

BUCHAN FIELD CLUB.

THURSDAY, 5th January, 1899.

RETIRING PRESIDENTIAL ADDRESS BY PROFESSOR R. W. REID, M.D., F.R.C.S., UNIVERSITY OF ABERDEEN.

I beg to thank you very sincerely for the honour which you have done me by electing me President of the Club.

I am very sorry that I have not been able to take a more active part in the work of the club during my term of office, but my University duties have prevented me from so doing.

The club has accomplished a good deal of work during the past year. In its transactions you will find published the following papers :—

1. One entitled "Protestantism beside the Ugies," by the Rev. A. Chalmers. It deals very fully with the dawn of Protestantism in Buchan, and from the great pains which Mr Chalmers has bestowed to verify his statements the contribution is an exceedingly valuable one.
2. Another is called "Place Names in Buchan," by Mr John Milne. Mr Milne is already well-known to members, from his geological researches, and in his papers on "Place Names," he records with great accuracy facts which have come under his notice.
3. "Folk Lore Days and Seasons" by Mr James Spence is an introductory paper and is full of first hand information.
4. A contribution on "Historical Notes on Ellon and Neighbourhood" was read in connexion with the only excursion of the season,—an excursion which took place on August 17th to Ellon and Esslemont—one which was thoroughly enjoyed by all who joined in it—and the thanks of the Club are due to Col. Wolrige Gordon for his extremely kind and hospitable reception.

5. Lastly we have the elaborate paper by the late Mr James Aiken on a subject which he treats from a very unusual standpoint.

Besides the contribution of these papers some progress has been made in Ethnological work. Our Vice-President, Mr Gray, and our indefatigable Secretary, Mr Tocher, hoped to have been able to publish their final paper on the Buchan Schools. The working up of the results has consumed much time, and in their anxiety to form reliable deductions these gentlemen have been unable to finish their research in this branch of Anthropology.

The adult survey of Buchan is also being proceeded with, but no analysis of the observations has yet been made. The instruments procured by funds granted by the Royal Society are distributed along the coast.

The membership of the club stands at 120, and we are not in debt. In fact, we have a small balance to our credit.

As perhaps you know already, an Anthropometrical Laboratory has been established in the University of Aberdeen, and that it has now been in operation, under my supervision, for the last 18 months or so, and although I should have preferred to have met the Club in the Laboratory and demonstrated to it practically the methods of taking accurate observations, and also pointed out to it the many difficulties attendant on doing this, even while working under advantageous conditions in a fully equipped Laboratory, yet I think I may interest the Club in some way if I describe shortly what is being done there.

Before doing this, I should wish to express my deep obligations to Dr Alexander Low, my trusty senior assistant, to Dr Harper, now of Stranraer, and to Dr Pozzi of Mintlaw, my former junior assistants, and to Dr Lumsden my present junior assistant in the Anatomical Department, and to Dr Charles Usher, the accomplished University Lecturer on Ophthalmology. Without their assistance it would have been utterly impossible for me to have undertaken the work.

Anthropometrical observations have been made on two classes of individuals—

Firstly on Medical and Science students attending the University.

Secondly, by the kind co-operation of the worthy chief constable, Mr Wyness, and his Lieutenant, Mr Morren, on the members of of the Aberdeen City Police Force.

The first class consists of individuals who are younger than those of the second class and is drawn from a much wider geographical area. It

comprises persons born in all parts of Scotland, England, Ireland, and the British Colonies.

Observations have been conducted on them chiefly from the point of view of watching changes which occur in their physical condition during their curricula as students at the University.

As the Laboratory has been established for the short space of about 18 months, such observations are of necessity, in the meantime, incomplete. All we can do now is to analyse the records of their first anthropometrical examination.

The second class, i.e. the members of the City Police Force, forms a very good sample of a picked body of well developed men drawn from a limited area of Scotland, practically confined to Aberdeenshire.

Observations have been recorded on 116 University students and 150 policemen. Although these numbers are ever so much too small to admit of reliable general conclusions being drawn from them, yet it is of interest to observe the deductions which can be made so far.

