ON THE METHOD, AND THE RANGE, OF STATISTICAL INQUIRY, AS APPLIED TO THE PROMOTION OF THE SOCIAL SCIENCE.

J. T. DANSON, F.S.S.

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TT was La Place, I believe, who first directly suggested the application L to political and social science of the methods of observation, and of computation, already so successfully applied to what are termed the natural sciences.* As to the meaning of the suggestion, from such a quarter, there can be no reasonable doubt. It obviously implied an opinion, which is now far more widely prevalent than when La Place wrote, that all the real knowledge we do or can possess is obtained by the detection and development of natural laws; and that the existence and the operation of these laws are as constant and undeviating

in the moral as in the physical world.

There are, doubtless, persons by whom the correctness of this opinion is still disputed; but, as to those of us who come here with any faith in the work of the National Association, it behoves us to observe that it lies at the root of all we are assembled here to do, or to promote the doing of. Our presence here assumes the existence, or, at the very least, the admitted possibility, of a Science of Society; and, if there be such a Science, it must consist in the knowledge of natural and invariable Social Laws. Yet it is notorious that the amplest admission of this momentous hypothesis, as yet, only brings us to the borders of a region of which it cannot indeed be said that there are no maps, but of which there are so many, equal, or nearly equal in authority, and altogether different in character, that it were perhaps better there were none. And the reason of this excess of direction, and deficiency of true guidance, is not far to seek. Our social science is still destitute of a scientific method. It is, in truth, not yet a science; and without such a method it cannot become one.

Then how is the want to be supplied? Is the suggestion of La

Place feasible? Let us see.

In physical science, the first step towards the detection of a natural law is accurate observation of the facts or events elicited by, and marking, its operation. So far we are all agreed. Nor is there much scope for

^{*} Appliquons aux sciences politiques et morales la méthode fondée sur l'observation et sur le calcul, méthode qui nous a si bien servi dans les sciences naturelles, -Essai philosophique sur les probabilités.

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difference of opinion about the next step. Having ascertained the facts, we must record them, in order that, by an accumulation of observations, we may obtain a basis of induction wide enough to justify inference of the law under, or in accordance with which, the facts observed have succeeded each other.

To the due taking of these two steps it is necessary that we acquire, in some degree of perfection, two arts: (1) that of observing accurately; and (2) that of stating, precisely, what has been so observed. The second is as necessary as the first. For, as to each topic, what has been achieved (in observation) by one person, at one time, must be made known, as exactly as may be, and must be considered, concurrently with that which has been achieved by the same or by other persons at other times. The process involved in the practice of these two arts is precisely the same for all the sciences, commonly so called; and instances of its use will readily occur to all who are acquainted with the growth of even one or two of them. It may indeed be said that some of the sciences, inasmuch as they admit of extension by experiment, have the benefit of a method not here adverted to. But, in the sense in which the term is here used, observation includes experiment: the latter only implying power to vary, more or less, at the will of the observer, the circumstances under which the observation shall be made.

The question, then, before us is—can this, or anything analogous to this, the invariable, and invariably successful, process of investigation in physical science, be applied to social or moral science? I venture to answer that it can—provided the same strictness of method be observed. And in support of this answer, I now invite your attention to what I deem the proper method and the true range of statistical investigation.

And first, to define 'statistics.' This is not needless. So far as I am aware, no definition of the term has yet been put forth with authority sufficient to command general acceptance; nor have I yet met with any that satisfies me. Were a definition sought in common usage, we might be led to infer that it signifies nothing more worthy of our attention than the art of plausibly enforcing any proposition whatever by a tabular array of figures. Turning from common to correct usage, we find it to be, practically, the art of bringing facts within the range of mathematical computation. High authorities have indeed claimed for it the rank of a science—the basis of all positive science. And, in this point of view, Quetelet, one of its most ardent and successful cultivators, claims for it the distinction of being at once the last born, and the most universally applicable, of the sciences.

What it concerns us now to observe is, that as an art—as the art of bringing facts, not immediately involving number or quantity, within the range of methods of investigation immediately applicable only to those qualities—methods invested with the highest degree of certainty known to, or even conceivable by, the human mind, it affords, or may be reasonably assumed to afford, means of obviating the difficulties which have hitherto impeded the development of the

science we are assembled here to promote; and which, if our efforts be continued, we must either place upon a positive basis or bring into unmerited contempt.

