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BY

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ADDRESS *delivered at the* ANNIVERSARY MEETING *of the* ANTHROPOLOGICAL INSTITUTE *of* GREAT BRITAIN *and* IRELAND, *January 25th*, 1887.

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

OUR Institute, as appears from the Report of the Council, and as I hope from your own observation also, continues to perform ts self-appointed task with usefulness, and to satisfy to the best of its opportunity the current needs of anthropological record and research.

It was formally incorporated under the Companies Acts on March 26th.

The year that has passed by has been eventful to it in many respects. The Institute has sustained, as in the course of nature it must do from time to time, the loss of valued members by death; it has also witnessed a considerable widening of the field of anthropological interest.

The nearest of our losses is through the death of our former judicious President, Mr. George Busk, distinguished in many lines, but in those which concern us, more especially as a craniologist. No one is better qualified to do justice to his labours in this special department of anthropology than his intimate friend Professor Flower, who at my request has kindly drawn up the notice of his life and works which will be found printed after this Address (p. 403).

Sir Arthur Phayre, G.C.M.G., was an administrator of high rank, who eminently devoted himself to the study of the men over whom he had to rule, and whose frequent memoirs, geographical and others, connected with Burmah, made him for many years the principal authority upon that country.

Through the death of Dr. Mann we miss a frequent attendant at many scientific meetings, who had been an eager exponent of South African ethnology for many years, and always ready to give or to obtain information for scientific inquirers on African subjects. In advanced age, though suffering from the severe bodily infirmities which ended in death, he superintended the

arrangement of the Ethnological Collection of Natal in the late Colonial and Indian Exhibition, and almost, if not quite, his last public appearance was when reading a memoir upon them at one of our Conferences in that building.

These and other active and efficient members have been taken from us, while new and zealous men have joined our ranks, so the Institute as a whole lives and thrives like an organic body; each of us in his turn plays his part, then falls away, and another succeeds to his place.

I will in my further remarks on the past year refer not directly to our own proceedings, as they appear set forth in our Journal, under the careful and willing editorship of Mr. Rudler but to those instances of our action outside, with which members have less opportunity of becoming acquainted.

An extensive ethnological inquiry has been initiated by the Council of the Palestine Exploration Fund. They formed a Committee upon which I was appointed to serve on behalf of this Institute, to draw up a list of questions applicable to the various races inhabiting Syria, which are to be placed in the hands of the numerous persons who come within the sphere of their operations. Many of these have had medical instruction and are likely to prove competent observers. The task of doing this was ultimately placed mainly in the hands of Captain Conder, R.E., to be carried out upon the general lines laid down in the Anthropological "Notes and Queries," but of course they have been much modified to suit the special inquiry. The questions are now printed and will very shortly be distributed.

The Anthropological "Notes and Queries" to which I have just referred, are running out of print. They were drawn up by various members of our Institute, at the suggestion of and under the editorship of our then President, Colonel Lane Fox, now General Pitt-Rivers. They were published at the cost of the British Association, who at their last meeting constituted a Committee from among the former writers of the little volume, to consider the propriety of publishing a second and revised

edition. The Association also made a small grant to cover initial expenses.

The British Association has further assisted the objects of our Institute in another way. It will be recollected by many that in the course of a discussion last spring that arose after the memoir read by Mr. Reginald Stuart Poole on the races portrayed in the ancient Egyptian monuments, that gentleman pointed out the urgent importance of obtaining photographs of all those sculptures and pictures that refer to persons of known races. He also suggested that Mr. Flinders Petrie might be induced to undertake the task of making them. Many of our members entered warmly into this view, and on application being made to the British Association a grant was made by that body to a Committee of which I was chairman, to carry this proposal into effect. The Committee has met and discussed the matter with Mr. Petrie, who was then in this country. A list of about 70 of the portraits that appear most desirable to photograph, was drawn up and carefully considered, and Mr. Petrie willingly undertook the labour of photographing them, so far as opportunity should permit. He is now in Egypt.

