

CHAPTER XXIV

Figures, Fallacies, and Frauds

SOME FALLACIES OF STATISTICAL OPERATIONS; AND SOME
IN REASONING.

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."

—MARK TWAIN in his *Autobiography*

"What is an average?"

It is merely a mathematical calculation—and often a false one at that. The average doesn't actually exist. Statisticians are always talking about the "average man." Did you ever see one?

I suppose the average height of people in the U. S. A. is about 5½ feet. On that basis, all mattresses should be 5½ feet long. What's our average age? About 35? Then there is no need to manufacture baby carriages or wheel chairs. A famous man once remarked that it was easy to drown in a stream with an average depth of six inches.

An average is a dangerous thing—as was learned by the fellow who wasn't afraid to try going over Niagara Falls in a barrel, because, on the average, not one person out of fifty million had died doing it.

—R. C. TRUNDLE in *Trundle Talks*

STATISTICS are the bookkeeping of political economy, and many suppose that, if figures can be produced to support an argument, the case is settled. There is an old saying that "figures do not lie but liars can figure," and they often produce figures that are a mass of trickery and deceit. The subject of statistics is too broad for discussion here, but we touch on a few aspects to put the reader on guard against common fallacies.

Consider a few fallacies which are all too common in statistical operations. Statements of ages made by women are always seriously below the truth and sometimes a definite scale of percentages is used in correcting age figures reported in some questionnaires. Replies to questions from college graduates regarding earnings and incomes present averages far from the truth. The reason is obvious: the successful reply to such questionnaires and the failures do not; and incidentally, prying generally leads to an over-statement of success. On the contrary, if such statements are prepared for the purpose of qualifying for pensions and benefits, these figures are often under-stated. Similarly prop-

erty values and incomes may be over-stated when seeking credit and under-stated when they may be used for purposes of taxation or in solicitation of gifts or contributions.

Aside from economic questions there are sometimes factors to be considered in more personal matters. We saw recently a questionnaire of a highly personal character, dealing with habits and morals. It is perhaps natural to lie to conceal our frailties but *per contra*, in one case, where replies were unsigned and unkeyed, graduates of one college, resentful of such inquisitiveness, lied with utter abandon, partly from a spirit of deviltry, wanting to discredit the study, and partly to shock snoopers engaged in such a survey—and they felt safe because of the anonymity of the replies. Also there seems to be a kind of Baron Munchausenish streak in many of us, which leads us to tell "tall stories" which are not always wholly true. Don't be too quick to accept all statistical studies as authentic.

One of the most common fallacies is to take unproven statements as law and gospel and to think that because something is "in a book" it must be true. For years we have had "statistics" copied, quoted and bandied about with very little basis in fact. It is stated again and again that farm women go crazy in far higher percentage than do city women; but apparently there is no truth in this statement, though it crops up repeatedly. We have already referred to the statement that one third to one half of our people are living in slums, but for this statement it is very doubtful if there is any real authority. Questionable medical figures are sometimes produced to prove that the use of tobacco increases blood pressure; but the only definite data on this question which the writer can find show that, if tobacco has any effect, it is to reduce blood pressure, although the difference is so slight that no conclusive opinion is justified.

It is generally necessary to be very careful in accepting government figures, especially if they can be used to influence legislation or to create jobs. During the First World War, figures were released regarding the number of desk-workers necessary for each man in the armed forces. If we accepted the ratios published, half our people of both sexes not in uniform would have had to become desk-workers at Washington! When the abolition of rent control was under consideration, figures were released from Washington, giving instances of increases in rents following the relaxation of rent-fixing regulations. Long lists of specific properties in various cities, with streets and numbers cited, showed how rents had been jumped; but investigation showed

that many addresses were fictitious—streets which did not exist and street numbers representing vacant lots. Apparently some of this publicity was an absolute fraud in an attempt to support a policy of rent control and to perpetuate jobs.

A similar instance of misrepresentation was detected when figures were released some years ago showing what purported to be the farm income. When it was desired to use these figures to prove that the farmer was in hard luck and needed help, one set of figures was used. Another time, when it was desired to show that the administration had done much to improve the lot of the farmer, another set was used, but covering the same years, all supposedly from the same source. It is certainly hard to see any explanation of such discrepancies other than fraud.