That the better alternative is open to us, though upon conditions which some may deem impracticable, and others too laborious, I anticipate no difficulty in now proving—if I can but secure your attention.

I have suggested that the methods of statistics are, simply, those necessary to bring any observed facts logically within the scope of mathematical computation. If this be so, it need scarcely be added that the most arduous and important labour of the true statist precedes his use of figures. He has to bring all the facts presented to him, whatever they may be, touching any given topic, properly within the category of number, or of quantity. It is said that many of the facts encountered by the student of social phenomena cannot, from their very nature, be thus reduced to lines or figures. This objection I will deal with presently. Let us first obtain a clear view of the proposed method. This done, we may more fitly consider to what and have for it is applied.

what, and how far, it is applicable.

Having ascertained a single fact, and determined the category into which it falls, we have arrived at unity. But we cannot add a second fact, so as to call in the agency of number, even in its lowest stage, until the like accordance of such second fact with the conditions of the category be also ascertained. Here lies the real labour of the statist who truly meets the conditions of his art. It is a labour of definition and analysis. To call a spade a spade, distinctively, we must first distinguish it from a shovel. We must define. Then, when counting spades we must not include shovels. We must analyse. The enumeration at which we aim, to be legitimate, to be otherwise than deceptive, must be of true units—of facts which, in reference to the quality enumerated, are identical. To this end the basis of identity must be clearly described, and its existence ascertained. In other words, by due preliminary definition our figures become intelligible. That is the first requisite. By observance of our definitions, we secure a second requisite, precision. A common example will show this: let the object be to make known how many persons, among those inhabiting a given locality, have, within a given period, been convicted of a given crime. Here the definitions required are (1) of the locality; (2) of what shall be deemed habitation within it; (3) of the period; (4) of the process of conviction; and (5) of the crime. Each person enumerated must fall within all five.

But to be intelligible and precise is not all that is required. Our statistics must also be full. They must embrace all the particulars requisite to complete the proof or statement intended. In the example given I have assumed that the convictions in question shall be those taking place among the inhabitants of a given locality. Now, the very first use, in argument, of any number thus elicited, may raise the question—what, at the same period, was the number of such inhabitants? Want of this information may bar the application of

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what is given. Regard to fulness, or completeness, therefore, counsels the addition of such information.

Finally, every statistical statement should be accompanied by sufficient means of verification. Though personal authority cannot here be said to have no place, its proper limits must always be narrow, and should always be clearly marked, and observed. To ask, or to place, no reliance upon the statistical statements of those who have proved their fitness to be so trusted, would be to deprive such statements of a great part of their value. They would cease to economize the labour of future inquirers. To verify figures, we must at least know by what process, and whence, they were obtained. Though all figures may not require to be verified, all should be capable of submission to that test. And the absence of means of such verification may be reasonably accepted as evidence that the figures so presented are not entirely trustworthy. The reason is obvious. An unsound conclusion is readily detected. Confronted with its premises, it escapes only by a lack of logical acumen in those to whom it is presented. But a false statement of facts—especially when veiled by the transition from the concrete to the abstract implied in a purely statistical statement-may pass muster under any examination, short of a direct comparison of the figures with the facts they are put forward to represent.

Every statistical statement, then, to comply with the conditions of the art of which it professes to be an example, must be intelligible, precise, full, and susceptible of verification. What shall, as to each of these qualities, be deemed a sufficient compliance with the necessities of each occasion, must, in the present state of the science, be left much to the discretion of each framer of such statements. But, within the limits of an honest endeavour to do what is right, this discretion carries with it no great risk. To those who take the trouble to examine what is presented to them, it will never be very difficult to ascertain in what degree the author of any really trustworthy statistical statement has recognised and complied with these requirements. If not recognised, they will seldom, if ever, be properly complied with; and if recognised, and honestly complied with, the

degree of compliance will be readily discovered.