The Ethnographical Gallery at the British Museum was thrown open in April last after its re-arrangement in rooms left vacant through the removal of the Natural History collection to South Kensington. The adjoining Asiatic saloon, which contains specimens of Oriental art and objects illustrative of the Oriental religions, was opened at the same time. The collection now comprises that formed and bequeathed by Mr. Christy 20 years ago, which, for want of space in the Museum had remained for most of that time comparatively unknown to the public, and installed in his former private residence. The whole has been very largely extended and supplemented through the continued zealous efforts of Mr. Franks. The arrangement of the pre-historic section is being vigorously proceeded with and will probably be completed in the spring. It will include the collection of Canon Greenwell as well as the pre-historic portion of that of Mr. Christy. Greatly as the space allotted to the collection has been

increased, and though it now occupies a magnificent suite of rooms, it is still seriously cramped in many of its sections. It is far from being as amply housed as those of Berlin and Vienna. Its area is too small for the legitimate requirements of a collection whose object is to explain the development of the faculties of mankind by specimens of their handiwork, beginning with those of pre-historic times and passing through successive and parallel stages of barbarism to the dawn of the higher modern civilization.

The anthropological collection presented by General Pitt-Rivers to the University of Oxford, is now nearly arranged by Professor Moseley in the building erected by the University to receive it. The ground floor will be thrown open to the public daily in the afternoon during the present term, and Dr. E. B. Tylor will lecture every Monday afternoon on the collections in the building. There is hope that the remainder of the room will be opened before the end of summer. It is gratifying to find that this magnificent collection excites much interest in the University, and is likely to be largely frequented.

Another great event of anthropological interest to us in the past year was the Colonial and Indian Exhibition, whose exhibits, so far as they concerned ethnology, were well brought into notice during the series of Conferences held by our Institute in the Conference Hall of that building. The subjects of the various Conferences will be found described in the Report of the Council and in the Journal of the Institute.

It has, moreover, led to the project of an Imperial Institute, that shall also serve as a memorial of the 50th year of Her Majesty's reign. Its principal function will be to bring us, who live in the mother country, into close and permanent touch with our fellow subjects of all varieties of race, creed, and mode of thought, who are spread over Her Majesty's dominions. It is a grand idea, which, if adequately carried into effect, will prove a noble achievement. Primarily the object of the Imperial Institute is to afford a centre of intelligence for commerce and emigration; but a busy mart and frequent meeting place for representatives

of all the races in the British dominions cannot fail incidentally to become an important centre of anthropological intelligence. It is in reference to that aspect of the future Imperial Institute, which also in some degree characterised the past Colonial and Indian Exhibition, that I offer the following remarks.

I am not sure whether there is any need for me to allude at all to a proposal that has been publicly urged, that a prominent feature of the Imperial Institute should be an Ethnological Museum of the races in the British dominions. There is no reason, so far as I have heard, to suppose that a museum of this kind is likely to be included in the plan, but as a proposal for it has been and may again be brought forward, I think it is well to show reasons why so costly and large an adjunct would not be of first-rate importance to us. The British possessions are spread widely over the globe, but they do not by any means include representatives of all the races that inhabit it. It follows that an Ethnological Museum, limited to the handiwork of populations subject to the British rule, cannot have the same scientific importance and interest as such general ethnological collections as those at the British Museum and at Oxford, of which I have just spoken. There seems to be no very useful stage half way between a good local and a good general museum. The former exhausts the peculiarities of its district, the latter collates analogous objects from every district where they exist, and makes each help in interpreting the rest. It therefore seems to me undesirable to ask that a prominent feature of the future Imperial Institute should be an ethnological collection, limited to the particular group of races who happen now to fall within the British possessions; on the other hand, the desire of any colony to maintain a local museum of its own would, I conceive, receive warm encouragement from anthropologists.

In the hope that the proposed Imperial Institute will be a focus for anthropological reference and information, we ought cordially to wish it success. With its prospective libraries, with the opportunities it will afford of personal intercourse with

colonists, and by the stimulus that it is capable of giving to a wide scientific co-operation, it may become a powerful agent in advancing anthropological knowledge and research.

