experiment, 85

questionnaire, 266-7

statistical procedure, 243

statistical techniques, 211

statistician, 224

statistics, 243

tables, 269

test, 273

statistics, 243

Fitzgerald, F. Scott (1896-1940)

406 STATlSTlCALLY SPEAKING

Fleiss, Joseph L. (1937-?)

biometrician, 225

statistician, 224, 225

Forbes, J.D. (1809-1868)

probabilities, 167

Forster, E.M. ( - )

statistician, 225

Foss, Sam Walter (1858-1911)

average man, 8

Fourier, Jean Baptiste Joseph

( 1768-1 830)

causes, primary, 23

measurement, 137

statistics, 243

data, 56

laws of probability, 129

probabilities, 167

Freeman, Thomas L. (1951-?)

probabilities, 167

Freidman, Martin ( - )

average rate, 8

Freud, Sigmund (1856-1939)

hypothesis, 119

Froude, James Anthony

Fox, Russell ( - )

Freeman, Linton C. (1927-?)

Freeman, R. Austin (1862-1943)

(1 8 18-1 894)

average, 9

averages, 9

cause, 23

certainty, 30, 31

error, 79

facts, 95

laws of probability, 129

medium, 9

odds, 40

probabilities, 167

probability, 167

probability, theory of, 167

Fry, Thomton C. (1892-?)

-GGallup,

George ( - )

statistically, 243

Galsworthy, John (1867-1953)

certain, 31

chance, 40

average, 9

average value, 9

chance, whimsical effects of, 40

correlation, 54

correlation, index of, 54

correlation, laws of, 54

data, 56

differences, 286

error, law of, 71

error, law of frequency of, 71

law of deviations, 129

law of frequency of error, 129-30

statistical conclusions, 211

statistical science, 204

statistician, 225

statistics, 243, 244

variability, 54, 286

variable, 286

Gann, Ernest K. (1910-1991)

statistics, 244

Garson, Barbara ( - )

facts, 95

Gay, John (1685-1732)

probability, 168

Geary, R.C. ( - )

normality, 72

Gibbon, Edward (1737-1794)

law of probability, 130

probable, 184

doubt, 184

error, 79

fact, 96

Gilbert, W.S. (1836-1911)

list, 202

theorem, binomial, 278

Gilbert, William (1540-1603)

probability, 168

Gilman, Charlotte P.

(1861935)

Galton, Francis (1822-1911)

Gilbert and Sullivan

facts, 96

AUTHOR BY SUBJECT INDEX 407

Gissing, George (1857-1903)

probability, 168

sample, 202

statistics, 244

statistical methods, 211

experiment, 85

impossible, 123

statistician, 226

Goodman, Richard ( - )

statistics, 244

Gracian, Balthasar (1601-1658)

probabilities, 168

Greedman, D.A. ( - )

models, 140

Green, Celia ( - )

experiment, 61

outlier, 150

research, 199

statistical norm, 211

Glantz, S.A. (1946-?)

Godwin, William (1756-1836)

Goldwyn, Samuel (1879-1974)

Good, I.J. ( - )

things, 85

Greenwood, M. ( - )

statistical difficulty, 211

Greer, Scott (1935-?)

observation, 144

Guest, Judith (1936-?)

chance, 40

Gumperson, R.F. ( - )

probability, 169

-HHabera,

Audrey ( - )

statistical mumbo jumbo, 212

statistics, 244

predict, 156

statistics, 245

percent, 152

theories, 278

Hacking, Ian (1936-?)

Hailey, Arthur (1947-?)

Haldeman, H.R. (1926-1993)

Hamilton, Edith (1867-1963)

Hamming, Richard W. (1915-?)

distribution, 72

probability, 169

probable, 184

prayer, 154

statistics, 245

statistics, 245

Hardy, Thomas (1840-1928)

average human nature, 10

Harris, Errole E. (1908-?)

probability, 169

science, 204

Harris, Sidney ( - )

Bemoulli, 72

Harrison, Harry (1925-?)

information, 96

odds, 40

Harte, Francis Bret (1836-1902)

average, 10

Harvey, Paul (1918-?)

chance, 50-50, 41

Harvey, William (1578-1657)

diversities, 287

Hawking, S. (1947-?)

dice, 68

Hayford, F. Leslie ( - )

statistics, 245

Heaviside, Oliver (1850-1925)

facts, 278

Heinlein, Robert A. (1907-1988)

facts, 96

random numbers, 191

statistical outcome, 212

statistics, 245

survey, 267

causation, 23

observer, 144

average, 10

Hammond, Henry ( - )

Hammond, Kenneth R. (1951-?)

