of interest, either to obtain additional information needful for administrative purposes, or, in countries possessed of representative institutions, to supply statistics asked for by parliaments or con­gresses. It is not necessary to refer particularly to this class of statistical information, except in the case of the census. This is an inquiry of such great importance that it may be regarded as one of the regular administrative duties of Governments, though as the census is only taken once in a series of years it must be mentioned under the head of occasional or special inquiries undertaken by Governments. In the United Kingdom the work is done by the registrars-general who are in office when the period for taking the census comes round. On the Continent the work is carried out by the statistical bureaus of each country,—except France, where it is under the supervision of the minister of the interior. For further information on this subject reference may be made to the excellent chapter in M. Maurice Block’s *Traité* entitled “ Recense­ment.” See also “Instructions to the Superintendent Registrar of Births and Deaths as to his duties in taking the Census,” 1871 ; also Census, vol. v. p. 334 *sq.*

B. The primary statistical quantities for which individuals or corporations are responsible may be divided into three categories.

(1) Among those which are compiled in obedience to the law of the land are the accounts furnished by municipal corporations, by railway, gas, water, banking, insurance, and other public companies making returns to the Board of Trade, by trades unions, and by other bodies which are obliged to make returns to the registrar of friendly societies. The information thus obtained is published in full by the departments receiving it, and is also furnished by the companies themselves to their proprietors or members.

(2) An enormous mass of statistical information is furnished voluntarily by public companies in the reports and accounts which, in accordance with their articles of association, are pre­sented to their proprietors at stated intervals. With these statistics may be classed the figures furnished by the various trade associations, some of them of great importance, such as Lloyd’s, the London Stock Exchange, the British Iron Trade Association, the London Corn Exchange, the Institute of Bankers, the Institute of Actuaries, and other such bodies too numerous to mention.

(3) There are cases in which individuals have devoted themselves with more or less success to obtaining original statistics on special points. The great work done by Messrs Behm and Wagner in arriving at an approximate estimate of the population of the earth does not belong to this category, though its results are really primary statistical quantities. Many of these results have not been arrived at by a direct process of enumeration at all, but by ingeni­ous processes of inference. It need hardly be said that it is not easy for individuals to obtain the materials for any primary statistical quantity of importance, but it has been done in some cases with success.

*Operations Performed on Primary Statistical Quantities.—*Only a brief description of matters connected with the *technique* of the statistical method can be given in this article. In order to form statistics properly so called the primary statistical quantities must be formed into tables, and in the formation of these tables lies the art of the statistician. It is not a very difficult art when the prin­ciples relating to it have been properly grasped, but those who are unfamiliar with the subject are apt to underrate the difficulty of correctly practising it.

*Simple Tables.—*The first thing to be done in the construction a table is to form a clear idea of what the table is to show, and to express that idea in accurate language. This is a matter which is often neglected, and it is a source of much waste of time and occasionally of misapprehension to those who have to study the figures thus presented. No table ought to be considered complete without a "heading ” accurately describing its contents, and it is frequently necessary that such headings should be rather long. It has been said that “you can prove anything by statistics.” This statement is of course absurd, taken absolutely, but, like most assertions which are widely believed, it has a grain of truth in it. If this popular saying ran “you can prove anything by tables with slovenly and ambiguous headings,” it might be assented to without hesitation. The false “ statistical ” facts which obtain a hold of the public mind may often be traced to some widely circulated table, to which either from stupidity or carelessness an erroneous or inaccurate “heading” has been affixed.

A statistical table in its simplest form consists of “primaries ” representing phenomena of the same class, but existing at different points of time, or coming into existence during different portions of time. This is all that is essential to a table, though other things are usually added to it as an aid to its comprehension. A table stating the number of persons residing in each county of England on a given day of a given year, and also, in another column, the corresponding numbers for the same counties on the corresponding day of the tenth year subsequently, would be a simple tabular statement of the general facts regarding the total population of those counties supplied by two successive censuses. Various figures might, however, be added to it which would greatly add to

its clearness. There might be columns showing the increase or decrease for each county and for the whole kingdom during the ten years, and another column showing what *proportion,* expressed in percentages, these increases or decreases bore to the figures for the earlier of the two years. Then there might be two columns showing what proportions, also expressed as percentages, the figures for each county bore in each year to the figures for the whole kingdom. The nine-column table thus resulting would still be simple, all the figures being merely explicit assertions of facts which are contained implicitly in the original “primaries.”

