ability to think well and do wisely. Their earnings and perhaps their usefulness to their employers, may be not so great for a short interval as those of the men who are taught more of empiricism and artisanship and less of rational science during their college courses, but the advantage soon flows in a strong current towards the scientifically trained.

The men who are responsible for this third type of electrical engineering courses may reasonably cry to be delivered from judgment upon the success of their work, which is based on the average earnings of the graduates during their first year out of college. The medical schools and law schools are judged by the attainments of their graduates reached in a decade or even in a quarter of a century, and this also should be the basis upon which to judge the work of the electrical engineering courses of this third and highest type.

Do not believe for a moment, however, that I would teach all theory and no practise. The earlier parts of this paper prove the contrary. In truth, right theory and the best practise are one, and practise which is out of accord with right theory is mere rule of thumb and can be bettered. The best college course in electrical engineering is the one which so teaches the fundamentals that right theory may be fully grasped, and which constantly illustrates the bearing of theory by examples derived from good practise. The administration of such a course requires thoughtful, clear-headed men, who are acquainted with the principles and right practise of pedagogy as well as trained in the principles and experienced in the practise of engineering.

My discussion of the subject makes it clear that there is a wide variance between the methods of the colleges which support electrical engineering courses. Complete unity is not only impossible but would undoubtedly be undesirable, since scope for individuality is as essential here as in the control of industrial enterprises; but the cause of sound college training for electrical engineers would be advanced by any action which clearly places the true aims of the college courses in electrical engineering before the authorities of all of our colleges which support such courses. And I may add that many of the greatest weaknesses of electrical engineering courses are due to the fact that the executive heads of the colleges or universities do not always understand what engineering truly stands for, and they equally often have no fair conception of the soundness of training that is required for its practise.

Dugald C. Jackson.
University of Wisconsin.

British Association for the Advancement of Science—Section of Anthropology.

The seventy-third annual meeting of the British Association was held in Southport, Lancashire, September 9–16. As will be seen by the dates, the meeting lasts a whole week, from Wednesday to Wednesday. Professor Johnson Symington, of Queen's College, Belfast, presided over the anthropological section. His address, published in a recent issue of this journal, was a plea for a more thorough and systematic collecting of human brains for purposes of detailed and comparative study; also a more thorough study of the cranial cavity in relation to the outer surface of the skull, on the one hand, and, on the other, its relation to the brain itself. It is known that definite areas of the cerebral cortex are connected with the action of certain groups of muscles; and that the nervous impulses, starting from the organs of sight, hearing, smell and touch, reach defined cortical fields. But all these do not cover

more than a third of the convoluted surface of the brain. The problem before anthropologists is to explore the remaining two thirds of the brain surface, which is still practically a *terra incognita*.

A number of papers on somatology followed Professor Symington's address. A collection of some eighty skulls from Round Barrows in East Yorkshire was the subject chosen by Mr. William Wright, of the University of Birmingham. The interments closely resemble each other, and belong to the late Neolithic and early Bronze Age. A great variety of cranial shapes are met with, the cephalic index ranging from 69 to 92. Metopism, when found, occurred in long skulls rather than broad skulls. There seemed to be no correlation between skull-shape and the mandibular and coronoid indices. Dr. Thurnam's dictum 'round barrow, round skull' is not even approximately accurate for the round barrows of Yorkshire.

Mr. Annandale's paper on a 'Collection of Skulls from the Malay Peninsula' dealt with material which he himself had helped to collect. The crania in question came from the Patani states, the population of which is very mixed, consisting partly of so-called Malays and partly of so-called Siamese, the difference between the two peoples being chiefly one of religion. The series has a higher cephalic index and a greater cubic capacity than would be found among the jungle tribes of the Malay Peninsula. Another distinguishing feature is the tendency of the third molar to disappear.

Mr. E. J. Evatt, in his paper entitled 'Some Observations on the Pads and Papillary Ridges on the Palm of the Hand,' pointed out that during the course of development of the hand eleven well-defined pads or cushions appear on the palm. The disposition and form of the pads when best marked in the fœtus correspond very closely with that which obtains in certain animals, *e. g.*, the mouse; the cushions in both cases are probably morphologically equivalent, and in man's remote ancestors possibly served similar functions. The pads in the adult may be regarded as vestigial. The papillary ridges were differentiated when the hand began to be used as an organ of prehension rather than locomotion, and the patterns assumed their present form as the result of mechanical forces.

