

is generally held that their resemblances to racial Mongols are only "accidental." Dr. Cruikshank, however, maintained that many of the characteristics of these children are really Mongoloid, while others are definitely simian and exhibit convergence towards the orangoid rather than the chimpanzoid or general type of great ape. It was pointed out that "Mongolian imbeciles" adopt the *horizontal* disposition of the lower limbs in sitting that is characteristic of racial Mongols and of oranges, in contradistinction to the *vertical* disposition adopted by negroes and other non-Mongoloid races, chimpanzees, and gorillas. The correlation of the "habitual posture" with various structural peculiarities was insisted upon and discussed.

An attempt had been made to explain away these homologies by reference to the hypothesis of gland-balance influence on racial peculiarities, first put forward by Dr. Cruikshank in the *Lancet* in 1912. He maintained, however, that this hypothesis was by itself inadequate, and that it was necessary to invoke the notion of a line of common descent, even though in consequence it became impossible to avoid acceptance of some such polyphyletic scheme of human origin as that of Klaatsch. While there was abundant evidence, both historic and prehistoric, making it impossible to exclude the persistence in Western Europe of sufficient "Mongolian" blood to account for the Mongolian characteristics of these unfinished children we call "Mongolian imbeciles," the orangoid homologies were not thus explained. Further precise anatomical study was required, not only of the Mongolian imbeciles, but also of the many Western "Mongoloids" who are not actually imbecile and of the Mongolian races themselves.

Finally, it was shown that while "Mongolian" imbeciles converge towards the orang, there is another type of mental defect recognised in Europe whereof the subjects converge markedly in respect of their simian homologies towards the chimpanzee and away

from the orang. There was need then for the coordination of the observations of the physicians and the anthropologists in the free discussion of their observations.

In the course of the discussion which followed the reading of the paper, Prof. Keith, while congratulating the author on his work as a pioneer in this subject, maintained that the homologies to which he had directed attention were superficial. Mongolism, he held, was pathological, and arose out of some defect in the working of the complicated internal mechanism which was a common inheritance of man and the anthropoids. Of this working we knew little except that in certain obscure conditions it gave rise to such abnormalities as acromegaly, cretinism, Mongolism, and the like. Dr. Langdon Down directed attention to certain peculiarities in "Mongolian" imbeciles which had not been mentioned by the author. The iris was frequently spotted and lacking in colour, the hair grew further down the back of the neck than in the normal, and the sides of the face were often covered with a down. Prof. Elliot Smith expressed the view that Mongoloids were purely pathological specimens, and directed attention to the recent investigations of certain Dutch physicians which indicated that these abnormalities were due to an interference with pre-natal growth in the seventh week of intra-uterine existence, and occurred in the offspring of young or worn-out mothers. Dr. F. C. Shrubbsall described a number of cases observed among defective children in the London area, and adduced statistics in support of the view that they occurred with greatest frequency in exhausted mothers. They were often followed by a miscarriage.

In his reply Dr. Cruikshank maintained that the view that the Mongoloid arose from a disturbance of the gland-balance or from an interference with pre-natal growth was not inconsistent with his theory of common descent.

The Alaskan Salmon.

IN an article of exceptional interest contributed to the *Scientific Monthly* for February, Prof. Barton W. Evermann, an American ichthyologist of eminence, asks this question: Can the Alaskan salmon fisheries be saved? These Pacific salmon are of economic value for the whole world. The first cannery was erected and operated in 1878, and by 1918 the number had grown to 135. The pack was 8150 cases in 1878, and in 1914 about 2,500,000, the highest figure yet reached. In 1919 the total pack had been reduced to about 1,250,000 cases, and there is every reason to fear that the decrease is progressive. The most fertile fishery in the world is thus in danger of practical extinction (from the commercial point of view, at all events) owing to ruthless exploitation unchecked by legislation and almost unguided by State-directed investigation.

There are five species of Pacific salmon (*Oncorhynchus* spp.), all of which have much the same life-history. They are anadromous, the adults ascending rivers in order to spawn. They die, males and females alike, as soon as they have spawned; not one of them ever returns to the sea. For a brief period of a week or two in every year each varietal species is represented only by the developing eggs, and no parent ever sees its offspring—surely something quite unique in the vertebrate sub-kingdom! The young fish remain in the rivers for one to several years, and then descend to the sea. Each river contains one variety, or elementary species, recognisable to the fishermen and zoologists (this is the case for

the sockeye, *O. nerka*, at all events), and it is the result of the "home stream" condition. The fry reared in one river are said invariably to return to the waters in which they have been reared. In all cases the sockeye seeks streams which have lakes as their head-waters, and the result is that the conditions under which they are reared are highly individualised. These conditions are most peculiar and of exceptional biological interest, demanding the fullest investigation. One would hesitate to believe in them were not the statements made so positively and on the authority of ichthyologists of distinction.