The schedule used in our Laboratory has been distributed throughout the room. It is more or less similar to other schedules of the kind. Its chief difference consists in the amplitude of record in connection with the special sense organ of sight.

As a kind of text I propose to make the various queries and items of the schedule the basis of the following remarks :—

As regards both students and policemen what one found very unsatisfactory was the getting accurate information as to the locality or localities to which the ancestors of the individual under examination, belonged. Every person does not possess a "family tree," and consequently we found that the answering of such vague questions as "What district do your father's and mother's people come from?" is practically worthless in order to determine the stock to which the individual belonged.

On making out a future schedule, I shall be inclined to omit all reference to such matters, and be satisfied by simply recording the place of birth of the individual under observation.

With reference to condition we find that the majority of students and policemen are of the medium type.

All colour shades and tones presented by types of men, and the mixed races derived from them, are due to these causes :—Transparence of the epidermis on scarf skin, the net-work of blood vessels under the epidermis and the pigment or colouring matter deposited in the deepest

layers of the epidermis. The pigment consists of black or brown molecules of a round or oblong shape, and almost too small for exact measurement. It is worthy of remark that when viewed singly with a very high magnifying power they look transparent and almost colourless, and it is only when they are heaped together that their dark colour distinctly appears. It is present in all races, but it varies in amount.

All human types can be collected into three groups—the white, the yellow, and the black. The mixture of these types and influence of surroundings have produced the many shades of colour visible in different individuals.

Hairs are growths of the epidermis agreeing essentially in nature with that covering, and from the amount of pigment which they contain their differences in colour depend.

The colour of the eyes is due to the pigment which is found in and immediately behind the iris. In the eye of the infant and the different shades of blue eye the colour depends upon the black pigment which is immediately behind and which covers the back of the iris, appearing more or less through the rest of the tissue of the iris, which in such cases is colourless or only but very slightly coloured. In the black, brown, and grey eye the colour is due to the pigment contained in the substance of the iris itself.

As regards the colour of the skin we found that the pale variety predominated, and that freckling was observed in two cases only.

In both classes too, the hair was straight and with reference to its colour we observed that in the first class.

| | | | | |
|------|-----------|---------------|--------------|---|
| 39·1 | per cent. | had hair of a | brown colour | |
| 33·4 | ” | ” | fair | ” |
| 20·8 | ” | ” | dark | ” |
| 5·2 | ” | ” | red | ” |
| 1·8 | ” | ” | black | ” |

and that in the second class

| | | | | |
|-----|-----------|---------------|--------------|---|
| 38· | per cent. | had hair of a | brown colour | |
| 34· | ” | ” | fair | ” |
| 20· | ” | ” | dark | ” |
| 4·6 | ” | ” | red | ” |
| 3·3 | ” | ” | black | ” |

From the above figures it will be seen that in both classes of individuals under examination more than one-third had brown hair, about one-third had fair hair, about one-fifth had dark hair, about one-twentieth red hair,

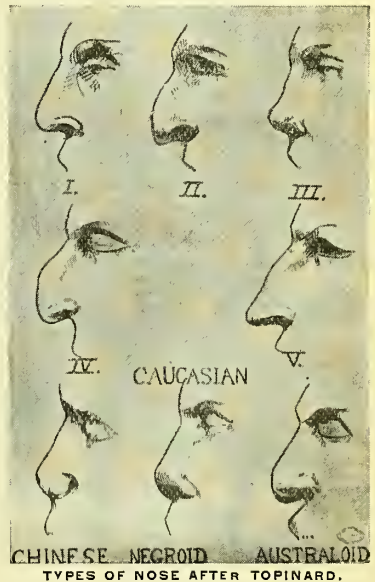
and that in about 1 in 50 the colour of the hair was black. The small percentage of individuals possessing red hair is worthy of notice, but perhaps this is explained by the fact that, in an ordinary way, one observes hair of a reddish colour more readily than hair which has any other hue.