Hancock, William Keith (1898-?)

Hand, D.J. ( - )

Heise, David R. ( - )

Heisenberg, W. (1901-1976)

Heller, Walter (1915-1987)

408 STATlSTlCALLY SPEAKlNG

Helvetius, C.A. (1715-1771)

Henry, 0. (1862-1910)

chance, 41

average, 10

statistics, 246

Henry, Patrick (1736-1799)

forecast, 107

Herbert, Nick ( - )

probability, 169

Herodotus (486-430 B.C.?)

chances, 41

Herschel, John (1792-1871)

residual, 200

Hesiod (c. 700 B.C.)

certainties, 31

Heyward, DuBose (1885-1940)

dice, 41

Heyworth, Sir Geoffrey ( - )

facts, 96

Hilton, James (1900-1954)

theorem, 279

Hippocrates (460?-370? B.C.)

forecast, 107

Hobbes, Thomas (1588-1679)

err, 79

Hoel, P.G. (1905-?)

statistical methods, 212

Hoffer, Eric (1902-1983)

certain, 31

Hogben, Lancelot (1895-1975)

statistically significant result,

statistics, 246

chance, 49

average, 10

cause, 23

certainty, 31

facts, 96, 97

probabilities, 169

analysis, 3

certainty, 31

statistics, 246

212

Holbach, P.H.T. (1723-1789)

Holmes, O.W. (1809-1894)

Holmes, O.W., Jr. (1841-1935)

Holmes, Sherlock

analytical reasoner, 3

cause to effect, 23

coincidence, 24

conjecture, 193

data, 56, 57

fact, 97, 98

facts, 97, 98

hypothesis, 119

observe, 144, 145

reason, 193, 194

theories, 279

Homer (800 B.C.?-?)

chance, 41

Hood, Thomas (1799-1845)

dice, 69

Hooke, Robert (1918-?)

average, 10

data, 57

design of experiment, 65

statistics, 246, 247

Hooker, Richard (1554-1600)

probabilities, 169

Hopkins, Harry (1890-1946)

statistical analysis, 212

statistical reasoning, 212

statisticians, 226

statistics, 247

Horace (65-8 B.C.)

mean, 10

statistics, 247

Hotelling, Harold (1945-?)

statistical theory, 212

Howe, E.W. (1853-1937)

common sense, 51,154

probability, 169

Howitt, Mary (1799-1888)

observe, 145

Hoyle, Fred (1915-?)

data, 57

outlier, 150

average man, 11

theory, 279

Hubbard, Elbert (1856-1915)

Hubble, Edwin (1889-1953)

AUTHOR BY SUBJECT INDEX 409

Huff, Darrell ( - )

percent, 152

statistic, 247

statistical theory, 213

statisticulation, 61

Hugo, Victor (1802-1885)

blunders, 79

Hume, David (1711-1776)

cause, 24

cause and effect, 24

causes, 24

chance, 41

experiment, 85

probability, 170

variability, 287

probability, laws of, 170

experiment, 86

average, 11

facts, 98

impossible, 123

probabilities, 170

errors, 79, 80

experiment, 86

fact, 98

hypothesis, 119

law, 130

mistake, 79

vary, 287

probability, 170

Hunter, Evan (1926-?)

