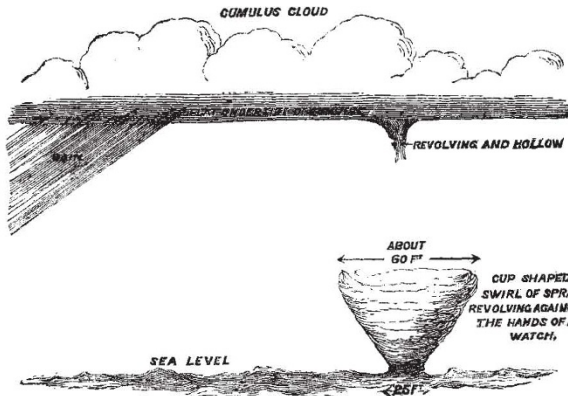


the sky, which had been generally overcast, was rapidly breaking up into masses of cumulus clouds separated by wide spaces of blue. About a dozen waterspouts were seen in all, the ship passing right through one of them and thus enabling me to estimate its diameter by direct comparison with the known beam of the *Servia*.

The swirls of spray rose from the sea in a cup-like shape, and revolving rapidly in a direction opposite to that of the hands of a watch. It was only after such a swirl had become well defined that the lower surface of the cumulus cloud above it began to descend as if to meet it, spinning at the same time. Indeed, so inconspicuous was this feature of the phenomenon that many of the passengers, intent on watching the spray-cups sparkling brightly in the sunshine, failed to notice it at all. In no case did the cloud swirl nearly meet the sea swirl, nor did the double-



funneled stem of whirling mist, so generally shown in books, appear. Some spray fell heavily on deck from the swirl through which the *Servia* passed, but the wind, which struck us at one moment on this, at the other on that, side of the face was not brisk enough to carry off any one's hat. The sight was remarkably beautiful whether closely or distantly viewed. In the one case the spray-cup seemed made of rustling jewels which sparkled in the bright sunshine; in the other, the sea horizon appeared as if here and there set with boiling and steaming caldrons, whose rope-like handles hung from the dark undersides of white billowy clouds.

D. PIGEON

Hartford, Mass., U.S.A., May 22

Meteors of June 3

THE large meteor seen by Mr. Hall and others (*NATURE*, vol. xxviii, pp. 126, 150) was also observed here by Mr. Paul Mathews and myself. We estimated the length of its path while visible as 120° with the middle part due east, the direction of its motion as parallel to the horizon, elevation as 20° , and length of tail as 25° ; its apparent brilliance I put at six times, Mr. Mathews at twice, the greatest brilliance of Venus, and the pieces into which it broke up (about six in number) as equal to the brightest planets. The time I should have put at 10.50, but did not note it (Mr. Mathews 10.40 to 10.45). The colour was golden. This was moreover in a very clear and brilliant sky, as about 10 we had observed that the light in the east was so intense that it cast quite a dark shadow as we passed through a somewhat shady part of the road.

Ripon

W. W. TAYLOR

IN the correspondence on the large meteor seen on June 3 I have not seen any notice of another curious meteor seen later on the same night. A flash of light in the sky drew attention to it, and when first seen it was moving in nearly a straight line from 102 Hercules to α Aquilæ. In five seconds it travelled slightly more than half the distance to the latter star, and then disappeared without any outburst. It was about a lunar diameter in length, and between 3' and 4' wide at the widest part, a point distant one-third of its entire length from the head. In fact it was not at all unlike a comet with a bushy tail tapering off to a point. The colour was a pale yellow.

P. F. D.

London, W.