The Colonial and Indian Exhibition brought forcibly to notice the rapid diminution in present and future importance of the barbarous races who inhabit the temperate regions of the world in which Europeans are now establishing themselves. Their peculiarities are losing present interest and are becoming historical and archaic, little to be taken into account in reckoning upon the future of those regions. They are to the new European lords of the soil of not much more consideration than the vegetation of the wilderness might be to the owner of a newly reclaimed and scientifically cultivated farm. The whole of the exhibits of native handiwork in the large courts occupied by Canada made so small a show that they could have been partly placed on an ordinary sized dinner table and partly hung up on the wall behind it.

In such colonies as these the anthropological interest of the future will become less and less concerned with the customs of the barbarous races who may still inhabit them, and more and more assimilated to that which we now take in the inhabitants of the United Kingdom. A vast deal remains to be done at home before this interest can even be moderately satisfied. It is but very lately that we have acquired a fairly exact knowledge of the most marked physical peculiarities of our countrymen; as to their mental characteristics they are almost untouched by the methods of strict scientific inquiry. Whatever concern we justly feel in taking stock from time to time of our race at home, and in discovering how far its quality is improved or deteriorated by locality, occupation, or other influences, that concern will be even more keenly felt in extending a similar inquiry to distant settlements of our race, where the differences of environment are greater than with us, and their effects are therefore less liable to be confused with those of concurrent and hidden influences. In astronomical language they will have a larger parallax, and therefore the errors of observation will be

less liable to vitiate the results. We can be sure that whatever effort we may bestow upon inquiries into the vital statistics of the numerous communities of our race who are settled in diverse climates and under various circumstances, will be more effective in solving the problems of sociology than the same amount of effort limited to investigations in the mother country.

Here I will draw your attention to the very important aid to sociological research that is likely to be given by the International Statistical Institute which Sir Rawson W. Rawson has had the good fortune to succeed in establishing. It is a body of great administrative weight and influence. It consists of members and associates, limited to the number of 200, who are heads of official statistical bureaux in all parts of the world, of commissions and of societies, and others who have special statistical knowledge or qualifications. Its object is to introduce uniformity, as far as may be, in statistical returns, so as to make those of different countries mutually comparable, and to stimulate the interests of Governments and individuals in the study of social phenomena. This Institute as at present arranged, is to meet biennially. The present year will be that of its second meeting, and at Rome.

As regards India and the Colonies in which the native population is large and is likely to subsist, whether owing to its vitality being strong enough to hold its own against that of the whites in a fair field of competition, or because the white races cannot thrive and multiply in their climates, additional objects of anthropological research will abound. Each of the various native races call for as much study as our own, and the sociological problems that arise from the mixture of races introduce a further complexity. Moreover, they are problems not only of academic interest, but they are living conditions that statesmen have to face and deal with.

I must diverge for a moment to express the welcome we afford to the Anthropological Society newly established at Bombay, for the discussion of Indian topics. It seems to be

supported on all sides by natives as well as Europeans, with the utmost cordiality. The first number of its publications reached me a few days ago, and judging from the variety of its contents and the originality of its papers, it seems likely to give valuable future aid to the advancement of our science. Also, I will take this opportunity of referring to another new Anthropological Society, that of Japan. It has already during the few months of its existence, published two numbers in the Japanese language, with some illustrations, and English tables of contents. The society has been instituted at a most propitious moment, when the traditions and usages of Old Japan remain in full memory, while the rapidly growing culture of New Japan has become sufficiently advanced to make their collection and study a matter of interest to the people. No doubt some of the more valuable papers in this journal will hereafter appear in one or other of the chief European languages. The curse of the Tower of Babel, in whatever sense we may employ the phrase, has long pressed heavily upon scientific men in Europe; the contemplation of the additional burden on our descendants of having possibly to learn Japanese, Russian, and Chinese as well as the western European languages can hardly be indulged in with equanimity.

The recent extraordinary spread and domination of the white races over the world is forcibly brought into notice by the various political treaties that have lately assigned vast regions in the Pacific Islands and in Africa to the protectorate of one or other of the great European Powers. It makes us again consider the often discussed problem whether any offshoots from European races are destined to take root and to naturalise themselves in the tropics, or whether the conditions of life in those climates are so prejudicial to their health, vigour, and fertility as to exclude the possibility of such an event.