Mr. David MacRitchie in 'Mongoloid Europeans,' supports Beddoe's view to the effect that 'some reason can be shown for suspecting the existence of traces of some Mongoloid race in the modern population of Wales and the West of England.' This strain may have come direct from the cave man or from a fresh Mongoloid immigration at a much later date, *e. g.*, the Hun conquests of the fifth century.

The committee appointed by the British Association to organize anthropometric investigation in Great Britain and Ireland submitted an important report, and asked to be reappointed with instructions to carry out the recommendations of its chairman, Professor J. Cleland, and to draft a scheme for a central anthropometric laboratory. Such a laboratory would 'collect and disseminate information on anthropometric work, give practical instruction in measurements, and supply schedules.'

By this means, uniform standards in anthropometric investigations would be secured, measurements best suited for any specific problem could be recommended, and cooperation among investigators assured. It is suggested that the central laboratory be attached to some already existing institution, preferably the Anthropological Institute.

The committee on 'Anthropometric Investigations Among the Native Troops of the Egyptian Army' (Professor A. Mac-

alister, chairman) announced that since their last report, Dr. C. S. Myers has published a paper in the current number of the *Journal of the Anthropological Institute* on 'Tattooing in Modern Egypt,' the material for which was procured in the course of the committee's investigations. Dr. Myers has also presented an album to the Anthropological Photographs Committee of the British Association which contains some four hundred photographs, full face and profile, of Egyptians and Sudanese. The committee asked for a grant of £35 to defray the services of a clerk, who, under Dr. Myers's supervision, will tabulate, average and determine the variability and correlation of the various series of measurements already collected.

The Scottish Ethnographic Committee (Mr. E. W. Brabrook, chairman) reported a delay in the 'Pigmentation Survey of the School Children of Scotland,' owing to the difficulty of procuring suitable lithographic color cards to be used as color scales for hair and eyes. The Educational Institute of Scotland has passed a resolution recommending the teachers to supply the information desired by the committee, an action which will be of immense value in expediting the survey. The subdivision of Scotland into 110 numbered districts has already been completed.

Papers relating to various fields of archeological research were read. Mrs. Stopes presented two papers, accompanied by exhibits of specimens, and relating to the last discoveries of her late husband. Of 'Paleolithic Implements from the Shelly Gravel Pit at Swanscombe, Kent,' she exhibited the large and small hache types, broad leaf-shaped type, discs, ovate types, awls, boat-shaped type, angular projectiles, graving tools, scrapers and spoke shaves, representing various shades of flint and patina-white, cream, ocherous, brown, black. Many of them are derived and water worn. The implements were found associated with a fauna containing many extinct species.

The 'Saw-edged Paleoliths' presented by Mrs. Stopes were from the Craylands gravel pit at Swanscombe. The serration is intentional and not a result of accident or use; is generally on a straight edge, though sometimes continued into spoke shaves and scrapers.

Mr. Llewellen Treacher's paper 'On the Occurrence of Stone Implements in the Thames Valley between Reading and Maidenhead' was read by Mr. Monckton, of the Geological Section. Mr. Treacher's investigations extend to the upper, middle and lower terraces, from all three of which important collections have been made.

Some of the megalithic monuments of Kent were discussed in Mr. George Clinch's communication entitled 'Coldrum, and its Relation to Stonehenge.' Mr. Clinch pointed out that the hitherto published descriptions of Coldrum do not mention its most important and characteristic feature, namely, that between the two upright stones which form the sides of the chamber there stand two stones about midway, forming a partition which divides the space into two sepulchral chambers. The two upright stones are of remarkable size. Their regular form, good proportions and flat surfaces are also noticeable features, suggesting artificial shaping and perhaps dressing. These point to a late epoch of the neolithic period, and present remarkable similarities to the forms at Stonehenge. The idea of enclosing the principal structure within a line of stones is also common to Stonehenge and Coldrum. But Coldrum was obviously a sepulchral monument. Stonehenge, on the other hand, though following to some extent the same arrangement, 'was conceived on a more ambitious scale, and probably designed for a very different purpose.'

