64

ADDRESS

DELIVERED AT THE

ANNIVERSARY MEETING

OF THE

ANTHROPOLOGICAL INSTITUTE

OF

GREAT BRITAIN AND IRELAND,

JANUARY 24TH, 1888.

BY

FRANCIS GALTON, F.R.S., President.

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ADDRESS *delivered at the* ANNIVERSARY MEETING *of the* ANTHROPOLOGICAL INSTITUTE *of* GREAT BRITAIN *and* IRELAND *January 24th*, 1888.

By FRANCIS GALTON, F.R.S., *President*.

ON behalf of this Institute, and sanctioned by their Council, I had the honour of delivering a short course of Lectures in December last, on *Heredity and Nurture*, at the South Kensington Museum. Their object was to test the reality of a supposed demand for information on such subjects, and so far as it was possible to judge from the results, there seemed to be a widely spread interest in the matter. It gives me pleasure to express my obligations to the Lords Commissioners of Education for the free use of their theatre, and to the many officers at South Kensington who aided in the various arrangements. Major Abney and General Festing exhibited in action their beautiful apparatus for testing the colour sense, which was described in the Bakerian Lecture before the Royal Society last year, and at the conclusion of each lecture Dr. Garson, Mr. Rudler, and Mr. Bloxam explained the working of the anthropometric instruments that were laid on side tables. Whether it be feasible for this Society hereafter to promote other lectures bearing on special topics in Heredity and Nurture, is a question on which I do not feel competent as yet to form an opinion, though I have no doubt that hopeful attempts to enlist popular interest in any branch of anthropology will always meet with your approval.

These lectures have led to at least one tangible result. I took the opportunity to reiterate my often expressed regret that no anthropometric laboratory existed in this country, at which children and adults of both sexes could at small cost have their faculties measured by the best methods known to science, and a record kept for their future use. I explained how difficult it would be to maintain such a laboratory, and to make it effective except under the shelter of some important institution, that

was daily frequented by the class of persons likely to make use of it. Previously, I had applied for permission to erect such a laboratory at the South Kensington Museum, but the difficulties of a suitable position seemed insuperable. Thanks, however, to a recent suggestion of General Donnelly, and with his cordial aid, and also with that of General Festing, a successful application was made to Her Majesty's Commissioners of 1851 for a small portion of the Arcades, rent free, that adjoins the Western Galleries at South Kensington, containing the collection of scientific instruments, wherein to erect a wooden building for the laboratory. It will be connected with and have its only entrance from the gallery. The building has (at the time when I revise these pages) been completed under the obliging superintendence of General Festing, and is opened to the public, though as yet incompletely equipped. I append in a foot note a copy of the printed notice.[1] In one sense it is small, but it offers sufficient accommodation for the purpose immediately in view, which is little more than a development on

[1] Anthropometric laboratory for the measurement in various ways of human form and faculty. Entered from the Western Galleries containing the Science Collection of the South Kensington Museum.

This laboratory is established by Mr. Francis Galton for the following purposes :—

1. For the use of those who desire to be accurately measured in many ways, either to obtain timely warning of remediable faults in development, or to learn their powers.

2. For keeping a methodical register of the principal measurements of each person, of which he may at any future time obtain a copy under reasonable restrictions. His initials and date of birth will be entered in the register, but not his name. The names are indexed in a separate book.

3. For supplying information on the methods, practice, and uses of human measurement.

4. For anthropometric experiment and research, and for obtaining data for statistical discussion.

Charges for making the principal measurements :—Three pence each, to those who are already on the Register. Fourpence each, to those who are not :—One page of the Register will thenceforward be assigned to them, and a few extra measurements will be made, chiefly for future identification.