Frequently comparisons are made regarding the *rate* of taxation, here and abroad, using as a basis the rates applied to personal income taxes. This looks legitimate, but if the reader will re-read what was said about the taxation of corporations, he will see that a greater—far greater—proportion of the earnings of industry is taken from the owners than *individual* tax rates would indicate. We tax the income of the owners of business twice, first when earned and again when distributed; and any statement of the percentage taken of income actually received by stockholders is tricky, for it ignores the tax already paid by the company, money which the rightful owner never even sees. Even in countries which, like ourselves, tax corporate income, comparisons limited to only one phase of income taxation may be misleading.

An argument sometimes stressed as an excuse for high taxes is an attempt to compare our national personal income tax rate with rates in other countries, ignoring this tax on business, the heavy state income taxes, and the increasingly frequent city income taxes. Obviously a comparison of our national income tax alone with the national income tax in a country where there is no other income tax is meaningless, and the United States is the only major power imposing a capital gains tax.

When price-fixing was terminated, statements of the sudden increase of prices of footstuffs were released. A twenty-five percent rise in cost of twenty-eight basic commodities was reported, but studies showed that increases in retail prices actually paid were negligible. Frequently there was misrepresentation, because comparison was made between prices paid after price control was relaxed and official prices authorized by the office of Price Stabilization; but the latter figures were meaningless,

for many commodities had disappeared entirely from the market, or were obtainable only on the black market at prices far higher than those set. Comparisons should have been made, not with the fictitious set-price, but with prices actually paid.

A similar instance of misrepresentation was a statement that the price of silk had increased by a hundred and forty percent as a result of ending price controls. During the period in question there was just one sale of silk and that by a government agency out of the government's stock—a "wash sale," or "rigging the market," as such practices are called in Wall Street where they are sharply condemned. The price in such a sale means nothing: it is like a trick we once saw in a dog show where two exhibitors each agreed to pay the other \$5,000 for a dog, so each had a \$5,000 dog on exhibition!

The bookkeeping of the TVA is an instance of the use of figures in a way which it is no exaggeration to call fraudulent. This is covered more adequately in a later chapter: decide for yourself if its methods are honest. Were private enterprise to resort to the same tricks, follow the same deceptive bookkeeping, and were they to attempt to sell securities by the same misrepresentation, the government would soon make short shrift of them. And yet the TVA puts over its program in Congress; and, with misleading financial statements and reports, continues to seek—and get—financing by the American taxpayers. If you or I tried such a scheme, the SEC would soon crack down on us—and rightly—and yet we gullible people continue to tolerate it, accept its statements, and go on supporting it!

There are other errors which creep into government statistical reporting. Often, in giving financial figures, they make no adjustment for the reduced value of the dollar, and such items as the amount of money saved and the amount of life insurance carried cannot be judged by comparing amounts in devalued fifty-nine-cent dollars with amounts in the old-time dollar. These comparisons often disregard completely our growth of population; and many of these figures, to have any significance, should be on a per capita basis. Figures published to show an increase in the value of bonds cannot be trusted. Bonds bought in the old days, with old-time honest dollars, may show a "paper profit," but if finally redeemed in fifty-nine-cent dollars or if figured in purchasing power, they show a loss. Even bonds bought today in devalued dollars will show a loss, regardless of supposed increment by interest accrued, if devaluation is again resorted to or if inflation continues unchecked.

To illustrate: it is claimed that bonds costing \$750 ten years ago are today worth \$1000, but that thousand dollars will not buy nearly as much today as would the original \$750—probably only about sixty percent as much. Had the money been invested in a certain stock, it would today be worth more than twice its price and it would have retained its full purchasing power. Furthermore, dividends, during the ten years, would have amounted to more than three times the paper profit of \$250 shown by the bonds.