It seems strange to say, after the experience of generations that we have had in India and elsewhere, that adequate data for the decisive answer to this question by appeal to past fact, do not appear to exist. Statisticians who have attempted the

problem have commonly arrived at this conclusion. The paucity of available data is due to the habit of successful colonists to return to their homes in later life, and for their children, even if they settle in the land where they were born, to marry European wives, and so to import fresh blood. Besides this the field of inquiry is full of statistical complexities and pitfalls, so much so as to render it futile to attempt to fairly state and weigh such evidence as exists, on an occasion like the present. However, I am desirous to say something on the subject, and to bring to your notice two or three general considerations, that are not without importance in themselves, and which have an independent interest of their own.

The unsuitability of the tropics for European settlement is principally due to their heat and to their diseases. I will consider these separately.

As regards heat we should bear in mind the great and increasing power of man to control within doors the influence of the out-of-door temperature. It has been almost wholly exerted until very recent years in resisting cold, with the happy result that active industries are carried on under inclement skies throughout the year, irrespectively of season, and that a highly refined and artificial society exists in countries which without warming appliances could be inhabited only by rude races, half dormant during the winter. It is difficult to assign any limit in the direction of the poles at which civilisation is impossible on account of the incapacity of man to battle with the cold. That limit is certainly not reached at St. Petersburg nor at Archangel.

It has not been the practice until very recent times to produce cold on a large scale by artificial means. I do not speak of the cooling produced in dry air by the evaporation of water, nor of that produced by radiation into space from the surface of the ground when the air is very still and the sky perfectly clear; these are exceptional circumstances, and are absent in the countries where the oppression of a hot and humid atmosphere is most severely felt. But I mean such cooling as is

produced on a large scale and of great intensity by one or other of the several forms of refrigerating machines worked by coal that are now used in the transport of frozen meat even from the Antipodes, and to preserve it for a long time in the same condition after its arrival in this country. It is reasonable to ask whether it might not be possible to alleviate the heat at least of sleeping rooms where there is no opening and shutting of doors, by some such process, and so to render the tropics more habitable to Europeans than they now are.

The idea is not new. It was, I believe, first broached by the late Mr. Siebe in his examination before the Commission of 1863 into the Sanitary State of the Army in India (pp. liv and 326), and now that his machine and those of many other inventors are largely employed and their use is rapidly extending, the same idea has again been occasionally brought forward. I would refer those who desire late intelligence about refrigerating machines to Mr. T. B. Lightfoot's admirable paper upon them in May last (1886) before the Institution of Mechanical Engineers, and to the discussion that followed. A previous memoir by the same author before the same society was read in 1881. I have, however, come across no calculations of the expense of cooling sleeping rooms in hot climates, so I have myself made a calculation for a single typical case which will afford a useful basis for hypotheses of what is or may hereafter be feasible.

In an occupied room when the purity of the air neither increases nor diminishes, the volume of outflowing air in each unit of time must contain just as much impurity as was being exhaled into the general body of air in the room during the same period. The greater the rate of outflow and replacement by fresh air the less the percentage of remaining impurity. Experience shows that an outflow of 1,200 cubic feet of air per man per hour, and a corresponding inflow will keep a room in these climates in fair condition; 1,500 would probably suffice in the tropics. This amount is, of course, independent

of the size of the room, and it is that which is now allowed in barracks.[1]

The volume of air that actually passes through the lungs is comparatively insignificant, being only from 7 to 8 cubic feet per man per hour, or the one hundred and fiftieth part of the air needed for ventilation.

In supplying cold air under the supposed circumstances it must at the same time be dry air, else its mixture with the hot humid atmosphere would produce a cloud of vapour. The special case I will examine is that where it is required to supply air at 70° Fah., with a dew-point of 60°, when the temperature of the surrounding atmosphere is 90°, and the air is damp to saturation.

At a barometric pressure of 30 inches each cubic foot of the air to be supplied contains a weight of 514 grains troy of dry air associated with 5 grains of vapour. The same weight of dry air when raised to 90° and fully saturated will contain no less than 15 grains of vapour. Therefore for each cubic foot of supply, 10 grains weight of vapour in excess will have to be condensed into water, and to do this exhausts no less than 78½ per cent. of the total cooling power that is required.