The megalithic structures of Kent, in-

cluding Countless Stones, Kits Coty House, several ruined examples in Addington Park and Coldrum itself, furnish a valuable series illustrative of the constructive skill of neolithic man.* Here, as well as at Stonehenge, Sarsen stones were employed. In this connection may be mentioned Mr. H. Balfour's presentation of 'A Model of the Arbor Low Stone Circle.'

Cretan and Egyptian archeology were especially well represented; the former by Messrs. Arthur Evans, J. L. Myres and R. C. Bosanquet, including Dr. W. L. H. Duckworth's report on the prehistoric human remains of Crete (being part of his 'Report on Anthropological Work in Athens and in Crete'); the latter by Messrs. Flinders Petrie, Garstang and C. S. Myers.

Mr. Evans had thought to complete his excavations at Knossos this year. 'But the excavations took a wholly unlooked for development, productive of results of first-rate importance' both as regards architecture and general archeology, and calling for 'supplementary researches of considerable and, indeed, at present, incalculable, extent.'

Mr. John L. Myres's paper: 'On a pre-Mycenæan Sanctuary with Votive Terra Cottas at Palæokastro, in Eastern Crete,' was based on his excavations of April, 1903. The terra cottas were found in a layer of blackened ashy earth, the latter covered by a layer of disturbed soil and of rubble building of early Mycenæan date. The figurines are of 'men and women in characteristic pre-Mycenæan costume analogous to that shown by the frescoes at Knossos, and completed, in the case of the women, by gigantic and very stylish hats; a quite new feature.' There were other figurines representing oxen, rams, goats, pigs, dogs, weasels, hedgehogs, birds, chairs, vases and other objects of daily use.

'Exploration in the East of Crete' and 'An Early Purple-fishery,' both by Mr. R. C. Bosanquet, Director of the British School at Athens, completed the list of papers on Cretan archeology. Leuke, a small island off the southeast coast of Crete, was an important fishing-station in antiquity. An inscription of about 350 B.C. mentions the levying of tithes on the catch of fish and of purple-shell. Messrs. Bosanquet and C. T. Currelly explored the island last May. They found, among the sand-hills on the north shore, a bank of shells, 'some whole, but mostly crushed, of the variety *Murex trunculus*, which is known to have been used in the manufacture of the purple dye.' Fragments of pottery and of a stratile bowl which marked it as not only pre-Hellenic, but pre-Phœnician, were scattered through the heap. Further digging only a few yards away uncovered characteristic Cretan vases of the Kamáres type and the foundations of a house. Enough evidence was obtained to show that the ''extraction of the purple juice was practiced in Crete at least as early as 1600 B.C. The Minoans of Crete, and not the Phœnicians, were the probable discoverers of 'Tyrian purple.' ''

'The Temples of Abydos' and 'The Beginning of the Egyptian Kingdom' were the subjects chosen by Professor W. M. Flinders Petrie, and made doubly interesting by a long series of lantern views. 'Recent Discoveries, Illustrating some Burial Customs of the Egyptians,' by Mr. John Garstang, and 'Antiquities near Kharga in the Great Oasis,' by Dr. C. S. Myers, were also fully illustrated.

Romano-British archeology came in for a share of attention. Mr. T. Ashby, Jr., reported on 'Excavations at Caerwent,

* The writer took photographs of this series just before the Southport meeting. Unfortunately, the films were all destroyed in transit (post), through being opened, presumably by U. S. customs officials.

Monmouthshire.' This is the site of the ancient Venta Silurum. The external walls of the city are still clearly traceable, forming a rectangle of about 500 by 400 yards, and, on the south side, preserved to a height of some 20 feet. The buildings thus far brought to light consist chiefly of private houses, and some of these present a ground plan which appears to be unique in England, having the rooms arranged round all four sides of a rectangular courtyard.

The Roman sites described by Mr. Garstang, at Brough and Ribchester respectively, were of a different character, both being fortifications. That at Brough in Derbyshire belongs to the earlier class, and was built probably under Hadrian or Antoninus Pius. The Roman fortress Bremetenacum, at Ribchester, has been known since archeological records began to be kept in Britain. Recent excavations show that this station conformed with the general scheme of frontier defenses of the Roman Empire. It was one of the series of fortresses 'which, with the wall of Hadrian, formed the northern frontier defenses of Roman Britain.' On Saturday, set apart by the British Association as excursion day, Mr. Garstang conducted a party of ninety-five to Ribchester.