How to arrest the decline which seems to threaten the very existence of an industry of world-importance is, however, the author's chief concern. Restriction of the annual quantity of fish packed is, of course, the only practicable remedy, but so powerful are the interests involved and so hand-to-mouth are the great financial enterprises that any suggestion of the kind is certain to arouse intense opposition, and it can scarcely be expected in these days that any conceivable Government will have so much courage as to take the steps that the conditions obviously indicate. But investigation must precede any such restriction. It appears that hatching out fry artificially has had no apparent effect—at least, with the methods so far employed—and so restriction seems to be the only remedy, the productivity of each river being found and the rate of exploitation fixed at the highest point compatible with undiminished yield. In a river methods of investigation are possible that could not

be followed in the sea. It is practicable to "rack" the rivers, permitting the ascent of the fish only through a narrow gap. It is even possible to count the fish that so pass during short sample times that can be averaged. Then the ratio of fish ascending to spawn to the run of fish four or five years later (when the hatched fry return from the sea) can be calculated. Comparisons over a number of years can so be made and a maximum degree of exploitation permitted. The method is, of course, much more complex than is here indicated, but it is all highly practicable. To such statistical investigation would, of course, be added a prolonged study of the spawning-beds in the head-waters, even the artificial improvement and control of the spawning and the elimination of the natural enemies of the very young fry. To some extent such investigations have been carried out—in spite, it is said, of the opposition of the Secretary of Commerce, whose non-appreciation of the value of scientific investigation was all that might have been expected.

Now, however, the commercial interests are threatened and the administrative attitude is likely to change—with results of value not only to the industry, but also to general biology.

J. J.

Recent Applications of Interference Methods.¹

PROF. MICHELSON said that since the armistice he had been interested in three questions: the measurement of the earth tides, a re-determination of the velocity of light, and the measurement of the diameters of fixed stars.

In the first of these problems the experiment reduced itself to the measurement of the difference in the movements of the free surfaces of water at the extremities of a long pipe submerged in the ground. Preliminary work was carried out with microscopes, but the final records were obtained from the movements of interference fringes. Records were taken at intervals of two hours on a cinematograph which worked continuously for a year. The results obtained were plotted, and found to agree very closely with those calculated from theory.

In the re-determination of the velocity of light the arrangement ultimately to be employed was the same as that previously used by Prof. Michelson, except that a much longer distance—say, twenty-five miles—was contemplated. This was to permit a larger angular movement of the rotating mirror, which in this case consisted of an octagon of glass rotating at about 1000 revolutions per second. If the speed were so adjusted that the octagon described 45° during the time taken by light to pass to the distant mirror and back, the returning beam would be undeviated. This condition could be determined to a much higher degree of precision than was possible for the angular measurements involved in previous determinations. The application of interference to this work lay in the method of making the angles of the octagon very accurately equal.

The third problem, that of measuring the diameters of the stars, was solved on lines which Prof. Michelson had applied many years ago to the measurement of the separation of double stars. The method consists in varying the separation of two slits in front of the object-glass of a large telescope until the visibility of the parallel diffraction fringes seen in the focal plane of the telescope is a minimum. No exist-

ing telescope is of large enough aperture for this condition to be reached in the case of single stars; but by attaching an arrangement of mirrors in front of the large 100-in. telescope at Mount Wilson Observatory, which in effect increased its aperture to 20 ft., it had been possible to obtain a result for the star α Orionis, the fringes from which disappeared when the slits were separated by about 10 ft. This corresponded to an angular diameter of just under a twentieth of a second.

University and Educational Intelligence.

PROF. G. ELLIOT SMITH is delivering two lectures, one at Groningen University on April 14 and the other at the University of Utrecht on April 16, entitled "Vision and Evolution." These lectures are being given under the auspices of the Dutch Royal Academy of Sciences, and form part of the scheme for the exchange of lecturers between this country and Holland which has been referred to recently in these columns.

THE Summer School of Civics, organised by the Civic Education League, is to be held this year at Guildford (Surrey) on July 30–August 14. Courses on economics, anthropology, social biology, maternity and child welfare, sociology, civics, and social psychology will be among those offered; while practical training in the presentation of civics (through public speaking, etc.) and in the regional approach to civics will also be provided. Full particulars may be had from the secretary, Miss Margaret Tatton, Leplay House, 65 Belgrave Road, Westminster, S.W.1.

THE governing body of Emmanuel College, Cambridge, is offering a research studentship of the annual value of 150*l.*, which will be tenable for two years and renewable in exceptional circumstances for a third year. The studentship is offered to a research student commencing residence at the college in October next, and applications should reach the Master of Emmanuel not later than September 17. The award, which will be made on the evidence submitted by the candidates, should include two certificates of good character, an account of their career with the names of professors or teachers under whom they have studied, a statement of the proposed line of research, and evidence of ability to undertake that particular class of work.

WHEN the closing of the Finsbury Technical College was announced by the City and Guilds Institute in July last the many friends of the college began to take steps to avert the threatened disaster. A defence committee, consisting principally of old students, was formed, and it presented a petition to the governing body signed by many workers in all branches of science and by others connected with industry and with some of the City Companies who felt that all possible steps should be taken to continue the college. The professional institutes and learned societies presented a memorial signed by their presidents, and other bodies, including the National Union of Scientific Workers, took such other action as seemed likely to help. The strong hope that, with the assistance of the London County Council and the Board of Education, the future of the college might be assured for the next five years was recently expressed by the governing body to the defence committee and the institutions concerned. The success of the negotiations is now announced, and it may be hoped that the permanence of the college will in the meantime be assured without its distinctive character being in any way impaired.

¹ Abstract of the Sixth Guthrie Lecture, delivered before the Physical Society of London on March 11 by Prof. A. A. Michelson, of the University of Chicago.