*Complex Tables.—*Suppose now we have another table precisely similar in form to the first, and also relating to the counties of England, but giving the number of houses existing in each of them at the same two dates. A combination of the two would form a complex table, and an application of the processes of arithmetic would make evident a number of fresh facts, all of which would be implied in the table, but would not be obvious to most people until explicitly stated.

The technical work of the statistician consists largely in opera­tions of which the processes just referred to are types.

*Proportions.—*The most usual and the best mode of expressing the proportion borne by one statistical quantity to another is to state it as a percentage. In some cases another method is adopted —namely, that of stating the proportion in the form “one in so many.” This method is generally a bad one, and its use should be discouraged as much as possible, the chief reason being that the changing portion of this kind of proportional figure becomes greater or less inversely, and not directly, as the phenomenon it represents increases or diminishes.

*Averages.—*Averages or means are for statistical purposes divided into two classes, the *geometrical* and *arithmetical.* An arithmetical mean is the sum of all the members forming the series of figures under consideration divided by their number, without reference to their *weight* or relative importance among themselves. A geometrical mean is the sum of such figures divided by their number, with due allowance made for their weight. An example will make this clear, and the simplest exam­ple is taken from a class of statistical quantities of a peculiar kind —namely, *prices.* The price of a given article is the approximate mathematical expression of the rates, in terms of money, at which exchanges of the article for money were actually made at or about a given hour on a given day. A *quotation of price* such as appears in a daily price list is, if there has been much fluctuation, only a very rough guide to the actual rates of exchange that have been the basis of the successive bargains making up the day’s business. But let us suppose that the closing price each day may be accepted as a fair representative of the day’s transactions, and let us further suppose that we desire to obtain the *average* price for thirty days. Now the sum of the prices in question divided by thirty would be the arithmetical mean, and its weak point would be that it made no allowance for the fact that the business done on some days is much larger than that done on others ; in other words, it treats them as being all of equal weight. Now if, as is actually the case in some markets, we have a daily account of the *total quantities sold* we can weight the members accurately, and can then obtain their geometrical mean. There are cases in which the careless use of arithmetical means misleads the student of the social organism seriously. It is often comparatively easy to obtain arithmetical means, but difficult to obtain geometrical means. Inferences based on the former class of average should be subjected to the most rigid investigation.

Before closing this short survey of the very important subject of averages or means, it is needful to discuss briefly the nature of the phenomena which they may safely be regarded as indicating, when they have been properly obtained. Given a geometric mean of a series of numbers referring to no matter what phenomenon, it is obvious that the value of the mean as a *type* of the whole series will depend entirely on the extent of divergence from it of the members of the series as a body. If we are told that there are in a certain district 1000 men, and that their average height is 5 feet 8 inches, and are told nothing further about them, we can make various hypotheses as to the structure of this body from the point of view of height. It is possible that they may consist of a rather large number of men about 6 feet high, and a great many about 5 feet 5 inches. Or the proportions of relatively tall and short men may be reversed, that is, there may be a rather large number of men about 5 feet 4 inches, and a moderate number of men about 5 feet 11 inches. It is also possible that there may be very few men whose height is exactly 5 feet 8 inches, and that the bulk of the whole body con­sists of two large groups—one of giants and the other of dwarfs. Lastly, it is possible that 5 feet 8 inches may really give a fair idea of the height of the majority of the men, which it would do if (say ) 660 of them were within an inch of that height, either by excess or deficiency, while of the remainder one half were all above 5 feet 9 inches and the other half all below 5 feet 7 inches. This latter supposition would most likely be found to be approximately correct if the men belonged to a race whose average height was 5 feet 8