Hunter, John (1728-1793)

Huxley, Aldous (1894-1963)

Huxley, Thomas H. (1825-1895)

Huygens, Christiaan (1629-1695)

-1-

Inge, William Ralph (1860-1954)

average man, 11

-JJacobs,

Joseph ( - )

Jahoda, Mane ( - )

middle american, 11

statistical records, 213

James, Henry (1843-1916)

fact, 98

James, P.D. (1920-?)

probabilities, 171

James, William (1842-1910)

cause and effect, 25

causes, 25

facts, 98

Jeans, James Hopwood

(1877-1946)

certain, 32

percent, 152

experiment, 86

probabilities, 171

likelihood, 135

errors, 80

knowledge, 126

statistics, 247

statistics, 247

certainty, 32

chance, 42

statistics, 247

statistical laws, 213

statistical probabilities, 213

statistician, 226

statistics, 248

truth, 284

Jonson, Ben (1572-1637)

observe, 145

Juster, Norton (1929-?)

average family, 11

averages, 12

impossible, 123

regression, 197

Jefferson, Thomas (1743-1826)

Jefferys, Harold (1891-1989)

Jevons, W.S. (1835-1882)

Johnson, Lyndon B. (1908-1973)

Johnson, Palmer 0. ( - )

Johnson, Samuel (1696-1772)

Jones, Franklin P. ( - )

Jones, Raymond F. (1915-?)

-KKac,

Mark ( - )

410 STATISTICALLY SPEAIUNG

normal law, 72

probability, 171

Bayesian, 18

laws, 130

cause and effect, 25

(1894-1984)

experiment, 86

Kaplan, Abraham ( - )

laws, 130

measure, 137

measurement, 137

model, 140

predict, 156

statistical techniques, 213

models, 140

actuary, 1

equiprobability, 171

reasons, 194

symmetry, 268

James

gambling, 111

Keats, John (1795-1821)

variable, 287

Keegan, John (1934-?)

averages, law of, 12

Keeney, Ralph and Raiffa, Howard

Kelly-Bootle, Stan ( - )

Kadane, Joseph (1941-?)

Kadanoff, Leo P. (1937-?)

Kant, Immanuel (1724-1804)

Kapitza, Pyetr Leonidovich

Karlin, Samuel (1924-?)

Karpansky, L. ( - )

Kasner, Edward (1878-1955)

Kasner, Edward and Newman,

analysts, 3

Bemoulli, 72

map, 62

Monte Carlo method, 213

MTBF, 188

MTT'R, 188

recursive, 196

standard deviation, 61-2

statistics, 248

Kendall, Maurice G. (1907-1983)

experiment, 86

Latin Square, 214

statisticians, 226

statistics, 248

Kerridge, D.F. ( - )

statistician, 227

Keynes, John Maynard

(1883-1946)

analysis of the instances, 3

common sense, 51

probability, 171, 172

probability, barometer of, 171

Babylonical Statistical

King, Willford ( - )

Association, 214

Kipling, Rudyard (1865-1936)

Kitaigordski, Aleksander

facts, 99

Isaakovich ( - )

theory, 279

Kneale, W. (1906-1990)

Bernoulli's theorem, 72

Knebel, Fletcher (1911-1993)

statistics, 248

Kolmogorov, Andrei N.

(1903-1987)

probability, theory of, 172

Koshland, Daniel E., Jr. (1920-?)

statistics, 248

Krass, F. ( - )

law, 130-31

Kratovil, Robert ( - )

facts, 99

Kruskal, William (1919-?)

statistical sea, 214

statistician, 227

statistics, 248, 249

Krutch, Joseph Wood

(1893-1970)

average, 12

average, statistical, 12

measurement, 138

Kyburg, H.E.,Jr . (1928-?)

summation convention, 61 probability, 172

AUTHOR BY SUBJECT INDEX 411

-LLaGuardia,

Fiorello (1882-1947)

Lang, Andrew (1844-1912)

statistics, 249

dice, 69

statistics, 249

statistics, 249

analysis, 4

common sense, 51

probability, 172

LaSage, Alan Rene ( - )

facts, 99

Lasker, Albert D. (1880-1952)

research, 199

Latin Expression

chance, 42

Laut, Agnes C. (1871-1936)

fact, 99

Leacock, Stephen (1869-1944)

average, 12

average education, 12

statistics, 249

LeCam, L. (1924-?)

theorem, central limit, 279-80

Lee, Hannah Famham (1780-1865)

causes, 25

Leibniz, Gottfried Wilhelm

Lapin, Lawrence ( - )

Laplace, Pierre-Simon (1749-1827)

(1646-1716)

certain, 32

probabilities, 173

variable, 287

hypothesis, 119

probability, 173

probabilities, 173

probability, 173

probable, 184

statistical generalizations, 214

statistical prediction, 214-5

Lewis, Don ( - ) and Burke, C.J.

