have now taken up the subject, and are making an oil engine; whilst the big agricultural engineering firm, Hornsby's, of Grantham, have also turned their attention in this direction. There have also been efforts made by foreign engineers. A petroleum engine works generally on the same principle as a gas engine, but the chief trouble, we believe, hitherto has been to get over the clogging of parts. This supplies the chief feature in the Priestman design, in which there is a spray maker specially designed to get over this trouble. A jet of oil is first broken up by compressed air, and the spray is then further mixed with air, heated by the hot products of combustion. To cleanse the air it is drawn through cotton wool, which naturally has to be renewed from time to time. The proportions of air and oil vapour are arranged to give an explosive charge, and a regular explosion is obtained every cycle by means of an electric spark. The cylinders are water-jacketted. Messrs. Priestman have fitted a pair of their oil engines into a small launch, which is said to have answered well. Whether petroleum used explosively in an engine afloat will ever oust our tried but very imperfect servant steam—as the gas engine is superseding the steam engine in so many positions ashore—is a very open question. Certainly it is a great temptation to get rid of the heavy and bulky boiler, which takes up so much room in a boat, but much remains to be done before we can arrive at the more logical method of generating heat energy in the place where it has to be used. It may be that that terrible exhaustion of our coal-fields, about which we heard so much at the meeting of the Association, will be indefinitely postponed by the using of petroleum or other hydrocarbon as a source of motive power. But that is another story.

Mr. Beauchamp Tower described some improvements in detail which he has introduced in the design of that beautiful piece of mechanism by which he has secured to us, by means of gyroscopically-controlled hydraulic gear, a steady platform at sea; and Prof. A. C. Elliott read a paper on the transmission of power by compressed air. Dr. William Anderson described his revolving water purifier; and Mr. Faija gave a long account of many points in connection with Portland cement. These were all the papers read on Friday.

On Saturday there was no meeting in Section G, and Monday was, according to custom, devoted to electrical matters. Mr. W. H. Preece opened the proceedings with a long paper, or rather lecture, on the London and Paris telephone, in the course of which he was enthusiastic upon the success which had been obtained. He is sanguine that before long we shall be able to talk between London and Berlin. Of course, he improved the occasion by insisting on the necessity of metallic returns, a point upon which all will agree with him except shareholders in telephone companies. Naturally, also, Mr. Preece did not fail to hint how much better off the British public would have been had telephone exchange been left in the hands of the Post Office. No doubt, if all the telephones were now transferred to Mr. Preece's guidance, we should sooner have metallic returns, and Christian patience would be less exercised; but the question may arise whether we should have had any telephones at all now if Government monopoly had not been broken through. With Mr. Preece as the controlling factor, we should answer "Yes." But there are other sorts of Government officials than Mr. Preece.

Mr. Bennett's paper on the telephoning of great cities referred mostly to the arrangement of details of exchange.

Prof. G. Forbes read a long paper, in which he gave an account of recent progress in the use of electric motors. It was of an interesting nature, and dealt largely with the advance that has been made in America. We trust Mr. Forbes is better acquainted with Transatlantic electrical practice than he is with one branch, at least, of British practice; for when he said, as we understood him, that there are no electrical cranes in England, he was certainly wide of the mark.

Papers by Mr. N. Watts, on electric fire-damp indicators, and by J. A. Timmis, on electric lighting in trains, were also on the list.