I find this total cooling power to be such that 68 grains of ice at 32° will effect it,[2] in other words that one ton of ice will supply air of the desired quality sufficient for one man, namely, 1,500 cubic feet per hour, for 127 hours, or during 16 nights of eight hours each.

There are some additional items of cooling to be effected, but

[1] *See* "Healthy Dwellings," by Captain Douglas Galton, C.B., F.R.S., 1880.

[2] The number of units of heat required—

(1) To melt 68 grains of ice at 32° F. into water of the same temperature and—

(2) To raise that water to 70°;

Are equal to the number of units of heat parted with—

(3) To condense 10 grains of vapour at 90° to water of the same temperature;

(4) To cool that water from 90° to 70°;

(5) To cool 514 grains of dry air to the same amount, and—

(6) To cool the 5 grains of vapour that are associated with it.

they are relatively insignificant in amount. About 530 grains of vapour per man per hour are given off from the lungs and skin, and all of this has to be condensed. But as we have already allowed for the condensation of ten times 1,500 or for 15,000 grains per hour, the additional demand in this respect is only one twenty-eighth part of that which has been already met.

Again, the volume of heated expired air is said in the tropics to be less than in these climates, and to be only 7 cubic feet per hour; its temperature will be say 98°. The additional demand for cooling somewhat less than this small quantity of dry air through 28°, is insignificant compared to the first charge which has already been met, of cooling 1,200 cubic feet through 20°.

Again, we may safely assume that the amount of warmth radiated from the surface of the body or carried away from it by heated currents is of relative insignificance, but I have no data to estimate it correctly.

We may fairly conclude that an additional 5 per cent. to the previously calculated quantity of ice would more than cover the demand for all these additional purposes.

We have lastly to consider the waste of ice owing to the invasion of heat through the walls and roof. Of course these would have to be made of very good non-conducting material, like the walls of refrigerating chambers.

Allowing for everything, it seems that a ton of machine-made ice, which can be produced at the prime cost of a very few shillings, might well serve to cool the sleeping room of one man for a fortnight. Artificially made ice can, as I learn on inquiry, be bought at the works at any time in London, if on a large scale, at 20*s.* a ton. It is carted, delivered, and stored for 30*s.* a ton.

The cooling of a sleeping room even by the costly method of artificially made ice would therefore be by no means a serious expense in comparison to other luxuries, and the details of successfully constructing a refrigerated sleeping room seem

to present no serious difficulty and to involve no large cost. It is easy to imagine how the ice would have to be stacked as in an ice house, above the ceiling of the refrigerated chambers among air flues; and how the inlet pipe before entering the room might pass by the newly incoming warm air from the outside in order that the saturated and over-chilled air should yield some of its cold to it, and enter the room as a somewhat less cold but dry air. Whether a better and much cheaper way of cooling a sleeping chamber by compressed air or otherwise might not be employed, is another question into which I do not enter. Certainly experiment is desirable, for whenever the problem of artificially cooling bed chambers and dwelling rooms shall have been practically solved, one of the difficulties in the way of Englishmen naturalising themselves in the tropics will have been removed.

As regards the diseases of hot climates which severely affect most Europeans, experience has largely shown that tropical countries are much more habitable in established settlements than they were to travellers and to the earlier settlers who were destitute of wholesome comforts. Sir Bartle Frere laid much stress on this, and quoted striking instances of it in India, in his memoirs on Eastern Africa.

Sanitation has within very recent years improved the life rate of our soldiers in India, so much so that the proportion who die annually is stated to be only one-quarter as great as it was a few years ago, their death rate now lying between 15 and 17 per thousand, while before the Crimean War it was between 60 and 70 per thousand.

There is I presume little chance of mere acclimatisation producing much effect in a few generations, or of an acquired capacity of withstanding tropical disease being transmitted hereditarily to descendants. The successful settlement of tropical countries seems to depend on "accidental" varieties of our race being found able to thrive in them. There is a marked difference between the power of different Englishmen to withstand, for example, the effects of African climate. It has been

a prominent feature among the successful explorers of that country that although they may frequently suffer from fever, it takes no permanent hold upon their constitution. It is clear that men possessing such natural peculiarities, have a far better chance than others of naturalising themselves and their descendants in tropical homes. There is therefore some hope of vigorous varieties of the English race being found able to establish themselves in our tropical possessions. The process would be effected least wastefully to life, through a step-by-step fashion; emigrants from families already thriving in sub-tropical countries being likely to include a much larger proportion of individuals capable of thriving in still hotter climates than those coming directly from England.