Another source of error lies in basing conclusions on a supposed national income, an estimate of the total income of the American people—a pretty vague and uncertain quantity. Recently three governmental departments have released three widely differing sets of figures. We believe it is practically impossible to get any figure of this sort; and, while there may be some figures indicative of what the national income might be guessed at and might furnish some basis for comparison, the whole thing is pretty nebulous. Mr. Thomas Hewes, a former Assistant Secretary of the Treasury, has said in his book, *Decentralize for Liberty*, that it is often argued that, if what we call the national income is big enough, we can pay all kinds of taxes for all sorts of foolish spending, and no one will feel the burden. For this reason, figures which are supposed to represent the national income are often exaggerated to make it appear that taxation takes a smaller proportion than it does. Mr. Hewes says, "The expression 'national income,' as commonly used in discussion of taxation and spending, is partly misleading and partly fictitious," and he adds, "It is physically impossible to arrive at an accurate dollars-and-cents determination of national income."

A common source of error in statistical methods is to attempt to compare figures compiled in totally different ways. Figures have often been published showing that the United States has a high infant death rate in comparison with other countries. But infant mortality has been computed in different countries on entirely different bases, and figures are often incapable of comparison. In some countries, they record all births and deaths. In other countries they do not record any births until after a lapse of months and sometimes a year. Sometimes still-births are counted as births and deaths and sometimes they are totally ignored. There is also a great difference in the accuracy of vital statistics in different countries.

Another weakness in statistical studies is basing an argument on insufficient number of cases. Dr. Bailey of Cornell once told,

with a chuckle, of a statement which he had made to the effect that some tree—I don't recall what—was gradually becoming extinct in the United States. This elicited an indignant letter from a country woman, who said he was quite in error, because, when she was little, there were six such trees that she could see from her window, and now there were seven. Surely such trees must be increasing! A similar case came to the writer's attention in public health work. A letter from a health officer complained that the Health Department was giving insufficient attention to appendicitis as a cause of death, for it was the cause of fifty percent of the deaths in his district. Investigation showed that in the backwoods district which this health officer served, there were only two deaths in the period covered, for the population was very meagre, and of these two deaths, one was from appendicitis. A fallacy, akin to trying to deduce general laws from too few instances, is the "inclusive" fallacy often seen in an attempt to justify racial or religious prejudices. You were once short-changed by a waiter in a Chinese restaurant; therefore all Chinese are dishonest. Obviously, it is not safe to deduce generalities from such limited data.

Akin to this fallacy is an assumption of exact accuracy in some vague figures and guesses. A story is told of a bridal couple visiting the Grand Canyon and the groom informing the bride that the colossal formation was 200,000,004 years old, explaining that the guide had told him, when he visited it four years previously, that it was then two hundred million years old. Sometimes in economic studies we find the same absurd attempt to draw positive and exact deductions from vague approximations and estimates, as in the case of "national income," already discussed.

Going back to governmental reports, we have an instance of this same evil of drawing too big conclusions from too little information. The writers of a government report comment on the low income of farm families. The fallacy is that they have data from twenty-five thousand families out of about 6,000,000 farm families in the United States, and there is no indication whatever that the twenty-five thousand families, from which they derived their figures, represent a fair sampling. If their twenty-five thousand families were taken from one district or from one line of agriculture or from one class, they would not be fairly representative of the entire number.

There is a common impression that if we average a sufficient number of figures, we shall get accuracy; but accuracy of an average

is limited by accuracy of the original figures. A dozen competent observers visit a city and study it carefully, and they all estimate its population. There will be some approximation to correction through averaging their estimates; but if you stop a dozen men in the street and ask them the population of Tuticarin, and then average their guesses, you will be no nearer the truth than if you had asked one person who had some slight knowledge of the city, who had heard of it or perhaps visited it. Averaging will not correct figures which are little more than guesses.

In connection with money and the commodity dollar, we said something about unbalanced averages, but perhaps this should be developed a little further. If you are studying the cost of what goes on your table, you may average the prices paid for the articles you buy, say flour at ten cents, sugar at twelve cents, coffee at a dollar, tea at two dollars, chocolate at one dollar. Add these prices together and divide by five. You have an average price of about eighty cents, an entirely erroneous figure, for it takes no account of the different amounts used of different foods. Suppose you buy:

200 lbs. of flour	@	\$.10	\$20.00
100 " " sugar	"	.12	12.00
25 " " coffee	"	1.00	25.00
10 " " tea	"	2.00	20.00
15 " " chocolate	"	1.00	15.00

You have 350 lbs. at a total cost of \$92.00; so the average of your purchases is not eighty cents a pound but about twenty-six cents. This illustrates the importance of weighing averages properly; and, in working out a price index, it is most important that the right weight should be given to each commodity.