Lewis, C.S. (1898-1963)

Lewis, Clarence Irving (1883-1 964)

( - 1

chi-sauare. 73

Lichtenberg, Georg (1742-1799)

causes, 25

gambling, 111

measure, 138

Lidberg, A.A. ( - )

Lieber, Lillian R. ( - )

average man, 13

Lincoln, Abraham (1809-1865)

probability, 173

Lindley, Dennis V. (1923-?)

probabilists, 173

Lippmann, G. (1845-1921)

normal approximation, 73

Lippmann, Walter (1889-1974)

statistical devices, 249

statistical method, 215

statistical situation, 250

statistics, 250

statistics, 250

statistics, 250

certainty, 32

probability, 174

Longair, M.S. (1941-?)

observations, 145

Longfellow, Henry Wadsworth

uniformly, 73

Lloyd George, David (1863-1945)

Lock, S. (1929-?)

Locke, John (1632-1704)

(1807-1882)

chance, 42

hypothesis, 119

Bayesians, 18

order, 148-9

probabilities, 174

probability, 174

statistic, 251

statistics, 250, 251

Loren, Konrad (1993-1989)

Luchenbruch, Peter ( - )

Lucretius (99?-55 B.C.)

Ludlum, Robert (1927-?)

Lydgate, John (1370-1451) . -

1 , test, 273

412 S TATIS TICA L LY SPEAKING

-MMacDonald,

John D. (1916-1986)

Macy, Arthur (1842-1904)

Magendie, Fransois (1783-1855)

Maier, N.R.F. (1900-?)

Malcolm, Andrew H. (1943-?)

Mallarme, Stephen (1842-1890)

Manners, William (1907-?)

Mansfield, Lord (1705-1793)

Marlowe, Christopher (1564-1593)

Marshall, A. (1842-1924)

Martin, Thomas L., Jr. (1921-?)

Masters, Dexter (1908-1989)

probability, 174

observation, 145

science, scavenger of, 204

facts, 99

statistics, 114

dice, 69

mistake, 80

certainty, 32

analytics, 4

statistics, 251

likelihood, 135

chance, 42

probabilities, 174

Mauldin, Bill (1921-?)

law of averages, 131

May, Robert M. (1936-?)

logistic equation, 73

McNemar, Quinn (1900-?)

sample, 202

Mei tzen, August (18 22-1 910)

statistical judgment, 215

statistical problem, 215

data, 57

forecast, 108

Meredith, Owen (1924-?)

facts, 99

Meyer, Agnes (1887-1970)

laws of probability, 131

Meyers, G.J., Jr. ( - )

statistical methods, 215

Mikes, George (1912-1987)

Mellor, J.W. (1928-?)

queueing, 190

statisticians, 227

Mill, John Stuart (1806-1873)

analysis, excellence of, 4

analysis, habit of, 4

cause, 25

law of causation, 131

Milton, John (1608-1674)

chance, 42, 43

Minnick, Wayne C. ( - )

probability, 175

reasoning, 194

Misner, Wilson ( - )

research, 199

Moger, Art. ( - )

theorem, 280

Moroney, M.J. (1940-?)

average, 13

figure, 62

graph, 114

probable, 184

statistical analysis, 216

statistician, 227

statisticians, 227

statistics, 251

teach, 271

sample, 202

statistics, 251

probability, 175

Miksch, W.F. ( - )

Mosteller, F. (1916-?)

Mr. Gregory

Muggeridge, Malcolm (1903-1990)

-NNeter,

John (1823-?)

Neuman, James R. ( - )

Newton, Sir Isaac (1642-1727)

statistics, 252

statistics, 252

analysis, method of, 4

errors, 80

hypotheses, 120

hypothesis, 119

reason, 194

AUTHOR BY SUBJECT INDEX 413

Nietzsche, Friedrich (1844-1900)

chance, 43

effect, 26

averages, 13

facts, 99

Nixon, Richard M. (1913-1994)

average American, 13

Nizer, Louis (1902-1994)

statistics, 252

theory, 280

Norton, John K. ( - )

questionnaires, 267

Nightingale, Florence (1820-1910)

-0-

Old Army Saying

queue, 190

teach, 272

facts, 100

theory, 280

observation, 145

questionnaire, 267

(1904-1967)

Olds, Edwin G. ( - )

OMalley, Austin (1862-1943)

Oman, John (1860-1939)

O’Neil, W.M. (1912-?)