In order to estimate colours of eyes or rather the colours of their irides we use Galton's test types. That anthropologist groups eyes into those whose colour is dark, those whose colour is medium, and those whose colour is light or roughly speaking into dark, grey, and blue. On recording the colour of an eye we refer it to the nearest type to which it seems to belong. As one would expect this reference is difficult to make with any degree of certainty, as the colour may be just on the border land between two types, and might equally well be referred either to the one or to the other. This difficulty introduces itself especially in connection with the types medium and light.

We found that amongst the individuals constituting Class 1. rather less than one half have eyes of the medium type, about one-third have light eyes and about one-fifth have dark ones. In Class 2. rather more than one-half have medium eyes, rather more than one-fourth have light eyes, and about one-fifth have dark ones.

On comparing the colour of the hair with the colour of the eyes we find that whatever be the colour of the hair—red, fair, brown, dark or black the colour of eye most commonly associated with it is the medium or grey type. Rather over 50 per cent. of individuals examined are included in this class. Of the other 50 per cent. we find that the lighter the hair the lighter the eye and the darker the hair the darker the eye. There were many exceptions to this rule, however, for in one case (a native of Fraserburgh) dark eyes were associated with red hair, and in eight cases light eyes were associated with dark hair.

Since the nose makes such an important and prominent feature of the face it is well to record the shape of the profile, and for this purpose we



have used the types recommended by Topinard, and have found that by far the most common form in all the individuals whom we have examined is the "straight" (fig. I.), the next most common the "sinuous" (fig. V.), next the "concave" (fig. III.), and lastly the "aquiline" (fig. II.), and "high-bridged" (fig. IV.). We find that a larger number of the students have straight, sinuous, and aquiline noses than the policemen, and that a larger number of the policemen have concave and high-bridged noses than the students.

When one looks at a number of dried skulls from the front, one is struck at once with the variety in shape of the front opening of the nose. In some it is long and narrow, in others it is short and broad, while in many it occupies an intermediate position as regards its shape. By comparing the greatest length with the greatest breadth of the aperture we obtain the "nasal index" and from an analysis of such indices we classify the openings into narrow, medium, and broad. The lower the race to which a skull belongs the broader the aperture. The human embryo is broad-nosed, the breadth diminishing as age advances.



TYPES OF HUMAN EAR AFTER KEITH.

Making allowances for the soft parts in the living body, we find that the individuals whom we have examined fall into the narrow group with an average index of 61.5.

Attempts have been made to classify the races of mankind from the various types of ear which they present. Hitherto such attempts have been of little value.

Recently Dr Keith, a distinguished anatomist in London, and a native of Old Machar, has taken as the basis of his classification a form which he observed as occurring most commonly in man (human type proper) and deviations from this form which he has grouped according as they approach in likeness to the ears of some of the higher anthropoids. On observation he found that a certain, but very small number, could not be referred to either the primary form or to its deviations, hence he makes another group, which he terms unclassifiable.

Keith's classifiable types are the following :—

1. Human proper.
2. Small chimpanzee.
3. Large chimpanzee.
4. Small orang.
5. Large orang.

Of all the methods which have been hitherto devised for recording the appearances of the auricle this seems the best. We have adopted it in the Laboratory, but in many cases it is by no means easy of application, as frequently ears have presented themselves which were of such an indefinite shape that they might be placed in one or other of the classifiable groups according to the fancy of the observer.

Among the individuals whom we examined only four cases were unclassifiable.

Of the classifiable ears we found that the most common types were the human and the chimpanzee, each of those types occurring in 40 per cent of the individuals examined, and that the remaining 20 per cent fell into the orang type.

We noticed too that the more delicately moulded small chimpanzee and small orang types belonged more frequently to the students, and the large chimpanzee and large orang types belonged more often to the policemen.

In order to form the most accurate register of the physical character of individuals for anthropological purposes, certain known fixed and easily found points of the body are selected. We look naturally for

such points in the skeleton. Measurements are made with reference to these points, and from a comparison of such measurements individuals may be fairly well classified.