Much has recently been written on the difficulty of any rare accidental variety of animal or plant establishing itself, when it has unrestricted opportunity of intercrossing with the parent stock. It is urged that the peculiarity would be halved in each successive generation, and would very soon cease to be apparent in the descendants. It seems to me that this argument is sometimes pressed too far. It cannot be a general truth that characteristics blend, else, to take a conspicuous example, there would be a growing tendency in every mixed population for the eye-colour to become of a uniform hazel or brown gray tint, through the intermarriage of persons whose eye-colours differ widely. On the contrary, I have lately shown by a considerable body of statistics[1] that among the English, the proportions between the eye-colours, as sorted under seven headings, has not changed at all during four generations. The fact is that heritages are only partially liable to be blended together; partially they are mutually exclusive. No case of inheritance probably falls altogether under either of these opposed extreme conditions, but some approximate to one, and others to the other. I am not aware that the respective results of these two extreme conditions have yet been put forward quite as forcibly as they admit and deserve to be.

[1] "Family Likeness in Eye-Colour," "Proc. Royal Soc.," 1886.

I will explain what I mean by rude but sufficient illustrations. Let us suppose a black population with a single white individual in it, and endeavour to trace the tints of his descendants under each of the two ideal conditions of completely blending and of mutually exclusive heritages. We will reduce the problem to its simplest form by assuming that intermarriage with the parent stock is the rule, and that there is no change in the vitality or the fertility of the hybrid offspring. It will be best to begin by supposing each pair to leave just two children to succeed them. Let us, for illustration sake, imagine a large number of similar glasses, each intended to represent a single individual, and the tint of their contents to represent those of the persons to whom they severally refer. In illustrating the effect of perfectly blending inheritance we have merely to mix a glass full of black fluid with a glass full of white fluid and to pour the mixture into two other glasses which represent the two children. That mixture will be of course the same in both, and of a pure mulatto tint. Repeating the process with each of the two glasses we obtain four glasses all of quadroon tint, then eight of octoroon tint, and so on. All this is plain enough; but now let us take the case of mutually exclusive heritages. I will represent the tint of each individual by a cylinder that just fills the glass. There will be a large number of glasses each filled with a black cylinder and one with a white cylinder. We will now treat their contents in the same outward form as before. We mix, that is, we throw and shake together in a separate jar the contents of the two glasses, namely, a white cylinder and a black cylinder, and then fill two other glasses from out of the jar. The contents of these two glasses will not be mulatto, but one of them will be pure white and the other pure black. We repeat the process and obtain four grand children, one of whom will still be of unmixed white and the other three of unmixed black; we repeat it again and obtain eight grandchildren, one of whom will be pure white and the other seven pure black, and so on for any number of generations, the one white cylinder appearing unchanged in every one of them

It would be tedious and of little profit to endeavour to modify this rude but distinct illustration so as to apply to families of varying numbers of children. In some cases the offspring would fail and the race of the white cylinder would come altogether to an end, in others it would be prolific and increase. In all cases the broad fact remains conspicuous that when heritages are mutually exclusive a rare variety may have numerous chances of establishing itself, one in each of many successive generations. Until it is wholly abolished, it will present itself again and again for competitive examination without diminution of vigour, and if it has natural advantages over the general population it has a corresponding number of chances of profiting by them. The conditions are far different with the heritages that blend. In these cases the peculiarity of one parent is diluted to half its amount in the very first generation, so that under the most favourable supposition of the offspring of that parent mating together and never mixing their blood with outsiders, and of not suffering from this close interbreeding, they would only be mulatto. No more than one-half of the original peculiarity of the one black parent could possibly become an established characteristic.