Intelligence in Animals

SOME years since, when calling on the late Hon. Marmaduke Maxwell of Terregles, our conversation happened to turn on the subject of intelligence and instinct of animals. Mr. Maxwell said if I would walk down to the stables with him he would show me a curious instance. On reaching the stable he pointed out an empty stall in which five well grown young rats were running about—a board had been fixed at the end of the stall to prevent the rats getting out. Some time before the cat had a litter of five kittens, *three* were taken from her and drowned; the following morning it was found she had brought in *three* young rats, which she suckled with the two kittens that had been left; a few days afterwards the *two* kittens were destroyed, and the next morning it was found the cat had brought in *two* more young rats. While we were looking at this strange foster family the cat came into the stable, jumped over the board and lay down, when the rats at once ran under her and commenced sucking. What makes the matter the more singular is, the coachman told me the cat was a particularly good ratter, and was kept in the stable for the purpose of keeping down rats.

Cargen, Dumfries

P. DUDGEON

AMERICAN ETHNOLOGY¹

UNDER the able management of Major J. W. Powell the Bureau of Ethnology, recently attached to the Smithsonian Institution, has already done much useful work in the wide field of American anthropology. This first annual report, however, of its proceedings for the year ending July, 1880, appears to be somewhat behind time for, although bearing on the title-page the date of 1881, it was not issued to the public till the beginning of the present year. But the delay is doubtless due to the large amount of preliminary work required to be got through in organising the department, and future reports may be expected to appear more punctually. The title, "Annual Report," is itself somewhat misleading, the actual report of the director really occupying no more than thirty-three introductory pages, and consisting mainly of a digest of the rich materials filling a large quarto volume of over 600 pages. Hence this is, strictly speaking, a first volume of the *Proceedings* or *Transactions* of the Bureau, and as such gives fair promise of a long and useful career in an anthropological domain which may be regarded as practically unlimited.

From the director's introductory remarks we gather that, after the fusion in 1879 of the various geological and geographical surveys in the general "United States Geological Survey," the Bureau of Ethnology was created and attached to the Smithsonian Institution for the purpose of continuing the anthropological work which had hitherto been prosecuted in a somewhat desultory way by those Surveys. The management of this newly-organised department was intrusted to Major Powell, who, as former Director of the Survey of the Rocky Mountain Region, had already shown special aptitude for ethnological investigation. The direct object of the Bureau, we are told, is to systematise anthropological research in America, and this it is proposed to effect both by the prosecution of research through the direct employment of students and specialists, and by the general encouragement and guidance of original observers co-operating throughout the continent. "It has been the effort of the Bureau to prosecute work in the various branches of North American anthropology on a systematic plan, so that every important field should be cultivated, limited only by the amount appropriated by Congress" (xiv.).

How closely this wide programme has been so far adhered to is evident from the varied contents of this

¹ "First Annual Report of the Bureau of Ethnology, Smithsonian Institution, 1879-80." By J. W. Powell, Director. (Washington Government Printing Office, 1881).

sumptuous volume, which comprises sundry contributions by the director on the "Mythology of the North American Indians," on the "Evolution of Language," on "Wyandot Government," and on "Limitations to the Use of some Anthropological Data"; a valuable and profusely illustrated treatise on the "Mortuary Customs of the North American Indians," by H. C. Yarrow; a preliminary attempt to decipher "Central American Picture Writing," by E. S. Holden; a paper by C. C. Royce on "Cessions of Land by Indian Tribes to the United States;" Col. Garrick Mallery's important treatise on "Sign Language among North American Indians," which has already appeared as a "Separat-Abdruck"; a "Catalogue of Linguistic MSS. in the Library of the Bureau of Ethnology," by J. C. Pilling; lastly, "Illustrations of the Method of Recording Indian Languages from the MSS. of Major J. O. Dorsey, A. S. Gatschet, and S. R. Riggs." Should the department continue to be administered on these broad lines and in this enlightened spirit, a school of anthropology must soon be developed in America, with which, without liberal State subvention, our European societies will find it difficult to keep pace. But with our petty rivalries, our heavy public burdens and constantly increasing armaments, the prospect of such State subvention seems at present at least somewhat remote.

