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of the
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Anatomical and Anthropological
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President

Robert William Reid, M.D.; F.R.C.S.

Professor of Anatomy

1906-08

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ORDINARY MEETING.

17th NOVEMBER, 1906.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

Professor Reid introduced Rev. Alexander Hetherwick, M.A., D.D., of Blantyre, who delivered a lecture on "Some Native Customs and Beliefs in Central Africa". The lecture was illustrated by a series of lantern slides and Dr. Hetherwick was heartily thanked for his address.

SOME NATIVE CUSTOMS AND BELIEFS IN CENTRAL AFRICA.

By REV. ALEXANDER HETHERWICK, M.A., D.D., Blantyre, British
Central Africa.

(Read 17th November, 1906.)

My purpose in this paper is to lay before you a few of the characteristic customs and beliefs of the tribes of Central Africa amongst whom I have been living for the past three and twenty years. These tribes inhabit the country lying along the banks of the Shire River and round the south end of Lake Nyasa, the Southern Division of what is known geographically and politically as British Central Africa.

The first of these tribes is that which calls itself the Mang'anja—a branch of the large Nyanja tribe which covers the whole southern half of our Central African Protectorate. The Mang'anja live along the Shire Valley from near its junction with the Zambesi River to the south end of Lake Nyasa. They are the people whom Livingstone met on his first expedition into the Lake District, and whom he describes in his book, *The Zambesi and its Tributaries*. They are the original inhabitants of the country, and long ago formed a large and powerful kingdom under the sway of one chief or king. But among all Central African tribes the tendency is to break up into petty chiefships jealous of each other, and often hostile, and the Mang'anja were no exception to the rule.

The second tribe is the Yao as it calls itself, who inhabit the hill country to the east of the Shire Valley and the south of Lake Nyasa. From there they stretch away along the valleys of the Lujenda and Rovuma Rivers to within a hundred miles of the sea coast. Originally

they lived to the north-east of their present habitat, but were driven to the south by pressure of the tribes from the east and north, and so about fifty years ago part of them came down into the Shire Highlands and drove out the original Mang'anja inhabitants, who fled to the Shire Valley for safety among their fellow-tribesmen there.

The third tribe is that known as the Angoni who live on the lofty tableland to the west of the Shire River and Lake Nyasa. They are really a branch of the Nyanja tribe and closely allied to the Mang'anja already alluded to, both in language and general characteristics. But about forty years ago they were subjugated by the Angoni, a raiding tribe of the Zulu race, who came into the country from the south, and from whom they took the name Angoni. Along with the name they took a few of the habits and customs of their conquerors, but they still retain so many of their own, and these so different from their neighbours the Mang'anja and Yao, that it is better to class them as a distinct tribe.

The fourth of the tribes I would refer to is known to outsiders as the Anguru. They live in the country between the east shore of Lake Shirwa and the coast, and within what is now a Portuguese Protectorate. But so many of them have fled within the past five years from Portuguese methods of government and taken refuge in British territory, that a large part of the south-east corner of our Protectorate is now inhabited by them. They are the least known of the tribes I have mentioned, having only lately come into contact with us, and consequently I shall have only rarely to allude to them in this paper.

In order to give you the best idea of native African habits of life and thought, I shall deal to-day chiefly with one of the tribes I have mentioned, and only refer to the others when they present some marked diversity of custom or belief. The tribe I have selected is the Yao, because, in one particular feature, to be noted later, it presents such a marked contrast to the others as to call for special reference. And in all I have to say to-day I must be understood as

dealing with the native in his primitive state, before he was brought into contact with the new ideas and customs of Christianity or civilisation.

Physically the Yao is the most powerful of the tribes I have mentioned. His tall strong frame, his broad-shaped skull, his features often with little of the negro type about them, his general air of strength and intelligence easily mark him off from his neighbours. The Yao tribal mark consists of a few short tattoo lines running down the centre of his forehead, and one or two similar marks on either temple. The Mang'anja, on the other hand, displays a broad cicatrix—sometimes two or three—drawn from the middle of his forehead down over his cheeks and neck to meet in the middle of his back. His lips and chin, as well as his breast, are not unfrequently covered with such marks. The Angoni is recognised by a hole bored in the lobe of the ear, into which a small plug of horn or wood is inserted, while the Anguru makes a large crescent-shaped cicatrix on either cheek, and often also in the middle of the forehead, sometimes cut so deep that I have known a man take the quid of tobacco from his mouth and lay it in the hollow of the cicatrix while he was speaking. The Yao women bore the upper lip and gradually distend the opening till a piece of wood, ivory, or even stone, an inch and a half or two inches in diameter, may be inserted, causing the lip to protrude in what to us is a hideous custom, but to them is the fashion—and fashion reigns supreme there as elsewhere. The Mang'anja women also follow this custom, and so too the Anguru, but the latter, in order to further enhance their charms, bore the under lip and insert a brass nail five or six inches long which hangs down over the chin. Sometimes the weight of the lip ornament breaks through the flesh of the upper lip. In this case the defect is repaired by plastering the two ends together with a piece of India-rubber—a rough method of surgery which has the desired effect of keeping the ornament in its place.

The primitive garment of the Yao is made of bark cloth. A roll of bark of the mjombo tree is stripped off by beating it with a piece

of wood. It is then steeped in water for some days. When soft it is hammered on a log of wood by means of a wooden mallet. In this way the fibres are separated one from the other, and the bark stretched to five or six times its original breadth. It thus forms a soft fibrous matting which affords a considerable amount of protection to the skin of the wearer. By steeping the bark in water into which a quantity of black loam has been stirred, the cloth is dyed black. It is worn kilt-fashion suspended from the waist, while a larger piece is thrown plaid-wise over the left shoulder and under the right arm. The Angoni, probably owing to the scarcity of wood in their country, dress themselves in the skins of small game—goats or sheep—which they wear tightly bound round the loins and thighs. In most villages one used to see a loom at work on which a rough kind of cotton cloth was woven (Plate I., Fig. 1). The cotton plant was grown in small patches on the outskirts of the village, and by means of a small distaff and spool was spun into a coarse thread. This was stretched on the loom frame, and the weft was thrown by means of a hand shuttle. But the process was slow and tedious, and only chiefs and head men could afford the possession of a piece of such cloth. The introduction of the products of our Manchester looms has thrown all such forms of apparel out of fashion, and barkcloth is now worn only at funerals by the chief mourners as a sign of grief, by mothers during and immediately after childbirth, and by boys and girls at the ceremonies of entering the state of puberty. In remote districts it is also worn over the ordinary calico dress to protect it from damage or during a shower.

The chief ornaments worn by both men and women are beads of various sizes, shapes and colours. They are worn in the form of necklaces, waistbelts, and anklets. The women also wear them strung on the hair or plaited into a wig (Plate I., Fig. 2). Coils of brass wire are also worn on the legs and arms. Such articles were procured from the coast through the Arab or coast trader, and must have been only of recent import. Till the introduction of European coinage they formed the main articles of barter with the natives. Among the Yaos the head is frequently shaved either wholly or in patches, and

the hair is always kept short. The Angoni man, on the other hand, ties his hair into little tufts which are bound round with thread, and gradually lengthened till the head, at a distance, looks as if it were covered with matches stuck on endwise. The Anguru not only never cuts his hair, but tries to make it appear longer than it really is by adding long threads to its length. The Yao files little notches on his front teeth (Plate II., Figs. 5 and 6). The Anguru files his to a point (Plate II., Fig. 7). The Mang'anja and Angoni leave theirs alone. The operation is done in youth, and is performed either by means of a file or by chipping with a small axe.

By way of arms the Yao carries a bow and arrows and a long light spear for stabbing. The Anguru and Mang'anja are similarly armed, only the Anguru spear is barbed and inflicts a nasty wound. The Angoni on the other hand has learned from his Zulu conquerors the use of the assegai and shield, and thus has made himself the terror and scourge of all his neighbours. He also uses the knobkerry which he can throw with great accuracy at a fleeing foe, and thus stun or maim him. With the advent of the Arab trader the use of guns and ammunition became common, and almost every man you met carried an old Tower flintlock. But the possession of a gun did not always mean the possession of a charge of powder, and so the Angoni wisely preferred his assegai and shield, the very sight of which was enough to drive the surrounding tribes in terror to the hills for refuge.

The Yao house is of the usual native African type—circular and thatched with grass (Plate I., Fig. 3). The circle is drawn by means of a string from a fixed central pin. The circle is the only regular geometrical figure the African is acquainted with—to teach him the value of a straight line is to make a vast step in his education. The walls of the hut are made of poles stuck into this circle at the distance of two feet apart. To these are fastened strips of split bamboo running round the house, and to these again are tied bunches of grass by means of other strips of bamboo. The string used in tying the bamboos and poles is got from the bark of the mjombo tree which is torn into long strips and used as ropes or string. The roof

is a flat cone made of bamboo tied with bark string and lifted bodily on to the walls. This is then thatched with grass so carefully laid on that the hut is wonderfully rainproof. Generally a verandah is made round the house by projecting the roof beyond the walls, and supporting it on an outer circle of poles. A door two feet broad and about three feet high is made in the wall, and is closed by means of a framework of bamboo laid against the opening from the inside. A crossbar kept in its place by two supports fastens the door on the inside. In most houses there used to be a small back door on the other side from the main door. This was used in case of a night attack when the usual entrance would be doubtless watched by the enemy. The walls and floor are plastered with mud and sand. A hollow is scooped in the middle of the floor for the fire, and round this are placed three stones for the pot to rest on. A raised platform is made on one side of the house, and forms the sleeping place of the family. On this is laid a mat of split reeds woven together with bark string. A fire is kept burning during the night, and no special covering is used during sleep unless the sleeper is the happy possessor of a large piece of native cloth or calico. In this case he tucks one end under his feet and draws the other over his head and so goes to sleep.

The implements used in house building consist of an axe which may be used also as an adze, and a knife. In addition to this the native has his hoe fastened into a short handle by means of a prong projecting from one side. For long the native of Central Africa has been acquainted with the manufacture of iron, which in certain districts he digs from shallow pits and smelts in a rude clay furnace by means of charcoal fuel and a goatskin bellows. The blacksmith's shop used to be seen in almost every village and, like the Scotch smithy in the olden days, was a great centre of the social life of the inhabitants. The Mang'anja and Anguru were noted blacksmiths and with their stone anvils and rough hammers produced wonderful specimens of skill. Welding iron they were incapable of, and so they had to resort to riveting. But the iron was poor and soft at the

best, so that with the advent of civilised trade the old native hoe, axe and knife were soon superseded by the manufactured articles from British and American forges.

With the hoe and the axe the native does all his agriculture. He has the virgin forest before him from which to choose, for there is no private ownership of land in native law, and the chief's country is open to the chief's people. But once a man has fixed on a piece of ground and marked it off for his own by tying the grass into tufts or placing a stone in the fork of a tree to mark the boundary, the ground becomes his till he vacate it or sell his rights to another. The system of agriculture is destructive in the extreme. A piece of virgin forest is felled and the timber burned on the spot. The ashes are gathered into heaps and covered with a thin layer of soil. On the fall of the early rains the seed is planted in these heaps, and in a few days germinates. It is twice hoed before it is ready to be reaped, and when reaped the stalks are left on the ground to be burned for next year's manure. But every year a new piece of forest is felled and burned, and added to the old garden. After three or four years' cultivation the soil is exhausted and is abandoned to lie fallow for years. In this way vast tracts of land in Central Africa are deforested, and in consequence the rainfall is yearly decreasing. With this decrease the level of the great lakes and rivers is slowly falling. Within the last thirty years the level of Lake Nyasa has fallen eleven feet, and there are watermarks on the rocks which show it once stood at a still higher level.

The chief food-crops are maize, kaffir corn, rice and beans. Pumpkins, ground nuts, and cucumbers are also grown in their season, but the staple crops are those I have mentioned. When the crop is reaped by cutting the heads off the stalks, it is stored in large bins made of plaited strips of bamboo and thatched over with grass. Part is stored on a shelf in the roof of the hut where it is protected from the moths and weevils by the smoke. This is used for seed in the next year's sowing. As required the grain is taken from the store, and threshed by beating with a stick, while the maize is separated

from the cob by means of the finger and thumb. The grain is broken up in the mortar by means of a wooden pestle, then steeped in water to soften it, and finally pounded into flour in the mortar or ground fine between two flat stones (Plate I., Fig. 4). The flour is boiled into a stiff pasty porridge which is eaten with the fingers. Always with the porridge there is eaten some relish such as beans, fowl, fish or game. The relish is indispensable to the meal, and a native will not infrequently go hungry rather than eat his porridge without its accompanying relish. Salt when procurable is always added to the relish, and some of the most widespread superstitions are connected with the adding of salt by the wife to the husband's food. The porridge is served in one dish and the relish in another. The men always eat by themselves and the women by themselves. By way of grace before meat a little of the porridge is picked up with the fingers and thrown over the shoulder or at the foot of the nearest tree as a thank-offering to the spirits.

Hitherto I have spoken of the division of the people into tribes, and have been referring chiefly to the Yao tribe. The distinctive features of a tribe in Central Africa may be classed as three in number : (1) language, (2) locality, and (3) certain customs which are peculiar to one tribe and are unknown among others. But there is a further division of the people which plays a far larger part in their daily life, and dominates their social life to a far greater extent, and this is the division into clans. I use the word "clan" as the nearest approach to the idea which we have in our language. It denotes blood relationship through descent, and is distinct from our ideas of the family or tribe. In the members of the family there may be more than one clan, and the members of a clan are to be found scattered through various tribes.

This system of clanship is dominated among the Yaos by two features, (1) descent through the mother, and (2) marriage outside the clan. Descent through the mother means that the children take the clan of the mother and not of the father, while marriage outside the clan means that a man must not take a wife from his own clan

but from another. To illustrate it from our own clan names, I should put it in this way. A Mackenzie must not marry a Mackenzie, but a woman of another clan, say a Macleod, and the children of the marriage would be not Mackenzies but Macleods. Under a system of polygamy a man may marry several wives who among the Yaos must be themselves of different clans, and so the children of a Mackenzie would be none of them Mackenzies but Macleods, Macphersons, Mackintoshes, according to the number and clans of his wives.

Now all the relationships are counted through the clan and not through the family as among ourselves, and the law of kinship among the natives may be roughly laid down as follows: All members of the same clan who are of the same generation are either brothers or cousins, those of the older generation are either fathers or mothers or uncles, while those of an older generation still are either grandfathers or grandmothers. Hence a man's brother means any fellow-clansman of the same generation as himself, his father means any clansman of the older generation, while grandfather denotes any male clansman of any older generation still. Thus a man may have many grandfathers, still more fathers and mothers, while his brothers are legion.

Among the Yaos, descent being through the mother, it follows that all property is inherited by the younger brother born of the same mother, because he is the nearest relation of the same clan. Failing him it is the sister's son who succeeds. Thus a man's heirs are never his own family but either his younger brothers, or nephews by his sister. With the property the heir takes the name of his predecessor and also his wives. And not only so but he takes also all the relationships of his predecessor and leaves his own original ones behind him. Thus those who before were his mother or mothers are now his sisters, while his original brothers now become his children or even grandchildren.

This system holds with slight modifications among the Mang'anja and Anguru, but among the Angoni—due probably to the influence of

their Zulu conquerors—descent is counted through the father, and it is the oldest son who is the heir.

Into the origin of the clan system it is not possible for me to enter to-day. It is enough to say it is traced by some to the belief in the descent of the clan from certain animals which gave their names to the various clans. Thus the antelope clan ascribe their origin to the antelope, and in consequence they abstain from eating the flesh of the antelope. But many of the names of the clans among the Yaos are not names of animals at all, nor does any system of taboo from special meats or other articles of food seem to be due to such a belief. If such a system existed, the Yao has lost it now, and can himself give no account of the origin of his clan system of relationship. Among the Mang'anja and Angoni there are several names of animals among those of the clans, and the flesh of the animal is abstained from by those who bear its name.

Marriage is consummated among the Yaos in three ways: (1) by inheritance of the wives of uncle or grand uncle; (2) by purchase of a slave woman who is afterwards promoted to the status of a wife, and (3) by betrothal. The betrothal is always arranged by a third party who thus becomes the "surety" for the good behaviour of the couple, and to whom any complaint of ill-treatment or infidelity is made. Separations are common and must be made through the "surety," and any property given by one of the parties to the other is given back. Among the Angoni the husband pays a sum to the father-in-law previous to the marriage as a sort of compensation to him for the loss of his daughter, but this custom has been derived from the Zulu conquerors and is not original to any Central African tribe.

At childbirth the mother retires to the bush with some woman friend, and in two or three hours may be seen returning to the village with the new-born baby strapped on her back. She retires to her hut and remains for some days in complete seclusion save for the presence of her women friends who have the case in hand. She remains there till the remains of the umbilical cord drops off, and during this time no man body dare approach the hut. The baby is weaned only when

the next child is born—even if then. It grows up without discipline or training of any kind. “The child is not my slave,” is all the excuse the mother gives for any act of disobedience on the child’s part.

Towards the age of puberty the boys are made to pass through the ceremony of initiation, and at this time the rite of circumcision is administered. The Yao alone of all the tribes I have mentioned observes this rite : he has in all probability obtained it from the Mohammedan Coast people who are the nearest neighbours of the Yao on that side of his country. It is now, however, universal where no trace of its Mohammedan origin is to be found. By a similar ceremony all girls are initiated into the rites and customs of womanhood and wifehood, and then they are eligible for marriage. They are generally, however, betrothed long before this, sometimes even before birth, on the understanding that the expected child is of the opposite sex to the contracting party.

The common diseases prevalent among the natives are those which have their origin in malaria, and the native is certainly as susceptible to malaria and its effects as the European—if not more so. Dysentery is a fatal disease common among them, due to their eating flesh and fish in a very high condition, and especially to the first rains of the rainy season washing all filth and effluvia from the villages into the streams and pools where the drinking water is drawn. Pneumonia is also prevalent, and very fatal in the cold season. Measles and small-pox are periodical epidemics, but by dint of vaccination the Government and mission doctors have largely succeeded in stamping out the disease in recent years. The “jigger” has wrought sad havoc of late, and many are the limbs that have been maimed by this new pest. The sleeping sickness has not yet made its appearance in the Protectorate, but it is reported to have broken out on the northern frontier, and as it seems to follow the great trade routes across Africa, we may prepare ourselves for a visitation from this most dread of all African maladies.

Of medical knowledge the native possesses but little. Where disease and death are ascribed to the influence of witchcraft, it is hardly

to be expected that medical research would advance very far. Still the native doctor does possess a few herbal remedies which are certainly efficacious, but the most trusted of his nostrums are prescribed in the form of charms or amulets. These I shall have to allude to presently, as they deal with the most abstruse and mysterious of all forms of native belief—the presence of spirit possession in material objects.

Let me first refer, however, briefly to the native belief in witchcraft, a part of the native creed which influences most powerfully his daily and social life. So strong is the native horror of this crime of witchcraft that it is very difficult to get him to discuss it at all, and it is only through actual charges that have been brought against individuals in the native law courts that one has been able to get any insight into this subject.

To put it briefly, the native “witch” is a member of a secret cult which feeds on human flesh, and thereby obtains its occult powers, and the deaths of their victims are said to be brought about for the purpose of obtaining the human flesh on which the “witches” feast at their midnight orgies. The powers thus obtained enable them to produce disease, misfortune and death. They are worked through the means of charms or “medicines” which are administered by secreting them about the hut or village or garden of the individual whom they wish to injure. The result is that some mysterious illness befalls this individual and unless his “doctor” can provide some more powerful charms, the case must end fatally. The result is as follows:—

As soon as a death occurs, the relatives and friends gather round the corpse, and watch it night and day, while the young men and women dance and sing to the accompaniment of drums and the firing of guns—all this to keep the “witches” from their supposed victim. The corpse is first washed and prepared for burial by bending the knees to the chin, and wrapping it up in a sleeping mat. When the near relatives have assembled, generally the morning following the death, the corpse is slung on a pole and carried to the grave. A grave is dug, and a recess scooped out at the bottom on one side of the pit. In this the corpse is laid on its side, with the face to the east, and, in

the case of chiefs or headmen, much of the personal property of the deceased is torn or broken up and laid alongside. The mouth of the recess is then closed by a mat supported by a few poles, so that the earth may not fall on the corpse, and the grave is filled in. If a chief, the grave is then hung round with offerings to the dead, and a pot is sunk in the ground to receive the sacrifice of native beer which from time to time the survivors will make to the spirit of their dead relative or friend. The mourners then return home, and have their heads shaved as a sign of mourning. The chief next calls a meeting to consult with his headmen, and the relatives of the deceased as a rule make complaint of witchcraft as the cause of death, and demand an appeal to the divining "lots". Two or three are selected to approach the divining oracle, and he, after consulting the lots, names one or more individuals as the cause of the death of their relative. The accused is then confronted with the charge, and the trial takes place. Originally among the Yaos the result of the appeal to the lots was sufficient proof of guilt, and the accused was forthwith put to death by burning upon a fire of thorns, but of late, owing doubtless to their contact with the Mang'anja, an appeal is allowed to the poisoned ordeal. This is prepared from the bark of the mwabve tree, and is administered in the presence of the accusers. If the victim dies of the poison, he is deemed guilty, and his body is forthwith mutilated and cast out unburied to the bush, while his relatives have to pay compensation to the relatives of the original deceased for the crime of their friend. If the accused vomits the poison he is deemed innocent, and the accusers have to pay him compensation for the charge they brought. They will then appeal again to the lots, the diviner, of course, finding some good excuse for the failure of his first appeal, and another will be accused, and so the case will go on till either some one dies of the poison or the relatives desist from further proceedings. Among the Angoni the poison is administered to the whole village, whose inhabitants thus hope to clear themselves of any complicity in the crime. Only last year I knew of eleven who thus died of the poison in the hope of establishing their good name.

When we speak of native charms and "medicine"—for charm and medicine are synonyms in the native tongue—we enter on a new region of native thought. The charm consists of small pieces of wood worn on a string tied round the affected part, or the ashes of plants or bones of animals or hair tied up in small packages and worn about the person. What the power of these charms consist in I have never got any native to give me any theory of his own. They are "just medicine," and that is enough for him. Taking into consideration analogous beliefs of the natives of other parts of Africa, I think I am justified in holding that these charms are simply degraded forms of the common fetich of native belief. A fetich is some material object which is possessed of miraculous powers because of its being the abode of some spirit which gives it vitality and power. Now these Yao charms and medicines would appear to be just the fetich of the West African without the faith in the inherent spirit. The Yao clings to his faith in the miraculous powers of the contents of these horns and amulets, but is utterly unable to assign any reason why such material objects should produce such results.

On this subject the Mang'anja and Anguru hold beliefs similar to the Yaos, but among the Angoni we find a firm belief that material objects may be taken possession of by the spirits of the dead. Thus an ox or goat or fowl or even a doll or basket or piece of cloth may become the abode of the spirit of some departed chief or relative, and this object is consequently cherished and made the medium of communication with the spirit inhabiting it. It thus becomes a fetich or charm and would appear to be the original type of which the Yao charm or medicine is the degraded materialism.