On Tuesday, August 25, Section G held its last sitting, and there was a varied selection of papers. The first was a contribution by Mr. A. R. Bennett, in which he advocated a system of house-to-house parcels distribution, which would certainly be very convenient if it could be carried out. He proposes tunnels under the street with miniature electric railways. That would be a difficult thing to arrange in any of our cities, the space being so occupied by gas- and water-pipes, sewers, electric wires, hydraulic mains, and many other things, were the tunnels simply to be run straight away with only stations at distant points; but Mr. Bennett proposes to make this a house-to-house service, each subscriber having his own siding. The tube would be rectangular, with two lines of rails one above the other. By means of semaphores at the central station, worked electrically by the passage of the train, so that the operator can always tell where the train is, and by further electrical connection he is able to shunt the train into the subscriber's own siding. When one subscriber wants to send a parcel to another, he procures a truck, and despatches this through the tunnel to the central station, from whence the operator forwards it to the right address. There is even an arrangement for unloading automatically, and the truck can then be brought back by the operator without the intervention of the subscriber. The idea is fascinating, and we may say that it appears quite practicable; but it will not come yet. Some day, when we determine to pull down and rearrange London—as manufacturers throw aside obsolete but perfectly sound machinery to gain the economy of some newer designs—Mr. Bennett's electrical exchange may come in; and then the blessing it will be to the community will be incalculable. We can have a five minutes collection and delivery of letters; butcher-boys will no longer whistle at the side door, and the baker will cease to scribble on the gate-post.

Mr. W. Worby Beaumont next read a paper on internal and external work of evaporation. This is one of a series of monographs which the author has prepared on this subject, but the matter is too abstruse for us to deal with in this very brief account of the four days' meeting. Were we to attempt to abstract the paper, it might lead us into controversial matter.

Major R. de Villamil's paper on the action of screw-propellers was a praiseworthy effort to accomplish the apparently hopeless task of lifting the practice of designing the screw-propeller from the region of empiricism—where it has always dwelt—to the domain of pure science. We fear, however, in spite of it, that the marine engineer will still adhere to the ancient rule-of-thumb by which alone he is now guided. It is curious that the man who has done most to improve the design of the screw-propeller was essentially non-scientific. He made his chief discovery in an endeavour to do one thing, but produced the reverse result. When Griffith first used the spherical boss, he was trying to produce a retarding effect, but found, on trial, that he had added greatly to the efficiency of the screw.

Mr. Beaumont also read a paper on the screw-propeller. He described a method of reversing the direction of thrust by means of feathering-blades, on the well-known Bevis principle. The advantages claimed were that, as the engines and screw would be always running in one direction, there would be no momentum of moving parts to be overcome when it was desired to go from ahead to astern, or *vice versâ*, and therefore there would be less danger of breakage of the mechanism. The proposal was somewhat roughly handled in the discussion which followed, but we think that Mr. Beaumont fairly held his own in his reply. The most valid objection appeared to be that of Mr. Heard, who pointed out that the pressure on a given area of the blade was by no means constant throughout each revolution, and the disturbance would cause the joints of the mechanism to wear. For this reason there would be introduced an undesirable and even dangerous play on the pins after the apparatus had been in use some time.

A paper upon non-conducting coverings for steam-boilers having been read, the business of Section G was brought to a close with the usual votes of thanks.

ANTHROPOLOGY AT THE BRITISH ASSOCIATION.

THE proceedings began with the President's address, after which Prof. R. K. Douglas read a paper on the social and religious ideas of the Chinese as illustrated in the ideographic characters of the language. After a short introduction, showing that the Chinese ideographic characters are picture-writings, the author gave an account of the earliest or hieroglyphic form of the writing, the development of this resulting in the ideographic characters. The social habits of the people and their domestic life were illustrated by a number of ideograms descriptive of their household arrangements and relationships. The author traced in the written characters the ideas associated with men and women, their virtues and their failings; the notions connected

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with marriage; and the evidences of pastoral as well as of agricultural habits among the people. The paper concluded with references to the coinage of the country as described in the ideograms employed to represent its various forms.

The following papers were also read: on recent progress in the analysis of vowel-sounds, by Dr. R. J. Lloyd; family life of the Haidas (Queen Charlotte Islands), by the Rev. Charles Harrison; and the Report of the North-Western Tribes of Canada Committee. This last is again the work of Dr. Franz Boas in the interesting ethnological field of British Columbia. It consists of two parts, the first being devoted to the Bilqula, a people inhabiting a limited tract in the vicinity of Dean Inlet and Bentinck Arms, the second dealing with the physical characteristics of the tribes of the North-west coast region.