It is between these two extreme conditions that the facts of inheritance really lie. They might be roughly illustrated by supposing each of the glasses to contain neither a volume of fluid nor yet a single cylinder, but a moderate number of large beads partly strung together as on a broken necklace, from which some fall off each time it is handled; but I will not pursue this illustration further. Suffice it to conclude that the establishment of a somewhat rare variety as that of white men naturally suited to thrive and multiply in tropical climates, is not so great an improbability as those anticipate, who lay exclusive stress on the tendency of rare peculiarities to disappear in a very few generations, through free intermarriage with the ordinary members of the original stock.

Obituary Notice of the late Professor Busk.

By the death on the 10th of August last of Mr. George Busk the Institute has lost one of its oldest and most valued members.

He was born on the 12th of August, 1807, at St. Petersburg, being the second son of Mr. Robert Busk, an English merchant residing in that city. He early devoted himself to the study of surgery, entering as a pupil at the Medical School, which had at that time a considerable reputation, established in Aldersgate Street, near St. Bartholomew's Hospital. He became a member of the Royal College of Surgeons in 1830, and was elected an honorary fellow of that body in 1843. For many years he was Surgeon to the Seamen's Hospital established on board the Dreadnought, an old man-of-war moored off Greenwich, an office which he resigned in 1856. Although never in large practice, chiefly owing to the fortunate circumstance that he was not under the necessity of devoting himself to the drudgery of the profession, he acquired a considerable reputation as a scientific surgeon and made some important contributions to the advancement of surgical knowledge. It was, however, as a naturalist that he was best known to the world. His early predilection for microscopic research, and familiarity with the instrument at a time when it was in comparatively few hands, led him to select the lower forms of animal life, as the principal objects of his painstaking and accurate researches. The numerous memoirs which he published, especially upon the organization and classification of the polyzoa had already in 1856 made him so great a reputation that when in that year Sir Richard Owen resigned the Hunterian Professorship at the Royal College of Surgeons, which he had long held with great distinction, Mr. Busk was chosen by the Council of the College to succeed him. His strength, however, lay rather in investigation than in exposition, and his modest, retiring nature making public lecturing an uncongenial pursuit, after three years he resigned the chair. He did, however, admirable service to the college

for many years, as a Member of the Council and of the Board of Examiners, and in 1871 was chosen to serve in its highest office, that of President. He was also an examiner in the University of London and the Army Medical Board; for many years Secretary to the Linnean Society, a member of the Council and Vice-President of the Royal Society, a Member of the Council and Vice-President of the Zoological Society, a Member of the Council of the Geological Society, Treasurer of the Royal Institution, a Member of the Senate of the University of London, Trustee of the Hunterian Museum, and one of the Governors of Charterhouse School. The number and variety of these appointments show the esteem in which his sound judgment, wide knowledge, excellent common sense, unwearied industry, and sterling integrity of character were held by his friends and colleagues.

For his numerous and varied researches in zoology, physiology, and comparative anatomy, the Royal Society in 1871 awarded to Mr. Busk a Royal medal, and he also received the Lyell and Wollaston medals from the Geological Society for his labours in palæontology, mainly the description of mammalian remains found in caves. It is, however, chiefly his work in connection with anthropology, a subject to which he devoted much of his time in the later years of his life, that must be spoken of here. He was elected a member of the old Ethnological Society in 1863, and soon after became one of its Vice-Presidents. In the negotiations connected with the fusion of that society with the Anthropological, which resulted in the formation of the present Institute in 1871, he took a considerable part. Of this body he was a Member of the Council from its foundation until the advance of illness about a year before his death compelled him to cease from attending. In 1873 he was elected President, an office which he served for two years with great advantage to the Institute, having been most assiduous in the discharge of its duties.

Mr. Busk's taste for anthropology appears to have been first roused by the opportunities for its study afforded by the seamen of the most varied races and nationalities who became patients

at the Dreadnought Hospital; and a small collection of typical crania which he then formed, furnished the materials for commencing those investigations into the distinctive characters of the skulls of races, which will always be associated with his name. He was the first in this country who seriously attacked this difficult problem, and he expended a vast amount of careful observation and experiment in devising methods of measuring the external form and estimating the internal capacity of crania. Since he first took up this question, the science of craniometry has engaged the attention of numerous anatomists in all parts of the civilised world, and has made advances which naturally have left Busk's methods somewhat in the rear, but still the ingenuity of his modes of procedure, and the thoroughly scientific and conscientious spirit in which his investigations were carried on will never fail to meet their due recognition. A large work which he had for many years in hand, entitled "Crania typica," containing descriptions and carefully executed lithographic figures, either by his own hand or of that of one of his accomplished daughters, was never published; but the plates, as far as they were completed, have been deposited in the library of the Institute.