As we enter further into his beliefs in the region of spirit, we find that the Yao stands entirely alone among his neighbours in the nature of his faith in the unseen world. Briefly put, his creed is as follows :—

Every human being has a spirit or soul. This spirit inhabits the body but may leave it during sleep and visit other individuals or scenes, and thus produce the phenomena of dreams. At death the

spirit leaves the body and goes into the spirit world. It then makes its abode near the house where he lived, or about the village council yard, or more generally at the grave where the body is buried. This spirit of the departed becomes the "god" of the surviving relatives, and is worshipped by offerings of cloth or food. When the Yao speaks of "God," he therefore means the spirit of some departed chief or relative, or he at times seems to mean the aggregate of all the spirits in the spirit world rather than any individual spirit. This is the Yao "Mulungu"—God. It is spirit; it is not personal. Beyond this the Yao does not go. The Supreme Being in his universe is this Mulungu—this spirit world—and this alone.

In this faith the Yao is alone among his neighbours, for the Mang'anja and Angoni hold that, in addition to the world of departed spirits or souls, there is a Being Supreme over all—the Creator. He is Mpambe, the "Lightning," Leza, the "Nurse," Chiuta, the "Great Bow". He is worshipped by offerings as the spirits of the dead are. The Yao has no such faith. He is a pure animist—a spirit worshipper. He has forgotten his faith in a Supreme Being and contents himself with the spirit worship alone. To the spirit of the departed chief or ancestor he makes his offering in the time of his trouble; when he goes on a journey or ventures on any exploit which may lead him into danger he asks the protection of the spirit world. For his worship he may erect a shrine over the grave, or at the hut where the dead used to live, or he may hang his offerings on the village tree—a relict this of an older faith in the possession of the tree by the spirit of the dead, a faith now forgotten—or if on a journey he may lay his offering of flour in a tiny heap by the wayside. On these occasions he is his own priest, but on great occasions when some village offering is made, it is the village chief who is the priest, or the nearest relative of the dead, or the two friends who bore his body to the grave and laid it there. Those who befriended him on earth are those who are supposed to have the greater influence with his soul in the world of the departed, and all offerings to the dead are made through their hands.

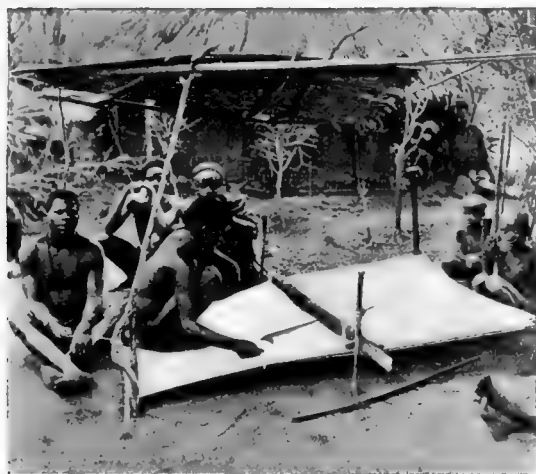


Fig. 1.—Native Weaver at Work.



Fig. 2.—Yao Woman Wearing Headwig, Necklace, Anklets, etc.



Fig. 3.—Mang'anja Hut on the Lower Shire River.



Fig. 4.—Yao Woman Grinding Flour.



Fig. 5.—Yao Boy showing Small Notches on the Upper Incisor Teeth.



Fig. 6.—Yao Boy showing Notches on the Upper Central Incisor Teeth.



Fig. 7.—Anguru Boy showing the Upper Incisor Teeth Filed to a Point.



Fig. 8.—Chikunda Boy from Lower Zambesi. Single Notch cut between the Upper Central Incisor Teeth.

These are but a few glimpses at a subject of which only a small part has been dealt with. Beneath the surface of native life there lies a world of thought and feeling and speculation that has only been partially explored. Professor Henry Drummond used to say he would give all he possessed to "get inside a native for half an hour" just to see the world through the native's eyes. For three and twenty years I have been trying to get at the heart of the native mind, and I feel as if I were as far away from it as ever.

But the whole subject is full of intense and living interest, and if the lot of any of the members of this Society should in their after career be cast among such people, they will find no subject more worthy of their study than the habits of native life and the working of the native mind. The students nowadays are to be congratulated on having the opportunities which this Society affords of becoming acquainted with such questions as are discussed here. They will learn what to look for and what to observe in any future investigations they may make. At every step they will find something new, and each fresh discovery adds to the sum of our knowledge and understanding of that most entrancing of all subjects of study—our common humanity.

ORDINARY MEETING.

15TH DECEMBER, 1906.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

Anatomical variations found in the course of practical work in the Anatomy Department of the University were described by Messrs. A. M. Brown, N. J. Calder, A. M. Geddes, R. Richards and D. H. W. Williamson.

Mr. Alexander Low, M.B., described the contents of a short cist recovered on the farm of Mains of Leslie, parish of Premnay, and presented to the Anatomical Museum by C. E. N. Leith-Hay, Esq., of Rannes and Leith Hall (see p. 54).

RECORD OF ANATOMICAL VARIATIONS.

Date of observation, November, 1906.

Sex, Female.

Abnormal muscular slip in forearm.

From the middle of the flexor longus pollicis on its ulnar side there arises a fleshy slip. This slip becomes tendinous about two inches above the anterior annular ligament and joins the tendon of the deep flexor of the index finger beneath that ligament.

(Signature of observer) A. M. BROWN.

Date of observation, November, 1906.

Sex, Male.

Absence of depressors of hyoid bone.

The sterno-hyoid muscles on both sides are absent. They are represented by a few fibres that run upwards from the back of the

manubrium sterni to become lost in the deep fascia below the hyoid bone. The absence of these muscles is in no way compensated for by the development of the other muscles. The omo-hyoid and sterno-thyroid muscles are poorly developed.

(Signature of observer) N. J. CALDER.

Date of observation, November, 1906.

Sex, Male.

Presence of a pyramidal lobe in the thyroid body.

The pyramid arises from the junction of the right lateral lobe with the isthmus and is conical in shape. A few muscular bands connect this pyramid with the hyoid bone and together form the muscle, named by Sommerring, levator glandulae thyroideae. The muscle is attached above to the body of the hyoid bone and below to the pointed extremity of the pyramid ; it is enclosed in fascia and has rather a tendinous appearance.

(Signature of observer) N. J. CALDER.

Date of observation, November, 1906.

Sex, Male.

Groove on liver.

The liver has a distinct groove, running from its upper to its anterior surface, parallel with the mid line of the body. Its greatest depth is 1 cm. and its length is 6 cm. There is no corresponding mark on the diaphragm.

(Signature of observer) ALEX. M. GEDDES.

Date of observation, November, 1906.

Sex, Male.

High division of great sciatic nerve.

The pyriformis is composed of two parts which unite and are inserted by one tendon. The great sciatic nerve is also divided into two, one part coming between the two heads of the pyriformis and

passing superior to the lower half of that muscle, the other being inferior. On the left side there is no abnormality.

(Signature of observer) ROBERT RICHARDS.

Date of observation, November, 1906.

Sex, Male.

Measurement of frontal sinuses.

		Right sinus.	Left sinus.
Maximum depth (antero-post)	-	14 mm.	13 mm.
Minimum depth (antero-post)	-	11 mm.	10 mm.
Maximum width	- - -	30·2 mm.	30·2 mm.
Approximate height	- - -	29 mm.	28 mm.

The superciliary ridges are well developed and the ethmoidal cells are large. The frontal sinuses lead by a large opening into the middle meatus.

(Signature of observer) D. H. W. WILLIAMSON.

ORDINARY MEETING.

13TH FEBRUARY, 1907.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

The President introduced Dr. C. G. Seligmann, who gave an address on "Anthropological Notes from British New Guinea," with lantern illustrations and exhibition of specimens from the Anthropological Museum of the University.

On the motion of Professor J. Arthur Thomson a hearty vote of thanks was accorded to Dr. Seligmann.

ANTHROPOLOGICAL NOTES FROM BRITISH NEW GUINEA.

By CHARLES G. SELIGMANN, M.B., M.R.C.P., F.Z.S.

(Read 13th February, 1906.)

The following paper is compiled from notes taken during the Daniels Expedition to British New Guinea in 1904. Owing to limits of time and space it has seemed best to confine my remarks to two of the ethnographically least known portions of the country visited by the expedition, and so I have selected the extreme Western and Eastern parts of the Possession as the subject of this communication.

One of the main objects of the recent expedition was to study the physical characteristics of the natives of the country west of the Fly delta, as it was important to determine whether the common belief, that in British New Guinea near the Dutch boundary there were natives resembling Australians, was true or not. In order to determine this the natives from two localities, both west of the delta of the Fly, were examined. Those seen at Bugi consisted of the remains of a number of tribes from the neighbourhood of Bugi and from Strachan Island who had escaped death at the hands of Tugere raiders over the Dutch border, farther west on the Netherlands boundary the Toro tribe were seen three days' journey up the Bensbach River and a number of these people were carefully measured and photographed. The natives seen at Bugi physically resembled the Toro in many respects, but were slightly shorter and on the whole less long headed. Culturally too they seemed closely related to the Toro, though as they were extremely timid it was not easy to make sure of this in the short time at our disposal.

The members of the expedition had the advantage of accompany-

ing a Government party during a partial ascent of the Bensbach River forming the Anglo-Dutch boundary, and to the officers of this party thanks are due for much courtesy and consideration. Three whale-boats were towed by the steam launch *Ruby*.

West of Bugi the country is a vast flat swampy plain presenting for the most part a uniform edge of mangrove swamp to the sea, broken only by the mouths of sluggish rivers and creeks whose banks are as a rule covered with mangrove in the lower reaches. Here and

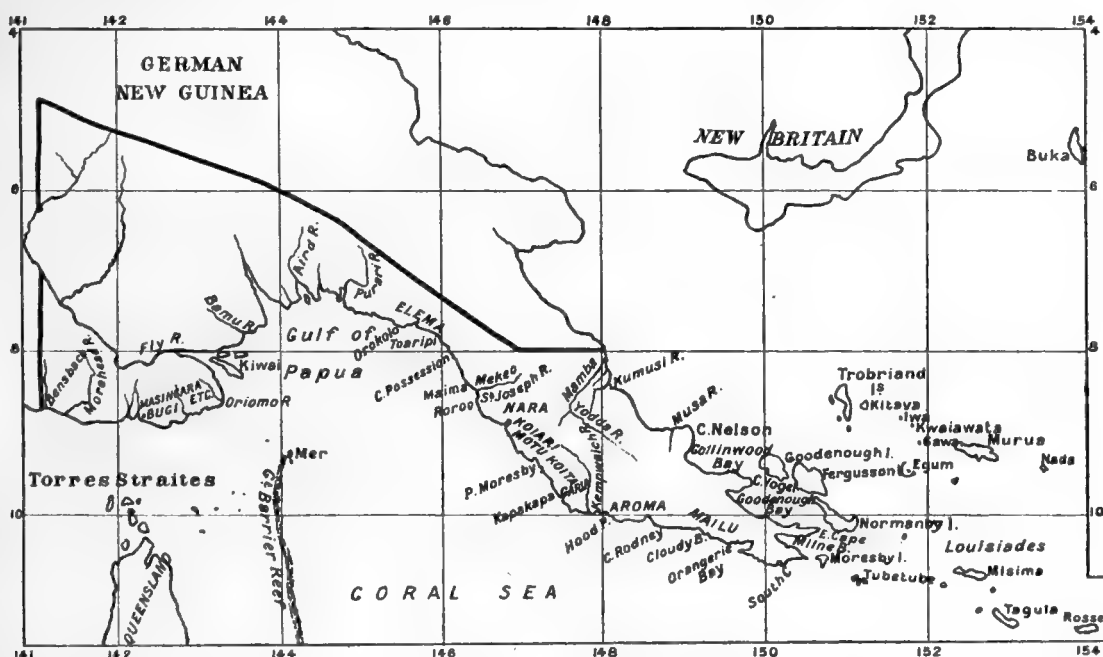


Fig. 1.—Map showing boundaries of British and German New Guinea.

there, however, a sandy foreshore occurs, as is the case at Wallarter Point, the eastern extremity of Jerai Bay, where behind a sand beach there rises to a height of about four feet a plain of loosely compacted sand and grit from the edge of which we obtained recent semi-fossil shells of land and marine genera, *Helix*, *Arca* and *Cerithium*. Some forty miles west of Wallarter Point the mouth of the Bensbach River appears as a break in the green-grey mangrove line, which hitherto had stretched as far as the eye could see, marking the junction of

grey sea and greyer mud. For the first nine miles the banks are fringed with mangrove and present the appearance of a typical rhizophora swamp and above this Nipa palms become common and the mangroves disappear. A little beyond this the banks are raised at intervals as much as two to three feet above the river and bear a fairly open jungle containing many eucalyptustrees, some of which resemble the larger Australian ti. On one such raised area our first camp was made. Farther up lengths of this kind of jungle alternate with open, grassy swamps which, without any definite margin, seem to fuse with the reeds and sedges of the river bed.

Above this a few coconut trees appear at some distance from the river bank, and soon native gardens with a few patches of forest trees occur on the higher banks. Throughout the distance ascended, the river, which presents a very winding course, varies considerably in width, some reaches being very noticeably broader than others. About half a mile up stream from its mouth Lieutenant Meyjes of the Dutch Navy found that the river was 150 yards broad, and had narrowed to between 50 and 60 yards where the mangrove belt began to give place to other vegetation. After the first day's travel there was enough drifting weed to obstruct the screw and necessitate frequent stoppages to free it.

We met natives belonging to the Toro tribe on the third day of our ascent of the river, soon after scattered clumps of coconuts had become frequent on the higher ground at a little distance from the river. Camp was pitched on the right bank of the river, on a small knoll on which grew an isolated clump of bamboo.

The natives were living at a place which appeared to be called Tivi, some three miles from our camp in a north-easterly direction and thus on the opposite side of the river. This was stated to be a recent, perhaps temporary, settlement made among the marshes on account of the fear inspired by Tugere raiders from over the Dutch border. The track to the village passed through extremely rich taro gardens, the ground being drained by many cuttings about a foot deep and eighteen inches to two feet across. Tibi itself seemed a poor

village with few things except the bare necessities of life. The houses stood upon the ground and were not more than five feet high and nine feet long. Their rounded roofs were made of ti tree bark; all the houses were open in front, many were also open at their opposite end, so that they were in fact mere roofed sheds. In the better built houses the bark roof was continued over what must be regarded as the back of the house to within a foot or eighteen inches of the ground.

The Toro, for this appeared to be the tribal name for these Bensbach River natives, are spare and moderately tall, with thin legs and often thin bony faces, projecting zygomata and marked supraorbital ridges. Facially they seem to vary more than other western tribes, some of them closely resembling examples of the less intelligent European types. The hair of all was frizzly and the nostrils were generally bored, in some cases in two places. In many these holes have become very small, so that the plugs that some men wore were evidently not considered important articles of toilette. Their noses are generally long and coarse with moderately broad bridges and often coarse fleshy tips which are never hooked. Generally speaking the Toro appear long faced.¹ In some of the older men the front teeth had gone, in others the fangs were exposed by receding gums, but in every case their teeth were white and no sign of betel chewing was seen, nor were any lime gourds noted. One of their favourite attitudes was to stand on one leg, the sole of the other applied just above the knee of the leg which supports the weight of the body; in fact they assumed the attitude figured by Grogan for the Dinkas of the Nile swamps.

With the exception of nose, hair and arm ornaments, most of the men went naked. A few, however, wore a pubic shell. These pubic shells were said not to have been traded, but to have been fetched by the Toro themselves from the coast between the Bensbach and Morehead Rivers. As a rule the shells were not ground or in any way worked, though in one Melo shell the curve had been so

¹ Measurements bear out the impression of variability already referred to; the cephalic index of 21 men varied from 69 to 86 with an average of 74.

ground away as to expose the columella. Even this scant covering was as often as not worn at the side of the hip or at the back. Many of the men had tinea and the only baby seen had yaws. The women, of whom we saw very few, wear two kinds of covering, one that is practically a perineal bandage, as on the Fly, the other a true petticoat.

Their weapons are bows, arrows and clubs. The latter were few and extremely rough and were certainly imported. Their bows are made of bamboo and with these they make fairly good practice as the following details show. A target about three feet long by two feet broad was put up at a convenient height at a distance of about forty yards. Sixteen men had each one shot at this and though no hits were recorded, many of the arrows went very near the target. It appeared that the time the arrow took to traverse the forty paces was between one and one and a fifth seconds. Each of four of the best shots then fired four arrows with the result that all but one of these hit the target once. The same men shooting at eighty yards, scored no hits, but there was no general falling off in the shooting, their arrows being pretty thick all round the target. Their bows were strung with strips of rattan, and their release is that known as "secondary".

During our stay we saw a fair number of canoes. These consist of a hollowed tree trunk, are pointed at each end and have no outrigger; they pole along with bamboos. As far as could be determined paddles were unknown; we saw none, nor could we hear of any, but in spite of this the pace was good even when in deep water, their unsplit bamboo poles being used as paddles by men standing in the bows and stern respectively.

At Tivi we saw a number of tobacco pipes of the same type as those common throughout the Possession; but in spite of this tobacco did not prove good trade. A twist of their own tobacco was light coloured and seemed extremely mild.

The only musical instruments met with were the drum and whistle. The latter consisted of an excavated nut-like fruit, and a

note was produced by directing the breath into a small opening in the way that a note may be produced with a key. The tympana of their drums consist of kangaroo skin and the drums themselves were larger than those I had elsewhere seen west of the Fly River. It should, however, be noted that far larger mammal skin covered drums are said to be used some distance up the Bamu River.

The Toro are a totemistic folk with descent of the totems in the male line. Perhaps the majority of the totems are birds. A number of palm-wood bullroarers were collected, but we could learn nothing about their use. Since, however, the Morehead River natives, whom the Toro closely resemble, use the bullroarer in their initiation ceremonies, it is probable that the Toro do the same.

Figures 1 and 2, Plate III., show full face and profile views of a Toro man, 1,748 mm. (about 68 inches) tall, with a cephalic index of 72, and facial and nasal indices of 91 and 81 respectively. Many of the Toro wear beards, and in all the hair was frizzly. The same applies to the natives seen at Bugi, so that the physical evidence at present available fails to connect the natives of the western extremity of British New Guinea with those of Queensland, or indeed any part of Australia.

Throughout the whole of the south-eastern extremity geographical conditions differ entirely from those found at the western extremity of the Possession. The south-eastern district corresponds very closely to the eastern and south-eastern division of British New Guinea, being bounded on the west by a line which roughly follows the 150th parallel of longitude and extending eastwards to include the numerous islands and archipelagos which extend in that direction for more than four degrees of longitude. As a whole this district is hilly and often mountainous, and throughout its extent there are to be found numerous raised beaches and even islands which are rather recently raised atolls. Such are Gawa and Kwaiawata in the Marshall Bennet group, perfect atolls elevated to a height of about 400 feet, and presenting to the sea a steep terraced cliff covered with forest which represents the seaward face of the old atoll. The inhabitants of

these islands live in the central depression formed by the bed of the old central lagoon which lies some sixty feet lower than the edge of the old reef, and therefore out of sight and sound of the sea.

On the physical side the natives of the south-eastern district, though probably essentially of one stock, differ within tolerably broad limits owing, as I believe, to local infusions of foreign blood.

If a line be drawn obliquely from the north-west to the south-eastern corner of this district it will divide it roughly into two equal areas, the southern half comprises by far the greater part of the land area, and is inhabited by a short broad-nosed people with moderately dark skin and frizzly or sometimes wavy hair and a mouth which is sometimes "snouty". In the northern half of the area, that is to say in the Trobriands, the Marshall Bennet group and Murua the natives are sometimes somewhat lighter coloured and often have curly or wavy hair; many of the men are of taller stature and less prognathous; their skulls are rounder and their noses often longer, the bridge being often high and narrow. But these characters are shown only by a portion of these islanders, and even in these the degree in which they occur is not constant, in fact if skin colour be ignored it is possible in the Trobriands to meet with individuals making a complete series from the typical Papuo-Melanesian of the district to a tall good-looking man, at least as Polynesian in appearance as many Micronesians. Broadly speaking the Papuo-Melanesians¹ of South-Eastern British New Guinea are dolichocephalic with a tendency to mesati-cephaly which becomes especially obvious in measurements on the living, though, as far as our present knowledge goes, a varying number of brachycephals occur everywhere, though the proportion of these may be locally very small. The inhabitants of the D'Entrecasteaux group, composed of the three big islands of Goodenough, Fergusson and Normanby, appear to be the most dolichocephalic of the Papuo-Melanesians. Of 118 skulls of both sexes, collected by Loria from the

¹ I apply this name to the rather short predominantly frizzly-haired, *café-au-lait* coloured race of South-Eastern British New Guinea and the neighbouring archipelagos. *Lancet*, 1906, p. 422.

villages fringing the straits between Fergusson and Goodenough, 93 (78·8 per cent.) are dolichocephalic, 22 (18·6 per cent.) are mesaticephalic, and only 3 (2·6 per cent.) are brachycephalic. These figures agree fairly well with the measurements of 34 skulls with an average index of 73, collected by the Daniels Expedition from a cave at Awaiama in Chads Bay. The natives of the D'Entrecasteaux group, and especially the men of Fergusson Island, were the shortest we met in New Guinea, the average of eleven Fergusson Island men was about 1,530 mm. (about $60\frac{1}{4}$ inches) and two of these men were under 1,470 mm., *i.e.*, considerably under 58 inches.

The coast and bush folk of Goodenough and Bartle Bay present as a rule very much the same appearance as the men of Normanby or Goodenough Island, and Fig. 3, Plate III., shows a fairly typical Papuo-Melanesian, a native of Goodenough Bay. Passing eastwards, the cephalic index begins to rise and brachycephalic individuals become less rare, although dolichocephaly is the typical condition until Tuber-tube in the Engineer group is passed. In the Louisiades, lying farther west, of nine men examined only one was dolichocephalic, while three were brachycephalic, and the average of this small group was 79. The tendency towards brachycephaly becomes even more marked in the northern half of the area under consideration, that is to say, in that part of the area in which there is reason to believe there has been an infusion of Polynesian blood. The Marshall Bennet group, although inhabited by a short people (average 1,577 mm., *i.e.*, about 62 inches), is an interesting example of this. The measurements of fifteen men from Gawa and Kwaiawata give an average cephalic index of 80, showing that these islanders are predominantly brachycephals or high mesaticephals. The same conclusion is supported by the measurements made by Mr. W. I. Pocock on 35 skulls collected upon Kwaiawata with an average cephalic index of 77. In this group the extremes of the inhabitants formed two types of men which could be distinguished at sight, one leptorhine or mesorhine and leptoprosopic, the other platyrhine and generally europrosopic; the two types which also differ in stature are shown in Plate III., Fig. 4. Much the same condition of

things prevails upon the Trobriands and upon Murua, whereas on the Marshall Bennets the hair of the natives is often wavy, but it is noteworthy that both the men of the Trobriands group and of Murua are taller than the Marshall Bennet islanders.

Sociologically the Papuo-Melanesian is characterised by the possession of a well-developed system of totemism, with descent in the female line of property and totems—in fact by being still in the age of mother-right. Cannibalism, except where it has been stopped by Government influence, is rife ; at Milne Bay the bodies are cut up in



Fig. 2.—Waga at Tubetube, Engineer Group.

stone circles specially built for this purpose. The marriage laws, at any rate in some parts of the area, approach closely to the Australian type, there being a dual grouping of the clans, each moiety in certain respects resembling an Australian phratry.