The Superintendent is charged with the control of the laboratory and with determining in each case, which, if any, of the extra measurements may be made, and under what conditions.

a more permanent basis of the anthropometric laboratory that I established in the International Health Exhibition of 1884, and at which nearly 10,000 persons were measured. I propose now to preserve copies of the records in such a form that the persons measured may always be able to refer to them so long as the laboratory exists. There will be one page of a folio register book assigned to each person in which the measurements made on successive occasions will be copied on successive lines, to show at a glance the personal development. No names will appear in the registers, but only initials and dates of birth; the names and the mothers' surnames will be entered in a separate book. There will be besides a brief list of questions, both personal and family, which the applicant for measurement will be invited to answer, one of them is whether the parents were first cousins. The copies of the measurements retained in the laboratory will be useful in two ways, the one as statistical documents, and the other as records always accessible under proper restrictions to the persons measured, or to their representatives. I conceive that this arrangement will facilitate the desirable, practice of keeping family records, because so far as members of any family may have been measured, it will be feasible, with their concurrence, to obtain copies of those measurements. I am by no means one of those who desire to confine anthropometry to the simpler physical data, but I wish to extend it as widely as the possibilities of measurements, however rough, may allow. Under judicious statistical treatment, rough measurements of many individuals are capable, as we all know, of yielding trustworthy results, and if we ascertain the degree of precision of our measurements, we can treat them individually on scientific principles, assigning to them their just weight, however small their precision may be. The off-hand measurements that can alone be made of a person who is only a few minutes under experiment, in respect to the delicacy of his senses, and of his reaction-times, are far better than none at all. They will at least serve to indicate such marked peculiarities as may merit more sustained examination.

The conditions of the laboratory admit only of measurements of the living person and in clothes, and we must make the best of these conditions. It would be undesirable to ask even that the shoes should be taken off. When persons of all ranks and of both sexes are admitted, and many operations have to be gone through in a brief time, it is necessary to measure those persons in their usual indoor clothing. Quite enough can be done under this restriction to furnish a record of the rate of growth and development of the young, and to yield statistical data of considerable value. We can at least record the eye colour; the length, breadth, and possibly the height of head; the stature in shoes less the thickness of the heel, the height above chair when sitting squarely in it, and the height of the knee above the ground; also the spread of the arms from finger tip to finger tip, the length of the middle finger, which is correlated with the length of the foot, and that from finger tip to elbow. These measurements give directly or inferentially the total stature and total arm-spread, and the respective lengths of the trunk and the two leg-bones; also the lengths of the upper and lower arm and of the middle finger. We also can easily and rapidly obtain the lung capacity, strength of squeeze with the right and left hand, keenness of sight with right and left eye, and the colour sense. More delicate apparatus will be at hand to be used occasionally, to test the remaining senses, the psycho-physical reactions, and such other physiological constants as may be found feasible and convenient to measure.

The curious memoir by M. Alphonse Bertillon in the "Annales de Démographie Internationale," republished as a pamphlet in 1881,[1] and the memoirs read at the International Penitentiary Congress at Rome in 1885,[2] by that gentlemen and by M. Louis Herbette, Director of the Penitentiary Department of the Interior,

[1] Une application pratique de l'anthropométrie sur un procédé d'identification, permettant de retrouver le nom d'un récidiviste au moyen de son seul signalement, &c. (G. Masson, Paris, 1881).

[2] "Les Signalements Anthropometriques." Conférence faite au Congrès Pénitentiare International de Rome (G. Masson, Paris, 1886).