Oppenheim, Abraham Naffali ( - )

Oppenheimer, Julius Robert

facts, 100

O’Reilly, John Boyle (1844-1890)

statistical Christ, 216

Orwell, George (1903-1950)

statistics, 252

Osbom, Don ( - )

Osbom’s Law, 131

Ovid (43 B.C.-18 A.D.)

cause, 26

facts, 100

facts, 100

Ozick, Cynthia (1928-?)

-PPaley,

William (1 743-1805)

chance, 43

chance, appearance of, 43

recursion, 196

Papert, Seymour (1928-?)

Paracelsus, Philippus Aureolus

(1493-1541)

experiment, 86

Parry, Thomas ( - )

percent, 152

Pascal, Blaise (1623-1662)

cause, 26

chance, 43

hypothesis, 120

mean, 13

probability, 175

probable, 184

chance, 43

innumerancy, 62

percent, 152

statistical evidence, 216

Pavlov, Ivan (1849-1936)

facts, 100

Peacock, E.E. (1926-?)

design of experiment, 65-6

Pearl, Judea (1936-?)

graphs, 114

probabilities, 175

Pearson, E.S. ( - )

probability, 175

statistical method, 217

Pearson, Karl (1857-1936)

correlations, 54

statistical laws, 216

statistics, 216

variability, 287-8

Peers, John ( - )

chance, 43

facts, 100

random, 191

outlier, 150

Pasteur, Louis (1822-1895)

Paulos, John Allen (1945-?)

Peirce, Benjamin (1809-1880)

Peirce, Charles Sanders

error, probable, 80

(1839-1 914)

414 STATISTICALLY S PEAKlNG

probabilities, 175

probability, 175, 176

tables, 270

theory of probabilities, 280

Penjer, Michael ( - )

forecasts, 108

Perec, Georges ( - )

Monte Carlo Theorem, 280-1

Perrin, Jean (18 70-1 942)

statistics, 253

Peter, Lawrence J. (1919-1990)

measure, 138

Petit, Jean-Pierre ( - )

theorems, 281

Pettie, George (1548-1589)

cause, 26

Phrase, Latin

fact, 100

Pirandello, Luigi (1867-1936)

facts, 101

Planck, Max (1858-1947)

experiment, 86

fact, 101

Plato (428-348 B.C.)

chance, 43-4

experimental, 87

prayer, 154

probabilities, 176

probable, 184

Plautus (254-184 B.C.)

facts, 101

Playfair, William (1789-1857)

graphs, 114

information, 270

statistical knowledge, 217

statistics, 253

Plonk, Phineas ( - )

inference, 62

Plotinus (205-270)

cause, 26

Plutarch (46-119)

die, 69

Poe, Edgar Allen

(1809-1849)

theory of probabilities, 281

Pohl, Frederik ( - )

chance, 44

probability, 176

chance, 44-5

errors, 73

errors, theory of, 80

experiment, 87

experiments, 87

fact, 101

facts, 101

foresee, 108

observe, 146

prediction, 176

probabilities, calculus of, 176

probable, 185

Polya, G. (1887-1985)

dice, 69

Polybius (200-118 B.C.)

cause, 26

Pomfret, John (1667-1702)

err’d, 80

Pompidou, Georges (1911-1974)

gambling, 111

Pope, Alexander (1688-1744)

chance, 45

design of experiment, 66

observations, 146

order, 149

observations, 146

probability, theory of, 176-7

probable, 185

science, 205

theories, 281

Porter, Theodore M. (1953-?)

statistics, 253

Prakash, Satya (1938-?)

cause and effect, 26

Pratchett, T. (1948-?)

probability, 177

Price, Richard (1723-1781)

laws, 131

Prior, Matthew (1664-1721)

probability, 178

Poincark, Henri (1854-1912)

Popper, Karl R. (1902-1994)

AUTHOR BY SUBJECT INDEX 415

Proschan, Frank (1921-?)