The papers contributed by the director to this volume touch briefly on several important topics of a general character, and often express views regarding the origin and evolution of speech, mythologies, religious and tribal institutions, which will scarcely go unchallenged in some quarters. That these psychological phenomena have hitherto been studied from a somewhat too subjective standpoint, and that many metaphysical subtleties have consequently been grafted on the theogonies and early philosophies of savage man may readily be admitted. In a paper on the mythology of the Indian Aryans recently read before the English Folk-Lore Society, Mr. Andrew Lang dwelt on the necessity of distinguishing between the old and comparatively modern hymns in the Vedas. He pointed out that the Vedas themselves do not embody the most primitive theories on the origin of man and the universe, that they contain ideas at once very old and very new, very mythological and very philosophical, and he adduced several instances of crude and childish savage myths overlapping the more profound and advanced concepts of the Aryan Hindus. In the same way Major Powell argues that philosophy passes in its upward evolution through two stages—the mythologic, in which all outward phenomena are interpreted by analogy with subjective experience, and the scientific, in which they are treated as orderly successions of events. The mythologic necessarily precedes the scientific stage, for "without mythology there could be no science, as without childhood there could be no ultimate forms." It follows that the views of primitive men are simple, childish, and incoherent, and that it is illogical to credit his theogonies, as is often done, with profound and abstruse concepts of the universe. Here, as in all other evolutions, the progress is from the simple and homogeneous to the complex and heterogeneous; the "unknown known" of savage philosophy antedates the "known unknown" of later science. In the primitive stage all things are known, that is, supposed to be known; later on some few things are really discovered, and these when properly understood throw doubt on all the rest. The era of the known unknown is thus reached; to crude and offhand explanations succeeds the critical period of investigation and discovery; science is born; civilisation begins. This upward growth is illustrated by many examples, such as that of the rainbow—which for the Shoshoni (Snake Indian) is a beautiful serpent abrading the icy firmament to give us snow and rain; which in the Norse myth is the bridge Bifrost stretching from earth to heaven; which in the *Iliad*

becomes the Goddess Iris, Messenger of Olympus; in Genesis a witness to the Covenant; in science an analysis of white light into its constituent colours.

North America, it is aptly remarked, presents a magnificent field for the study of savage and barbaric philologies from this fresh standpoint. Formerly attention was paid almost exclusively to the more advanced peoples, Aryans, Semites, Hamites, Chinese. Now it is felt that the complex mythologic, religious, linguistic systems of these peoples are the outcome of earlier and simpler phases of thought, consequently that the study of barbarous and savage communities can no longer be neglected. But in North America alone we have our seventy-five ethnical groups speaking seventy-five stock languages and more than five hundred well-marked dialects, each linguistic stock with a philosophy of its own, or rather as many philosophic systems as it has distinct languages and dialects.

To account for this astounding diversity of speech, Major Powell holds with one or two distinguished European philologists that the fundamental languages must have been evolved in independent centres, that in fact "mankind was widely scattered over the earth anterior to the development of articulate speech, and that the languages of which we are cognisant sprang from innumerable centres as each little tribe developed its own language" (p. 28). He fails to see that this view, in itself to the last degree improbable, is wholly unnecessary and even inadequate to explain the actual conditions. It is unnecessary because the present diversity of speech may be sufficiently accounted for by its vast antiquity and extremely evanescent character. Time, acting in combination with the phonetic growth and decay inherent in all speech, must inevitably effect an indefinite amount of specific change, even supposing that all languages started from a single centre. No evolutionist can deny this, for he admits that time combined with a tendency to modification in altered environments, has brought about an indefinite amount of specific and generic change in the biological world. But animals and vegetables are certainly more persistent, *ceteris paribus*, than linguistic types. *Ergo*. The theory is moreover inadequate to explain the actual conditions in America alone. Here we have doubtless a vast number of specifically distinct languages; but the mechanism of all is very much alike; all are cast, as it were, in the same mould; all belong to the polysynthetic or at least to the agglutinating order. But if speech had in America been evolved in many different centres, it may be asked how this striking uniformity is to be explained? Why have we not here, as elsewhere, representatives of the isolating¹ and inflecting, as well as of the polysynthetic order of speech? Does not their common structure point at a common centre of dispersion, while their specific diversity within this common groove is amply explained by time and evanescence?