This method of observation of necessity requires a certain amount of anatomical knowledge, and when I say that it is somewhat difficult for any two professional anatomists to obtain exactly the same results on measuring various parts of the skeleton in the dried state, much more so will it be when it is clothed by soft tissues in the living body and still more so when the observations are made by persons who have no, or very little, practical knowledge of the anatomy of the human frame. Inaccuracies creep in therefore, among the records obtained by such methods of examination; still if a very large number of records have been obtained, these inaccuracies are somewhat counter-balanced, and fairly good and reliable statistics may be ultimately obtained. I should say distinctly that no one should attempt to make anthropometrical measurements of the living bony frame-work unless he has had some instruction given him in its anatomy, and has had shown to him the errors into which he may fall while making such observations.

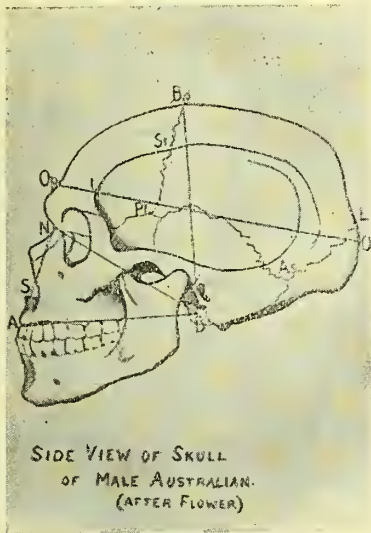
It is needless for me to say that my assistants or I should be very happy to give such instruction to any member of the Club who may care to take advantage of it in the Anthropometrical Laboratory of our University.

The part of the skeleton which stands out pre-eminently for observation is the skull. It is composed of two parts, one the cranium or brain-box, and the other the face for the lodgement of the special sense organs and the apparatus concerned in mastication.

The higher the race to which an individual belongs and the more cultured the individual is, the greater is the size of the cranium as compared with the face. This is accounted for by an increase in the development of the brain and a diminution in the development of the organs of mastication. The previous preparation of food by cooking etc., renders the presence of powerful teeth, jaws, and muscles less necessary.

In order to estimate the size and general shape of the cranium, we find the measure of its circumference, the relation of its breadth to its length, and the relation of its height to its length.

To obtain the measure of its circumference we apply a tape round the head falling on the middle of the narrowest part of the forehead in front (Op. in accompanying figure), and the farthest off point of the cranium behind.



As a practical point one must take care not to place the tape on the glabella or eminence between the eye-brows, for behind it lies an air-chamber instead of brain material.

Measuring in this way we find that the cranial circumference of the students examined averages 56.05 cm. and of the policemen 57.25 cm. This difference is no doubt accounted for by increased age in the latter case. This observation gives no indication of the shape of the head; whether it is flattened at the sides, back or front, or whether it shows bulges anywhere along the line of measurement.

I am betraying no secret I think if I say that anthropologists are looking forward to the modification and improvement by our Vice-President,

Mr Gray, of Harting's Cephalograph, and which, on application to the head, will give an exact outline of what we may call its greatest horizontal circumference.

In order to obtain the most reliable notion of the form of the cranium in the living body, we make a comparison of the breadth with its length. This relation is expressed numerically by what is called the cranial or breadth index, introduced into craniometry in 1842 by a Swede, A. Retzius. It is obtained by multiplying the greatest breadth by 100 and dividing the total by the greatest length. By so doing heads may be classified into the two great primary groups of narrow and broad, and a third of a medium shape—the result of crossing between the two primary ones.

Without going into details we found that the average head which we examined was of the medium shape, and that a few were narrow and a still smaller number broad. This finding, after making allowance for soft parts, agrees with the result of the examination of a very large number of mixed European and British skulls contained in the museums of our University and the Royal College of Surgeons of England.