In competitive contracting, notably in official contracts, advantage is sometimes taken of this complication to underbid on a contract. In one state it was the custom in letting contracts for excavation of a canal, to get estimates in terms of a price per cubic yard of excavation of sand, clay, gravel, rock, etc. These prices were averaged, and the contract went to the concern whose average price was the lowest, but it was very easy for those on the inside, who knew the conditions and who had access to test borings, to find out the nature of the soil. If, for example, there was no rock, if it was all easy loam, they could put a high price on that and a very low price on rock excavation, and thereby get a contract. Similarly in printing contracts, sometimes a mistake is made by averaging bids for each item with no regard to whether

some bids are for a million envelopes while other bids are for a hundred of some simple printed form.

There are different kinds of "averages": a mean average obtained by adding together all components and dividing by the number of components, giving us what is commonly called an average; but, as we have seen in the case of unbalanced bidding, this is not always a correct way to arrive at the truth. For many purposes we determine the median or the norm. By the median, we mean the point between two extremes where the number of cases exceeding and falling below this division are equal. For instance, to study distribution of the stock of a corporation, classify the numbers of stockholders according to the number of shares held, in a progressive column starting, say, with five to ten, ten to twenty-five, and so on, and perhaps by hundreds and finally by thousands. Then determine the point where, if you draw a line through this column, there will be the same number of stockholders listed both above and below the line. That will give a much more representative picture than would the mean average, if a few of the officers each owned say a hundred thousand shares of stock and the rest of the stockholders own under ten. For a purpose of this sort what we are seeking is not the average holding but to determine the holdings of the greatest number of stockholders.

Another variation is to determine the norm, which means to find in which group there is the greatest number. This is equally applicable to studying the stockholdings of a corporation or wage levels. We might for example find that fifty or seventy-five percent of the stockholders held from ten to fifteen shares of stock or that seventy-five percent received wages of less than \$2500 a year. That immediately gives us a picture of the conditions and for many investigations it is hardly necessary to go much further.

Something similar is frequently found in cost accounting. A manufacturer will find that his overhead runs 20%, and he will add 20% to the cost figures of everything he puts out. It may happen, and it often does happen, that some things represent very little overhead while others represent a high overhead, and the quantities of these two commodities produced each year may vary greatly. In cost accounting of this nature, it is wise to figure, not the overhead for the entire output of a concern with a diversified product, but to figure the overhead for each product, or trouble will result.

Before leaving the subject of statistics, a word should be said about their graphic portrayal. Anyone who has worked with figures is familiar with the common forms in which curves, graphs, and charts of various kinds are drawn, but there are some points which should be borne in mind, with which many are not familiar. The ordinary graph with a curve, indicating by elevations and depressions the ups and downs of whatever statistics it is desired to portray, may be drawn in two ways on two different kinds of paper. Generally, these curves are drawn on a paper in which the lines indicating ups and downs of the curves are spaced evenly. However, for some purposes, it is far better to use what is called logarithmic paper, in which, as you ascend on the chart, the interval between each two lines represents a diminishing quantity.

The difference between these two charts that is the ordinary chart shows *the absolute figures*, whereas the chart on logarithmic paper shows *the rate of increase*. For example, if you plot the increase of a savings bank account at compound interest, on ordinary paper, the curve will mount at an increasing rate because, as interest is compounded and the balance increases, the interest becomes greater every year, so the balance increases more rapidly if we consider simply the absolute sum of the balance. If plotted on logarithmic paper, assuming that the interest rate remains constant, the "curve" will go up at the same *rate* being a straight line, increasing at the same rate every year. Similarly, curves of population showing the increase of population of a city, drawn on plain paper, will show the increase in numbers, but, drawn on logarithmic paper, it will show the rate of increase. Which method we are to pursue depends entirely upon our purpose, but this point should be understood by those who attempt to use or to read charts of this character.