Prof. Max Müller then made some remarks on the work of Major J. W. Powell, Director of the U.S. Bureau of Ethnology. He said that he had just received the proof-sheets of a most important publication on the classification of the Indian languages spoken in America. It is a splendid piece of workmanship from Major Powell, the indefatigable Director of the American Bureau of Ethnology. The publications of that Bureau count amongst the most valuable contributions to anthropological science, and they reflect the highest credit, not only on Major Powell and his fellow-workers, but also on the American Government, which has sanctioned a very large outlay for the prosecution of these studies. There is no stint in the way these volumes are brought out, and most of the papers contained in them inspire the student with that confidence which can only be produced by honest, conscientious, and truly scholarlike work. Our American friends have perceived that it is a national duty to preserve as much as can still be preserved of the languages and thoughts of the indigenous races who were the earliest dwellers on American soil. They know that the study of what Prof. Max Müller ventured to call intellectual geology is quite as important as that of terrestrial geology, and that the study of the lower strata contains the key to a right understanding of the higher strata in the growth of the human mind. Coming generations will call us to account for having allowed the old world to vanish without trying to preserve its records. People who ask what can be the use of preserving the language of the Mohawks forget what we would give if some scholar at the time of Cato or Cæsar had written down, what many could then easily have done, a grammar of the Etruscan language. Some years ago the author had succeeded in persuading a Secretary of State for the Colonies that it was the duty of the English Government to publish a series of colonial records, containing trustworthy information on the languages, customs, laws, religions, and monuments of the races inhabiting the English colonies. Lord Granville saw that such an undertaking was a national duty, and that the necessary funds should be contributed by the various colonies. What a magnificent work this would have been! But while the American Government has pushed forward its work, Lord Granville's scheme expired in the pigeon-holes of the Colonial Office. America may well be proud of Major Powell, who would not allow the treasures collected by various scholars and Government officials to moulder and perish. He is a true enthusiast, not a man of mere impulse and good intentions, but a man of sustained effort in his work. He deserves the hearty thanks of the Association, and more especially of the Anthropological Section.

The whole of Friday morning was occupied by a paper by the Marquess of Bute, on the language of Teneriffe. The difficulties in the study of the language are due to the fact that the aboriginal words have been collected from *all* the islands without indicating their several origins, so that the Teneriffe words were not at first easily distinguished. Students hitherto have held three opinions as to this language. The first is that of Dr. Glas, who considered the language American (and the people African); the second, advanced by Sir Edmund Scory, classed the language and people as Berber; while the third holds that the Teneriffians were of Aryan origin.

Dr. Edward B. Tylor read a paper on the limits of savage religion. It has lately become clear by the inquiries of anthropologists that the world-famous Great Spirit of the North American Indians arose from the teachings of the Jesuit missionaries in Canada early in the seventeenth century. This and analogous names for a Supreme Deity, unknown previously to native belief, have since spread over North America, amalgamating with native doctrines and ceremonial rites into highly interesting but perplexing combinations. The mistaken attribution to barbaric races of theological beliefs really belonging to the cultured world, as well as the development among these races of new religious formations under cultured influence, are due to several causes, which it is the object of this paper to examine: (1) direct adoption from foreign teachers; (2) the exaggeration of genuine native deities of a lower order into a god or devil; (3) the conversion of native words, denoting a whole class of minor spiritual beings, such as ghosts or demons, into individual names, alleged to be those of a Supreme Good Deity or a rival Evil Deity.

Mr. H. Ling Roth read a paper on *couvade*, in which he gave an account of the distribution of this curious custom, and showed that the savage believes that there is some hidden link which binds the new-born child to its father, and he argued that the practice of *couvade* is to prevent the father bewitching his child.