But if Major Powell does not always reason conclusively, he is a good observer, and describes in vivid language the scenes of savage life of which he has been a spectator, as witness the subjoined account of oral narrative in the Indian community:—

"On winter nights the Indians gather about the camp-fire, and then the doings of the gods are recounted in many a mythic tale. I have heard the venerable and impassioned orator on the camp-meeting stand rehearse the story of the crucifixion, and have seen the thousands gathered there weep in contemplation of the story of divine suffering, and heard their shouts roll down the forest aisles as they gave vent to their joy at the contemplation of redemption. But the scene was not a whit

¹ The Othomi of the Anahuac tableland has been cited as an instance of an isolating language in America. But M. de Charancey rightly regards Othomi rather as "une langue primitivement incorporante [polysynthetic], qui, parvenue au dernier degré d'usure et de délabrement, a fini par prendre les allures d'un dialecte à juxtaposition [isolation]" (*Mélanges de Philologie*, &c., p. 80, Paris, 1883).

more dramatic than another I have witnessed in an ever-green forest of the Rocky Mountain region, where a tribe was gathered under the great pines, and the temple of light from the blazing fire was walled by the darkness of midnight, and in the midst of the temple stood the wise old man, telling in simple, savage language the story of *Ta-wáts*, when he conquered the sun and established the seasons and the days. In that pre-Columbian time, before the advent of white men, all the Indian tribes of North America gathered on winter nights by the shores of the seas, where the tides beat in solemn rhythm, by the shores of the great lakes, where the waves dashed against frozen beaches, and by the banks of the rivers flowing ever in solemn mystery—each in its own temple of illumined space—and listened to the story of its own supreme gods, the ancients of time" (p. 40).

A detailed notice of the other more important papers in this volume must be reserved for a future occasion.

A. H. KEANE

THE FISHERIES EXHIBITION

WE are gratified to see the very thorough way in which the management of the Fisheries Exhibition are endeavouring to carry out their plans. It is evident that the scientific aspects of the wide and important subject will have a fair amount of attention; and we are glad to think that in this direction advice has been sought in the right quarter. In the Exhibition itself those interested in the science of the subject will find much to attract them. Last week (p. 156) we gave a list of subjects which have been settled for conferences, and among those who have consented to read papers, we find such names as Professor Huxley on Fish Diseases, Professor Ray Lankester on the Scientific Results of the Exhibition, Professor Brown Goode on the Fisheries of the United States, Professor Hubrecht on Oyster Culture and Fisheries, Sir Henry Thompson on Fish as Food, Dr. F. Day on the Food of Fishes, Mr. R. H. Scott on Storm Warnings. Further, we are glad to see that a series of handbooks has been arranged for on subjects cognate to the Exhibition. Among them are a few by men of scientific standing, and likely to be of real scientific importance; we hope it may not yet be too late to secure the preparation of a few more handbooks or reports of a similar character. Among the handbooks arranged for, six will be published this month, and the remainder in July. Those of special interest to science are, "The Life History of Fishes," by Prof. H. N. Moseley; "Fish Culture" and "Indian Fish and Fishing," by Dr. Francis Day; "Food Fishes," by Mr. G. B. Howes; "Marine and Freshwater Fishes of the British Isles," by Mr. Saville Kent; "Curious Sea Creatures," by Mr. Henry Lee.

The conferences were introduced on Monday by an interesting lecture by Prof. Huxley, a report of which we give below, and this was followed on Tuesday by a carefully prepared paper by the Duke of Edinburgh, on British Fisheries and Fishermen, read by the Prince of Wales. The real interest which the leading members of the Royal family take in the Exhibition has no doubt done much to contribute to its success. It was to be expected that the German Ambassador would show his appreciation of the importance of science to an industry of such magnitude as that of fishing, and he aptly pointed out how important was the didactic and scientific work at last commenced.