On the technological side the most notable feature of the whole area is the elaborate way in which wood is carved, the predominant note being a conventional reproduction of totem animals, especially totem birds and snakes, the forms of which have often degenerated into the scroll and zigzag patterns so typical of the district. This is



Fig. 1.



Fig. 2.

Figs. 1 and 2.—Face and Profile Views of a Man of the Toro Tribe, Bensbach River.



Fig. 3.—A Papuo-Melanesian from Goodenough Bay.



Fig. 4.—Two Types of Men from Kwaiawata.



Fig. 5.—A Man of Go-aribari, Aird River Delta.



Fig. 6.—A Binandere Man, Lower Mamba River.



Fig. 7.—Naro Woman with Wavy Hair, Valley of the St. John River.



Fig. 8.—A Man of the Ikoro Section of the Sinangolo (Eastern Papuan).

the only part of British New Guinea in which large built-up canoes occur, and certain islands in this area build and export large built-up sea-going craft called waga which may have a length of thirty feet or more, and a depth of almost six feet (Fig. 2). The bow and arrow and stone-headed club are everywhere absent, their place being taken by slings and the very characteristic hard wood sword, the blade of which is usually elaborately carved.

In conclusion it remains only to express my indebtedness to the editors of the *Lancet* and the *Geographical Journal* for permission to reproduce figures which have already appeared in these journals.

ORDINARY MEETING.

24TH MAY, 1907.

A meeting of the Society was held in the new Anthropological Museum at Marischal College. There was a large attendance of members.

Professor Reid gave a concise and interesting demonstration of the various sections, paying special attention to the local specimens.

Thereafter F. W. Moir, M.B., Medical Officer of the Ashanti Gold Fields Corporation and of the Colonial Office, gave a short description of specimens from the West Coast of Africa and which he had presented to the Anthropological Museum.

On the motion of Mr. H. E. Smith, Professor Reid and Dr. Moir were accorded very hearty votes of thanks.

ORDINARY MEETING.

15TH JUNE, 1907.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

Professor Reid intimated the receipt of copies of papers upon Anthropological subjects by Dr. Deniker, of Paris, and presented by the author to the Society.

Thereafter a paper was read by the Secretary consisting of a synopsis of "A report on the alleged prevalence of pulmonary tuberculosis, and on some of the principal diseases existing in the kraals of the natives in Portuguese East African Territory, south of latitude 22°, with a description of the native's mode of life, and his principal habits and customs likely to affect his health,' by G. A. Turner, M.B., D.P.H., Medical Officer to the Witwatersrand Native Labour Association, Limited, Johannesburg. The report was sent by Dr. Turner to the Society by the permission of the Chairman of the Witwatersrand Native Labour Association, Limited. The paper was illustrated by numerous lantern slides.

On the motion of Dr. Low, a hearty vote of thanks was accorded to Dr. Turner for his interesting report.

A SYNOPSIS OF A REPORT BY G. A. TURNER, M.B., D.P.H., ON
THE NATIVES OF PORTUGUESE EAST AFRICA, SOUTH OF
LATITUDE 22°.

By A. G. STEWART, M.A., Secretary of the Society.

(Read 15th June, 1907.)

The natives of Portuguese East Africa belong mainly to four races: the Myambaams, the Mtyopis, the Shangaans and Lourenço Marques boys. The Myambaams are a very mixed people. Of the Mtyopis some are pure, but the majority have Shangaan or other blood in their veins. The Shangaans are almost pure Zulus. In very early times an off-branch of the Zulu army marched north and settled, some in British Central Africa and Uganda, others farther south in Gazaland. From this latter group the Shangaans are descended. They marched south and settled in Portuguese East Africa, driving the former inhabitants before them. The natives are generally good-natured, lazy but honest, and form a law-abiding and well-behaved community. In common with most native races, they are exceedingly superstitious. No sickness is put down to natural causes; witchcraft is always supposed to be at the bottom of the trouble. Judged from a European standpoint, they are absolutely devoid of morals, but they have a code of their own, to which they strictly adhere. Physically they vary somewhat. The Lourenço Marques boys and Shangaans are superior to the others. Apart from tribal differences in physique, natives from the coast are superior to those dwelling inland, perhaps depending on the fact that the former have a certain amount of Arab blood, derived from the old East Coast traders.

Clothing and Diet.—Many of the natives now work in the mines

in Johannesburg and there acquire a large stock of European clothing, but this they soon discard on their return home, though they may retain a small waistcoat and an umbrella. The native garments are :— the Mtyeka, or loin cloth, which is the universal garment of the East Coast ; blankets, which are now mostly imported, although some are made from the bark of a tree called Mshala ; jackets made of skins, and worn when travelling. The Shangaans and Lourenço Marques boys feed mainly on mealies and Kaffir corn, while the Myambaams and Mtyopis depend more on ground nuts and mandioca (the tapioca of commerce). Beans, fruits of various kinds, and honey are also used. They eat flesh of all kinds, including snakes (except the Shangaans), with the exception of the crow, which is considered unclean, the owl, which it is unlucky to interfere with, and the hawk, the reason for abstinence in this case being unknown. They eat fish, both fresh and dried, when they can get it. Some, but not many, are mud eaters, since the natives, noticing the fertilising effect of the alluvial soil on the vegetation, believe that by swallowing it they will be able to increase their own powers of reproduction. The Myambaams and Mtyopis drink wine and spirits, while the Shangaans are more dependent on beers. The two former races are inveterate drunkards, so much so that they refer to the various seasons of the year according to the drink which can be obtained at the time.

The Myambaams and the Mtyopis use tobacco in the form of cigars, while the Shangaans prefer it as snuff. They also smoke dacha which is the bhang of India, the hashish of the Arabs, and the Cannabis Indica of the British Pharmacopœia. The dacha pipe may be seen hanging in the centre of the kraal, and is the common property of the inhabitants. It is usually produced when two or three men meet. Each one takes two or three inhalations, the result being a violent fit of coughing, sometimes so severe that the smoker spits blood. It is considered the correct thing, while coughing, to sing the praises of their chief.

Habitations.—The dwellings vary somewhat according to the tribe. The Myambaam kraals are circular clearances in the bush. The huts

in each kraal are placed in a semicircle, and in the centre is a large tree, which serves as a shade for the inhabitants. The kraals are small, consisting often of only three or four huts, probably occupied by a man and his wives. Usually a number of kraals are clustered together, communicating with one another by narrow and tortuous Kaffir paths. In some cases the whole kraal is surrounded by a rough fence. The huts are well built with walls about five feet high, and have a large door fitted with a wooden lock and key of native manufacture. At the entrance of the kraal may often be noticed a small bunch of grass containing a handful of mealies hanging from a tree. This is supposed to prevent the evil spirits from attacking the inhabitants of the kraal, as it is expected that the witch will take the mealies and be satisfied without interfering with the good men of the kraal.

Besides the dwelling houses there are usually also a corn store, a goat pen, and sometimes a pigeon cot. A fire for cooking smoulders under the big tree, the trunk of which is usually ornamented with skulls of buck, monkeys, and other animals. There is usually a dacha pipe hanging from the tree, and at the base a bow and collection of arrows.

A Mtyopi kraal is generally larger, sometimes containing as many as seventy huts of the same variety as described among the Myambaams, and as a rule the kraal and a considerable area of surrounding ground is fenced by a strong hedge, in which there are stiles or rough gates. This hedge is for the purpose of confining the pigs. Sometimes there is also a stockade—a remnant of the old fighting days. The Shangaan kraals are small, consisting of only a few huts (Plate V., Fig. 1). They are not so well built, because the Shangaans being a warlike people look on their huts as more or less temporary abodes, liable to be destroyed in war at any time.

The huts are cone-shaped, and the walls low and are really modifications of the Zulu type of hut. There is generally a cattle kraal in the neighbourhood.

Domestic Utensils.—These consist of the stamp block, which has

a handle five feet in height, and is worked by two women ; water utensils, which, if clay is obtainable, are made of earthenware, being moulded to all sizes and burnt in the fire, but in the absence of clay are made from the bark of a tree, the bark being stripped and curved while wet, and held in position by pegs ; gourds, which are made from pumpkins ; cooking-pots made of clay ; spoons of all sizes, made of wood ; drinking-cups, carved out of wood, and often highly ornamented (these, however, are being superseded by imported enamel mugs) ; wooden bowls of various sizes and shapes, which take the place of plates, and are sometimes made with two or even three compartments to prevent the different kinds of food from mixing. Their tools are partly of native manufacture, such as the forge, and partly European. The carving and what we may call poker-work are done with great rapidity and exactness, but apparently the natives have no idea of going off a beaten track, as directly I asked a man I was watching to make some lettering on a bowl which I had bought, he "lost his head". Unfortunately I had asked the chief carver's assistant to do this, and the question immediately arose as to whether by doing so I was not giving the assistant knowledge which his chief did not possess. The propriety of my having done so was keenly discussed and evidently aroused a certain amount of jealousy. They make wooden pillows carved out of Umkuhla wood. It sometimes happens that a particularly ingenious man will cut out of one piece of wood a walking stick, on the staff of which is a pillow for himself and one for his wife, and at the extremity a drinking cup. A good example of this is the case of a native who cut out an artificial limb for himself, and returned to the mines to become a policeman in one of the compounds. They make baskets of very fine work, sometimes so closely woven that they are watertight, and varying in size from that of a cigarette case to that of one into which a man could easily get. They have also conical baskets which the women carry on their heads, and small hand-bags beautifully decorated with beads, for carrying food, etc.

Their agricultural instruments are the usual Kaffir hoe and a small axe for cutting wood.

Weapons.—In the Inhambane and Mtyopi districts nearly all adults have large bows and arrows, while the children have smaller specimens. The bow is made of wood, the string of hide, and the shaft of the arrow of bamboo or light wood tipped with feathers. The head of the arrow is made of steel and is usually three or four inches long and sharp pointed. The Mtyopis, even nowadays, sometimes poison their arrows. They also use a pick like a battle-axe, assegais, knob-kerries, and the usual variety of sticks. They possess a certain number of trade-guns, which are dangerous at least to their owners. The barrels are used for the manufacture of spirit, which probably does not improve them (Plate VI., Fig. 3).

Boats.—They have two kinds of boats. The first is the ordinary dug-out canoe—Unkumbe—which appears to be common in tropical South Africa. It is hollowed out from the trunk of a tree, holds ten people, draws very little water (not more than five or six inches), and is punted by means of a pole worked at the stern. The second is the Amatwabele, made from the bark of a tree. The bark is peeled off the tree for about five feet, the ends are curled up and pegged by a piece of stick driven through them. The centre of the canoe is supported by four sticks driven through the sides, and these serve as seats. Canoes so formed are exceedingly primitive looking, but do not easily upset and can be paddled at a considerable rate (Plate VI., Fig. 4).

Ornaments.—Wire bangles are very common, especially among the women, who sometimes wear several pounds' weight on each ankle or wrist. Occasionally they are made of ivory, but more usually of solid brass, which must be very heavy and uncomfortable. However in a free fight the lady decorated with several pounds of brass on her wrists has a distinct advantage. Sometimes one notices on the men's heads the dried gall-bladder of a goat or sheep. It is worn as a sign that on his return from a journey his brothers killed a sheep or goat for him, and is evidence that he is considered a man worthy of distinction. They have necklaces made of every variety of article strung together, the scalps and bills of small birds

being favoured ornaments. Crocodiles' teeth are commonly worn round the neck, and lions' claws are great favourites, but as the supply of these is limited, it is usual for artificial claws to be worn. Strings of beads are often worn round the waists of both men and women. The Isococo is a heavy black ring worn by the older men as a mark of distinction. It is made of a mixture of beeswax and other materials. Red clay is greatly appreciated by the native women. They stamp it into a very fine powder, mix it with oil, and use it as a cosmetic on their faces. In common with those of many other tribes, the East Coast women paint their bodies with it when advanced in pregnancy and while suckling a child. Red clay is also used to dress the hair, which they twist into tags.

The Chase.—The natives stalk their game till they are very close at hand. They drive large game into soft swampy parts, where they sink in the mire and can be safely despatched with their assegais. Sometimes when the grass is dry they light fires in such a way that the game is driven towards hunters posted with assegais, and bows and arrows, etc., and a wholesale destruction occurs. Besides the regular methods of hunting, there are innumerable kinds of traps for catching game. Most of these depend on the ordinary noose or running snare principle.

For fishing they have nets of a triangular shape. Two sides of the triangle are made of sticks of bamboo or some light wood about six feet long; the base of the triangle is formed of stout string; across the triangle a baggy piece of close meshed netting is fastened, forming a scoop net. When using these nets they usually fish in parties in fairly shallow water. They form themselves into a wide circle, each one dragging his net behind him, holding it by the bamboo sides, and in this manner advance to a central point to which they drive the fish, so as to be able to scoop them up. At other times the nets are dragged behind canoes up stream. They also make use of cone-shaped traps placed at the banks, into which fish go for food, but the narrow open mouth prevents them from getting out; and again, wherever there are tidal waters, one sees traps so formed that

the fish will enter them at high tide but will be left high and dry when it ebbs. Occasionally one sees natives fishing with a rod and line, but this method does not appeal to them very much.

Musical Instruments.—The Mtyopis are the most musical of the East Coast natives. Each group of kraals appears to have its own trained band, which assembles at convenient times for practice. The most noticeable instrument is the Mtyopi piano, which consists of a number of wooden keys, suspended by means of leather thongs over gourds of various sizes. Across the mouths of these gourds a thin membrane of gut is stretched, which vibrates when the key is struck. The performer sits with his legs under the piano and beats the notes with two sticks, on the ends of which are lumps of native india-rubber (Plate V., Fig. 2). There are several sizes of pianos, some of which give the higher notes, and others, the big brass instruments, which are only used when a large band has assembled. If properly played they are undoubtedly musical, but one appreciates them far more when they are at some considerable distance. They have drums which vary in size from that of a fifteen gallon barrel to that of a quart pot. They are usually cut out of one piece of wood, and the drum surface is made of raw hide stretched over the mouth. They are beaten either with the flat of the hands or with sticks. Their rattles are two cases containing beads or pebbles, and are used by the bandmaster when he is beating time for a large band. There is also one made of a gourd, more commonly used as a child's plaything. Thirdly, there is one made of grass, containing numbers of seeds. Lastly, there are rattles worn on the legs when dancing. The boys occasionally use pipes of reed when they dance, each performer blowing a pipe incessantly. A band seen performing by Dr. Turner consisted of twenty pianos arranged in three rows, the operators sitting on the ground. Behind them were six big brass pianos which were raised on stands, the operators standing to manipulate them. In front of the small pianos were a number of drums, and presiding over the whole was a conductor, armed with a metal rattle with which he beat time, in what appeared to be quite a professional manner.

Dancing.—Here again the Mtyopi is more advanced than the Myambaam or the Shangaan. The natives of the district, having been informed that there is to be a dance at a certain kraal, assemble and in some instances travel twenty or thirty miles on foot to attend. When approaching the scene of the festivities, they blow a horn to announce their approach, and a small band of three or four drums is sent out to play them into the village. When it is thought that most of the people have arrived, a somewhat more elaborate band plays round the village, in much the same way that is done at a circus, to warn the people that the dance is about to begin. In the dance seen, the large band of pianos with drums, etc., had already been placed in position, and in front of the instruments the dancers arranged themselves in rows, as if for a war-dance. Altogether there were about six hundred dancers, consisting of adults and children. The adults were in the front row, and they wore ostrich feather headgear, and had ox-tails ornamenting their knees, and were armed with shields and battleaxes. In the space between the band and the dancers were a few women, and a man dressed up as a woman, who acted as a buffoon. When the band commenced to play, the performers sang, dancing at the same time. They appeared to act a complete scene, dancing with tremendous energy, and evidently prepared to go on for an indefinite period. At one time, one could see they were pretending to kill imaginary foes; at other times retreating or defending themselves; finally they stood to the salute. Occasionally a dancer rolled in the sand from exhaustion. While the men were dancing in this way, the few women referred to before danced in their own manner, though they appeared to be taking some part in the scene which was being acted. After this dance had gone on some time, another was started in which unmarried girls and married women took a leading part. The former borrowed the men's ostrich head-dresses. The girls and women took it in turns to dance, while the men looked on and sang. Following the two big dances, a number of small ones were commenced, as side shows, in which women were the only performers. They were accompanied either by a couple of Kaffir

pianos, played very rapidly, or else by two or three men beating drums. This was kept on continuously, and with endless zeal, as long as boys could be got to beat the drums or play the pianos for them. Among the Shangaans the dances consisted chiefly of a warlike display. The men armed with kerries, battleaxes, etc., formed themselves into circles, and at intervals one of their number rushed into the centre and chanted some song, at the same time taking most violent exercise in the way of killing imaginary foes.

Marriage Regulations.—Polygamy, as among all other Bantu races, is universal among the East Coast natives—the number of wives a man has depending entirely on the amount of wealth he has with which to buy them. To the women's share falls all the hard work of the kraal, so the more wives a man can afford to buy, the greater the ease in which he lives. Marriage among the natives is frequently arranged by the father of a girl, in some cases even while she is still in infancy. Usually she is not altogether disregarded in the matter of the choice of her future husband, and if forced to marry some man against her will, she sometimes takes the law into her own hands by running away from a husband she does not like.

A man almost invariably pays for his wife. In the Inhambane district about fifteen pounds is the average price, while among the Shangaans as much as forty pounds is paid. A daughter is thus of considerable value to her father, and consequently it is her duty to get married. It sometimes happens that a man, through his friends, enters into negotiations for marriage with a girl whom he has never seen. He may even go so far as to leave money with his father or brothers to buy a wife for him, just before he leaves for work in Johannesburg, in which case the girl is bought and taken to the kraal of her husband's father to await the return of her rightful owner. The money a man receives for a daughter he uses to buy his son a wife. After the price to be paid has been settled, a day is arranged for the husband to go and fetch her, though in some cases she is simply sent to his kraal. Besides the price of his wife, in some districts the future husband has to pay an extra pound to buy a sheep in order to cele-

brate the occasion with a feast. In other places, the wife's father supplies this, and there is, of course, an excuse for a good deal of drinking. The fact that a man has bought one daughter in a family entitles him to take her next sister, more or less as his first wife's servant, as it is considered that since he has bought one daughter, he is the man with the first claim to her sister, provided he is eventually able to pay for her, and she is taken on credit.

In the event of a man dying, his wives are passed on to his eldest son, if he be an adult, and failing him to his brother. The eldest son's own mother has a hut put aside for her in her son's kraal; it is only his stepmothers whom he takes for wives. This levirate marriage system among natives is an important question, because, with the rite of circumcision, it is one of the principal arguments used to prove the Jewish descent of the Bantu races. But the custom is so widely spread throughout the world that, as with circumcision, one has only to look at the list of tribes which adopt it to see that it is no more proof that the Bantus are descended from the Jews than that they came from Australian stock.

Their Dead.—When any one dies it is not considered by the natives as a matter to be talked about, and the burial is carried out quietly by one or two of the relatives, and the grave concealed as far as possible. The grave is a circular hole about four feet deep. The corpse is tied in the position of the anthropoid ape, with the elbows on the knees and the neck bent, and is placed in such a position that it looks towards its former kraal. If a man dies of a disease from which he has been continually gasping for breath—*i.e.*, consumption—the man performing the burial rite has to open the thorax in the middle line and remove both the lungs and heart. The thorax is kept open by a couple of sticks. On top of these sticks is placed a piece of cloth which supports the viscera so that they do not slip back into the thorax when they are laid on it. This performance is carried out to prevent the person who is burying the deceased from contracting the disease. A rather fuller kind of *post-mortem* is carried out by the Wankonde of British Central Africa, to ascertain the cause of death

in the case of every person not dying in warfare. One of the village elders makes an incision from the end of the sternum to the umbilicus, and carefully examines the mesentery, and according to the distribution of the blood-vessels, he confirms or denies the supposition that death has been due to witchcraft.

On the death of a person, although the actual burial ceremony is kept as secret as possible, the mourning rites which are carried out are extensive, varying somewhat with the importance of the deceased. The mourning has to be observed at the place or kraal where the death actually occurred. It sometimes happens that if a man dies a long way from home, the news may not reach his people for some time, and even in that case the women of his kraal have to walk to the place of his death, carrying with them corn to make beer with. Every evening they commence wailing from sunset until midnight, and this is kept up for various periods, sometimes only a few days, sometimes a whole month. While wailing, some of the beer is poured on the ground, while the rest is drunk. In different parts of the country various signs of mourning are worn, such as bark bandages of different shapes among the Myambaams and Mtyopis. The elliptical chaplet of green bark is one of the commonest forms (Plate VII., Fig. 5). The men seem to prefer to mark their mourning simply by narrow strings of green bark tied closely round their necks. At other times grass neatly plaited and fitting closely round the ankles and wrists is used as a sign. Among the Shangaans white cloth is tied round the mourners' heads.

Native Markings.—These may be divided into cicatrization and tattoo marks and into incisions. The native of the East Coast, south of latitude 22°, who most generally uses cicatrization to distinguish himself, is the Mtyopi. Taking first the males of this tribe, they may be divided into three classes: the old generation of men who used to cicatrize their faces, making a series of lumps on the forehead and cheeks, in the same manner as the women will be seen to do on their abdomens (Plate VII., Figs. 6 and 7); then we have a younger generation who in place of these swellings disfigure themselves with

linear marks on the face and chest ; and, lastly, the present generation who have clean faces, because the other boys on the mines laughed at these disfigurements. In the first class the cicatrisation took the form of a series of lumps about the size of two peas on the forehead and down the cheeks. In the second form it is interesting to note that certain of these scars have a definite significance. A mark drawn from the external auditory meatus transversely across the cheek under the eye as far as the nose is known as the Sinsanga, and indicates that the man has killed another in a fight. If there is more than one mark, it shows that he has killed more than one. A line down the side of the cheek is known as the Bin Nanga. It is sometimes said this is put on after the boy has been circumcised, but this is probably not correct. Thirdly, there is an arrow-shaped mark on the right side of the forehead known as Lembombo. It is characteristic of the Mtyopis, but its significance is not known.

The most noticeable feature amongst the Mtyopi women is the extraordinary manner in which they mark their abdomens (Plate VII., Fig. 7). By means of cicatrisation they raise a series of lumps, varying in size from a walnut to a pea. These are arranged symmetrically in lines, the largest being in the centre. They extend from between the breasts, over the whole surface of the abdomen, over the pubes, and over the front and internal surface of the legs, reaching to within five inches of the knee-joint, and there are also slighter markings arranged in curves on both buttocks. These markings are known as Tindorba. They are commenced when the girls are about six years of age, and are carried out with a great deal of ceremonial, the girls dancing to music, in order that they may for the time being forget the pain they are suffering. The ceremony takes part in a lonely part of the bush, and no males are admitted. This proceeding is not altogether devoid of danger, sepsis and even syphilis sometimes occurring. Besides the Tindorba, the Mtyopi women have the Sinsanga, but the meaning is different from what it was in the case of the male, and indicates that she has aborted a male child. Shangaan and Myambaam women have lighter markings than the above. Cicatrisation

consists in making a number of slits in the skin with a sharp knife and rubbing into the wounds the juice of an irritant plant which prevents it from healing, and causes it to assume the appearance of a raised scar.