American Statistical Association,

217

statists, 253

variety, 288

Proverb, Chinese

graph, 114

Proverb, English

chance, 46

Proverb, German

observation, 146

Proverb, Greek

forecast, 108

Proverb, Italian

probabilities, 178

Proverb, Latin

cause, 27

cause and effect, 27

Proverb, Spanish

statistics, 253

Proverbs

chance, 48

Puckett, Andrew ( - )

statistics, 217, 253

Puzo, Mario (192&?)

gamblers, 112

statistic, 254

average, 13

binary, 74

Monte Carlo Fallacy, 254

Poisson equation, 74

statistical cherub, 217

statistical illiterates, 217

Proverb

Pynchon, Thomas (1937-?)

-QQueneau,

Raymond (1903-1976)

facts, 102

likelihood, 135

average man, 13

Quetelet, Adolphe (1796-1874)

-RRaleigh,

Sir Walter (1551-1618)

examination, 273

examinations, 273

Ramsey, Frank Plumpton

(1903-1930)

probability, 178

Ramsey, James B. ( - )

statistics, agreeable, 254

Read, Herbert (1893-1968)

measure, 138

Reade, Charles (1814-1880)

probabilities, 178

Redfield, Roy A. ( - )

average, 14

probability, mathematics of, 178

error, 81

posit, 62

probable, 185

theory of probability, 281

Reynolds, H.T. ( - )

measurement, 138

statistics, 254

law, 132

average minds, 14

dice, 69

fact, 102

statistical, 254

graph, 114

statistics, 254

cause, 27

probability, 46

facts, 102

reasoning, 194

theory, 281

facts, 102

Reagan, Ronald (1911-?)

Reichenbach, Hans (1891-1953)

Rhodes, Charles E. ( - )

Rickover, H.G. (1900-1986)

Ritsos, Yannis ( - )

Roberts, Nora ( - )

Robinson, Lewis Newton ( - )

Rogers, Will (1879-1935)

Rohault, Jacques ( - )

Romanoff, Alexis L. (1892-?)

ROSS, JoAnn ( - )

416 STATISTICALLY SPEAKING

Rousseau, Jean Jacques ( - )

Rudner, R. ( - )

Runyon, Damon (1884-1946)

Russell, Bertrand A. (1872-1970)

cause, 27

strong enough, 218

chance, 46

averages, statistical, 14

causality, 27

data, 58

facts, 102

laws, scientific, 132

measurement, 138

probability, students of, 178

second law of thermodynamics,

132

statistics, 255

error, 81

design of experiment, 66

experiment, 87

Russell, Cheryl (1953-?)

Russell, E.J. ( - )

Rutherford, Ernest (1871-1937)

-SSalsburg,

David S. (1931-?)

Samuelson, Paul A. (1915-?)

Sartre, Jean-Paul (1905-1980)

statistics, 255

predict, 156

probabilities, 178

probable, 185

Savage, L.J. ( - )

statistics, 255

Sayers, Dorothy L. (1893-1957)

theories, 282

Schiller, Friedrich (1759-1805)

chance, 46

probabilities, 179

Schlozer, Ludwig ( - )

statistics, 255

Schopenhauer, Arthur (1788-1860)

chance, 46

Schumacher, E.F. (1911-1977)

Scott, Sir Walter (1771-1832)

chance, 46

soothsayer, 157

Seaton, G.L. ( - )

statistician, 228

Seeger, Raymond J. (1906-?)

theory, 282

Segal, Erich (1937-?)

statistical expectations, 218

statistics, 256

Statistics, American Journal of,

statistics, professor of, 256

observation, 147

average, 14

cause, 27, 28

causes, 27

certainty, 32

chance, 47

chance, slaves of, 48

chances, disastrous, 47

die, 70

graph, 114

impossible, 123

mean, 14

measure, 138

observations, 147

observers, 147

probable, 185, 186

reasons, 195

Shapere, Dudly ( - )

facts, 102

Shapiro, Karl (1913-?)

statistics, 257

Shaw, George Bernard (1856-1950)

certainty, 32

fact, 103

facts, 103

probability, mathematics of, 179

256

Seuss, Dr.