A common fallacy is to draw a curve with its base line not at zero but at some arbitrary point which gives a greatly exaggerated picture of the increase. For example, we have a city of a hundred thousand and wish to show the increase in population. If we draw a curve with the base line at the eighty thousand point and then show the population the first year at the hundred thousand point, the next year at a hundred and ten thousand, and so on, the effect on the casual onlooker will be entirely different from exactly the same curve drawn on a chart with the base line at zero. We instinctively judge by the appearance of the curve; and if the curve mounts from ninety thousand to a hundred thousand and then to a hundred and ten thousand,

it looks as if it were going up far more rapidly than if zero were the base.

A somewhat technical example may make this a little clearer. Not long ago an advertiser stated that his product would withstand a temperature "twice that of boiling water," meaning that it would stand a temperature of 424 degrees Fahrenheit 212 being the boiling point. However, as we all know, zero on the thermometer scale is not at true zero, as is proved by the fact that temperatures often go far below zero. Zero on the scale is purely arbitrary; and the absolute zero, at which there is no heat, is about 461 degrees below zero on the Fahrenheit scale. Now, if we show it on a graph, starting with the zero on the thermometer scale as our base, the temperature which this product would stand would be twice as high as the temperature of boiling water; but if we draw these charts to show true temperature, with a base point 461 degrees below the zero on the scale, we see that the temperature which the product withstands is only about 30% higher than boiling water.

A word now about a few common fallacies: among the most common are the "nonsequitur"—it does not follow and "post hoc, ergo propter hoc"—"after this, therefore because of this." The first, the non-following argument, often runs like this: "Free industry and the profit motive have often failed and been productive of evils: therefore government should take over." Utterly illogical: failure of free enterprise does not prove that the government would do any better. Quite the contrary! In matters of business the government fails far more often than does private industry. Because A fails it does not prove that B will do a better job.

This fallacy lies back of much dangerous political thinking and is frequently advanced as an argument for socialistic and communistic programs. Some business men are crooks, some large enterprises have been honeycombed with fraud, and there is room for plenty of improvement; but, by and large, the intelligence and morality of business is superior to that of politics and the business man is more worthy of trust than a ward-heeler. A business man makes his success by ability, effort and honesty, whereas the man in politics sometimes succeeds through corrupt methods little better than buying votes.

The "post hoc" fallacy is the argument illustrated by an old school-boy "oration." A village father argues that because more ships run aground on a sand-bar since the spire was built on the church the spire should be razed. The wrecks might just as

well be charged to the birth of a red-headed baby, and indeed in former days such idiotic reasoning caused the persecution of many an unfortunate. The price of liquor, betting on horse races, and salaries of teachers and ministers have all gone up in recent years. Which "causes" which? Clearly there is no relation.

A favorite trick in argument, when one is getting the worst of the discussion, is the "ad hominem" turn, shifting the argument from the case in point to personalities and habits of the individual, and turning attention into by-paths leading nowhere. Again and again, especially in political investigations, we lose sight of the point at issue in discussing the habits and ways of attorneys, witnesses or prosecutors often with no relation whatever to the question in hand or even to the credibility of those under fire.

QUESTIONS

Would you necessarily accept as authentic, statistics because they are printed in a book or reputable periodical?

Do you believe all figures released by departments of the government?

Are figures in dollars showing savings, investments, etc., reliable when uncorrected to counterbalance devaluation?

Are figures showing the increase of investment in government bonds reliable? Wherein lies the fallacy?

Is it easy to estimate the total income of a hundred and sixty million people with accuracy?

For comparative purposes should figures be checked to see if they are compiled on the same basis?

Can you make broad deductions from very few instances?

If judging the reliability of statistics, would you consider the motives which may affect them and would you consider also the purpose for which they are issued?

What is meant by an unbalanced average?

What are the differences between an average, a mean and a norm?

In the ordinary curves, graphs, and charts, does it make any difference what base we select for drawing and whether it is zero or some arbitrary point?

What is the difference between the methods of drawing charts showing absolute figures and rate figures?

If two events occur simultaneously, does it always follow that one is the cause and the other is the effect?

Can we say that because remedy A fails to cure a disease remedy B is better; or that, because conditions in the United States are not perfect, we should adopt communism?

Is it logical to say that because some business men are dishonest we should turn the management of business over to our politicians?