In a paper by Mr. S. E. Peal, on the *morong* and other customs of the natives of Asam, the author shows that this institution of the *morong*, or club-house for the unmarried, is very widely distributed over the whole of the Indo-Pacific region, and he argues that it is, in fact, a relic of pre-marriage communism. Moreover, this custom being so often found associated with others of a distinctly non-Aryan character, such as juming, tattooing, blackening the teeth, building on piles, head-hunting, &c., has led him to suspect former racial affinity, even among such widely different types as Papuan and Mongol, Dravidian and Sawaiori.

A paper by the Rev. B. Danks, on the burial customs of New Britain, was read.

In a paper on the worship of meteorites, Prof. H. A. Newton, on Monday, gave a series of accounts of divine honours having been paid to meteoric stones in early times, and of myths and traditions pointing to such worship. Particular attention was directed to the indications of such worship that are found in Greek and Roman history and literature.

Dr. Garson read a paper on some human remains found in Yorkshire. He dealt principally with a round barrow in which skeletons with very long skulls had been found. These skulls were much longer and narrower than the heads of the existing inhabitants of this country, and corresponded with those of the Iberians. The average height of the persons whose skeletons were found in this barrow was a little over 5 feet 3 inches. The discovery of flint and the absence of iron implements showed that the burial took place before the use of metals. The Iberian people were short, had dark hair, straight noses, flat foreheads, and no ear-lobes. It was a race quite distinct from the Celtic type, which afterwards came in and drove them further westwards into forests and swamps.

A paper by Miss Buckland was read, on points of contact between Old World myths and customs and the Navajo myth entitled "The Mountain Chant." The author drew attention to the numerous points in which this myth reproduces customs and beliefs of the Old World. Among these were mentioned the singular prohibition of food in the abode of spirits, such as appears in the classical story of Persephone, but which is found slightly modified in the fairy folk-lore of Europe, in Aino and Japanese tales, and in New Zealand. Miss Buckland points out the great contrast between the bloodless Navajo rites and the sanguinary ceremonies of the ancient Mexicans, and the great dissimilarity in the forms of the Navajo and Mexican gods, as denoting an entirely different origin for the two religions, incompatible with the belief commonly entertained of the wholly indigenous character of American culture; and she urges that the Navajo rites point unmistakably to an Eastern origin.

A paper by the Rev. James Macdonald, on East Central African customs, was read. The customs dealt with ranged over the whole domestic and social life of the people.

The following papers were also read:—Prof. G. Hartwell Jones, barbaric Greece and Italy; J. E. Budgett Meakin, the Berbers of Morocco; Dr. J. S. Phené, a comparison of ancient Welsh customs, devices, and commerce with those of contemporary nations; W. M. Adams, the first sea-wanderings of the English race. The Report of the Prehistoric Inhabitants Committee, and the Report of the Elbolton Cave Committee, were also read.

On Tuesday, Dr. Garson read a paper on M. Bertillon's method of criminal anthropometry, in which he described the plan now adopted by the French police for the identification of criminals.

Dr. S. A. K. Strahan read a paper on instinctive criminality, its true character and rational treatment. The instinctive

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criminal belongs to a decaying race, and is only met with in families whose other members show signs of degradation; in fact, instinctive criminality is but one of the many known signs of family decay. Not only is criminality hereditary, but it is interchangeable with other degenerate conditions, such as idiocy, epilepsy, suicide, insanity, scrofula, &c., and it is a mere chance whether the insanity or drunkenness, say, of the parent, will appear as such in the child, or be transmuted in transmission to one or other of the above-mentioned degenerate conditions. Alcoholism is the most fruitful source of instinctive criminality, but insanity, epilepsy, and suicide are often transmuted to crime in passing to the children. Senility and immaturity of parents are also fruitful sources of crime in the enfeebled descendants, as is proved by the statistics of Marro, Korosi, and others. The present system of treatment has proved a disastrous failure; short periods of punishment can have no effect upon the instinctive criminal, either curative or deterrent. Everything points in the direction of prolonged or indefinite confinement in industrial penitentiaries. This system has been tried with success in America, and life-long detention has not been found by any means necessary.