As regards the second form of native marking—the incision—the most noticeable feature among the East Coast natives is the slit in the lobe of the ear seen among the Shangaan males. This mark is common to all races who are off-shoots of the Zulu race, *e.g.*, the Angonis of British Central Africa. Formerly it was a distinctive mark, and Gungunyana, if he found a native other than a Shangaan with these slits, used to complete the operation by removing the offender's head. Now, however, one finds numbers of Myambaams and Mtyopis with slits in their ears ; so it has lost its value as a means of distinction.

Teeth.—Though the East Coast native does not file his teeth to the same extent as some tribes, he practises the custom to some degree. Many of the Mtyopis file their teeth into the shape of pegs. It is suggested that this is a mark of ancient cannibalism, as they would be better able to tear human flesh with their teeth filed. This custom is less frequent among the Myambaams, and still rarer among the Shangaans. Another plan is to file out the middle half of the two upper central incisors, and to knock out the two lower central incisors with an iron rod. The Masai extract the two lower central incisors with a knife. This custom is supposed to date back to the time when tetanus was a great scourge among the Masai, as it was possible by this process to easily feed a man suffering from lockjaw.

Albinism.—This condition is frequently met with among the Bantu races. The albino is a truly repulsive object, as besides the unnatural dull white colour of the skin there is often a considerable amount of eczema. The wool of the head is of a dull yellow colour. The cause of this condition is not known, and apparently heredity is not very largely responsible for it.

Native Medicine Men and their Drugs.—As with most other South African natives we find two kinds of native doctors : the man who deals in witchcraft and the man who deals with drugs only. Probably

the witch-doctor is the man who is usually first consulted, and the following is briefly his mode of operation.

After seeing the sick person he throws bones, or else he rattles a little basket somewhat after the nature of a small tambourine, and then appears to have a fit. He next states that the patient has been bewitched, and after a time he names the village in which the person who has bewitched the patient is living. Next he usually discovers that it is a woman who is the cause of the trouble, and finally he mentions the name of the culprit. The people of the kraal in which the patient is living go to the village, and make inquiries about any person having the name mentioned by the doctor, and if it so happens that there is no person having that name in the kraal, the natives make inquiries until they find some one living there who has got a name closely resembling the one mentioned by the doctor. This person, when found, is proclaimed to be a witch, and after due inquiries various penalties are inflicted. Such belief have the people in the power of the doctor that it frequently occurs that when an unfortunate woman or child has been accused of bewitching a child, she says that though she has no recollection of doing so while awake, she may have done so in her sleep, and in this way plays more or less into the hands of the doctor. Sometimes she is only fined, but frequently she is turned out of the village, and in the old days was sometimes killed. At the present time the doctor is generally very careful not to accuse a man of having bewitched a person. The male native, as a result of his contact with a European population at Johannesburg, is beginning to know rather too much to be duped by any trickery which the Kaffir doctor may try to impose on him. Consequently he is liable to illustrate to the medical man with a knobkerrie or an assegai that a mistake has been made in the diagnosis in his special case. This naturally leads to unseemly proceedings, and a loss of that professional dignity so necessary to every general practitioner.

At the same time this witchcraft is undoubtedly a source of great trouble among the natives. One Portuguese commandant said that he frequently had husbands bringing their wives to his commando,

and asking his opinion concerning them, as it had been alleged by some native doctor that they were witches. The commandant found it best to give his opinion at once, to the effect that though he saw no signs of witchcraft about the women, yet there was something about the husbands which led him to think that it was highly probable that they themselves were supernatural. By doing this, he transferred the charge to the husbands, who, being quite convinced that they were not afflicted, gave the matter up, and no further trouble occurred. Supposing it is decided that there is no question of witchcraft about the person's sickness, or supposing that having thrown the bones, the Kaffir doctor is unable to decide whether there is a witch in the case at all, he falls back on the use of drugs, and a second form of medical man is called in. He also throws the bones to decide which form of drug will be most suitable for the treatment of the patient. He possesses a number of stock medicines, many of which are undoubtedly very useful, while others are not. The chief medicines employed are: the leaves of a tree used in the treatment of malarial fever (the identity of this plant is very carefully concealed by the Kaffir doctors); a plant used to bring back the milk in women—Hlafunamaas; the juice of the Cashew (supposed to be antisyphilitic, and the plant was probably introduced into the country from South America by the Portuguese); a plant used for bladder trouble—Umramgala Umgubo; the root of Umkunga used as an abortifacient (the practice of abortion being very common, the native possessing several medicines which produce this effect, and also resorting to mechanical methods).

Isolation Camps for the Sick.—These are huts or shelters which are built in the bush for the sick whom the native doctor has decided should not be permitted to live in the common kraal. Patients are sent to these places for one of two reasons: firstly, in cases in which the native doctor thinks a person is suffering from an infectious disease and is therefore a source of danger to the general community; and, secondly, in cases in which a doctor thinks that the native is so ill that his life would be endangered if a witch were to look upon him. In the latter case, he is removed for his own safety, so that he will not

be seen by any chance travellers coming through the kraal, one of whom might be a witch. Under the first heading, we find men with dropsy, lepers, advanced cases of pulmonary disease and small-pox. As regards this last complaint, should only one or two cases occur at a kraal they are isolated. Should the disease suddenly assume an epidemic form, it is considered that the isolation of a number of cases is impossible, and accordingly the patients are allowed to remain in their own huts. When the medical men decide that the patient will not recover, he is looked upon as being dead in the same way as was done in the old days in England, when a leper, before being turned out of the community, had the burial service read over him, and his property confiscated. Accordingly, all the man's possessions—his hut, his wives, etc.—pass to his next of kin, probably his brother. There is this exception, however, that the patient's children still remain his property, and they, if old enough, are responsible for his food.

Circumcision.—There is one native rite where the medical man takes a leading part, namely, that of circumcision. This rite was originally practised by all the Bantu races, but it has been discontinued by some, including all the Zulu races, as it prevented them at times putting all their men into the field in time of war. Thus on the East Coast it is practised by the Myambaams and Mtyopi, but not by the Shangaans. The winter is the time usually selected for the operation. When it has been decided to carry out the ceremony, a number of camps, known as Soka camps, are chosen, and placed in charge of a native doctor, generally a man of some importance, selected from the chief's kraals, though the local doctor may act as his assistant.

The ceremony forms a kind of brotherhood among the boys belonging to each camp, and for this reason when a chief's son is to be operated on it is customary to get as many boys as possible in his camp, so that he may have a large following. The ages of the boys operated on vary considerably. Sometimes the operation is performed during childhood ; at other times it does not take place until the man is grey-headed. This diversity in age is accounted for by the fact that

the rite is only solemnised at considerable intervals, and it is quite possible that a boy who is not always in the district may miss one or more opportunities.

The camp is situated in an out-of-the-way part, and covers a large area including temporary dwellings for the boys to sleep in, a hut for the doctor to live in, and kraals for goats, etc. When the operation is about to commence, the doctor places a clay pot of water on a large fire burning in the centre of the kraal, and into this puts two powders, one black, the other white. Then he leads the way to a small clearing about twelve yards in diameter, only a few paces from the main camp, but hidden from it by bushes. On one side of this is a thick hedge, in the centre of which is a small hole, just big enough to let a man pass through on his hands and knees. The doctor takes up his position in the centre of this place, where a small hole has been made in the sand. He lays out his instruments, consisting of a collection of razors, and takes a pinch of black powder, some of which he puts into the hole, and with the rest makes a smudge on each side of his face. In the meantime a drum beats vigorously, and a couple of Kaffir pianos play noisily, while the assistants dance and sing round the doctor. The patient to be operated upon is then driven through the gap in the hedge described above, and is at once tripped up by two assistants placed in readiness, and carried to where the doctor kneels. The doctor now seizes the prepuce, and having carefully pulled it forward so as to avoid injuring the glans, leisurely saws it off, and drops it into the hole in the sand. The mucous membrane is slit in the middle line with the razor, separated from the glans very thoroughly, and trimmed off close round to the frænum. After the operation the patient is given a decoction to drink, being urged to imbibe copiously. The medical man now washes his hands several times carefully in hot water and takes from an earthenware bowl a moist linen bag filled with astringent herbs, and squeezes it over the bleeding surfaces. This is a very painful proceeding, and a hand has to be placed over the patient's mouth to prevent him yelling. The hot lotion is followed by cold water, and then the part carefully dressed with leaves. The



Fig. 1.—Hut showing Mutswa Painting.



Fig. 2.—Mtyopi Piano.



Fig. 3.—Native Distillery in full working order concealed in the Bush.



Fig. 4.—Bark Canoe on Lake Suli.



Fig. 5.—Woman Wearing Mourning Chaplet.



Fig. 6.—Makua Decorations produced by Cicatrization.



Fig. 7.—Mtyopi Married Woman.



Fig. 8.—Shangaa Married Women.

dressing produced is very neat and is not changed for three days. Various other ceremonies, too numerous to be described, take place in the circumcision camp.

From a medical point of view the most noticeable thing is the cleanliness with which the medical man operates, and consequently the excellent results obtained. Occasionally septic poisoning sets in with disastrous results, but this is not common.

ORDINARY MEETING.

6TH JULY, 1907.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of last meeting were read and approved.

Anatomical variations found in the course of practical work in the department were described by Messrs. J. Fettes and S. G. Trail.

Professor Reid intimated the presentation to the Anatomical Museum of a short cist and its contents by Wm. Bean Moir, Esq., of Scotstown. Mr. Alex. Low, M.B., showed photographs of the cist and described the contents.

After the treasurer's report had been read and accepted, the following were elected office-bearers for the coming year:—

President—

PROFESSOR R. W. REID, M.D., F.R.C.S. (Eng.).

Vice-Presidents—

ALEX. LOW, M.A., M.B., C.M.; R. W. A. SALMOND, M.B., Ch.B.;
A. G. STEWART, M.A.

*Secretary—*N. J. CALDER, M.A.

*Recording Secretary—*J. D. FIDDES, M.A.

*Treasurer—*R. RICHARDS, M.A.

RECORD OF ANATOMICAL VARIATIONS.

Date of observation, June, 1907.

Sex, Female.

Accessory head of biceps flexor cubiti.

This slip arises from the humerus at the lowest point of the insertion of the coraco-brachialis muscle and between the coraco-brachialis and brachialis anticus muscles. It is chiefly inserted into the bicipital semilunar fascia and is supplied by filaments from the musculo-cutaneous nerve.

The superior profunda artery comes off the posterior circumflex artery.

(Signature of observer) JAMES FETTES.

Date of observation, July, 1907.

Sex, Male.

Abnormal origin of left common carotid artery.

The left common carotid artery arises from the innominate artery about half an inch from the commencement of that trunk. The trachea lies between the abnormal left common carotid and the left subclavian artery, just above the level of the arch of the aorta, and higher up is crossed by the left common carotid artery.

(Signature of observer) S. G. TRAIL.

ON TWO ADDITIONAL SHORT CISTS FROM ABERDEENSHIRE.

By Professor R. W. REID, M.D., F.R.C.S., and ALEX. LOW, M.A., M.B., C.M.

(Presented 6th July, 1907.)

In previous communications¹ the contents of a series of short cists preserved in the Anatomical Museum of the University have been described. Recently the contents of two additional cists, and in one case the cist itself, have been added to the Museum, and we now describe these.

LESLIE SHORT CIST.

This cist was recovered in a cultivated field on the farm of Mains of Leslie, parish of Premnay, on the 13th November, 1906. The covering stone of the cist was struck by the plough, and the cist was opened by Mr. Peter Thomson, the tenant of the farm, and Mr. John Morrison, Bridge of Leslie. Later the cist was examined by Mr. J. Graham Callander, F.S.A. Scot., Inch, who furnished the following note regarding it:—²

“The cist was found to be full of soil which had found its way into the chamber at the junction of two of the corner stones. On being emptied of this soil the remains of a skeleton were discovered lying on its right side in a crouching position, the head being near the south-west corner of the cist; behind the skull was a ‘drinking cup’ urn in fragments. The cist was composed of four thin slabs of local Coreen stone; it was carefully made, being nearly rectangular

¹ See the *Proceedings of the Society* for 1902-04 and 1904-06.

² Mr. Graham Callander publishes a detailed account of the finding of the cist in the *Proceedings of the Society of Antiquaries of Scotland*, vol. xli., p. 116.

with the longer axis nearly due east and west. The inside measurements of the cist were : length along the south side, 3 feet 5 inches, and along the north side 3 feet $5\frac{1}{2}$ inches ; breadth at west end 2 feet $4\frac{1}{2}$ inches, and at east end 2 feet $3\frac{1}{2}$ inches ; depth at east end 1 foot 6 inches and at west end 1 foot 8 inches. The mouth of the cist was covered with a large slab of irregular shape, 4 feet 5 inches in its greatest length ; 3 feet broad at the west end and 2 feet 1 inch near the other end. The north-east corner of the cist was covered with a smaller slab. The large slab was about 6 inches thick. The top of the slabs at the east end of the cist being slightly sunk, this part had been heightened by some small thin stones having been built in with clay as mortar. The corners and the vacancies under the cover stone were packed with yellow clay. The bottom of the cist was composed of the gravelly subsoil of the district, above which was a very thin sprinkling of charcoal which was covered with a layer of yellow clay, three quarters of an inch thick, on which the remains reposed."

THE SKELETON.—The bones, with the exception of the skull, are mostly much broken, but the remains indicate the skeleton of an adult male.

Skull.—The skull is fairly well preserved, but has crumbled away in the right parietal region so that there is here a hole measuring about two inches by one inch. The zygomatic arches are broken, as are also the left angle and ramus of the lower jaw. The sutures are open with the exception of the lower ends of coronal sutures which have commenced to synostose. The sutures are delicate and elaborate and in the lambdoidal suture there are several small wormian bones—in the right half there are three ossicles, each measuring about 10 mm. by 7 mm., and in the left half of the suture there are two ossicles. The infraorbital suture on the left side is continued across the orbital margin to the infraorbital foramen. At the pterion the frontal is well separated from the squamosal. The enamel of the crowns of the teeth has been worn off, and the dentine exposed : this might be taken to mean old age ; but the wearing down of the teeth has probably been due to the hard and gritty nature of the food. The supraorbital

margins are fairly thick and the muscular impressions distinct. The cranium has a cubic capacity of 1,460 c.c. of mustard seed.

Norma verticalis.—The external angular processes just appear in this view and so probably would the zygomata. The superciliary ridges are obscured by the frontal eminences. The outline is somewhat pentagonal with the breadth relatively very great, the length-breadth index being *hyperbrachycephalic*. The parietal foramina are not symmetrical, the left being in the sagittal suture and in a plane anterior to the right which is in its usual site 1 cm. to the right of the middle line.



Fig. 1.—Skull from Cist at Mains of Leslie (3).

Norma lateralis (Fig. 1).—There is distinct subnasal prognathism. The nasal bones are short and the nasion shallow. The glabella is slightly developed, while the superciliary ridges are distinct. The frontal eminences are prominent, smooth and rounded. There is post-parietal flattening with scarcely any projection of the occipital pole.

Norma occipitalis.—The outline forms a low wide pentagon with the upper lateral angles rounded off. The parietal eminences are high up and the sides of the skull tend inwards. The post-parietals form a large part of this view.

Norma frontalis (Fig. 2).—The face is relatively broad, and there is a certain amount of subnasal prognathism. The orbits are rectangular with their long axis passing down and out. The orbital index is *microseme*, and the nasal aperture is *platyrrhine*. The nasal bones are very narrow, short and stout.

Norma basilaris.—The cranium bulges all round beyond the base and in front the alveolar process projects forwards like a beak. The mastoid processes are small and delicate and made up of cancellous tissue. The palate is broad and short and the alveolar processes con-



Fig. 2.—Skull from Cist at Mains of Leslie (†).

verge slightly behind the second molar teeth. To the inner side of the left alveolar process at a point corresponding to the interval between the first and second molar teeth there is an opening leading into the antrum of Highmore. The opening is oval in shape with a smooth even slightly everted margin, and measures 7 mm. by 6 mm. The second molar tooth is *in situ* and healthy, while the first molar tooth is lost, but the sockets for its fangs appear normal. The teeth are much worn. The wisdom teeth have been present in the upper jaw but have fallen out *post-mortem*. In the lower jaw the second molar

teeth are peculiar, in that in addition to the two normal fangs each has a small accessory fang on the lingual aspect.

MEASUREMENTS IN MM. OF SKULL FROM LESLIE SHORT CIST.

Sex - - - - -	Male.	Inter-malar breadth - - -	—	
Cubic capacity - - -	1460	Inter-dachryonic breadth - -	20	
Glabello-occipital length - -	177	Nasio-mental length - - -	108	
Ophyro-occipital length - -	177	<i>Complete facial index</i> - - -	81.8	
Nasio-inional length - - -	168	Nasio-alveolar length - - -	64	
Basi-bregmatic height - - -	136	<i>Upper facial index</i> - - -	48.4	
<i>Length-height index</i> - - -	76.8	Nasal height - - - - -	48	
Minimum frontal diameter - -	100	Nasal width - - - - -	26	
Stephanic diameter - - -	126	<i>Nasal index</i> - - - - -	54.1	
Maximum breadth - - - -	154	Orbital width - - - - -	40	
<i>Cephalic index</i> - - - - -	87	Orbital height - - - - -	30	
<i>Breadth-height index</i> - - -	88.3	<i>Orbital index</i> - - - - -	75	
Horizontal circumference - -	522	Palato-alveolar length - - -	48	
Frontal longitudinal arc - - -	130	Palato-alveolar breadth - - -	64	
Parietal longitudinal arc - -	132	<i>Palatal index</i> - - - - -	133.3	
Occipital longitudinal arc - -	124	Dental length - - - - -	—	
Nasio-inional longitudinal arc -	333	<i>Dental index</i> - - - - -	—	
Total longitudinal arc - - -	386	Measurements of lower jaw.	Symphysial height - - -	29
Base line - - - - -	127		Coronoid height - - -	—
Proportion of vault to base -	3		Condylod height - - -	62
Sagittal circumference - - -	513		Gonio-symphysial length - -	70 <i>ap.</i>
Vertical transverse arc - - -	332		Bicondyloid width - - -	114 <i>ap.</i>
Biauricular diameter - - -	124		Bigonial width - - - - -	86 <i>ap.</i>
Transverse circumference - -	456		Breadth of ascending ramus -	33
Foramen magnum length - - -	29		Condylod-symphysial length -	102
Basi-nasal length - - - - -	98		Condylod-coronoid width - -	—
Basi-alveolar length - - - -	96		<i>Mandibular index</i> - - - -	—
<i>Gnathic index</i> - - - - -	97.9		<i>Coronoid index</i> - - - - -	—
Inter-zygomatic breadth - -	132 <i>ap.</i>			

The other bones of the skeleton are much broken. There are several vetebrae nearly complete; they are rather small bones. The acromial ends of the clavicles are delicate flat bones with well developed conoid tubercles. The left humerus is complete and measures 30.7 cm. in length: its tuberosities and deltoid impression are well developed. Pieces of radius and ulna indicate slender bones.

Of the lower extremity bones the left femur is practically complete, and measures 42.2 cm. in length. The upper third of its shaft is flattened; the *platymeric* index is 67.5 and the *pilasteric* index is 116,

The head of the right tibia and the lower two-thirds of the left are preserved ; the *platynemic* index is 60·6. The left os calcis is complete, and measures 68 mm. in length. The left astragalus measures 47 mm. in length, and its neck measures 22 mm. ; the index of its neck is 46·8 and the angle of the neck 34°.

The pelvic bones are somewhat broken, but sufficiently intact to permit of their being fitted together so as to give approximately the diameters of the pelvic inlet : transverse diameter 118, conjugate 117 and oblique 117. These diameters give a pelvic index of 99·1.

The height of the individual, as calculated from the femur, according to Pearson's formula, would have been 5 feet 4 inches.

The bones thus indicate an individual of low stature with a hyperbrachycephalic skull, having a low breadth-height index, and showing parieto-occipital flattening, and with narrow orbits and a broad nose. These are characters common to the series of skeletal remains recovered from short cists and now preserved in the Anatomical Museum here.

URN.—Lying in the cist near the skull were recovered fragments of an urn. These pieces have been fitted together so that the size, shape and ornamentation of the urn can readily be seen (Fig. 3).

The urn is an example of the low-brimmed type of "drinking cup" or beaker urn with a distinct neck. It measures $6\frac{3}{4}$ inches in height, and its external diameters are $5\frac{1}{2}$ inches at the brim, 5 inches at the neck, $5\frac{1}{2}$ inches at the bulge, and 3 inches at the base. The thickness of the wall is $\frac{2}{3}$ of an inch, and of the base $\frac{3}{8}$ of an inch. The paste is fairly fine and of a chocolate brown colour. On the outer surface of the urn there are four bands of ornamentation passing horizontally round the vessel and separated by unornamented areas. The ornamentation has evidently been produced by a notched die impressed on the soft clay.

The cist contained :—

1. The skeleton of an adult brachycephalic male about 5 feet 4 inches in height.

2. An urn of the beaker type.

3. Pieces of charcoal.

C. E. N. Leith-Hay, Esq., of Rannes and Leith Hall, has presented the contents of the cist for preservation in the Anatomical Museum.

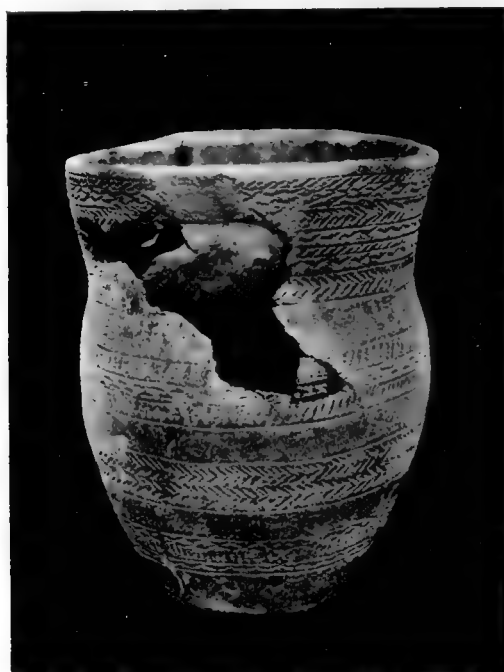


Fig. 3.—Urn from Cist at Mains of Leslie ($\frac{1}{3}$).

SCOTSTOWN SHORT CIST.

This cist was recovered on the farm of Gateside of Scotstown, Old Machar, on the 13th April, 1907, by the Messrs. Hanton. Notes and also photographs of the cist were taken during the process of unearthing. The site of the cist is in a gravelly knoll in the corner of a field which had been under cultivation for many years. There is no external mark indicating the position of the cist over the cover stone of which there is a depth of from 6 to 9 inches of soil. The cover of cist is a large heavy oblong block of foliated gneiss measuring 5 feet at the greatest length, 3 feet at the greatest breadth, and from 12 to

15 inches in thickness. The cover stone is remarkable for its great size and weight (Plate VIII.).