Another useful observation is a comparison of the height with the length of the cranium. On so doing we obtain the height index. It is found by multiplying the greatest height by 100 and dividing the total by the greatest length. This is more difficult to do in the living body than in the dried skull, as we cannot approach the base of the skull in the living state. We found a somewhat higher index in students than in policemen.

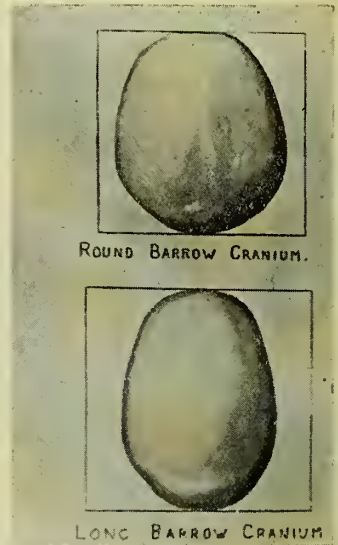
From a close comparison of the breadth and height indices of the individuals whom we have measured we are led to infer that as the result of the process of education the brain tends to expand more in the directions of height and breadth, especially the former, than in that of length.

The forward projection of the face has a variable relation to the vertical line of the forehead. The lower a race to which a head belongs the more pronounced is this projection. We estimate the amount of projection by comparing the distance between the depression in front of the ear and the root of the nose above, with the distance between the same depression behind and the roots of the incisor teeth in front, thereby forming an alveolar index. By analysing indices so made we classify heads into those whose jaws

project most—prognathous
 „ least—orthognathous
 and those whose jaws project to }
 occupy an intermediate position } —meso-gnathous.

As the result of our investigation we find that the individuals whom we examined are orthognathous ; the average student showing an index of 96.4 and the average policeman an index of 96.5.

It is a matter of common observation that the faces of some people seem longer than others. We have therefore compared the lengths and breadths of different portions of the face, and have found that the faces



of the students are relatively narrower than those of the policemen. This is probably explained by the immature condition in the former of the bony parts of the face to which the powerful masticatory muscles are attached.

Hitherto we have been confining ourselves to an examination of the head, but as time, and no doubt your patience is getting exhausted, I shall merely mention some of the results which we have obtained in measuring other parts of the body. The right upper extremity is on an average longer than the left, but very slightly so, only about 2 mm. This increased length depends on an increased development of the extremity generally, and not to the special elongation of any particular part. In 30 per cent. of students and in the same proportion of policemen the left limb was longer than the right.

From the records of strength of grasp—with practically all the muscles of the limb in action—we found no immediate relation between length of limb and strength of limb.

The average standing and sitting heights of students was 5 feet 8½ inches and 3 feet 0½ inches respectively. Similar measurements of policemen showed 5 feet 11½ inches and 3 feet 1½ inches respectively.

The span of arms from opposite finger tips behind the chest bears a relation to the height of the individual. On an average it measures more than the height. In the case of students the difference was 39 cm. or 1½ inches, in the case of policemen 7 cm. or 2¾ inches. The difference in the relative proportion between arm span and body height may be explained by the fact that the trunk as a whole gains maturity sooner than the extremities.

As to weight we find that the average student scaled 10 3-10ths and the average policemen 12½ stones, and that the weight increased uniformly but slightly each year until the 22nd year of age, that it decreased somewhat irregularly until the 26th year of age, that it ascended again somewhat uniformly until the 35th year, and that after that it tended to decline. The average greatest weight occurred between 30 and 35 years of age inclusive.

As to grasp we observed nothing worthy of special remark excepting that in 60 per cent. of individuals the right extremity was stronger than the left. In about 30 per cent. the left was stronger than the right, and in about 10 per cent. the grasps of the extremities were equal.

The average grasp of the best hand in students was 105½ lbs., and in policemen 130½ lbs.

In order to estimate the breathing capacity of an individual we measure the amount of air which he can expel from his lungs by the deepest expiration after taking the deepest inspiration. We found that the policemen had a greater average capacity than the students—an average of 251.1 cub. in. in the former case, and 214.4 cub. in. in the latter.