Shaffer, Peter (1926-?)

Shakespeare, William (1564-1616)

Shelley, Percy Bysshe

(1792-1822)

observation, 146-7 chance, 48

AUTHOR BY SUBJECT INDEX 417

Sherman, Susan (1939-?)

analysis, age of, 4

Shewhart, W.A. (1891-1967)

probability, laws of, 189

Sheynin, O.B. ( - )

impossibility, 123

Skinner, B.F. (1904-1990)

knowledge, 126

Slonim, Morris James ( - )

average, 14

sampling, 202

Smedley, F.E. (1818-1864)

facts, 103

Smith, Logan Pearsall (1865-1946)

statistics, 257

Smith, Reginald H. ( - )

statistics, 257

Smollett, Tobias (1721-1771)

facts, 103

Snedecor, G.W. ( - )

statistician, 228

Snood, Grover

averages, law of, 14

Solomon, Ben ( - )

statistics, 257

Sophocles (496-406 B.C.)

knowledge, 141

measure, 139

random, 192

South, Robert ( - )

probable, 186

Spearman, Charles (?-1945)

measurement, 139

Stalin, Josef (1879-1953)

statistic, 258

Stamaty, Mark Alan ( - )

statistics, 258

Stamp, Josiah (1880-1941)

average, 15

statistical method, 218

statistician, 228

statisticians, 228

statistics, Indian, 58

Steadman, Frank M. ( - )

quality control, 189

Stekel, Wilhelm (1868-1940)

Steme, Laurence (1713-1768)

statistics, 258

hypothesis, 120

statistical balance, 218

Stewart, Alan ( - )

averages, law of, 15

Stigler, Stephen M. ( - )

least squares, method of, 258

statisticians, 229

Stoppard, Tom (1937-?)

average, 15

averages, law of, 15

facts, 103

probability, 179

statistics, 258

Stout, Rex (1886-1975)

Streatfield, Mr. Justice Geoffrey

(1897-1978)

facts, 103

Strong, Lydia ( - )

forecast, 108, 109

forecaster, 109

forecasts, 108

surveys, 267

Strunsky, Simeon (1879-1948)

statistics, 258

Sturgeon, Theodore ( - )

percent, 153

Suidas ( - )

dice, 70

Swift, Jonathan (1667-1745)

observation, 147

-TTaylor,

J.P. ( - )

Tchekhov, Anton (1860-1904)

Tennyson, Alfred Lord (1809-1892)

Terence (185-159 B.C.)

causes, 28

statistics, 259

chance, 48

chance, 48

facts, 103

418 STATIS TlCAL LY S P E A K "

Tertullian (160-230)

impossible, 123

Thackery, William M. (1811-1863)

statistics, 259

The Bible

chance, 48

The Editors of The American

S tu tisticiun

statisticians, 229

statistics, 259

Thompson, William [Lord Kelvin]

(1824-1907)

measure, 139

Thomsett, Michael C. ( - )

analysis, probability, 5

forecasting, 109

hypothesis, 121

likelihood, 135

statistician, 229

statistics, 259

statistics course, 272

Thoreau, Henry David ( 3

errors, 81

tools, 218

Thom, John (1947-?)

7-

thinking statistically, 260

Thucydides (471-400 B.C.)

chance, 49

Thurber, James (1894-1961)

data, scientific, 58

impossible, 124

probability, 180

statisticians, 229

Thurston, L.L. (1887-1955)

factor analysis, 219

Tiilmon, Johnnie ( - )

statistic, 260

Tindall, Matthew (1657-1733)

fact, 103

Tippett, L.C. ( - )

data, 58

degrees of freedom, 64

variation, 288

probables, 186

Toffler, Alvin (1928-?)

Tollotson, John ( - )

probability, 180

Tolstoy, Leo (1828-1910)

cause, 28

chance, 49

laws, 132

statistics, 260

true gospel, 284

cause and effect, 28

Tsu, Lao (c. 604-531 B.C.)

average, 15

Tufte, Edward R. (1942-?)

graphical integrity, 115

statistical graphics, 115

analysis, data, 5

error, possible, 81

jackknife, 219

praying, 154-5

statistician, 230

statisticians, 230

statistics, 260

teaching, 272

graph, 116

average, 16

average civilized man, 16

average man, 16

experimenting, 87

facts, 104

percent, 153

statistics, 261

Trollope, Anthony (1815-1882)

TSU, Chuang ( - )

Tukey, John W. (1915-?)