and the very favourable remarks on M. Bertillon's methods by M. Paul Topinard, in the "Revue d'Anthropologie," of 1886, p. 607, and of 1887, p. 379,[1] suggest another use for an anthropometric laboratory. M. Bertillon showed that the various measurements of an individual might afford data of extraordinary value in deciding questions of identity. Ten or a dozen words easily transmissible by telegraph, could give a sufficiently exact description of a man to make it highly improbable that the same words would apply to any other out of many thousands of persons. The immediate object of M. Bertillon's method was to afford means of discovering whether an arrested person had been previously convicted. It is impossible for the French police to make effective search through the vast collection of photographs in their keeping, which is stated to have received an accession of 100,000 in number during the course of 10 years. He, therefore, suggested the plan of indexing prisoners according to their measurements, and this appears to be now done with considerable success. The service over which he presides is well installed and is in full work. The measurements chiefly relied upon were adopted after considerable preliminary experience and consideration in concert with M. Topinard, who speaks of M. Bertillon's method in the first of the passages above referred to, as "an ingenious system which experience has proved to be excellent, which I have seen in work, and have myself practised, and which I declare to answer its purpose perfectly." Independently of this application of anthropometry to rogues, it is clear that it may also be of service to honest men; I cannot do better than extract some phrases from M. Herbette's speech, as published in the French report of the Penitentiary Congress at Rome, already alluded to.

"S'élevant à des considérations d'ordre plus général encore et louant les heureux efforts de M. Bertillon, M. Herbette a montré comment cette constatation de la personnalité physique et de l'indéniable identité des individus arrivés à l'âge d'adulte,

[3] "Une visite à la Préfecture de Police au bureau des signalements anthropométriques" de M. Alphonse Bertillon.

doit répondre, dans la société moderne, aux besoins les plus réels, aux services les plus variés.

"Qu'il s'agisse de donner par exemple aux habitants d'une contrée, aux soldats d'une armée, aux voyageurs allant dans les pays les plus lointains, des notices ou cartes individuelles, des signes recognitifs permettant de déterminer et de prouver toujours quels ils sont; qu'il s'agisse de compléter par des indications certaines les actes de l'état civil, d'empêcher toute erreur et toute substitution de personnes; qu'il s'agisse de consigner ces marques distinctives de l'individu dans les documents, titres, contrats, où sa personnalité doit être établie pour son intérêt, pour l'intérêt des tiers ou pour l'intérêt de l'État, le mode de signalement anthropométrique peut trouver sa place.

"Qu'il y ait certificat de vie, contrat d'assurance sur la vie ou parfois acte de décès à dresser, qu'il y ait à trouver, à certifier l'identité d'une personne aliénée ou grièvement blessée, ou défigurée, dont le corps aura été en partie détruit, ou sera devenu méconnaissable ou sera difficile à reconnaître, en cas de mort subite ou violente, à la suite d'un crime, d'un accident, d'un naufrage, d'un combat,—quelle ne sera pas l'utilité de tracer ces caractères invariables en chaque individu, infiniment variables d'un individu à l'autre, indélébiles au moins en partie, jusque dans la mort?

"A plus forte raison aurait-on à s'en préoccuper s'il fallait faire reconnaître les gens à longue distance et à une longue durée d'intervalle, après que l'apparence extérieure, la physionomie, les traits et les habitudes physiques ont pu se modifier de façon naturelle ou artificielle, et cela sans déplacement ni frais, par simple échange de quelques notes ou chiffres à envoyer d'un pays à l'autre, d'un continent à l'autre, de manière à savoir aux États–Unis ce qu'est tel homme venu de France, et à établir si tel voyageur que l'on trouve à Rome est bien tel personnage qu'on a mesuré à Stockholm dix ans auparavant.

"En un mot, fixer la personnalité humaine, donner à chaque,

être humain une identité, une individualité certaine, durable, invariable, toujours reconnaissable, et facilement démontrable, tel semble l'objet le plus large de la méthode nouvelle.

"On peut dire en conséquence que la portée du problème comme l'importance de la solution dépasse de beaucomp les limites de l'œuvre pénitentiaire et l'intérêt pourtant bien considérable de l'action pénale à exercer dans les diverses nations."

