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PSYCHOMETRIC OBSERVATIONS IN  
MURRAY ISLAND.

*Reports of the Cambridge Anthropological Expedition to Torres Straits.* Vol. ii., Physiology and Psychology. Part i., Vision. Pp. vi+140. By W. H. R. Rivers, with an appendix by C. G. Seligmann. Part ii., Hearing, Smell, Taste, Cutaneous Sensations, Muscular Sense, Reaction-Times. By C. S. Myers and W. McDougall. Pp. 141-223. (Cambridge: University Press, 1901, 1903.)

IN his short preface to this second volume of the Cambridge anthropological reports, Dr. Haddon remarks that no investigation of a race of people can be considered as complete unless it embraces observations on such psychological phenomena as admit of definite determination. In order to carry this into practice, he appears to have resolved that such branches of study should be efficiently dealt with in the second expedition to Torres Straits. Dr. Haddon is to be congratulated on having framed this comprehensive and truly scientific conception of ethnographical study, and he is further to be congratulated on having secured the services of such efficient psychological representatives as Dr. Rivers, Dr. Myers, and Dr. McDougall. The psychometric observations carried out by these gentlemen have, as was to be expected, been conducted on thoroughly sound lines, and the results described in the reports thus form not only an extremely valuable addition to anthropological knowledge, but an almost unique contribution to the physiology of the special senses. To Dr. Rivers in particular, special praise is due for the thoughtful care which he has bestowed upon the conduct of the inquiry, and for the way in which he has collated and presented the results.

The main part of the work was carried out in Murray Island, where the observers lived for four months. This island was originally selected by Dr. Haddon as being, in his judgment, particularly favourable for the study of a simple primitive people; it is out of the track of commerce, and its inhabitants still retain their simple natural characteristics; it is true that they have come into contact with missionaries and have acquired a certain knowledge of pidgin English, but this was found to be a distinct advantage from the point of view of the expedition, since it facilitated the establishment of a good understanding between the natives and the members of the expedition, besides enabling the observers to converse more freely with those selected for psychometric experiment. The limited population, 450 all told, was an obvious aid to the inquiry, and, judging from the reports, it appears doubtful if any other community, European or Polynesian, has been psychometrically investigated under more favourable conditions as regards both absence of disturbing factors and simplification of method.

The observations discussed in the reports are mainly those involving sensation, their scope being determined by the time at the disposal of the investi-

NO. 1766, VOL. 68]

gators, the available apparatus, and the nature of the individuals on whom the experiments were made. In the first part of the reports Dr. Rivers gives an account of various visual experiments chiefly made on the Murray islanders, but also carried out with the aid of Dr. Seligmann on some of the other small islands in Torres Straits. The chief points aimed at were the determination of visual acuity, of colour vision, and of visual spatial perception. As regards visual acuity, the most trustworthy test seemed to be the well-known E type method, which consists in determining at what distance a given size of this letter can be recognised; the letter was placed in various positions (sideways, upside down, &c.) and recognition was indicated by the observed person placing in a similar position a corresponding E on a card which he held in his hand. The conclusion arrived at by Dr. Rivers is that the visual acuity of the Torres Straits islanders is only slightly more pronounced than that of normal Europeans, and that probably this difference would disappear on taking into account the refractive errors, myopic and other, of the latter class. The unanimity with which travellers ascribe a high degree of visual acuity to savage races does not, therefore, mean that these races have organs which are abnormally sensitive to stimulation by light, but is related to the power of the primitive savage to make correct inferences from comparatively insignificant visual data. This power does not depend on a more perfect organ, but is associated with the close attention which the savage pays to the natural objects which surround him. Dr. Rivers appears to agree with Ranke in believing that this close attention to **detail** can be acquired by practice, but that in primitive races it is associated with lower mental development and with incapacity to feel any marked æsthetic interest or enjoyment even in scenes which the European regards as of great natural beauty.

A very large number of observations were made upon the extremely interesting phenomena of colour vision. It is well known that the references to colour in classical literature show a limited variety of colour nomenclature as compared with modern colour vocabularies. The view of Gladstone and others that this indicates a difference between the range of colour sensations of the ancients and those of their modern successors has, however, been generally rejected on the ground that sensations may have been undoubtedly experienced even when no special terminology has been framed in order to describe them. It appears, however, from the observations on the Murray islanders that it is precisely those colour sensations which are more or less defective for which there is no definite descriptive word, thus supporting Gladstone's views. In Murray Island 107 individuals were tested for colour, and it is remarkable that **not a single** case of red-green blindness could be detected, **although** in Europeans such defects amount to quite 4 per cent.