On removal of the cover stone the position of the contents of the cist was carefully noted, it being necessary to remove a layer of fine surface soil which covered the floor to a depth of about 3 inches. The longer axis of the cist lies north-east and south-west. At the south-west end of the cist are very much crumbled pieces of skull bones and teeth, indicating the position of the head ; towards the east corner lie the remains of bones of the feet and some pieces of leg bones, while some indications of vertebræ lie near the north-west wall. Although the bones are much crumbled and decayed, there is sufficient evidence to show that the skeleton lay doubled up on its right side with the skull to the south-west end of the cist, and facing south-east. From behind the skull near the north-west wall of the cist was recovered a flint knife. The contents of the cist were now carefully removed, all soil being passed through a fine riddle, but beyond numerous small pieces of charcoal nothing further was recovered.

The floor of the cist is composed of a thin layer of yellow clay, covering the gravelly subsoil, and dotted over this layer of clay are flat water-worn stones of a fairly uniform size of about 3 inches by 2 inches. The inside measurements of the cist are 4 feet 4 inches in length, 27 inches at the greatest breadth, 23 inches at the south-west end and 24 inches at the north-east end, so that it is somewhat narrowed at either end. The depth averages 18 inches. The south-west end of the cist consists of a slab of gneiss averaging about 6 inches in thickness ; the south-east side consists of two slabs set on edge, one larger one of granite measuring 27 inches in length and a smaller one of gneiss, this latter is not of sufficient height to reach the top of the cist, but is filled in over the top by a flat stone about 3 inches in thickness ; the north-west side is also made up of two slabs, one larger one of granite measuring 36 inches in length, and a smaller one of gneiss. On the top of this rests also a flat stone about 3 inches in thickness to bring it up to the height of the

others; the north-east end of the cist is formed by a smallish slab of granite set on edge with a flat stone over its top, so that at the north-east end of the cist three somewhat irregular flat stones rest on the top of the slabs to bring these to a uniform height; these rest on a bedding of clay. Outside the cist, as it were, packing the backs of slabs forming the walls of the cist, are a number of irregularly shaped stones, measuring up to about one foot in diameter.

Contents of the Cist.—The cist contains the remains of the bones of an adult human skeleton. They are very much broken and show no indication of having been subjected to the action of fire. There are small pieces of skull bones very much decayed, and the enamel of the crowns of six teeth, the dentine having crumbled quite away. The tubercles of the crowns of these teeth are very beautifully preserved,

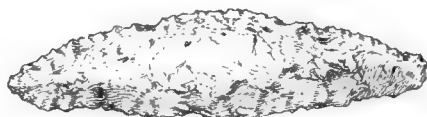


Fig. 4.—Flint Knife from Cist at Gateside of Scotstown (†).

and not at all worn. There are also pieces of the lower ends of both femora and pieces of the shafts of the tibiae.

A very fine specimen of a flint knife was recovered from the floor of the cist. It measures 55 mm. in length and its diameters at its middle are 14 mm. by 6 mm. The knife has been fashioned from a flake of flint, so that one side is flat; the other convex and this convex side has been carefully chipped to an edge. The knife is tapered at each end (Fig. 4). Both cutting edges have been carefully worked but show no trace of polishing.

Scattered over the floor of the cist are numerous small pieces of charcoal. Pieces of charcoal were also found in the soil round about the cist.

The cist contained :—

1. The remains of an adult skeleton.



Cist at Gateside of Scotstown, Old Machar, Aberdeenshire.

2. A flint knife.

3. Pieces of charcoal.

The proprietor, W. B. Moir, Esq., of Scotstown, has presented the cist with its contents for preservation in the Anatomical Museum, and it has been carefully re-erected in the vestibule of the Anatomy Department.

ORDINARY MEETING.

30TH OCTOBER, 1907.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of last meeting were held as read and approved.

The President introduced Mr. James Troup, M.A., formerly H.B.M.'s Consul-General at Yokohama, Japan, who gave an address on "Some Remains of Buddhist India". The lecture was illustrated by many lantern slides made from photographs taken by the lecturer himself.

At the close of the lecture several questions were asked and replied to by Mr. Troup.

Mr. R. Richards, M.A., proposed a very hearty vote of thanks to Mr. Troup for his address.

SOME REMAINS OF BUDDHIST INDIA.

By JAMES TROUP, M.A., Formerly H.B.M.'s Consul-General at Yokohama,
Japan.

(Substance of an Address delivered 30th October, 1907.)

Before taking you to see, in photographic illustration, a few of the architectural and other remains of Buddhism in India, which I had an opportunity of seeing during a visit extending over six months which I paid to India in the season 1905-6, it may be well that I give you the very shortest sketch of the career of the founder of Buddhism.

The date of the death of Buddha has now been brought down to the end of the fifth century, B.C. As he was said to have been in his eightieth year when he died, this would place his birth soon after 500 B.C. He was the son of the chief of the State of the Sākya clan, an aristocratic republic, whose capital city was Kapilavastu, in what is now the frontier country of Audh (Oudh) and Nepāl. His father was Suddhodana Raja, his mother the Lady Māyā. In his youth he excelled in athletic sports, such as the use of the bow. He married; had a son. But, his thoughts turning to serious views of human life, he, notwithstanding his social position, and the dissuasions of his father, quitted the palace and adopted the life of a wandering ascetic. He visited Uruvilva, in the neighbourhood of Gayā, in Bihar, where he remained six years; and there perfected his religious system,—“attained enlightenment,” or Bodhi, as it is called. Subsequently he went to Banāres, the religious centre of India, to establish the Kingdom of Righteousness, as he termed it. In the Deer Park there, the Modern Sarnath, he expounded his system and established his religious community. An account of his life as a religious teacher,

moving about from place to place in the districts of India to which allusion has been made, has been given in English by Professor Rhys Davids and others.

In spite of opposition and internal dissension, the Buddhist system spread after his death ; and not long after that event a council was held, with the assistance of the King of Magadha (Bihar), to settle authoritatively the words of the Master, and a second council, a hundred years later, to deal with questions of heresy which had arisen. By the middle of the third century, B.C., the system had secured for itself an assured position in India, independent of and, in fact, antagonistic to the Brahmanic system. Then was the golden age of Buddhism in India, under Asōka, the grandson of Chandragupta, the contemporary of Alexander the Great and founder of the Moriya, or Peacock, Dynasty. Asōka had inherited from his grandfather the throne of Magadha—and more ; he was the emperor of an India as extensive as the modern British India, with his capital at Pātaliputra, the modern Patna.

I was unable to visit the region where Buddha was born, and where he died ; but I had an opportunity of passing two days at Bodh-Gayā and seeing much of what remains of the monuments which piety erected on the spot where he “attained enlightenment”. The modern Temple of Mahā-bodhi is a restoration, but a restoration on the undoubted lines of the original later temple erected on this spot, and following its original style of decoration. In front of the building is what is known as the Torāna Gateway, which was found by General Cunningham lying in pieces near where it had stood, and was pieced together by him and re-erected. The Torāna Gateway will be alluded to farther on, in speaking of the Great Stūpa at Sānchi.

There is no regular worship carried on in this temple ; pious pilgrims who visit it from Burma, Ceylon,—on more rare occasions from Japan, Tibet and other Buddhist countries—use their own forms of devotion, in their own languages, before the figures of Buddha erected within.

But this is not the first temple which was erected on this spot,

Originally, and not long after—perhaps within—the lifetime of Buddha, Prasēnadjit, King of Kósala, had a wall or wooden fence erected around the spot, enclosing the stone seat—known then, or later, as the Vajrāsan—on which the Buddha sat in contemplation, and the famed Bodhi-Tree which overshadowed it. A century and a half later Asōka erected a shrine around the Tree and Stone, and surrounded the whole with the famous sculptured stone railing, part of which has survived to the present day. We know the form of this shrine of Asōka ; for representations of it have been preserved in the sculptures of Barāhat and Sānchi. Of the latter I hope to show you a view later on. The later temple, first erected, probably, in the second century, A.D., was much larger. It underwent many vicissitudes in the course of centuries, its latest restoration having been effected by faithful Burmese and the care of the Archæological Department of the British Indian Government.

On the erection of the larger temple the old stone railing of Asōka was removed from its place around the site of Asōka's shrine,—which was included within the limits of the newer temple,—and was erected around the latter. This stone railing has itself seen vicissitudes ; most of it was removed to serve as building material or otherwise, but portions of it have been recovered and replaced around the restored temple. Here is a view of one of the principal portions which remain (Plate IX., Fig. 1). Note the forms of the railing—evidently reproductions in stone of forms originally executed in wood,—the rosettes and medallions, and a figure of a Yakshinî, or female Yaksha, a species of ogre, on the nearest upright. This railing and some remains of pillars are, it is understood, those of the most ancient specimens of Indian art.

When the larger temple was built the topmost stone of the Buddha seat, the Vajrāsan, was removed outside the temple, and erected on a new platform at the west end. The Bodhi-Tree also—a pipal or *Ficus Religiosa*—was planted outside, by the Vajrāsan. Here is a representation of it (Plate IX., Fig. 2). The figures underneath it are those of a Ceylonese monk and his acolyte, who

kindly posed for my purpose. They were the only Buddhist ecclesiastics about the place.

You will sometimes see, in popular magazines, this Bo-Tree referred to as the identical tree under which the Buddha sat, some centuries before the Christian era. This is pure imagination. We know that the Bo-Tree was several times cut down. On one occasion a hostile Raja cut it down, dug up the roots, and burnt it with fire. In 1880, General Cunningham, digging near the site of the original Vajrāsana, "found two large pieces of an old pipal tree," which, for reasons assigned, he conjectured may have been part of this pipal. He, further, was of opinion that fifteen or even twenty trees may have intervened in succession between the original tree and the present one. The tree which immediately preceded this latter had completely decayed and fallen, by the year 1876; but, he says, new scions of the parent tree were already in existence to take its place. An authority on the subject says the pipal is a comparatively fast-growing tree; but, under favourable circumstances, may last for several hundred years. The Bo-Tree at Anurādhapura, in Ceylon, which was brought as a sapling from the Old Pipal at Bodh-Gaya, in the third century, B.C., is said (Emerson Tennant's *Ceylon*) to be the oldest, or nearly the oldest, tree in the world historically known.

Sarnath, we have seen, was the place, known as the Deer Park, where Buddha preached. It was part of the Banāres of those days. Now it consists of heaps of mere ruins. One large stūpa you pass as you near the spot. Of the two which stood near the monasteries one has fallen; the other is standing. It is built of brick faced with stone. The spot is visited by pilgrims from Ceylon, Burma and other Buddhist countries. When I was at Banāres the Tashi Lama of Tibet arrived there and went out to visit Sarnath. The ruins of the monasteries begin from perhaps a hundred yards from this stūpa. It is evident that, during centuries, monastic buildings had decayed and fallen into ruin, and others had been built on the top of those ruins. I noticed that, where recent excavations had been going on, a piece of Buddhistic railing had been exposed. A Lion Pillar, beautifully polished, had recently been dug up. It had, as such pillars usually have, three lions on the top, which had supported, no doubt, the emblem of the Wheel on their shoulders; and, around the base of the capital, the figures of a horse, an elephant, a bull and a lion, with a Wheel between each figure.

Near the ruins the Archæological Department has instituted a museum for the preservation of articles discovered. I got the figure of a Buddha in the attitude of teaching (Plate IX., Fig. 3). We know that he is teaching from the attitude, and from the representation of the Wheel, under the seat. Note the figures in adoration on each side of the Wheel.

The Wheel is well known to bear the symbolical meaning of the "Law"—the law, that is, as understood by the Buddhist—Dharma—the moral principle by which the universe and the beings in it persist,—Righteousness. Professor Rhys Davids has pointed out an explanation of this symbol which is natural and simple. In the early days in India it was the custom for a prince, on succeeding to the throne, to drive out in his chariot towards each of the four Cardinal Points a certain distance, symbolical of driving unopposed in every direction throughout his dominions. From this the term Chakravartti Raja, or King who causes his chariot-wheel to revolve, came to be applied to the Universal Monarch, or Emperor. The Buddha was the Spiritual Prince exercising universal sway in the world of religious faith.

The first occasion on which he is represented as causing his chariot-wheel to revolve is when, at Banâres, he commenced the teaching of his system. This is expressed in a Pâli Sûtra thus:—"The royal chariot-wheel of the Truth set rolling onwards by the Blessed One. . . . The Supreme Wheel of the Empire of the Truth . . . that Wheel which not by any Brahma or Mâra [the Wicked One] nor by any one in the Universe can ever be turned back." The use of the Wheel is not limited to the Buddhists. In India the Jains also have it; and with the Brahmins it represented the "undisputed reign of the Sacred Law," as they understood this expression. Without doubt the Wheel symbol was Brahmanic before it was Buddhist. The Wheel has also other uses among the Buddhists themselves,—witness what are commonly, but not very correctly, known as the "Praying Wheels" of Tibet, and the wheels, occasionally seen by the wayside, or near Buddhist temples in Japan, which the faithful turn in lieu of repeating the formulas written on them. Nay! the symbol is farther travelled still; in Miss Harrison's *Prolegomena to the Study of Greek Religion* there is a reference to the use of wheels in Egyptian sanctuaries, a use which may be compared with that of the Buddhist Wheels last referred to; and from Egypt the use of such wheels would appear to have passed to Orphic sanctuaries of the Greeks. It would be of interest to determine if there was a connection between the Brahmanic-Buddhist Wheel and the Egypto-Greek.

To return to the figure (Plate IX., Fig. 3),—above it, at the corners of the slab, are what I take to be Dêvas bringing garlands. Two winged animals appear, one on either side, beneath. Around the head of the figure there is a nimbus or halo; but the ornamentation around the outer portion of this is unusual. In the Buddhistic sculptures found in the North-West of India the representation of the nimbus, or halo, is extremely common. That it comes from the later Greek sculptors is undoubted. Subsequent to the time of Alexander the Great it was customary to represent the heads of the Olympian Deities as surrounded by a nimbus or halo. The sculptors of the Greek school in India gave this ornamentation to the figures of Buddha, who had, by that time, practically become a God. The pictorial and glyptic representations of Buddha travelled northwards and eastwards with Buddhism. In earlier days I have often wondered at the figures of Buddha in Japan, with the nimbus or halo around the head, and how this resemblance to figures of the Saviour and the Christian saints had come about. There can be no doubt whence the resemblance has come; both classes of figures are, in this respect, ultimately derived from the later representations of the Olympian Deities.

In view of some things which we thus see in the ornamentation of these remains, and shall see in the Sānchi sculptures, it may be noted here that Greek and Greek-taught artists and artisans were to be found in India after the days of Alexander, and that intercourse with the West was maintained. Megasthenes was the Ambassador of Selencos Nikator at the Court of Pātaliputra, and a daughter of this Macedonian King of Syria was married to the Emperor of India. In the subsequent reign also a Greek Ambassador was received at this Court. In the North-West of India kingdoms dominated by Greeks existed for centuries after that. The special field of what has been called the Greco-Buddhist remains is in the North-West of India, which we do not touch.

Before leaving the Sarnath sculptures and ruins, I ought to mention that General Cunningham assigns them to, say, between 150 and 600 A.D.; but Fergusson brings down the decorations of the

Stūpa as having been discontinued so late as the tenth or eleventh century.

The great Stūpa at Sānchi is composed of earth and stone, and dates probably from the time of Asōka. The railing followed soon after, if not in his time ; and the South Gateway, according to Grünwedel, about 150 B.C. The other gateways came later. There were originally three stūpas in this locality, two of which remain, as restored, and the ruins of a third. As late as 1820 they were all three entire.

Fig. 6, Plate X., represents the front of the left-hand pillar of the Eastern Gateway ; and a slight idea may be gained of the structure of the stūpa from the portion of it which is shown behind this pillar. The upper central panel shows a representation, to which I have already alluded, of the Asoka Shrine erected at Bodh-Gaya. The Sacred Tree is represented as emerging from the centre of this shrine, and underneath it is the Vajrāsan, like a relic casket, on which is inscribed the symbol of the Trisūla and Disc. Above the tree are Dēvas bringing garlands. On the panel immediately below is a representation of one of the legends of Kāsyapa of Uruvilva. This Brahman was well affected towards the teaching of Buddha, but had not yet become a convert. The river being in flood, the Buddha gave an exhibition of the wondrous powers which he had attained, by suddenly disappearing from where he stood and appearing on the other bank. Kāsyapa followed him in a boat, as shown in the sculpture. It is notable that never in these older sculptures is the person of the Buddha represented ; it is left to be implied. The spirited representation of the water-fowl, the crocodile's head emerging from the water, the lotuses, the ancient form of boat and the divers foliage of the half-submerged trees represented are worthy of note.

Fig. 5, Plate X., shows the rear of the Eastern Gateway. On the first crossbeam, remark, on the one side, the figures of a man and a woman riding on goats ; on the other, on a goat and elephant ; also, elephants bringing flowers to a stūpa. On the second crossbeam, on the

one side, a man and woman on dromedaries, on the other, on horses ; along the crossbeam are animals adoring the Sacred Tree, among which are well-depicted Indian buffaloes, and uncouth animals, no doubt meant for foreign ; the five-hooded snake also appears. The volutes at the extreme ends of the crossbeams are probably derived from snake forms. This is more obvious in the case of the gateway of the ruined stūpa. On the third crossbeam are figures on horned lions, one holding a cluster of grapes, indicating their foreign character. Can there have been here in the mind of the sculptor a reminiscence of the Legend of Dionysos, the lions taking the place of the tigers of the Greek sculptors ?

On the top, on one side, is shown the symbol of the Trisūla and Disc ; no doubt the same emblem was shown, when the gateway was complete, in the corresponding place on the other side. The figure riding on one of the elephant supporters under the lower crossbeam carries a standard having the same emblem on the end of the pole.

The Trisūla existed as a symbol before it became, along with the Disc, an emblem of authority in Buddhism. It is, in the Hindu system, the Trident of Siva, the Destroyer. But what is it,—this Trident ? It is nothing else but the forked lightning of Heaven. The development is not a difficult one to follow, and is sufficiently established. But it seems an open question whether, as Grünwedel puts it, “the thunderbolt as an attribute of the Gods was introduced by Greek influence, or whether the gleaming sheaf of lightning-flashes of the Babylonian-Assyrian Gods should be considered as the model”. Whichever way this may be, we identify it with the Thunderbolt of Jupiter and the Trident of Neptune. It is always represented in these sculptures along with the Disc. But the Disc itself,—originally, according to the legend, formed from the Sun,—was a thunderbolt ; and the Trisūla and Disc became thus a duplicated emblem, having a similar meaning. In these sculptures the Disc is conventionalised into the Lotus, pre-eminently the flower of Buddhism.

The consideration of the Trisūla is bound up with that of another

symbol, the Vajra, or double Thunderbolt. This is represented on the front of the Eastern Gateway at Sānchi, and is there held in the right hand by personages whom Grünwedel takes to be Deities of the Indian Pantheon. The God Sakra, in Buddhistic sculptures found in the North-West of India, is constantly represented as holding this symbol in his hand; and it was used we know by the Princes of India as a symbol of authority. It came to be adopted by the Buddhist priesthood; and, in Tibet, in the hands of the Lamas it is the symbol of their authority. There it is known as the Dorjé. With Buddhism it travelled still farther North, and is not unfrequently seen in Japan. This symbol must have been known in India, within the Buddhist system, in the days of Asoka; for on the original Vajrāsan, —the Diamond or Thunderbolt seat,—which was within the Asoka Shrine at Bodh-Gaya, the Vajra was represented on the ornamentation, within the Lotus circle.

Fig. 7, Plate X., shows the inner side of the right-hand pillar of the Eastern Gateway, and, in the distance, the gateway of the ruined stūpa. The top panel, shown here only partially, represents the adoration of the Tree. Immediately below is depicted the legend of the Dream of the Lady Maya,—the White Elephant, emblem of Wisdom, entering her womb. The large panel below represents a royal procession,—probably that of King Asoka himself leaving the gate of a city, and proceeding to worship at the Sacred Tree. The musicians in front of the royal chariot, and the ladies looking down on the procession from the balconies, are worthy of note.

We have seen the Tree constantly appearing in these sculptures. We now know that this Tree is not a mere tree, but the symbol of the Sage who sat under the tree. There is a Tree-worship,—a dread or veneration of the Tree, or Spirit which resides in the tree. And that this veneration for trees had nothing to do with the assignation to each of the Buddhas of the past a particular tree, as the Pipal is assigned to Gótama Buddha, it would be somewhat hard to say. But the veneration of the Buddhist Tree is far re-

moved from the point of view of the early man, who saw a Dryad in every tree.¹

We have seen at the Mahābodhi Temple, and more extensively in these Gateways at Sānchi, specimens of what is known as the Torāna Gateway. Now, this form of gateway is not peculiar to India. In Japan, and elsewhere, there is a form of gateway which irresistibly reminds us of the Indian one. Conjectures have been made as to how the Indian Torāna may be connected with the Japanese Torii, the gateway seen in Japan before Shinto shrines. There is a theory that the Torāna gateway belongs to a form of primitive architecture common to Mongolian races, among which are to be included a race which existed in India before, and alongside of, the Aryans. Fergusson called them (provisionally) Dasyus; and suggested that the Buddhist rail and stūpa are developments from the form of the tomb of a Dasyu chief. Mr. Samuel Tuke, in an interesting paper read before the Japan Society a few years ago, has put together some interesting information on the subject of such gateways and railings, congeners of which are to be seen in Siam, Camboja, China and Korea.

Fig. 8, Plate X., represents part of the railing of the smaller stūpa.²

The rock-cut Temple of Karli lies about eighty-five miles by rail from Bombay, on the way to Poona. Fig. 4, Plate IX., represents the interior of the temple. The stūpa at the far end was the object of adoration. The wooden ribs of the roof are believed to be the original

¹ In one of my old note-books I find an entry which I had made referring to a painting of a Tree, at Hōryūji, the oldest Buddhist monastery in Japan. This Tree is in the centre of the picture; and surrounding it are figures of the Shi-Tennō, as they are called,—the Four Celestial Kings, Guardians of the Four Quarters of the Universe,—the Chatur Mahārāja; and on the Tree are seven clusters, which looked as if they might be garlands. I did not know then what the Tree was; but, no doubt, it is the same Tree as that of which we are now speaking, and represents the Buddha.

² The figure of a centaur, holding in his hand a garland and having on his back what seems to be a kingly form, is worthy of notice. On the other upright are two figures, apparently duplicates, standing on the lotus, and holding a lotus bud in the hand. Can they represent Avalōkitēśvara as Padmapāni, the Lotus-bearer?



Fig. 1.—Asoka's Railing at the Mahabodhi Temple, Bodh-Gaya.



Fig. 2.—The Bo-Tree, Mahabodhi Temple, Bodh-Gaya.



Fig. 3.—Figure of Buddha from Excavations at Sarnath.



Fig. 4.—Interior of Rock-cut Temple at Karli.



Fig. 5.—Rear view of East Gateway of Great Stupa at Sanchi.