Whether all that was claimed for the power of M. Bertillon's system, on purely theoretical grounds and in his earlier publications can be sustained, may fairly be questioned ; but there can be no doubt that a series of measurements must be of considerable service as supplementary evidence, either that a person is really the man he professes to be, or negatively that he is not the man for whom he is taken. In speaking of these matters it is impossible not to allude to the Tichborne trial, and the enormous waste of money, effort, and anxiety which might have been spared, had Roger Tichborne passed through an anthropometric laboratory before he went abroad. It would be a reasonable precaution for every person about to leave his country for a long time, having regard to the various accidents of good or ill-fortune, to be properly measured, and to leave a copy of his measurements in the safe keeping of an anthropometric laboratory.

It will doubtless be of interest to many if I should give here the principal details of M. Bertillon's system such as I have learnt partly from published memoirs, and partly from the obliging answers accompanied by useful illustrations that I have received from that gentleman in answer to my inquiries.

All the measurements and other remarks concerning each person are written opposite to printed headings, upon a thick card $5\frac{1}{2}$ inches square. The most convenient primary basis for classifying the cards is found to be not stature, but the head-length and the head-breadth, and in each case under the three-fold division of large, medium, and small. The limiting values of the measurements ranked as medium are so chosen that the number of large, medium, and small measurements shall be

approximately equal. We thus obtain nine primary classes. Each of these is sub-divided according to a secondary classification of foot-lengths and of the middle finger-lengths of the left foot and left middle finger respectively, and as before under the threefold division of large, medium, and small. Thus there are nine secondary sub-divisions of each of the nine primary classes; that is eighty-one sub-divisions in all, to each of which is allotted a separate compartment in a large cabinet. Each of the cards is sorted into its appropriate compartment. The number of persons at present dealt with is such that there are an average of five hundred cards in each compartment. In each of the eighty-one compartments the cards are again sub-divided into nine tertiary groups by means of attached tickets, that project beyond the upper margin of the cards. They are of three different colours, according to whether the man is of large, medium, or small stature, and they are cut into different shapes, something on the plan of an A B C index, according to whether the person measured has a long, medium, or short arm, reckoning from the elbow to the middle finger tip of the left arm. Thus there are nine times eighty-one, or seven hundred and twenty-nine tertiary groups. There still remains the possibility of further sub-division on the same general principle.

It is found to be a rapid operation to scrutinise individually the small batch of cards to which this process of six successive sub-divisions, each with three categories, directs the search. It is also found that the cases are not so numerous as might be feared in which the nearness of the measurement to limiting values, makes it necessary to extend the search to many compartments, but on this point precise details are as yet wanting. There is also an absence of data from which the frequency of such cases might be theoretically inferred.

It appears to me that the problem of the easiest method of identification by measurements might be usefully furthered, if certain data existed which could be procured with little difficulty. Let us consider what it is with which we have to deal. It is the comparison of two fallible measures of a variable

subject. The man who measures the subject in the first instance, is liable to error; the subject in the course of months or years is liable to vary; again, the second operator who measures him at the end of the period is liable to error. The data which we want for calculation are the "probable errors" of the two operators, whose compound effect could easily be formulated if they measured, say, a couple of hundred persons consecutively and independently. If there were three operators, A, B, and C, the series of differences between the measurements by A and B, by A and C, and by B and C, would enable us to easily disentangle the probable errors of each. Again we want more definite information than we as yet possess about the variability of the subject, after different intervals of time, and at different ages.

Another, and a very important question, is as to the degree in which the several bodily proportions that are measured may be looked upon as independent variables. The stature is related with the length of the foot, and with that of forearm, and we should expect a still closer relation to exist between any two of these taken together, and the third. We have yet to learn the proportion between the number of the elements measured, and their value for purposes of identification. The supposition that they may be treated as independent variables, which lies at the bottom of some of the earlier estimates, such as that in page 22 of the Conference at Rome, headed "Étendue infinie de la Classification," cannot be accepted as correct.

The whole subject of "Personal Identification and Description" forms an important chapter of anthropological research, and it is one on which I hope before long to be in a position to offer some views of my own.

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