The following list of Mr. Busk's published memoirs in anthropological subjects will give some idea of the extent and scope of his researches in this branch of science.

1. "Observations on a Systematic Mode of Craniometry." "Trans. Ethnol. Soc.," I, 1861, p. 341.

2. Translation of Schaaffhausen, "On the Crania of the most Ancient Races of Man;" with remarks, and original figures, taken from a cast of the Neanderthal Cranium. "Nat. Hist. Review," 1861, pp. 155–176.

3. "Observations on some Skulls from Ceylon, said to be those of Veddahs." "Linn. Soc. Journ.," VI (Zool.), 1862, p 166.

4. (With Carpenter and Falconer). "An account of the proceedings of the late Conference held in France to enquire into the circumstances attending the reported discovery of a

Human Jaw in the gravel at Moulin-Quignon, near Abbeville; including the *Procès Verbaux* of the sittings of the Conference, with notes thereon." "Nat. Hist. Review," 1863, pp. 423–462.

5. "Note on the Skeleton found at Bennet Hill, Elgin." "Journ. Anthrop. Soc.," II, 1864, pp. 9, 10.

6. "On a very Ancient Human Cranium from Gibraltar." "Brit. Assoc. Rep.," XXXIV, 1864 (Sect.), pp. 91, 92.

7. "Account of the Discovery of a Human Skeleton beneath a bed of peat on the coast of Cheshire." "Trans. Ethnol. Soc.," IV, 1866, p. 101.

8. "Description of two Andamanese Skulls." "Trans. Ethnol. Soc.," IV, 1866, p. 205.

9. "Description of an Aino Skull." "Trans. Ethnol. Soc.," VI, 1868, pp. 109–111.

10. "Description of, and Remarks upon, an Ancient Calvaria from China, which has been supposed to be that of Confucius." "Journ. Ethnol. Soc.," II, 1870, p. 73.

11. "Supplementary Remarks to a note on an Ancient Chinese Calva." "Journ. Ethnol. Soc.," II, 1870, p. 156.

12. "Remarks on a Collection of Skulls from Rothwell, in Northamptonshire." "Proceedings Ethnol. Soc.," 1870, p. xci. [In "Journ. Anthrop. Inst.," I, 1872, Appendix.]

13. (With W. Boyd Dawkins). "On the Discovery of Platycnemic Men in Denbighshire." "Brit. Assoc. Rep.," XL, 1870 (Sect.), p. 148.

14. "Note on a ready method of Measuring the Cubic Capacity of Skulls." "Journ. Anthrop. Inst.," III, 1874, p. 200.

15. "Remarks on a Collection of 150 Ancient Peruvian Skulls, presented to the Anthropological Institute by T. J. Hutchinson." "Journ. Anthrop. Inst.," III, 1874, p. 86.

16. "Description of a Samoiede Skull in the Museum of the Royal College of Surgeons." "Journ. Anthrop. Inst.," III, 1874, p. 494.

17. "Notes on some Skulls from Palmyra, presented to the Institute by the late Mr. Cottesworth." "Journ. Anthrop. Inst.," IV, 1874, p. 366.

18. "Presidential Address to the Anthropological Institute." "Journ. Anthrop. Inst.," III, 1874, p. 499.

19. "Presidential Address to the Anthropological Institute." "Journ. Anthrop. Inst.," IV, 1875, p. 469.

20. "Notice of a Skull from Ashantee, and supposed to be that of a Chief or Superior Officer." "Journ. Anthrop. Inst.," IV, 1875, p. 62.

21. "Description of two Beothuc Skulls." "Journ. Anthrop. Inst.," V, 1876, p. 230.

22. "Notes on a Collection of Skulls from the Islands of Mallicollo and Vanikoro in the New Hebrides Group." "Journ. Anthrop. Inst.," VI, 1877, p. 200.

W. H. F.

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