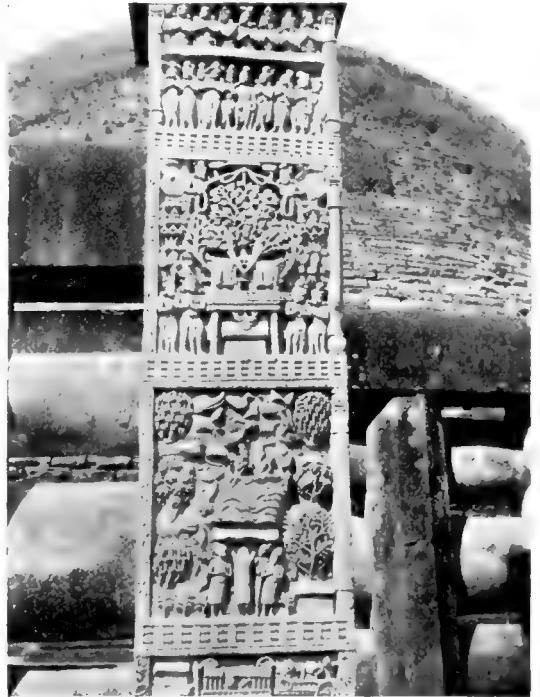


Fig. 6.—Front view of Left-hand Pillar of East Gateway of Great Stupa at Sanchi.



Fig. 7.—Side view of Right-hand Pillar of East Gateway of Great Stupa at Sanchi.



Fig. 8.—Part of Railing of Smaller Stupa at Sanchi.

material. The stone work is the rock of the mountain in which this temple is hewn out. It dates from about the second century, A.D. The worship in such a temple included the circumambulation of the stūpa; the Path of circumambulation was called the Pradakshina, as in this ceremony the stūpa was kept on the *right hand* of the worshipper, who passed round it by means of the aisles behind the pillars.

Stūpas had originally, and still have, generally, one "umbrella" over the top, the symbol of honour, as rendered to the Prince. In some instances, however, the number of umbrellas over the stūpa is increased to three, and to five; and, when these are represented in stone, they are, as the material would tend to bring about, combined together. They are often further increased in number, until we have a stūpa of many tiers. Constructed in wood again, as it was when it travelled to China, Japan and elsewhere, the stūpa has taken the form of what we know as the "Chinese Pagoda".¹

¹The exigencies of reproduction have necessitated the limitation of the number of illustrations to eight out of the forty-five shown at the meeting. Among the books which may be consulted by those interested in the subjects treated of may be named:—Fergusson's *Tree and Serpent Worship*, Cunningham's *Mahābodhi*, Grünwedel's (enlarged by Burgess) *Buddhist Art in India*, Goblet d'Alviella's *La Migration des Symboles* and *Ce que l'Inde doit à la Grèce*, W. Simpson's *Buddhist Praying Wheel* and Rhys Davids' *Buddhist India*.

ORDINARY MEETING.

11TH DECEMBER, 1907.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of last meeting were read and approved.

Anatomical variations were described and discussed by Messrs. C. Clyne, W. C. Milne, R. R. M. Porter, J. Ritchie, W. G. Thomson and W. M. Tough.

Mr. N. J. Calder, M.A., gave a description of an imbecile's brain which was presented to the Anatomical Museum by W. Sim Garden, M.B., Menston, Leeds. Thereafter Professor Reid compared this brain with that of a congenital idiot who had not been possessed of any reasoning power or of any of the finer intellectual faculties. This brain is described and figured in the *Proceedings* of the Society for 1900-2.

RECORD OF ANATOMICAL VARIATIONS.

Date of observation, November, 1907.

Sex, Male.

Lateral branch from the internal mammary artery (right).

This branch, which is of a large size, is given off an inch from the origin of the internal mammary artery. The pleura is behind it and it is close up to the first rib. It passes downwards and outwards across the first and second and part of the third intercostal spaces about an inch to the outside of the costal cartilages. It anastomoses with the intercostal arteries in the spaces over which it passes. Ac-

companying the artery are two veins, one on each side, which remain separate throughout.

(Signature of observer) CHARLES CLYNE.

Date of observation, December, 1907.

Sex, Male.

Abnormal course of median nerve (left).

The nerve runs as usual along the outer side of the brachial artery but instead of crossing in front of the artery at the middle of its course, it crosses behind the artery just where it divides into radial and ulnar. From this point the course of the nerve is quite normal.

(Signature of observer) WM. C. MILNE.

Date of observation, December, 1907.

Sex, Male.

Abnormal arrangement of branches of brachial artery (left).

The anastomotica magna instead of arising from the brachial two inches above the elbow-joint arises at least four inches and at the same place from which the inferior profunda also takes origin. The anastomotica gives off muscular branches to the biceps and brachialis anticus and divides just above the external condyle into two branches, the outer of which anastomoses with the radial recurrent and the inner supplies the front of elbow-joint.

(Signature of observer) WM. C. MILNE.

Date of observation, November, 1907.

Sex, Male.

Axillary arch (right).

On opening the axillary cavity a muscular axillary arch is seen crossing superficial to the sheath containing the brachial artery and the branches of the brachial plexus. This slip consists of fine fibres, and has a muscular origin from the anterior surface of the tendon of the latissimus dorsi muscle, and is inserted by a few tendinous fibres into the aponeurosis covering the upper part of the coraco-brachialis.

The slip is $2\frac{1}{2}$ inches long and $\frac{3}{8}$ of an inch broad at its origin and tapers to its insertion. It is flattened against the sheath of the vessels and nerves, which lie external to it. Its upper border is about an inch below the posterior circumflex and subscapular arteries. Its inferior border is the same distance above the floor of the axilla. This arch occurs in about seven subjects in 100, and is often inserted into the pectoralis major or the fascia over the biceps.

(Signature of observer) R. R. M. PORTER.

Date of observation, December, 1907.

Sex, Female.

Liver with Riedel's lobe.

The right lobe of this liver is enlarged in its vertical extent, measuring 8 inches in this direction. On the anterior surface of this lobe there is a deep transverse groove about $\frac{3}{4}$ of an inch above the level of fundus of gall bladder.

(Signature of observer) J. RITCHIE.

Date of observation, November, 1907.

Sex, Male.

Abnormal arrangement of arteries of arm and forearm (left).

The ulnar artery originates about two inches below the commencement of the brachial artery. It is in close relation with the brachial artery, being separated from it only by the ulnar nerve. At the elbow it crosses the brachial artery and becomes closely attached to the flexor carpi radialis which had to be slightly cut to expose the artery. For the rest of its course it is superficial to the flexor group of muscles after emerging from the fibres of the flexor carpi radialis, passing downwards and inwards to come into close relation with the ulnar nerve at the pisiform bone. At its origin it is quite a quarter of an inch in diameter and its upper part gives muscular branches to the biceps and to the flexor carpi radialis. Its lower part gives off no branches.

In this forearm, too, the brachial artery at about an inch below

the elbow-joint divides into radial artery and a larger continuation, which in turn gives off anterior and posterior interosseous and continues as an artery in close relation with the median nerve.

(Signature of observer) W. G. THOMSON.

Date of observation, November, 1907.

Sex, Male.

Unusual connection between the flexor longus digitorum and flexor longus hallucis (left).

In this case the flexor longus digitorum, in addition to receiving a tendinous slip from the flexor longus hallucis, sends a strong tendinous slip to join the tendon of the flexor longus hallucis.

(Signature of observer) W. MILNE TOUGH.

NOTES ON THE BRAIN OF AN IMBECILE.

By N. J. CALDER, M.A., Secretary.

To the naked eye, this brain presents an appearance very similar to that of an ordinary adult brain. It is small, but the convolutions are well marked and the fissures are in their usual positions. The parietal lobe perhaps shows slight divergence where the sulci are extremely numerous, and the convolutions very closely packed together. The opercula are well developed.

The weight of the brain is only 32·8 ounces. The individual was about fifty years of age, and the brain of a person of this age weighs usually about 49·5 ounces. The significance of the weight of the brain depends upon the proportion it bears to the dimensions of the body. In this relation, it is interesting to compare the weights of the various organs of this individual with those of a boy, seven years of age, who was about the same height.

	Imbecile.	Healthy Boy.	Average Adult.
Height - - -	39 inches	37 inches	—
Brain - - -	32·8 ounces	40·23 ounces	49·5 ounces.
Heart - - -	4·5 "	2·7 "	11 "
Liver - - -	29·4 "	19·13 "	55 "
Spleen - - -	7 "	1·85 "	7 "
Kidneys - - -	4·55 "	4·05 "	10 "
Right Lung - -	10·5 "	—	22 "
Left Lung - -	9·8 "	—	20 "

From these figures it will be seen that he has a small brain compared with his other organs. The weight of the brain of the boy is larger, whereas the weights of the other organs are smaller.

For this brain the Society is deeply indebted to W. Sim Garden, M.B., Menston, Leeds, who presented it to the Anatomical Museum.

ORDINARY MEETING.

18TH JANUARY, 1908.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of last meeting were read and approved.

The President introduced W. R. Macdonell, Esq., LL.D., University Lecturer on Statistical Methods, who gave an address "On Certain Physical Characters of Aberdeen Medical Students".

The material on which the paper was based was placed at the lecturer's disposal by Professor Reid, and consisted of measurements and observations taken in the Anthropometrical Laboratory during the last twelve years.

On the motion of the Secretary, a hearty vote of thanks was accorded to Dr. Macdonell for his address.

ON CERTAIN PHYSICAL CHARACTERS OF ABERDEEN
MEDICAL STUDENTS.

By W. R. MACDONELL, LL.D., University Lecturer on Statistical Methods.

(Read 18th January, 1908.)

I.—MATERIAL AND METHODS OF OBSERVATION AND MEASUREMENT.

1. The material on which the following paper is based was very kindly placed at my disposal by Professor Reid, and consists of measurements and observations taken in his Anthropometrical Laboratory during the last twelve years. It has been his custom to measure all the students who attend the Anatomy Class at the beginning of their course, and he has also measured many of them towards the end of their course, that is, after an interval of about four years. As these measurements have been made by the Professor himself or his trained assistants, their accuracy can be accepted with confidence.

2. The characters recorded are forty-one in number, but to treat them all mathematically would have required a very long time and delayed the appearance of this paper indefinitely. I have, therefore, made a selection of characters that are important in themselves, or have been dealt with in other groups of the population by previous investigators, so that they offer material for interesting comparisons. Those that I have chosen are :—

- (1) *Head Circumference*, the largest horizontal circumference measured with the steel tape over the glabella.
- (2) *Head Length*, from the glabella to the most distant point in the median plane.
- (3) *Head Breadth*, the greatest transversal diameter.
- (4) *Head Height*, from the auricular point (the depression just in

front of tragus of pinna) to a plane touching the highest part of the middle line of the head in the horizontal position.

Characters (2) (3) and (4) were measured with Flower's callipers. No special allowance was made for the hair in taking the cranial circumference, but in taking the other three measurements the points of the callipers were passed between the hairs.

(5) *Height Standing*, less heels of boots.

(6) *Height Sitting*.

(5) and (6) were measured with a stadiometer made by Ashton and Mander, London.

(7) *Span of arms* from opposite finger-tips (behind the chest), as measured with a special instrument made by the same firm.

(8) *Colour of Hair*, five classes : Black, Dark, Brown, Fair, Red. No special standard test colours were used.

(9) *Colour of Eyes*, three classes : Dark, Medium, Light, as tested by Galton's standard colours for eyes, made by Groves, London.

(10) *Size of Right Pupil*, measured by pupillometer on the ophthalmoscope.

(11) *Colour Sense*, as ascertained by Jeaffreson's colour circle and Holmgren's wools for refinements.

(12) *Keeness of Hearing*.

(11) and (12) call for no elaborate discussion.

II.—DIVISION OF STUDENTS INTO TWO GROUPS.

3. I have divided the total collection of students into two groups : the first group contains 493 individuals whose parents were both Scottish, the second group contains 93 men who have only one parent Scottish or one or both parents English, Welsh or Irish, and I shall call these the Scottish and the non-Scottish groups respectively. I have excluded foreigners and women students, of whom there were 45.

3*a*. It is worth noting that about 75 per cent. of the Scottish group belong to the four adjoining counties of Kincardine, Aberdeen, Banff and Moray, in the sense that at least one parent of each member of the group was born in one or other of these counties, but, as we

should expect, the great majority of the group belong to Aberdeenshire and Banffshire. The birthplaces of both parents of 467 students are recorded, and the result is shown in the following table :—

TABLE I.
BIRTHPLACES OF PARENTS OF SCOTTISH STUDENTS.

		Fathers.			
		Aberdeenshire.	Banffshire.	Rest of Scotland.	Total.
Mothers.	Aberdeenshire -	188	19	30	237
	Banffshire -	25	40	7	72
	Rest of Scotland -	43	12	103	158
		256	71	140	467

Thus we see that, of 256 Aberdeenshire fathers, 188 married natives of their own county, 25 married natives of Banffshire and 43 married natives of the other Scottish counties. Obviously there is a large preponderance of intra-county unions in Aberdeen and Banff, as we should have expected.

III.—THE TWO GROUPS COMPARED.

4. *Age*.—The average age of the Scottish group at the beginning of their course is $19\frac{8}{12}$ years ; of the non-Scottish group $19\frac{7}{12}$ years.

5. *Head Measurements*.—The means are as follows :—

TABLE II.
MEANS OF HEAD MEASUREMENTS OF ABERDEEN STUDENTS, IN MM.¹

	Length.	Breadth.	Height.	Circumference.	100 B/L.
Scottish -	194·8 ± ·174	153·4 ± ·143	132·3 ± ·217	562·6 ± ·430	78·8 ± ·085
Non-Scottish	194·2 ± ·421	153·1 ± ·383	133·2 ± ·475	562·2 ± 1·009	78·9 ± ·227

¹The figures with the symbol ± prefixed represent the "probable errors" of the various characters.

It will be observed that there is practically no difference between the groups.

6. *Eye and Body Measurements* are seen in the next table :—

TABLE III.

MEANS OF EYE AND BODY MEASUREMENTS OF ABERDEEN STUDENTS.

(Pupil in mm., heights and span in inches.)

	Pupil.	Height Standing.	Height Sitting.	Span.
Scottish - -	$6.9 \pm .045$	$67.6 \pm .071$	$35.5 \pm .042$	$68.7 \pm .086$
Non-Scottish -	$6.5 \pm .097$	$67.9 \pm .173$	$35.6 \pm .105$	$69.1 \pm .185$

Here again there is practically no difference between the groups.

7. I will now give tables showing the distribution of *Eye and Hair Colour*.

TABLE IV.

DISTRIBUTION OF EYE COLOUR IN ABERDEEN STUDENTS.

(Percentage of total in each group.)

	Light.	Medium.	Dark.
Scottish - -	26.4	49.4	24.2
Non-Scottish -	23.9	50.0	26.1

The groups are again remarkably alike.

TABLE V.

DISTRIBUTION OF HAIR COLOUR IN ABERDEEN STUDENTS.

(Percentage of total in each group.)

	Red.	Fair.	Medium.	Dark.	Black.
Scottish - - -	4.8	26.4	47.2	20.6	1
Non-Scottish - -	2.2	36.95	36.95	23.9	.0

Here we observe a slight difference—the non-Scottish have a preponderance of “Fair” and a falling off in “Medium”.

8. Only two characters remain to be considered, *Colour Sense* and *Keeness of Hearing*. As regards colour sense, thirteen cases of abnormality have been recorded amongst the Scottish students, and only one amongst the non-Scottish. In neither group is any abnormality recorded in keenness of hearing.

9. I will now show the *variability* of the two groups as measured by the “standard deviation”.

TABLE VI.

STANDARD DEVIATION OF HEAD MEASUREMENTS OF ABERDEEN STUDENTS IN MM.

	Head Length.	Head Breadth.	Head Height.	Circumference.	100 B/L.
Scottish -	5.73 ± .123	4.69 ± .101	7.08 ± .153	14.08 ± .304	2.79 ± .060
Non-Scottish	6.01 ± .298	5.47 ± .271	6.75 ± .336	14.43 ± .714	3.24 ± .160

TABLE VII.

STANDARD DEVIATION OF EYE AND BODY MEASUREMENTS OF ABERDEEN STUDENTS.

(Eye in mm., heights and span in inches.)

	Pupil.	Height Standing.	Height Sitting.	Span.
Scottish - -	1.44 ± .032	2.34 ± .050	1.38 ± .030	2.80 ± .061
Non-Scottish -	1.33 ± .068	2.48 ± .123	1.48 ± .074	2.64 ± .131

Here we are dealing with much smaller quantities than in the case of the Means, and the differences are therefore relatively much larger. We have therefore to consider the question, do these differences indicate a marked divergence between the two groups as regards their variability? Before answering this question, I would remind

you that the number of individuals in the first group is about 500, in the second group only about 100; the results for the first group are therefore likely to be nearer the true magnitudes for the total population from which it is drawn than the results for the second group. The one set of results has more weight, so to speak, than the other; how to allow for that, and how to make an accurate comparison between the two sets is the province of the theory of "probable errors," a somewhat advanced part of the Theory of Probabilities, with which I will not trouble you. But I may say that on applying this theory to the figures of Tables VI. and VII. I find that the differences therein shown are not significant, that is, they do not show any very appreciable divergence between the two groups as regards Variability.

10. I now come to the subject of *correlation*. I have not attempted to calculate all the possible coefficients of correlation, but have confined myself to one in each group; that, however, is an important one, the coefficient of correlation between head length and head breadth. It is as follows:—

Scottish	-	-	-	·3059	±	·0275
Non-Scottish	-	-	-	·2446	±	·0658

Here again I find that the difference between the two groups is insignificant.

11. The general conclusion which I think the foregoing facts establish is that, as regards the characters which I have selected, the two groups are practically identical.

IV.—THE TWO GROUPS COMPARED WITH OTHER CLASSES OF THE POPULATION.

12. I now come to the next part of my paper, in which I propose to compare Aberdeen students with similar classes of the community, and also with classes very different indeed,

TABLE VIII.
COMPARISON BETWEEN ABERDEEN STUDENTS AND OTHER CLASSES
(MALES).

Means of Characters.

Groups.	Head Length.	Head Breadth.	Cephalic Index.	Stature.
All Aberdeen Students -	194·7	153·3	78·8	67·64
Aberdeenshire, Rural ¹ -	193·9	153·4	[79·1]	67·72
Cambridge Graduates ² -	194·0	154·2	79·6	—
Cambridge Students ³ -	193·5	153·9	79·6	68·86
Scottish Criminals ¹ - -	196·3	153·1	78·0	64·84
English Criminals ⁴ - -	191·7	150·4	78·5	65·54
Scottish Insane ¹ - -	195·5	151·5	77·6	65·86

Here you will notice the marked similarity between the four higher classes as regards head measurements, and the taller stature of Cambridge men. But when we look to the criminal and insane classes, we find striking differences between them and the others. The most marked difference is in stature, and it is very striking, the criminals and insane being two to four inches shorter than the students and the rural population of Aberdeenshire. In head breadth, too, the English criminals and Scottish insane are considerably below the other classes; so are the English criminals in head length, but the curious fact is brought out that both in head length and head breadth the Scottish criminals are very much the same as the other classes; indeed they and the Scottish insane have the longest heads of all. The most distinguishing character between the higher and the lower type is stature.

¹ *Biometrika*, vol. v., pp. 344, 346-47, Tocher.

² *Ibid.*, vol. v., p. 124, Pearson.

³ *Ibid.*, vol. i., pp. 188, 190, Macdonell, and *The Chances of Death, etc.*, vol. i., p. 351, Pearson.

⁴ *Ibid.*, vol. i., pp. 181, 190, Macdonell.

13. I will now exhibit two tables showing the comparative distribution of *Eye and Hair Colour*.

TABLE IX.
COMPARATIVE DISTRIBUTION OF EYE COLOUR.
(Percentages of total of each group.)

Groups.	Light.	Medium.	Dark.	
Scottish Students (Aberdeen)	26·38	49·40	24·22	
Non-Scottish Students (, ,)	23·91	50·00	26·09	
Scottish Schoolboys ¹ - -	44·97	32·72	22·31	
British Schoolboys ² - -	38·40	40·30	21·30	
General Scottish Insane (Males) ³ - - - -	44·94	32·63	22·43	

Aberdeen students are unlike the other groups, while Scottish and British schoolboys closely approximate to each other.

TABLE X.
COMPARATIVE DISTRIBUTION OF HAIR COLOUR.
(Percentages of total of each group.)

Groups.	Red.	Fair.	Medium.	Dark.	Black.
Scottish Students (Aberdeen)- -	4·79	26·38	47·24	20·63	·96
Non-Scottish Students (Aberdeen) -	2·17	36·96	36·96	23·91	·00
Scottish Schoolboys ¹ - - -	5·49	24·95	43·28	25·01	1·25
British Schoolboys ² - - -	3·70	35·00	32·80	28·50	—
General Scottish Insane (Males) ³ -	1·56	6·49	59·55	32·40	—

¹ From an important paper by Mr. J. F. Tocher, on "A Pigmentation Survey of School Children in Scotland," to be published in an early number of *Biometrika*.

² *Biometrika*, vol. iii., p. 461, Pearson, where interesting returns for other races will be found.

³ *Ibid.*, vol. v., Supplement, p. 96, Tocher.

The distribution of hair colour amongst Scottish students is about the same as that amongst Scottish schoolboys, and non-Scottish students and British schoolboys are also similar, the medium type prevailing amongst the two former groups, the fair and medium in equal proportions amongst the latter two, while the percentage of dark is fairly uniform in all, *viz.*, about four. The great preponderance of the medium and dark types amongst male Scottish insane is very striking.

14. I have next to make a comparison of *Variabilities*.

TABLE XI.

COMPARISON BETWEEN ABERDEEN STUDENTS AND OTHER CLASSES.

Standard Deviations.

Classes.	Head Length, mm.	Head Breadth, mm.	Head Height, mm.	Stature, ins.
Scottish Students - -	5.73	4.69	7.08	2.34
Non-Scottish Students - -	6.01	5.47	6.75	2.48
Cambridge Students ¹ -	6.16	5.06	—	2.54
English Criminals ² - -	6.05	5.01	—	2.54
Scottish Insane (Males) ³ -	6.55	5.39	5.58	2.84

Here we find a general similarity in all the characters except in Auricular Height, for which the insane are the least variable.

15. We have now to see how our *correlation coefficients* compare with those of other classes.

¹ *Biometrika*, vol. i., p. 188, Macdonell.

² *Ibid.*, p. 181, Macdonell.

³ *Ibid.*, vol. v., p. 303, Tocher.

TABLE XII.
CO-EFFICIENTS OF CORRELATION BETWEEN HEAD LENGTH AND
HEAD BREADTH.

Scottish Students (Aberdeen) -	$\cdot 3059 \pm \cdot 027$	This Memoir.
Non-Scottish Students (Aberdeen)	$\cdot 2446 \pm \cdot 066$	This Memoir.
Cambridge Students - - -	$\cdot 3448 \pm \cdot 019$	<i>Biometrika</i> , vol. i., p. 188.
English Criminals (Males) - -	$\cdot 4016 \pm \cdot 010$	<i>Biometrika</i> , vol. i., p. 181.
Scottish Insane (Males) - -	$\cdot 4848 \pm \cdot 008$	<i>Ibid.</i> , vol. v., p. 314.

Correlation is distinctly greater in the abnormal classes than in the other two.