The colour vocabulary is largely framed from the names of such natural objects as force themselves on the attention; thus the word for "red" is derived from blood, that for "green" from the bile of the turtle, it being common knowledge that if the turtle's gall-bladder was accidentally opened in preparing the

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animal for food, then the intensely green bile rendered all parts inedible; only one colour was named from the hue of a flower, in spite of the great variety which tropical flowers show. Points of equal interest are the indefinite character of the word used for "blue," this being applied indifferently to blue-green, dirty yellow, grey, &c., and the complete absence of any word for "brown," the language resembling in this respect Homeric Greek. The Murray islander recognised "red" far more distinctly than any other colour; yellow was the next most recognisable hue, "blue" could only be differentiated when in considerable strength, and brown was merely a dull-looking light.

In this connection the simple experiments made upon peripheral colour vision were extremely suggestive. It is well known that in the European the red-green visual field is the smallest, whilst the blue and yellow fields are far larger, but in the Murray islander the green field was distinctly the smallest, and the red field extended widely into the peripheral regions; the largest field of all was, however, the blue one, these colours being far better recognised with peripheral vision than in vision involving the central macula. Probably, as Dr. Rivers suggests, the defective stimulation of the macula by blue light may be related to the excess of yellow pigment present in the Papuan race, and would not be in itself a sign of defective retinal capacity for excitation by these rays.

Many other points of great interest are detailed in this part of the reports, colour contrast, after-images, visual perception of distance, binocular vision, capacity to bisect lines, capacity to compare the length of vertical with that of horizontal lines, susceptibility to such well-known visual illusions as those of Müller-Lyer, Zöllner's line displacements, &c. In regard to all these points there appears to be little, if any, difference between the Murray islander and the average European; the details of these experiments will well repay the reader, particularly as Dr. Rivers has presented the results and described the methods in such a manner that his account can interest those who have not especially devoted themselves to this kind of work.

The second part of the present volume of reports deals with other sensory phenomena. The investigation of hearing was undertaken by Dr. C. S. Myers; it was rendered difficult by the not infrequent presence of defects in the ears due to the now prohibited practice of deep diving for pearls. The experiments on the younger inhabitants were free from such hampering circumstances, and the results showed that, as compared with Europeans, both the acuity of hearing and the capacity to distinguish differences of tone were distinctly inferior in the case of the islanders; on the other hand, it is remarkable that the range, as estimated by modified Galton whistles, was at least as extensive in the islander as in the European. The investigation of the sensations of smell by Dr. Myers was also extremely difficult, owing to the great objections entertained by the islanders for this class of experiment, but it seems from such observations as could be made that there is no marked hyper-sensitiveness to olfactory stimulation in this primitive race as compared with Europeans.

NO. 1766, VOL. 68]

Dr. Myers also made some limited experiments on tastes; a specially interesting feature brought out by these observations is the complete absence of any word to describe the extremely conspicuous gustatory sensation which we denote as "bitter," although it is certain that the sensation was experienced. In connection with this remarkable omission is the circumstance that, even in Europeans, there is considerable confusion as to the sensory significance of the qualities connoted by the word "bitter." Cutaneous sensations, muscular sense, &c., were undertaken by Dr. McDougall, and here there are some striking, but not unexpected, differences between the Murray islander and the European. In the former the sense of pure contact was twice as delicate as in the average Englishman, whilst the susceptibility to pain through pressure, &c., was far less pronounced. It is somewhat surprising, considering how unfamiliar the islanders were with the necessary procedure, to find that, as regards the estimation of different weights, the average least recognisable weight increment was actually smaller in their case than in the corresponding average of thirty Englishmen, being 3.2 per cent. as compared with 3.9 per cent.

Finally, the very important subject of reaction-time was undertaken by Dr. Myers, who gives most valuable details of the results of his observations. It appears that, as regards auditory reaction-time, the younger Murray islanders give results identical with the average young English townsmen, but that, as regards visual reaction-time, the Murray islanders give distinctly longer results. This lag becomes more perceptible when the attention is definitely fixed on the visual stimulus rather than the preconcerted movement, a procedure which always lengthens the reaction-time of Europeans, but which lengthened that of the islander comparatively more. Further, when the method of choice visual signal was used, involving a complexity of psychical conditions, then the increased lag became still more apparent. The reader is referred to the original for the very instructive and, from a psychological standpoint, most suggestive details of these observations.

In conclusion, the authors are to be heartily congratulated on the appearance of this work, which is a very important contribution to both physiology and psychology. The reports form a lasting memorial both of the activity of Cambridge anthropology and of the genuine character of the scientific spirit which now actuates those who study the various aspects of ethnography; the appearance of the remaining volumes promised by Dr. Haddon will be looked forward to with the greatest interest by a wide circle of biological students.

F. G.

#### A REVISION OF PRINCIPLES.

*The Principles of Mathematics.* By Bertrand Russell, M.A. Vol. i. Pp. xxviii + 534. (Cambridge: University Press, 1903.) Price 12s. 6d. net.

THE appearance of a book addressed equally to mathematicians and to philosophers, setting forth all the assistance which philosophy can afford in the shape of material for mathematics to work