The two papers on American archeology were 'A West Indian Aboriginal Wooden Image,' by Dr. J. E. Duerden, and 'The Ancient Monuments of Northern Honduras, and the Adjacent Parts of Yucatan and Guatemala, with some Account of the Former Civilization of these Regions and the Characteristics of the Races now Inhabiting Them,' by Dr. T. W. Gann. Miss A. A. Bulley presented 'Some Points about Crosses, chiefly Celtic,' and Mr. Annandale discussed 'The Survival of Primitive Implements in the Faröes and Iceland.'

Personal ornaments among civilized peoples consist of precious metals and stones or imitations of stones, pearls or shells themselves, amber, jet and occasionally various other objects. It has been supposed, hitherto, that purely esthetic considerations led to the use of such objects for purposes of adornment. Professor W. Ridgeway, in 'The Origin of Jewelry,' endeavored to prove that such was not the case. He attributes their use to magic.

Small stones of peculiar form, color or properties were considered magical long before they were worn as ornaments. In Australia and New Guinea, crystals are used for rain-making, although the natives can not perforate them for use as ornaments. In Uganda these same rock crystals are fastened into leather and carried as amulets. In Africa, the sorcerer carries a small bag of pebbles as an essential part of his equipment. Modern cylindrical glass beads are descended from the beryl and quartz crystal. Babylonian cylinders, Egyptian scarabs and Mycenæan gems were not, as has been generally supposed, primarily signets, but amulets. "The Orphic Lithica gives a clear account of the special virtue of each stone, and it is plain that they acted chiefly by sympathetic magic; *e. g.,* green jasper and tree agates make the vegetation grow, etc. Mithridates had a whole cabinet of gems as antidotes to poison. To enhance the natural power of the stone, a device was cut on it, *e. g.,* the Abraxas cut on a green jasper, the special amulet of the Gnostics. The use of the stone for sealing was simply secondary, and may have arisen first for sacred purposes." Cowrie shells are worn as amulets by the modern savages in Africa; similar shells were worn in Strabo's time to keep off the evil eye. Red coral was a potent amulet to the seafarer, as it is at the present day in Mediterranean lands. If powdered, it kept red rust from grain. Pearls are still a potent medicine in China. Seeds of plants have magic properties, the

banana seed being especially valued in Uganda. Claws of lions are such important amulets in Africa that they are quite generally counterfeited. So with the teeth of jackals, which are imitated in wood, if the real thing is not to be had. When gold first became known, it was regarded exactly as the stones mentioned above. "Thus the Debae, an Arab tribe who did not work gold but had an abundance in their land, used only the nuggets, stringing them for necklaces alternately with perforated stones." Magnetic iron and hematite were particularly prized, the belief being that the former was endowed with a living spirit. "It is thus clear that the use of all objects still employed in modern jewelry has arisen primarily from the magical powers attributed to them, by which they were thought to protect the wearer."

Mr. Edward Lovett, in "Some Suggestions as to the Origin of the Brooch, and the Probable Use of Certain Rings at present called 'Armlets,'" suggests, as the prototype of the ring-and-pin contrivance for fastening a cloak, the use, by a hunting people, of the mammalian *os innominatum* and *os calcis*, the corners of the cloak being drawn through the oval perforation of the former, and pierced by the sharp point of the latter. It is further noted that very many rings of early date and of various materials, usually described as 'armlets,' are of too small diameter to allow the entrance even of an infant's hand. "As such rings are frequently found associated with pins of similar materials, commonly regarded as 'hair-pins,' and as ring and pin are sometimes found *in situ* on the breast of a skeleton, it is inferred that they represent a simple ring-and-pin fastening." It was pointed out that an apron fastener of this type, composed of an iron ring and a horseshoe nail, is still worn in some blacksmith shops of Scotland. The shepherds of Perthshire wear a brooch of similar pattern. The next step in the development is to be found in the ring-and-pin fastening so common at present in China. The ring is of agate, and the pin, which is of silver and perforated, is attached to it by means of a silken thread. A further step is taken when the pin itself is hinged upon the ring for security, by bending its flattened head around the ring, a form abundant in Celtic times.