I may insert here the coefficient of correlation between *Span and Stature* of our Scottish students ; it is $\cdot 8442 \pm \cdot 009$, a very high value, confirming the common belief as to the relation of span to height. Dealing with much larger groups than mine, Professor Pearson found this coefficient of correlation to run from $\cdot 783$ to $\cdot 828$.¹

TABLE XIII.
CORRELATION BETWEEN HAIR AND EYE COLOUR.

Mean Square Contingency Coefficient.

Scottish Students - - -	$\cdot 2876$	This Memoir.
Scottish Children - - -	$\cdot 3802$	<i>Biometrika</i> , vol. v., p. 339, Tocher.
British Schoolboys - - -	$\cdot 4203$	<i>Ibid.</i> , vol. iii., p. 461, Pearson.
Aberdeenshire Adults - -	$\cdot 3673$	<i>Ibid.</i> , vol. v., p. 339, Tocher.
Scottish Insane (Males) - -	$\cdot 3039$	

You will observe that in no case is the correlation very high—a

¹ *Biometrika*, vol. ii., p. 370.

result that runs counter to the commonly accepted view. The low value in Scottish students suggests that here we may be dealing with a considerable Gaelic element, characterised by dark hair and light eyes.¹

V.—COMPARISON OF HONOURS AND PASS MEN.

16. The next part of my inquiries is interesting, but will not detain us long. Professor Reid has kindly placed at my disposal the following figures, which enable me to answer the question: Is there any difference between honours and pass men as regards their chief cranial characters?

TABLE XIV.

ABERDEEN HONOURS AND PASS MEN, SCOTTISH AND NON-SCOTTISH.

Means of Characters.

Class.	Number.	Head Length.	Head Breadth.	Cephalic Index.
1st and 2nd Class Honours Men	26	195·3	152·5	78·1
3rd Class Honours Men - -	71	194·1	153·3	78·4
Pass Men - - - -	489	194·7	153·4	78·9

Note.—1st and 2nd class men represent those who have graduated with 1st and 2nd class honours respectively; 3rd class includes those who have passed with distinction in one or more professional examinations.

There are very few in the first and second classes, but I think we are justified in concluding that there is practically no difference between the pass and the honours men. Professor Pearson's figures show that this is true also of Cambridge graduates;² in their case, indeed, the similarity between the different grades was even more striking.

¹ See Professor Pearson's remarks in *Biometrika*, vol. iii., p. 461.

² *Biometrika*, vol. v., p. 124.

VI.—GROWTH IN HEAD AND BODY CHARACTERS.

17. I now come to the last part of my inquiry. As I mentioned before, Professor Reid has measured some of his men more than once, and I have compared the first and last measurements, the interval between them being almost exactly four years, with the view of ascertaining the amount of growth in that period. The result is shown in Table XV.

TABLE XV.

ABERDEEN STUDENTS—AVERAGE GROWTH IN FOUR YEARS.

Character.	Scottish.		Non-Scottish.	
Age at first measurement, years -	$19\frac{4}{12}$		$19\frac{1}{12}$	
„ second „ „ -	$23\frac{2}{12}$		$23\frac{1}{12}$	
Number - - - -	220		36	
	Percentages.	Absolute mm.	Percentages.	Absolute mm.
Head Circumference - - -	1·21	6·8	1·31	7·3
„ Length - - - -	1·17	2·3	1·34	2·6
„ Breadth - - - -	1·51	2·3	1·39	2·1
„ Height - - - -	3·51	4·6	3·09	4·1
Span - - - -	·85	14·9	·66	11·7
Height Standing - - - -	·96	16·6	·70	12·2
„ Sitting - - - -	1·27	11·5	1·42	12·9

The average growth, you will observe, is very nearly the same in both groups, and is so very small, except as regards Auricular Height, that it suggests a doubt whether it is worth while going to the trouble of taking second measurements. Some individuals have, of course, grown more than others, and a few have actually gone back in their measurements, owing, probably, to inevitable slight discrepancies between different measurers.

VII.—SUMMARY.

18. I may sum up the main conclusions of the inquiry :—

- (1) The two groups which I have called Scottish and non-Scottish are practically identical in the characters selected.

- (2) They closely resemble Cambridge students and graduates in Head Length and Breadth, but are slightly lower in Stature ; they are also practically identical with the rural population of Aberdeenshire in these three characters.
- (3) The average growth between the nineteenth and twenty-third years of life amongst Aberdeen students is about $1\frac{1}{4}$ per cent. in all characters except Auricular Height, in which it is about 3 per cent.
- (4) There is practically no difference between Honours and Pass men in Head Length and Breadth.
- (5) The Aberdeenshire head is not larger than that of other classes of the community.

ORDINARY MEETING.

22ND FEBRUARY, 1908.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

Anatomical variations found in the course of practical work in the Anatomy Department of the University were described by Miss M. K. Moir and Messrs. N. J. Calder, H. T. Finlayson, W. P. Hogg and W. G. Thomson.

Thereafter Mr. Alex. Low, M.B., described the process of reconstruction, by Born's wax plate method, of a human embryo of 13-14 mesodermic somites. The anatomy of the embryo was briefly referred to and the completed wax models of the embryo were demonstrated.

RECORD OF ANATOMICAL VARIATIONS.

Date of observation, February, 1908.

Sex, Male.

Abnormal arrangement of the arteries on the dorsum of the foot.

The anterior tibial artery, in this dissection, divides under the anterior annular ligament into two terminal branches. The branch that is the real continuation of the artery follows the normal course of the dorsalis pedis artery, but is small and gives off no tarsal or metatarsal branches. The other terminal branch is large, curves outwards and eventually ends at the posterior part of the second intermetatarsal space by receiving a posterior perforating branch from the deep plantar arch and giving off an interosseous artery for the

second interosseous space. It also gives off from its convexity a tarsal and a metatarsal branch. From the latter are given off two interosseous branches for the two outer interosseous spaces.

(Signature of observer) NORMAN J. CALDER.

Date of observation, February, 1908.

Sex, Female.

Absence of the posterior tibial artery (right).

In this dissection the popliteal artery is continued on in the leg as a very large peroneal artery. A small branch, which may represent the posterior tibial artery, arises at the level where the peroneal artery is usually given off and runs downwards and inwards to terminate in the deep aspect of the flexor longus digitorum muscle. The large peroneal artery takes the usual course of an ordinary peroneal artery to a point about half an inch above the ankle-joint. At this point it gives off the anterior peroneal artery and then continues on to the sole of the foot, dividing into internal and external plantar arteries.

(Signature of observer) HAROLD T. FINLAYSON.

Date of observation, February, 1908.

Sex, Female.

High radial artery (left).

In this dissection the radial artery arises from the brachial artery opposite the insertion of the coraco-brachialis muscle, and in its course downwards lies on the biceps and brachialis anticus muscles. It crosses the median nerve from without inwards. On passing below the bicipital fascia it is joined by an anastomosis from the ulnar artery.

(Signature of observer) W. P. HOGG.

Date of observation, January, 1908.

Sex, Female.

High division of the great sciatic nerve.

At the level of the lower border of the pyriformis muscle the great sciatic nerve has already divided into two; the upper division

pierces the pyriformis muscle while the lower issues below the muscle.

(Signature of observer) MARGARET K. MOIR.

Date of observation, February, 1908.

Sex, Female.

Abnormality in arterial supply of orbit.

In the right orbit the arterial blood supply consists of a small branch from the internal carotid coming off in the usual situation of the ophthalmic artery and entering the orbit by the optic foramen in much the ordinary fashion; the peculiarity being that it is very small. This artery on coursing forwards towards the nasal side of the orbital cavity is joined by an unusually large branch from the middle meningeal artery entering by the sphenoidal fissure. The point of junction is beneath the superior rectus muscle.

On the left side no indication of an ophthalmic artery is found in the usual position. Certainly no branch from the middle meningeal exists as on the opposite side. The apparent absence of the ophthalmic artery may be due to various causes, but the injection of the other eye is good and the fact that even in the right eye the artery is very small tends to confirm the suspicion that no ophthalmic artery, or at least a very tiny branch is present.

Another peculiarity is that on the left side the infra-orbital artery enters the infra-orbital canal by an aperture somewhat further forwards than usual. The sphenomaxillary fissure is very small, and there is a certain degree of compression of the bones in this region.

(Signature of observer) W. G. THOMSON.

DESCRIPTION OF A HUMAN EMBRYO OF 13-14 MESODERMIC SOMITES.

By ALEXANDER LOW, M.A., M.B., C.M.

(Presented 22nd February, 1908.)

The human embryo Pfannenstiel III. was placed at the disposal of Professor Keibel, for publication in his *Normentafel zur Entwicklungsgeschichte des Menschen*, by Professor Pfannenstiel of Griefswald. In the *Normentafel* the embryo is No. 6 (Fig. Vr. and Vv.). Professor Keibel kindly afforded me the opportunity of studying this embryo in the Anatomical Institute in Freiburg, and at his suggestion I undertook to reconstruct models of the embryo according to Born's method. The work of modelling was begun in the Anatomical Institute in Freiburg, and completed in the Anatomy Department, Aberdeen University.

The embryo Pfannenstiel III. was obtained at an operation, and as measured through the amnion had a length of 2.6 mm. The embryo was fixed in formalin—Muller's fluid, stained in paracarmine, and sectioned at a thickness of 10 μ . Histologically the embryo is in an excellent state of preservation. A model of the whole embryo has been reconstructed at an enlargement of 100. A separate model of the nervous and alimentary systems has also been made, and three models of pharynx, heart with its blood-vessels, and septum transversum at an enlargement of 150.

EXTERNAL FORM. (Plates XI. and XII.)

The embryo is somewhat similar to the embryo von Bulle of Kollmann (7), which shows fourteen mesodermic somites and measured 2.5 mm. in length, but is not so far developed; indeed, its outer form

more nearly approaches that of the embryo of eight paired somites and a length of 2.11 mm. described and modelled by Professor Eternod (4). Like the Eternod embryo, it is spirally twisted in its long axis, and shows the same three back curvatures—a convex neck bend, a concave dorsal, and a convex rump. The dorsal flexure is slight, while the neck bend makes a right angle with the body, approaching in this respect the form of the embryo of twenty-three somites and a length of 2.15 mm. described by Professor Peter Thompson (9). The medullary plate is still open at its head and caudal ends. The front of the head is directed down and slightly to the right over the bulging heart region, and thus is formed a well-developed stomodæum. Three visceral clefts are visible—the first and second being deep, the third a shallow groove. The first and second visceral clefts lie dorsal to the rounded swelling caused by the commencing mandibular arch. The first cleft occupies a position more to the cranial end of the embryo. The second cleft is separated by a convex ridge from the first, and its caudal end extends to the convexity of the body wall caused by the heart. The third visceral cleft is caudal and somewhat more dorsal, and separated by a considerable interval from the other two clefts. Its ventral end leads into a depression of the body wall behind the pericardial region. The ear pit is represented by an oval depressed area of thickened epithelium just cranial to the dorsal end of the third visceral cleft. There is a large elongated umbilical opening through which the embryonic and extra-embryonic coelom are in communication. The yolk sac is constricted at its communication with the primitive intestine to form a distinct neck. The body stalk arises from the ventral aspect of the embryo and passes to the right, lying first in front and then to the right of the caudal end of the embryo, the tail being directed to the left. The body stalk is separated from the neck of the yolk sac by a narrow interval. The caudal end of the embryo is swollen out, and terminates in a blunt point; a trace of the primitive streak is prolonged from the medullary groove to the cloacal membrane. Along the line of attachment of the amnion to the lateral body wall on each side there is a ridge caused by the underlying umbilical vein; this ridge

bounds the umbilical orifice laterally. The amnion extends on to the dorsal aspect of the body stalk, leaving its lateral and ventral aspects uncovered—a disposition similar to that in the embryo described by Professor Thompson.

MESODERMIC SOMITES AND NOTOCHORD.

There are thirteen pairs of well-formed mesodermic somites, and in addition to these there is an anterior pair incompletely formed.

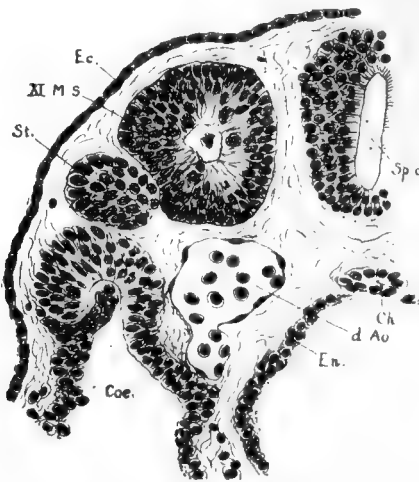


Fig. 1.—Right half of a transverse section of the embryo through the region of the eleventh mesodermic somite.

Ec., ectoderm; *XI M S.*, mesodermic somite; *St.*, segmental tubule; *Coe.*, coelom; *d. Ao.*, dorsal aorta; *Sp. c.*, medullary canal; *En.*, entoderm; *Ch.*, notochord.

This most anterior and rudimentary pair of somites is situated just at the level of the neck bend. The last pair of somites are well formed, and situated at the level of the commencement of the rump bend. As the ganglia are not developed, it is not possible to differentiate the regions to which the somites belong. Each somite has a uniformly thick wall three or four cells deep, enclosing a distinct cavity (myocoel). Towards the cavity many of the cells are undergoing mitotic division. The more cranial-placed somites are triangular on cross-section, while the more posterior ones are quadrangular (Fig. 1). The notochord

extends from a point behind the bucco-pharyngeal membrane, to end in the caudal region just short of the hindgut and between the cloaca and medullary plate, and not extending into the tail. The chorda lies in close relation with entoderm forming the roof of the intestine, and only toward its caudal termination is it quite separated off, and here lies in the mesoderm midway between the gut and the medullary plate. At its cranial commencement the chorda is at first not separated off, but appears more as a heaping up of entoderm cells in the roof of the pharynx; soon, however, it becomes more differentiated, as represented in Fig. 2. At the level of the first pair of mesodermic somites the chorda appears more as an evagination of the entoderm of the roof of the gut, and this condition obtains almost to its caudal end, where it gets quite separated off from entoderm (Fig. 3). The cells of the chorda



Fig. 2.—Notochord in region of first pair of mesodermic somites, and Fig. 3 in caudal region.

En., entoderm of gut; Ch., notochord; Sp. c., spinal cord; Ao., dorsal aorta.

are large, oval and clear, and contain small, distinctly staining nuclei; in some of the cells mitosis is seen. There is no trace of a cuticular membrane.

VASCULAR SYSTEM.

Cardinal Veins.—The anterior cardinal veins, containing blood-cells, are present in the region of the first to the fifth mesodermic somites. A connection with the heart cannot be established from a careful examination of the sections. No trace of posterior cardinal veins is to be seen.

Vitelline Veins.—Although in the wall of the yolk sac are numerous blood-vessels containing blood-cells, still the vitelline veins are difficult to trace. Their terminal parts can be defined where they lie in the septum transversum on the ventral aspect of the gut, and open

into the sinus venosus mesial to the umbilical veins. Before they open into the sinus venosus, a transverse piece connects the two vitelline veins.

Umbilical Veins.—The umbilical veins are large vessels, and lie in the body stalk at first dorsal to the umbilical arteries; here they communicate, and then run cranialwards in the body stalk to gain the lateral body wall. From the lateral body wall the cranial end of each vein bends abruptly, passing mesially and ventrally each to join its own horn of the sinus venosus; here each vein lies embedded in the

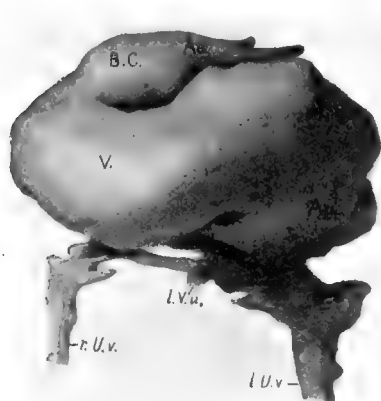


Fig. 4.

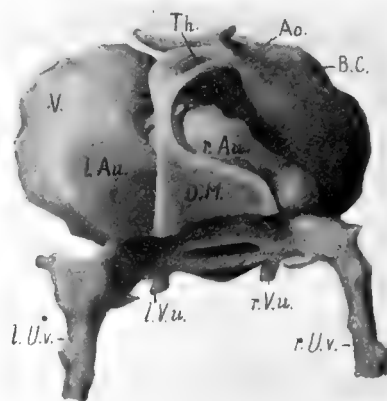


Fig. 5.

Model of heart. $\times 75$. Fig. 4, viewed from the front and left; Fig. 5, seen from behind.

Ao., aortic stem; *B.C.*, bulbus cordis; *V.*, ventricle; *r.Au.*, right auricle; *L.Au.*, left auricle; *s.v.*, sinus venosus; *r.U.v.*, right umbilical vein; *L.U.v.*, left umbilical vein; *r.V.u.*, right vitelline vein; *L.V.u.*, left vitelline vein; *D.M.*, dorsal mesentery; *Th.*, depression in mesentery into which median thyroid extends.

septum transversum and close to the floor of the parietal recess (Fig. 12).

Aortæ.—The aortic stem divides into a pair of aortic arch vessels, which pass on either side of the median thyroid anlage backwards in the first visceral arch, and each of these is continued caudally as a dorsal aorta. There are traces also of a second pair of aortic arch vessels. The dorsal aortæ rest on the roof of the gut on either side of the notochord, and do not unite in any part of their course, remaining paired throughout and terminating on the sides of the cloaca. A short distance before the termination of the dorsal aortæ the umbilical ar-

teries are given off and pass on either side of the allantoic duct into the body stalk, where they unite, forming a single trunk, which again divides into two vessels.

The Heart.—The heart is in a stage very similar to that represented

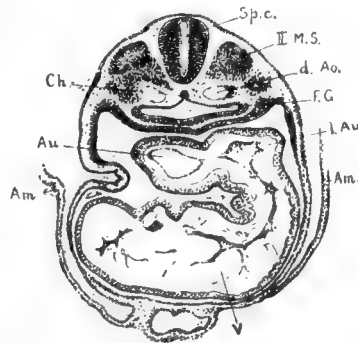


Fig. 6.—Transverse section in region of second pair of somites. $\times 50$.

Am., amnio; *Au.*, auricle; *V.*, ventricle; *Sp.c.*, medullary canal; *Ch.*, notochord; *II M.S.*, second somite; *d. Ao.*, dorsal aorta; *f. G.*, fore-gut.

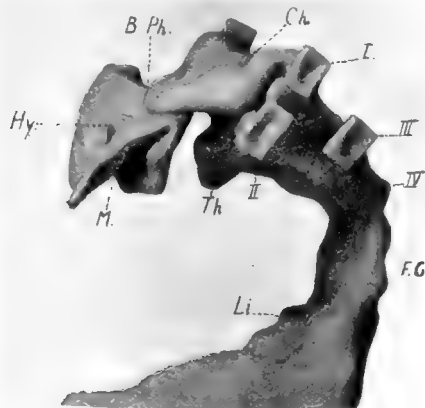


Fig. 7.—Model of pharynx. $\times 75$. Seen from the left side and slightly from the front.

M., mouth; *Hy.*, hypophysis; *B. Ph.*, bucco-pharyngeal membrane; *Ch.*, notochord; *I.-III.*, visceral clefts; *IV.*, fourth pharyngeal pocket; *Th.*, median thyroid; *F. G.*, fore-gut; *Li.*, liver bay.

by Born's model (1) of the heart of a rabbit embryo of 0.95 mm. length—model 1 (Ziegler). The heart as a whole is S-shaped, and shows sinus venosus, auricle, ventricle, and just at the base of the aortic stem a slight dilatation which may represent a bulbus cordis.

The sinus venosus is crescentic in shape, with dilated ends, and is situated in the septum transversum in close relation with the ventral wall of the gut. Opening into its horns are the terminations of the large umbilical veins, and mesial to these the vitelline veins. The sinus passes into the auricle without any very distinct constriction except on the left side, where there is a slight furrow between the two.

The auricle lies dorsal to the ventricle. Its transverse diameter is the greater, and it is divisible into a smaller right part and a larger left by a distinct in-pushing—the dorsal mesentery being attached here. The left part of the auricle is separated from the ventricle by a slight groove.

The ventricle is U-shaped, with the left limb much the larger and passing dorsally and to the left to open into the left side of the auricle. The cranial end of the right limb becomes constricted, and then is succeeded by a somewhat dilated part, which may indicate the bulbus cordis which is so largely developed in the embryo described by Professor Thompson.

ALIMENTARY SYSTEM.

The mouth is represented as a narrow transverse fissure between the fore brain and the body wall. In its roof is a slight funnel-shaped out-pushing—the commencement of the pocket of ectoderm to form the hypophysis. The mouth is separated from the pharynx by a complete bucco-pharyngeal membrane. The pharynx widens out rapidly behind this, and is flattened dorso-ventrally (Fig. 7). There are four pairs of pharyngeal pouches, of which the third and fourth are small and pointed. The second pocket is so situated that it lies much more ventral than caudal to the first pocket. The first two pairs of pockets are elongated vertically, and come in direct contact with the external ectoderm, where it forms the bottoms of the first and second pairs of visceral clefts (Fig. 7). The third and fourth pockets do not come in contact with the ectoderm. In the floor of the pharynx in the region of the second pockets is present the median thyroid anlage as a relatively large, widely open, funnel-shaped cavity with its apex passing

caudally between the aortic arches (Fig. 8). The lung anlage is not plainly indicated, but caudal to the median thyroid is a groove in the entoderm which may indicate the lung groove. As the fore gut is traced towards the yolk sac, its lumen becomes narrowed transversely and elongated dorso-ventrally; and just before it opens out into the yolk sac, there is a liver bay with walls of thickened entoderm. There is no actual liver bud and no trace of liver trabeculæ. The middle third of the alimentary tract is still in communication with the yolk sac. The hind gut is narrowed at a point opposite the attachment of the body stalk, and then dilates to form a large cloaca. Dorsally the

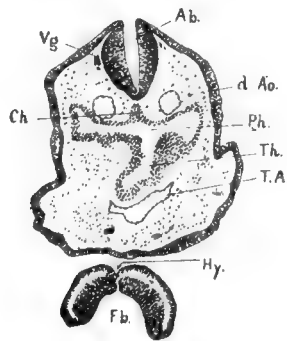


Fig. 8.—Section through region of hind-brain. $\times 50$.

Fb., fore-brain; *Ab.*, hind-brain; *Hy.*, hypophysis; *Ch.*, notochord; *Vg.*, vagus ganglion; *d. Ao.*, dorsal aorta; *Ph.*, pharynx; *T.A.*, aortic stem; *Th.*, median thyroid.

cloaca is expanded with convex walls, while ventrally it is narrowed so that its cavity forms a fissure. Ventrally the entoderm of this anterior fissure-like part of cloaca is in direct contact with the ectoderm, forming an elongated cloacal membrane. Cranial to the cloacal membrane the cavity of the cloaca leads into the small lumen of the allantois. The allantoic duct passes into the body stalk between the two umbilical arteries, which eventually surround it by anastomosing across it. There is a very small post-anal gut projecting caudally between the posterior limit of the cloacal membrane and the tip of the notochord.

EXCRETORY SYSTEM.

The excretory system is in a very early stage of development. Professor Felix of Zurich is to describe this in detail in a separate paper on the development of the excretory system in early human embryos. I may say that this embryo shows rudimentary pronephric tubules in the region of the eighth, ninth and tenth mesodermic somites, and segmental vesicles in connection with the eleventh, twelfth and thirteenth segments. There is no Wolffian duct.