Turgenev, Ivan (1818-1883)

Twain, Mark (1835-1910)

-UUnknown

actuaries, 1

actuary, 1

analysis, 5

biostatistician, 231

causality, 28

cause, 29

chance, 49

AUTHOR BY SUBIECT INDEX 419

chances, 74

confounded effect, 274

correlation, 54

critical ratio, 219

curve, 74

data, 58

distribution, 75

error, type 111, 81

error, type IV, 81

experiment, 88

experiment, eleven phases of an,

88

facts, 104

h yperexp onen tial, 74

hypothesis, 121

laws, 133

measure, 139

measurements, 139

middle road, 16

outlier, 150

Poisson, 75

Poisson distributions, 74

predict, 157

probability, 186

quality, 189

random, 192

recurse, 196

regression, 197

samples, 203

statistician, 231

statisticians, 230, 231, 262

statistics, 231-2, 261, 262

statistics class, 262

theorem, 282

theory, 282

Twyman’s Law, 133

variance, 288

variates, 288

-VVan

der Post, Laurens ( - )

statistics, 262

Venn, J. (1834-1923)

average, 16, 17

averages, 17

Virgil (70-19 B.C.)

causes, 29

chance, 49

statistics, 63

average, 17

define, 63

forecast, 110

probabilities, 180

probability, 180

theorising, 282

probabilities, 180

probability, 181

probability, theory of, 181

statistical physics, 219

statistics, 263

Volkhart, Edmund H. (1919-?)

Voltaire (1694-1778)

Von Clausewitz, Karl (1730-1831)

Von Mises, Richard (1883-1953)

-w-

Walcott, Derek (1930-?)

Walker, Marshall ( - )

statistics, 263

certain, 33

forecast, 110

probability, 181

statistics, 263

statistics, mathematical, 263

Waller, Robert James (1939-?)

probability, 181

Walsh, John E. (1919-?)

nonparametric, 63

Wang, Chamont (1949-?)

Bayesians, 18

statistical inference, 263

statistician, 232

statistics, 263

Watson, Alfred N. ( - )

error, standard, 81

Watson, Dr.

reasoning, 195

Waugh, Evelyn (1903-1966)

statistics, 263

420 S TATIS TICALLY SPEAKlNG

Wells, H.G. (1866-1946)

statistical thinking, 220

statistician, 232

West, Jessamyn ( - )

facts, 104

Weyl, H e r " (1885-1955)

experimenter, 88

Whatley, Richard (1787-1863)

fact, 104

Wheeler, William Maston ( - )

variability, 288

White, William F. ( - )

statistics, 264

Whitehead, Alfred North

(1861-1947)

analysis of the obvious, 5

error, 82

experiment, 88

fact, 104, 105

facts, 105

law, 133

laws, 133

observation, 147

probzbility, 181

samples, 203

statistics, 264

Whyte, Lancelot Law (1896-1972)

probability, 181, 182

Wigner, Eugene P. (1902-1995)

statistician, 232-3

Wilde, Oscar (1856-1900)

average, proper, 17

examinations, 274

facts, 105

impossible, 124

probability, 182

taught, 272

dice, 70

probability, 182

Wilkins, John (1614-1672)

probable, 186

Wilson, E.B. (1856-1939)

statistics, 265

Wolfowitz, J. ( - )

theorems of statistics, 283

Wonnacott, Ronald J. ( - )

statistics, 265

Woodward, Robert S. (1849-1924)

probabilities, theory of, 182

Wordsworth, William (1770-1850)

measured, 139

likelihood, 135

Wilder, Thomton (1897-1975)

Wright, Jim (1922-?)

-YYates,

F. ( - )

statisticians, 21 9-20

Yeats, William Butler (1865-1939)

statistics, 265

Youden, W.J. (1900-1971)

normal law of error, 75

Yule, G.U. ( - )

regression, 198

statistician, 233