There were a number of communications of general ethnological interest. Dr. W. H. Rivers presented two: 'The Toda Dairy' and 'Toda Kinship and Marriage.' From the ordinary operations of the dairy, the Todas of the Nilgiri hills have evolved an elaborate religious ritual. The priest is the dairy man; the temple, the dairy. The dairy temples are of different degrees of sanctity corresponding to the different degrees of sanctity of the buffaloes tended in each. Only the milk of the sacred buffaloes is churned in the dairy temple. The milk of those that are not sacred is churned in the front part of the huts in which the people live. "The more sacred the dairy, the more elaborate its ritual. The dairy vessels, in all, are divided into two groups, those which come in contact with the milk are the more sacred; those which receive the products of the churning, the less sacred. The kinship system and marriage institutions of the Todas were studied by means of the genealogical method." The system of kinship is 'classificatory,' every male of an individual's clan being his grandfather, father, brother, son or grandson, and every female his grandmother, mother, sister, daughter or granddaughter. As to marriage regulations, the people are divided into two endogamous groups, each of which is subdivided into a number of exogamous groups. There can be no marriage between the two chief groups; a man

must marry a woman of his own division but not of his own clan. The orthodox marriage is that of cousins. The institution of polyandry still exists. When a girl marries a boy it is usually understood that she becomes also the wife of his brothers. "For all social and legal purposes, the father of a child is the man who performs a certain ceremony about the seventh month of pregnancy, in which an imitation bow and arrow is given to the woman." "Fatherhood is determined so absolutely by this ceremony that a man who has been dead for several years is regarded as the father of any children borne by his widow, if no other man has given the bow and arrow." The author considers it possible that the Todas are moving from polyandry toward monogamy through an intermediate stage of combined polyandry and polygeny.

In 'The Ethnology of Early Italy and its Linguistic Relations to that of Britain,' Professor R. S. Conway discussed the various suffixes used by the various tribes to form names of communities derived from names of places. There are only six or seven suffixes used for this purpose in ancient Italy and, of these, only three are significant for ethnology, viz., -co, -no and -ti (generally -ati).

The remaining paper, 'The Progress of Islam in India,' by Mr. William Crooke, admitted the increase of Islam and endeavored to ascertain the cause or causes of it. One of these is physical, tending to make the Mohammedans more fertile and more long-lived than the Hindus. The former are recruited from a more vigorous race, discourage infant marriage and the celibacy of widows, and permit a more varied and invigorating diet.

In addition to the above program, a member of Section H, Dr. Robert Munro, was invited to deliver one of the evening lectures arranged for by the association. Dr. Munro's subject was 'Man as Artist and Sportsman in the Paleolithic Period.'

Mention should also be made of a number not on the published program, a special treat provided for the anthropologists by Mr. James Hesketh, of Southport. The city is built upon blown sand. Some years ago, while engaged in street or sewerage construction, workmen came upon a rather large wooden structure buried some ten or twelve feet beneath the surface of the ground. Mr. Hesketh, on whose property the find occurred, had extensive excavations made prior to the meeting, in order that visiting scientists might see to best advantage what proved to be a pile dwelling or perhaps a landing for boats. A large fragment of a willow mat or basket was found by the piles. It resembles the bird-cage weave of the Clallam Indians. The site is now between one and two miles from the sea.

George Grant MacCurdy.
Yale University Museum.

Societies and Academies.

Biological Society of Washington.

The 376th meeting was held on Saturday, November 14.

W. H. Dall called attention to the doubt expressed by Dr. True, in a recent number of the *Proceedings* of the Biological Society, as to the existence of dorsal and ventral keels on the posterior part of the body of *Phocæna dalli*. Without offering any comments as to the presence or absence of this character in other porpoises, Mr. Dall showed by the original notes and drawings made at the time of the capture of the type of *Phocæna dalli* that such keels were certainly present in this species.

Lester F. Ward noted a curious case of scientific prediction in which ten species were named and described before they were discovered. This was done by Ehrenberg, who in working on the diatoms, classed by him as infusoria, described a number of species of *Actinocyclus* based on the number of rays. For most of these he had specimens, but for