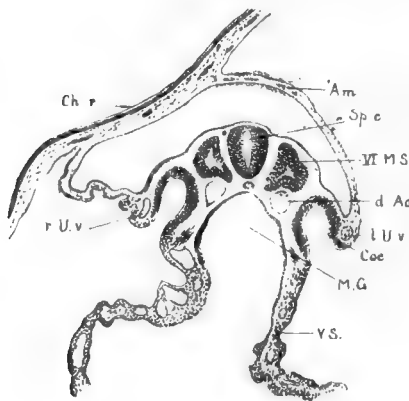


Fig. 9.—Section through region of sixth somite.
x 50.

Am., amnion; *Sp.c.*, medullary canal; *VI. M.S.*, sixth somite; *d.Ao.*, dorsal aorta; *l.U.v.*, left umbilical vein; *Cœ.*, coelom; *M.G.*, mid-gut; *V.S.*, yolk sac; *r.U.v.*, right umbilical vein; *Chr.*, chorion.

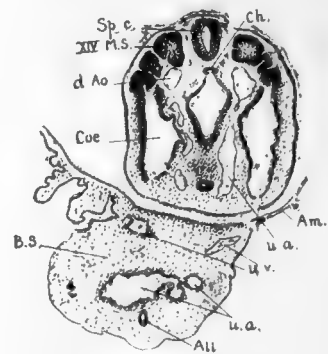


Fig. 10.—Section through region of hind gut. x 50.

Sp.c., medullary canal; *Ch.*, notochord; *Am.*, amnion; *U.a.*, umbilical artery; *U.v.*, umbilical veins; *All.*, allantoic duct; *B.S.*, body stalk; *Cœ.*, coelom; *d.Ao.*, dorsal aorta; *XIV. M.S.*, fourteenth somite.

CÆLOM AND SEPTUM TRANSVERSUM.

All parts of the coelom are in communication with each other. The pericardial coelom is very large, and extends cranially on either side of the median thyroid anlage. Ventrally the pericardial coelom causes a bulging of the body wall, the ventricle lying in close apposition with it; while dorsally it is prolonged round into the parietal recesses of His (5). Figs. 11 and 12, from a model, show the relation of the umbilical vein and sinus venosus to the floor of the parietal recess, as also the two horn-like extensions of the septum transversum described

by Professor Thompson (10). On the right side there is an infolding of the body wall which produces a ridge running from the anterior part of the dorsal mesocardium to the septum transversum, and slightly constricting off the pericardial coelom from the parietal recess; this may be the "pulmonary ridge" of Mall (8). Only the cranial end of this ridge is present on the left side.

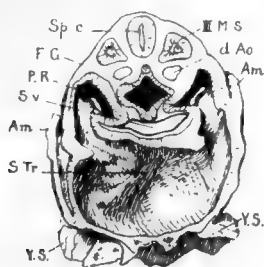


Fig. 11.

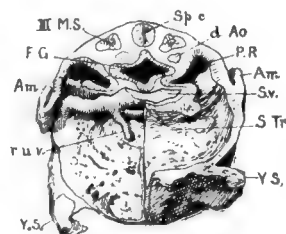


Fig. 12.

Model showing septum transversum viewed from above. Fig. 12 shows right half of septum removed and the right umbilical vein passing in to open into the sinus venosus.

Sp.c., medullary canal; *d.Ao.*, dorsal aorta; *P.R.*, parietal recess; *Am.*, amnion; *S.v.*, sinus venosus; *S.Tr.*, septum transversum; *Y.S.*, yolk sac; *r.u.v.*, right vitelline vein; *F.G.*, fore-gut; *III*, third somite.

NERVOUS SYSTEM.

The medullary plate is open at its head and tail ends almost to the same extent as in Eternod's embryo of eight mesodermic somites. In Kollmann's embryo of fourteen somites the medullary groove is closed behind, but open anteriorly. The brain shows very distinctly the three parts, prosencephalon, mesencephalon, and rhombencephalon, separated by grooves (Plate XIII.). There is no demarcation between the rhombencephalon and the spinal cord, but the junction seems to be at the neck bend at the level of the first pair of mesodermic somites. Just cranial to this point the two folds of the medullary groove have fused. The fore-brain shows elongated, gutter-like evaginations of its later walls which are the commencing optic vesicles. The walls of these vesicles are many cells thick, and are in close contact with the external ectoderm (Fig. 13). From the floor of the fore-brain is a slight out-pushing, the anlage of the infundibulum.

The mid-brain is bounded in front and behind by grooves, and its transverse diameter is rather less than that of either fore-brain or hind-brain. The hind-brain forms by far the largest part of the whole brain, and passes without distinct demarcation into the spinal

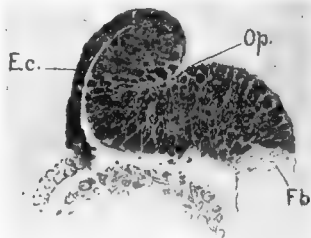


Fig. 13.—Section through optic vesicle (*Op.*).

Fb., wall of fore-brain; *Ec.*, external ectoderm.

part of the medullary tube. The hind-brain is of interest in that it shows certain neuromeres very clearly; these neuromeres form folds involving the whole thickness of the lateral wall of the hind-brain, and are convex externally, with corresponding concavities internally

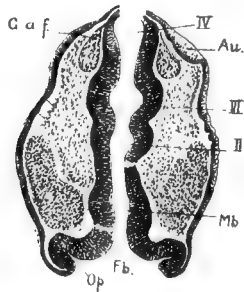


Fig. 14.—Section through head of embryo. $\times 50$.

Fb., fore-brain; *Mb.*, mid-brain; *I.*, *III.* and *IV.*, 2nd, 3rd and 4th neuromeres of hind-brain; *Op.*, optic vesicle; *Au.*, auditory pit; *G.a.f.*, ganglion acustico-facialis.

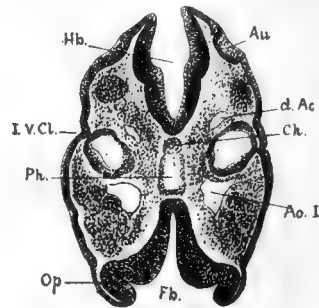


Fig. 15.—Section through region of first visceral cleft. $\times 50$.

Fb., fore-brain; *Hb.*, hind-brain; *Op.*, optic vesicle; *Ph.*, pharynx; *I.V.Cl.*, first visceral cleft; *Au.*, auditory pit; *d.Ac.*, dorsal aorta; *Ch.*, notochord; *Ao.I.*, first aortic arch vessel.

(Fig. 14). The neuromeres are seven in number, as has already been noted by Broman (3) in a human embryo of 3 mm., and more recently by Thompson in the twenty-three somite embryo and Ingalls in an embryo of 4.9 mm. (6). The first neuromere is the smallest, and does

not reach the ventral margin of the brain, while the second neuromere is the largest and best defined. The third neuromere is also prominent, but not so wide as the second, and its ventral end tapers off to a point between the ventral ends of the second and fourth neuromeres. The fourth neuromere is pointed dorsally and widens out below, between its ventral end and that of the second neuromere being a notch as described by Bremer (2) in a 4 mm. embryo. The ganglion acustico-facialis is attached to the upper end of this neuromere, but largely lies in the furrow between the third and fourth neuromeres. The fifth, sixth and seventh are not so clearly marked off.

The oval auditory field of thickened ectoderm lies over the dorsal end of the fifth neuromere, but also extends over the upper end of the fourth. The trigeminal ganglion is not developed. The ganglion acustico-facialis is large, and is attached to the lateral wall of the hind-brain in connection with the anterior margin of the fourth neuromere. The ganglion of the vagus is only being developed.

The flexures of the brain agree very closely with the flexures described by Professor Thompson as being present in his embryo of twenty-three somites. There is a prominent flexure in the region between the mid-brain and hind-brain, the mid-brain and fore-brain being bent downward. The anterior extremity of the notochord is bent down in a corresponding manner. There is also a distinct flexure of the hind-brain at the notch between the ventral ends of the second and fourth neuromeres. The neck flexure is just commencing, and forms an open angle (Plate XIII.).

In conclusion, I wish to express my thanks to Professor Wiedersheim for kindly granting me permission to work in his laboratory; more especially to Professor Keibel for the loan of the embryo, and much help and advice; and also to Professor Pfannenstiel to whom the embryo belongs. I also express my indebtedness to Professor Reid in connection with my research work, and to the Carnegie Trustees for a grant toward the cost of embryological research and the illustration of this paper.

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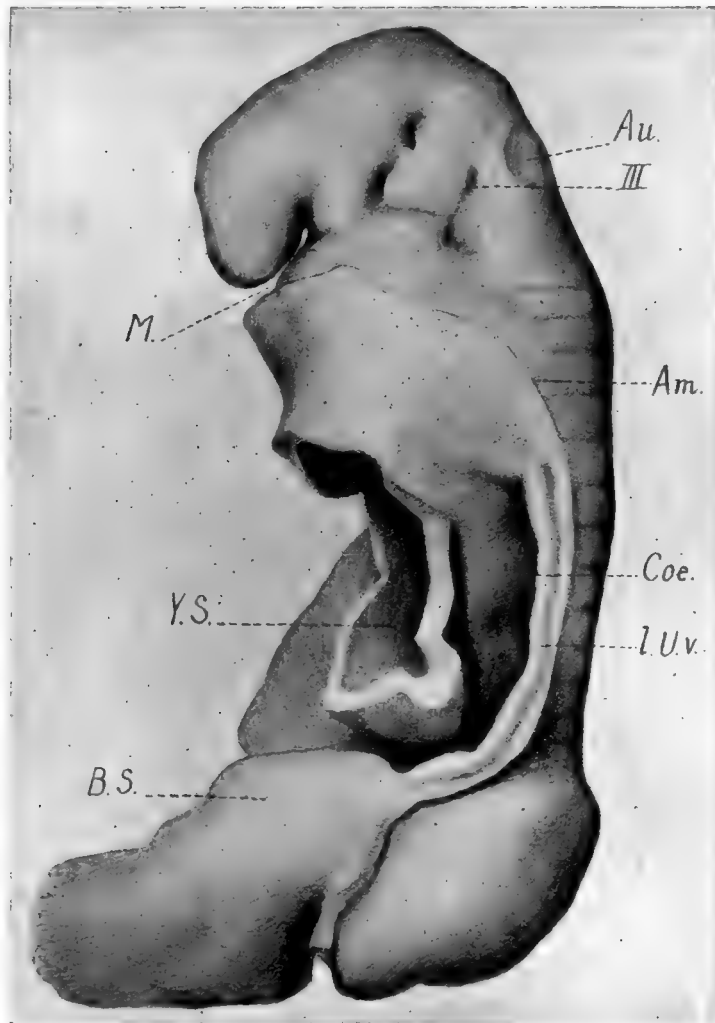
EXPLANATION OF PLATES.

Plate XI. Model of the Embryo, left side (enlarged 60 times).

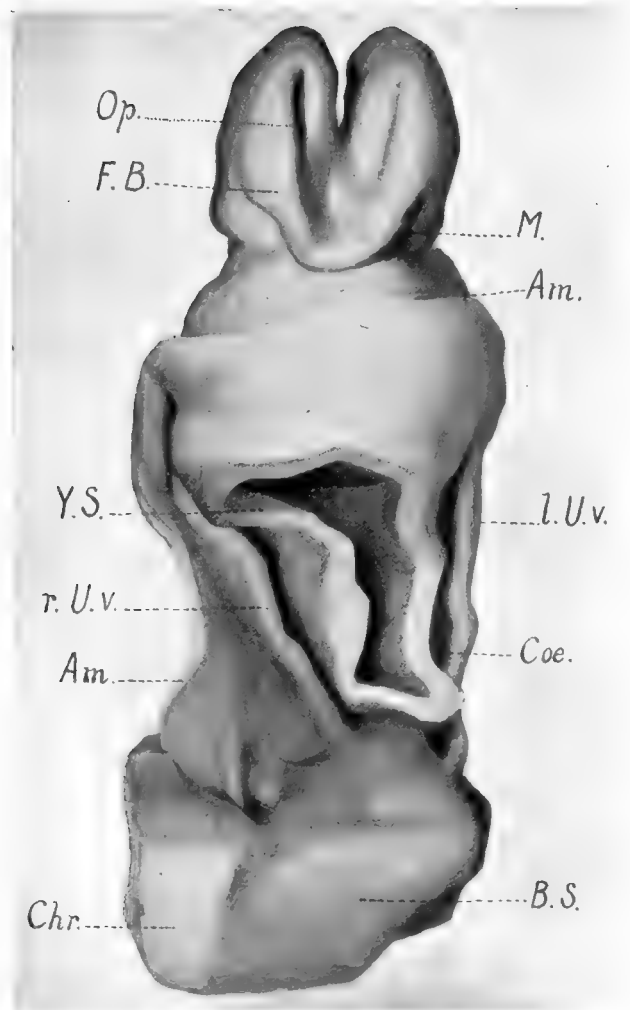
Plate XII. Model of the Embryo, front view (enlarged 60 times).

Plate XIII. The same model in sagittal section, viewed from the left.

Al., allantoic duct; *Am.*, amnion; *Ao.*, origin of the first aortic arch; *B.S.*, body stalk; *Ch.*, chorda dorsalis; *Chr.*, chorion; *Cl.*, cloaca; *Cæ.*, cœlom; *D.M.*, dorsal mesentery; *F.B.*, fore-brain; *F.G.*, fore-gut; *G.a.f.*, ganglion acustico-facialis; *H.G.*, hind-gut; *Hy.*, hypophysis; *M.*, mouth; *M.B.*, mid-brain; *M.G.*, mid-gut; *Op.*, optic vesicle; *Ot.*, otic pit; *P.C.*, pericardial cœlom; *S.T.*, septum transversum; *S.v.*, sinus venosus; *Th.*, median thyroid; *l.U.a.*, left umbilical artery; *l.U.v.*, left umbilical vein; *r.U.v.*, right umbilical vein; *Y.S.*, yolk sac; *I. and III.*, first and third visceral clefts; *I.-VII.*, first to seventh neuromeres.



Model of Human Embryo, left side (enlarged 60 times).



Model of Human Embryo, front view (enlarged 60 times).

ORDINARY MEETING.

24TH JUNE, 1908.

Professor R. W. REID, M.D., F.R.C.S., President,
in the Chair.

The minutes of the last meeting were read and approved.

Anatomical variations were described by Messrs. Baxter, Bisset, Fraser, McGillivray, Smith and Souper.

Dr. Salmond described a dissection, made by himself, showing the anatomy of the parts involved in excision of the rectum from behind. This was followed by a demonstration by Dr. Robertson of a dissection of the genito-urinary system made by him, to show in particular the parts concerned in exposing the ureter by the extra peritoneal operation.

The President then read a paper "On Three Bronze Dagger-blades Found in Aberdeenshire". He also exhibited and described specimens from the Anthropological Museum illustrating the evolution of bronze implements.

The Treasurer's report for the past year was then read and adopted.

On the suggestion of Professor Reid it was resolved to make an alteration in the constitution of the Society, to the effect that the office-bearers of the Society shall consist of an Honorary President (the Professor of Anatomy in the University of Aberdeen for the time being), two Honorary Vice-Presidents (one of whom shall be the senior assistant to the Professor of Anatomy in the University of Aberdeen for the time being), a President, a Vice-President, a Recording Secretary and a Secretary and Treasurer.

Thereafter the following were elected office-bearers for the ensuing year :—

Honorary President.—Professor R. W. REID, M.D., F.R.C.S.

Honorary Vice-Presidents.—ALEX. LOW, M.A., M.B., C.M., and JAMES WATT, M.A., M.B., Ch.B.

President.—NORMAN J. CALDER, M.A.

Vice-President.—ROBERT RICHARDS, M.A.

Recording Secretary.—ROBERT M. EASTON, M.A.

Secretary and Treasurer.—JAMES FETTES.

The retiring office-bearers were thanked for their services, especially Professor Reid for the interest and help which he had extended to the Society, acting as its President since its inception in 1899.

RECORD OF ANATOMICAL VARIATIONS.

Date of observation, June, 1908.

Sex, Male.

Abnormal course of the musculo-cutaneous nerve (right).

In this dissection the musculo-cutaneous nerve comes off as a branch from the median nerve about the junction of the upper and middle thirds of the arm. It does not perforate the coraco-brachialis muscle but runs between the biceps and brachialis anticus muscles. Thereafter its course is normal.

(Signature of observer) A. G. BAXTER.

Date of observation, June, 1908.

Sex, Male.

High origin of the flexor accessorius muscle (left).

In this case the flexor accessorius arises about three inches up from the deep fascia of the back of the leg. It lies in front of the tendo Achillis and beneath the internal annular ligament while the

posterior tibial vessels and nerve lie on its posterior surface. This variation is present in the other foot.

(Signature of observer) I. G. BISSET.

Date of observation, June, 1908.

Sex, Male.

Additional head to biceps flexor cubiti (left).

This head arises above and internal to the brachialis anticus, some of its fibres being continuous with those of the coraco-brachialis. It passes down behind the brachial artery and appears as a slip of biceps which has been split off by the brachial artery and is inserted into the bicipital fascia and the inner side of tendon of biceps about two and a half inches from the insertion of the latter.

(Signature of observer) A. F. FRASER.

Date of observation, June, 1908.

Sex, Female.

High origin of radial artery (left).

The radial artery takes origin from the inner side of the brachial artery about two inches above the bend of the elbow. After passing obliquely outwards in front of the median nerve and brachial artery it takes a normal course down the front of the forearm.

(Signature of observer) G. M. MCGILLIVRAY.

Date of observation, June, 1908.

Sex, Female.

Diverticulum of duodenum.

Projecting upwards and a little to the left from the posterior surface of the second stage of the duodenum is a blind diverticulum about the size of a small walnut. When distended it presents a lobulated appearance and measures in its greater diameter 30 mm. and in its lesser 20 mm. The diverticulum is in close relation to the head of the pancreas. The bile-duct has no connection with it, merely passing downwards and in front.

(Signature of observer) A. H. SMITH,

Date of observation, June, 1908.

Sex, Female.

Unusual arrangement of branches of axillary artery (right).

From about the middle of its course, the axillary artery gives off a large branch fully its equal in size, and which after a course of about one inch splits up into three divisions. The anterior division gives off the anterior circumflex artery and about one and a half inches further on subdivides into the superior and inferior profunda arteries. These follow their usual courses. The internal division is the subscapular artery which otherwise is normal. The external division is the posterior circumflex artery which also follows its usual course.

(Signature of observer) H. R. SOUPER.

ON THREE BRONZE DAGGER-BLADES FOUND IN
ABERDEENSHIRE.

By Professor R. W. REID, M.D., F.R.C.S.

Through the exertions of Mr. James Smith, Servitor in the Anthropological Museum of the University, there have been recently added to the pre-historic collection in that Museum three bronze dagger-blades.

Specimens such as these are so rarely found in Scotland, and therefore so very interesting and valuable, that I think that they are worthy of being shown to the Society.

They were exposed on the farm of New Park, New Machar, Aberdeenshire, by Mr. David Davidson, tenant of that farm, in January of this year, while making a bridge over a ditch leading from the New Park Moss and between two of his arable fields.

The three blades were found lying together between the sub-soil and a layer of moss land about two feet thick, and from over which Mr. Davidson says a "bank of moss about ten feet in depth had been removed some years ago".

I visited the situation in which they were found and satisfied myself that Mr. Davidson's statement was an accurate one and also that there was no indication of any kind of *interment* in association with their deposit.

Of the three blades: the first (Fig. 1) is in a good state of preservation, the second (Fig. 2) is very fairly so, while the larger half of the third (Fig. 3) has disappeared.

All blades show signs of decomposition, especially the third, and in neither is there any indication of ornamentation.

The most perfect specimen (Fig. 1) is flat, has its edges sharp and

practically straight, its point rounded and its haft end thin and with a free basal convex margin. It shows a well-marked mid rib, tapering to the point of the blade and three rivet holes in its haft end. Its surface presents a somewhat worm-eaten appearance, as an effect of

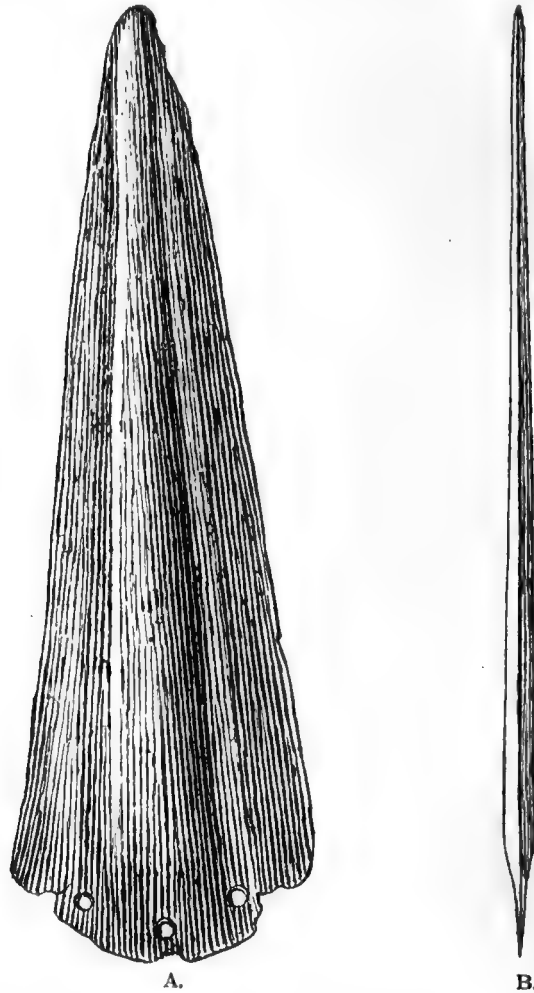


Fig. 1.—Bronze dagger-blade (about $\frac{1}{2}$). A, face view ; B, edge view.

decomposition, and its point is rounded and blunt, probably due to the same cause. It measures 28.5 cm. in its greatest length, 9.2 cm. in its greatest breadth, and 1 cm. in its greatest thickness. A very shallow groove runs along the blade on each side of the mid rib.

The second blade (Fig. 2), in its fully formed state, has evidently been very similar to the specimen just described, with this difference, however, that its mid rib is broader and flatter, especially at its haft



Fig. 2.



Fig. 3.

Figs. 2 and 3.—Bronze dagger-blades; face view ($\frac{1}{2}$).

end. Its edges are very irregular from erosion, and from its general appearance, especially that of its mid rib, it has evidently not been cast in the same mould. There is only one rivet hole in its haft end.

Its greatest length is 26·7 cm. Its greatest breadth is 9 cm. and its greatest thickness is 8 mm.

The third blade (Fig. 3) is very imperfect. All which it presents is a shortened mid rib with a portion of one side of the blade. Its greatest length is 22·7 cm. Its greatest breadth is 4·8 cm. and its greatest thickness is 8 mm.

These dagger-blades are good examples of objects belonging to the later period of the Bronze Age, which are usually found in groups or scattered and not in connection with interments.

GN Aberdeen, Scot. University.
2 Anatomical and Anthropological
A2 Society
1906-08 Proceedings

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