Nicobar pottery, by E. H. Man. In this paper Mr. Man stated that the little island of Chowra has held for generations a monopoly of the manufacture; and the entire work of preparing the clay, as well as of moulding and firing the finished utensil, devolves on the females of the community. The inhabitants of the island appear to guard their art jealously, and the value of trade-marks is recognized. No vessels are made especially by the Nicobarese for funeral purposes, but cooking pots are among the personal and household requisites which are laid on a grave after an interment. They have no knowledge of any implement answering the purpose of a "potter's wheel."

The following communications were also received:—E. Seward, on the formation of a record of the prehistoric and ancient remains of Glamorganshire; Dr. J. S. Phené, on recent Hittite discoveries; Mrs. S. S. Allison, account of the Similkameen Indians of British Columbia; Report of the Anthropometric Laboratory Committee; Report of the Anthropological Notes and Queries Committee; and the Report of the Indian Committee.

SCIENTIFIC SERIALS.

THE *American Meteorological Journal* for September contains the concluding part of an article on mountain meteorology, by A. L. Rotch. The subjects specially treated of are wind and temperature in connection with atmospheric pressure, as observed chiefly at the Blue Hill Observatory. The wind velocity is found to be two-thirds greater there than at Boston, about 500 feet lower, but the difference changes for various hours of the day. At low levels the wind force generally increases from the early morning until the afternoon, but the conditions are reversed at higher levels. This fact was pointed out by Prof. Hellmann in 1875, when studying the Mount Washington observations, and the same fact has since been observed at Ben Nevis and other Observatories. The wind has also a vertical as well as a horizontal motion, which has amounted to seven miles an hour in a storm. The normal temperature at the summit of Blue Hill is 2° lower than at the base, giving a decrease of 1° for each 220 feet of ascent, but inversions frequently occur, when the temperature of the base is lower than at the summit. Instances of this are given, together with records obtained during balloon ascents.—The aspiration psychrometer and its use in balloons, by Dr. R. Assmann. Such an instrument was first used by Welsh in 1853, but it was not fully adapted to use in balloons. The apparatus invented and described by Dr. Assmann, which is intended to register the changes, which ordinary thermometers do not show quickly enough, is made by Fuess, of Berlin. The aspirator may be driven by a small electric motor, instead of by clockwork.—The Bergen Point tornado, by W. A. Eddy. The track was about nine miles south-west of New York City, on June 16 last. The tornado was preceded and followed by showers of large hailstones, and extended only for about two miles.—The hot winds of California, by Lieutenant J. P. Finley. The period during which these winds occur is from May to September; the thermometer has been known to reach 118° in the shade, and the winds generally occur during entire absence of clouds.—Altitude and hay fever, by Dr. W. J. Herdman. Special attention is drawn to the curative influence of mountain stations.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, September 14.—M. Duchartre in the chair.—Recent discussions on the subject of cyclones, by M. H. Faye.—A contribution to the botanical history of the truffle—*Kammé*, from Damas (*Terfezia Claveryi*), by M. A. Chatin. A description of a new species of truffle—the white truffle of the desert, known in Syria under the name *Kammé*. It has a wide range, the same species as this found near Damas having been also seen in the desert 400 miles south of Biskra. It forms an important article of food.—On the incandescence of platinum wires under water, by M. Paquelin. A mixture of hydrocarbon vapours and air is led over a specially arranged platinum apparatus, which becomes heated almost to its fusion point, and will then remain luminous if suddenly plunged into water.—Observations of the Comet Wolf, 1884 III., made by the *coudé* equatorial (0·36 m.) of the Lyons Observatory, by M. G. Le Cadet.—On the yeast of wine, by M. A. Rommier. Experiments made on the production of wines from vines of the same stock grown in different districts lead to the conclusion that the ferments producing the characteristic bouquet in wines of different districts, are peculiar to those districts and are not carried to new districts readily by the transplantation of the vines.—On the determinism of sexuality in *Hydatina senta*, by M. Maupas.

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