Now let us consider its fitness to place our social inquiries on a positive basis. It will be observed that the method itself is precisely the same as that which has founded all the established sciences. But, by way of evidence of its unfitness to do as much for the so-called moral and political sciences, we are told that the statist can deal with a few only of the facts presented to the investigation of the student of social phenomena. Let us see what this objection amounts to. It is true that we can deal only with facts which, (1) have been clearly ascertained, (2) are capable of being grouped on some common ground of identity, and (3) are capable of being numbered. It is true, also, that such facts are, in social economy, not yet very numerous. But our conditions are, we affirm, the necessary conditions of every scientific

method. And the paucity of the facts yet fairly within our reach in no way impeaches the method we recommend. All scientific investigation, worthy of the name, has three prime conditions—positive data, a positive method, and positive results. Now, it is the method alone, be it remembered, that we undertake to supply. Give us the data, and we will ensure the results.

But it is objected that we require extraordinary precision in our data -a degree of precision to which the facts on which a large portion of the social science must needs rest cannot be reduced. It is true that we require precision where it is not usually found, and require it in a degree analogous to that called for in laying the foundations of what are termed the natural sciences. But we also affirm that upon any foundation less secure no science whatever can be erected. You offer us what are called facts. We require that they be susceptible of being defined, ascertained, and analysed. If so susceptible, they may be thrown into groups, enumerated, and submitted to that collective investigation which is the office of the statist. If not so susceptible, we deny that they can be generalized at all; and affirm that they are, therefore, to science, worthless. Between the facts and the law they indicate lies absolute need for one process—due co-ordination of the facts. It is this co-ordination alone that our method pretends to supply. If the facts are fit for this process, then is the method efficiently applicable, and a scientific result is possible: otherwise not.

To say, then, that there are facts with which the statist cannot deal, is to say that there are facts which cannot be duly ascertained, defined, and grouped. And, allowing for a somewhat lax use of the term 'facts,' this is true enough. But it proves anything rather than that the statistical method of dealing with facts is defective.

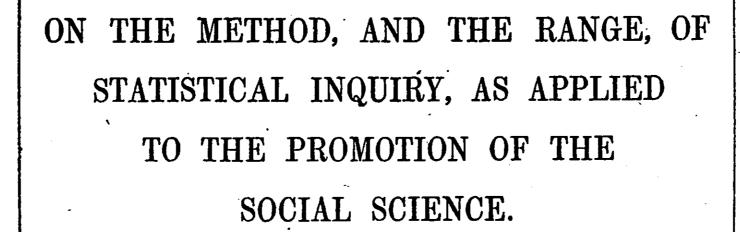
We all know that every instrument has its fit use, and that to reap the utility we must respect the use. The use of a loom is to weave thread into cloth. But if wool be abundant, yet there be no thread, and so no cloth, we do not find fault with the loom. Nor can we justly depreciate the statistical method of inquiry on the ground that there are facts—many or few—not yet, by due observation and analysis, reduced to the degree of certainty under which alone, that or any really scientific method can be legitimately applied.

The true meaning of this objection—that which, whenever made, it really signifies—is not that the statistical method is defective, but that it is not known. And here I may fitly observe that to its becoming known a great obstacle has of late arisen from its misuse. The method has been discredited. Sound statistics commonly involve severe labour; and when unsound, and so framed with ease, they are, to most observers, equally imposing. Hence they commonly are unsound; and are deservedly distrusted. The remedy for this must, I fear, be very slow; for it can come only through a better knowledge of the method itself, of its requirements, and of its legitimate results. Such knowledge will engender a determination to exact due compliance with the conditions of the art, before acceptance of its pre-

tended fruits. And, for either readily acquiring or willingly impart-

ing such knowledge, we can rely only on the more intelligent, earnest, and single-minded of the students of the Social Science. From the so-called 'practical' men we can look for little aid for a long time to come. They are, and always will be, more disposed to reject than to reform anything once marked as defective. They demand immediate results, and would rather be led astray plausibly than put through a laborious path to the truth. They want a mode of finding out truth by which they may discover it quickly, agree presently with their neighbours upon it, and apply it in their own time. Show them earnest efforts, and assure them of good intentions, and they are far too willing to dispense with the strict and patient research without which all advance, however earnest or well meant, is but stumbling in the dark. It is a pity it is so. But it cannot be helped. Things must be known before they can be rationally dealt with. Every problem must be solved under its own conditions. And if there be, as I believe there is, in this Social Science a great deal of hard labour not yet done, lying between us and much of the fruit we are eagerly grasping at, even to-day, it is as well, nay better, that we should know it—know it, and consider whether we shall now go steadily through this labour, or shall first augment by trying to evade it.

THE END.



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