From the nature of things, especially as regards the apparatus employed for measuring the amount of expired air, this is an unsatisfactory test of the power of the breathing mechanism of an individual, and on the whole, I think I should omit it from a future schedule.

We now come to our researches in connection with the eyeball. Those imply a very intimate knowledge of the structure and functions of that sense organ. I shall speak of them therefore in the most general way possible.

In all, we have examined 520 eyes—300 of policemen and 220 of students.

We have conducted our researches under very advantageous circumstances, using a uniform and constant electric light.

We have observed the colour sense or faculty possessed by the individual of distinguishing colours correctly. We did this with the object of inquiring into the proportion of individuals in whom that faculty is absent or only partially present. In no person did we find it wholly absent, and our results show that about 4 per cent. of students were partially colour-blind, while we found only one policeman having this defect.

The most perfect test yet devised is that introduced by Holmgren of Upsala, and consists of a number of skeins of wool from which the individual under examination is asked to select all those having different shades of any particular colour. Those whom we found to be partially colour-blind confused the various shades of red with those of green (i.e.), were red-green blind.

It is an observation which requires some patience in its carrying out.

We estimate the acuteness of vision of one eye by closing the other and making the individual read certain test letters at a certain distance. If the person can read those letters or smaller ones the eyeball under examination is spoken of as possessing normal or better vision. We know that many people do not possess such vision. Their eyeballs are formed in such a way as to preclude its possibility, and hence science steps in and helps to make good their deficiencies.

Putting aside pathological imperfections, abnormal eyes may be classified into—

1. Hypermetropic or long-sighted. This condition results usually from the eyeball being too short, and as a consequence the image of any object looked at is brought to a focus behind the ball.
2. Myopic or short-sighted. Here the eyeball is too long and as a consequence the image of any object looked at is brought to a focus in front of the proper place in the eye-ball.
3. Mixed astigmatic. In these the curvature of the refractive surfaces of the eye are unequally great in its different meridians, and, as a consequence, the rays of light cannot be united or focussed in one point.

Such errors of refraction may be corrected by the use of convex glasses in the first case, concave glasses in the second and in the last by glasses of unequal curvature in their different meridians. Out of 520 eyes 348 had normal or better vision.

By far the most common form of refraction was hypermetropia or long-sightedness. It occurred in 73·8 per cent. of eyes examined.

Myopia or short-sightedness was found in 13·6 per cent. mixed astigmatism in 8 per cent, and 4·4 per cent. of eyes were classed as normal as regards their refraction, but in all probability they should have been found to be hypermetropic had their muscles been paralysed by the action of a drug.

Myopia or short-sightedness was found to be three times more prevalent in students than in policemen, a fact which points to a probable cause of the production of short-sightedness being the use of the eyes for near visions as in reading, writing, etc.

After determining the errors of refraction we proceeded to correct them by the use of appropriate lenses, and we found that out of 520 eyes the vision of 64 only could not be improved by correction so as to bring them up to the normal standard.

Hence a large proportion of eyes are better with errors of refraction corrected than without correction.

It does not follow from this that all eyes should have their errors of refraction corrected, because for various reasons the advantage gained by so doing does not counter-balance the disadvantages caused by the use of the means of correction. For example, in certain occupations, glasses are precluded as in shooting in wet weather, etc., where moisture

tends to accumulate on the glass and so obstruct the vision. Or in cases where the error is slight the disfigurement which they cause does not counter-balance the advantage which they gain to the persons wearing them.

On the other hand the use of glasses is indicated in many such cases not only on account of the improvement of vision produced but also for the prevention of the increase of the error of refraction (myopic) and in many cases (hypermetropic) for the relief of pain and discomfort caused by the use of such eyes when their error of refraction is uncorrected. The correction of refraction has an important bearing on squint.