With the general concurrence of opinion in high quarters as to the value of the scientific aspects of the Exhibition, and of the great services which science may render in bringing about the practical objects which are aimed at, we of course heartily concur. It is admitted on all hands that the haphazard way in which our fisheries have hitherto been carried on has led to the worst results, the

extinction almost of some important fishes and mollusks, the bad condition of others, and the dearth of what might be the cheapest and most plentiful of foods. In recent years science has done something to remedy this state of things, and it will be well for our fisheries, and therefore for the welfare of a large portion of our population, if the Fisheries Exhibition leads to still more being done in this direction. So far the Exhibition has been an immense success; half a million of people have already visited it, and thus the educational results are likely to be widespread.

Prof. Huxley, in opening the proceedings, said:—

It is doubtful whether any branch of industry can lay claim to greater antiquity than that of fishery. The origin would seem to be coeval with the earliest efforts of human ingenuity; for the oldest monuments of antiquity show us the fisherman in full possession of the implements of his calling; and even those tribes of savages who have reached neither the pastoral nor the agricultural stages of civilisation are skilled in the fabrication and in the use of the hook, the fish-spear, and the net. Nor is it easy to exaggerate the influence which the industry thus early practised and brought to a considerable degree of perfection has directly and indirectly exerted upon the destinies of mankind, and especially upon those of the nations of Europe. In our quarter of the globe, at any rate, fishery has been the foster-mother of navigation and commerce, the disseminator of the germs of civilisation. Having glanced at the development of the industries connected with fishing, more especially by the Phœnicians, he continued:—"These few remarks must suffice to indicate the wide field of interesting research which fisheries offer to the philosophical historian, and I pass on to speak of the fisheries from the point of view of our present practical interests. The supply of food is, in the long run, the chief of these interests. Every nation has its anxiety on this score, but the question presses most heavily on those who, like ourselves, are constantly and rapidly adding to the population of a limited area, and who require more food than that area can possibly supply. Under these circumstances, it is satisfactory to reflect that the sea which shuts us in at the same time opens up to us supplies of food of almost unlimited extent. In reference to the relation which the fisheries bore to the total supply of food of those who had easy access to the sea, he quoted the following paragraph from the Report of the Fisheries Commissioners, 1866:—"The produce of the sea around our coasts bears a far higher proportion to that of the land than is generally imagined. The most frequented fishing-grounds are much more prolific of food than the same extent of the richest land. Once in a year an acre of good land, carefully tilled, produces a ton of corn or two or three hundredweight of meat or cheese. The same area at the bottom of the sea in the best fishing-grounds yields a greater weight of food to the persevering fisherman every week in the year. Five vessels belonging to the same source in a single night's fishing brought in seventeen tons' weight of fish, an amount of wholesome food equal in weight to that of fifty cattle or 300 sheep. The ground which these vessels covered during the night's fishing could not have exceeded an area of fifty acres." My colleagues and I made this statement a good many years ago. I have recently tried to discover what yield may be expected, not from the best natural fishing-grounds, but from piscicultural operations. At Comacchio, close to the embouchure of the Po in the Adriatic, there is a great shallow lagoon which covers some 70,000 acres, and in which pisciculture has been practised in a very ingenious manner for many centuries. The fish cultivated are eels, gray mullet, atherines, and soles; and, according to the figures given by M. Coste, the average yield for the sixteen years from 1798 to 1813 amounted to 5 cwt. per acre—that is to say, double the weight of cheese or meat which could have been obtained from the same area of good pasture land in the same time. Thus the seas around us are not only important sources of food, but they may be made still more important by the artificial development of their resources. But this Exhibition has brought another possibility within the range of practically interesting questions. A short time ago a visitor to the market might have seen fresh trout from New Zealand lying side by side with fresh salmon from Scandinavia and from the lakes and rivers of North America. Steam and refrigerating apparatus combined have made it possible for us to draw upon the whole world for our supplies of fresh fish. In my boyhood "Newcastle" was the furthest source of the