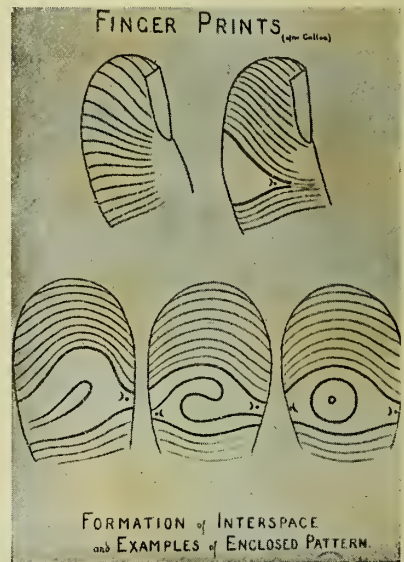
The younger the eye and the smaller the pupil, the better the vision. The pupil is smallest in long-sighted persons, largest in eyeballs whose refractive surfaces are not uniformly curved and intermediate in size in short-sighted individuals. We found that light coloured eyes have best vision and have an average pupil, whose size is considerably less than that of dark eyes and about the same as that of medium eyes.

The observations of the reactions of a person to sight and to sound is a difficult and somewhat unsatisfactory one to make, and without the apparatus which we use being at hand in order to help me to explain it, all I can say is that we found the time reaction for sound is considerably shorter than that for sight.

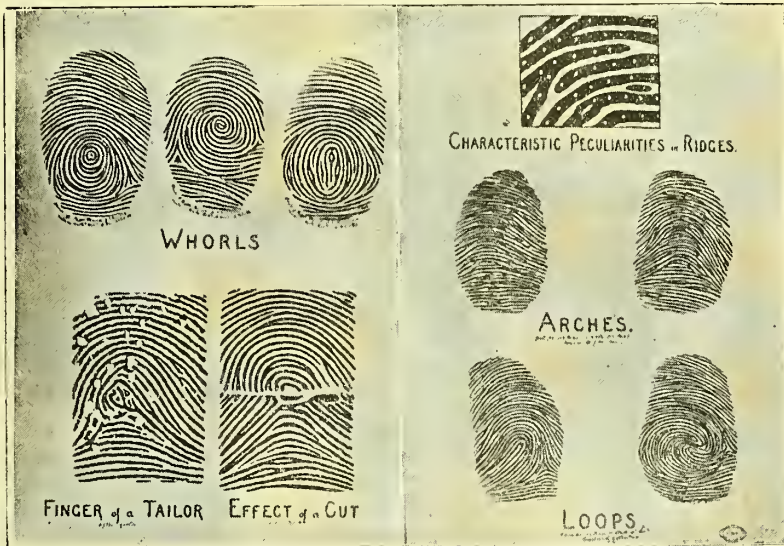
Of late—especially by Mr Francis Galton—the arrangement of the small inconspicuous ridges with intervening furrows visible on the skin of the pulps of the thumbs and fingers has been investigated, especially with reference to its being a means of identification of criminals.

We have obtained impressions of the thumb, index, and middle fingers of both hands of 287 individuals, and have made many statistics in connection with them, which are too numerous to mention in detail.

Some of the more leading results are the following :—



We find that the ridges form definite patterns, characteristic of each individual, and are capable of being classified into the three great types of loops, arches, and whorls.



The most common pattern is the loop, next the whorl, and lastly the arch.

As a rule the patterns are scattered indefinitely over the different fingers but we found similar patterns on the right and left hands of the same individual in 32 per cent. of persons examined.

The opposite thumbs seemed to show greatest identity of pattern, for we found them alike in 71 per cent. of the policemen and 63 per cent. of the students.

We have now completed the schedule, and as I said at the beginning, our observations are too few to admit of any general conclusions being drawn from them. They point to the fact however, that the individuals whom we have examined are of a mixed origin and difficult to group ethnologically.

I am afraid my remarks have been somewhat long and tedious, but my excuse for making them is that I thought I might interest the members of the Club by letting them know a little of what we are doing in the University in connection with the Anatomical side of the rapidly advancing science of Anthropology.

I beg to thank you for your very kind attention.