Among the "observers" present were persons nominated by the several British societies, among others the British Medical Association, which was represented by Dr. Gustave Monod. The meeting first of all received communications with regard to the position in various countries and after a brief discussion it was decided to found a *Confédération internationale des travailleurs intellectuels*—that is to say, an international association of brain workers. A committee was appointed consisting of two delegates from each of the eight countries having an organized confederation, and an "observer" from each of the other countries represented; the latter having only consultative privileges. This committee was instructed to take steps to invite those countries which had not already done so to establish associations of brain workers and to draw up a constitution for the international association; the draft is to be submitted to the national organizations and afterwards considered at a meeting to be held in Paris before the end of this year. Dr. Monod informs us that medical societies in France are beginning to join the French confederation. The Association Générale des Médecins de France joined a short time ago and on April 11th the members of the Therapeutic Society of Paris, a purely scientific body, unanimously resolved to join also. Among the objects the organization has in view is the prolongation to eighty years of the period during which the author has a property in artistic and literary creations and to extend this principle to scientific workers. With this object it will seek to bring into existence an international code governing the right in intellectual property.—*British Medical Journal.*

SCIENTIFIC BOOKS

The Racial History of Man. By ROLAND B. DIXON. New York, Charles Scribner's Sons. 583 pages. $6.00.

DURING the last quarter of a century, particularly since the development of studies on heredity, the attempts to unravel the history of human types have been based more and more on the investigation of morphological forms. The more mechanical classifications according metrical features which dominated anthropological inquiry during the end of the past century do not play as important a part as they used to do. An excellent instance of this kind is the detailed investigation of the history of the Melanesian-Australian type given by Sarasin in his study of New Caledonia.[1] The same tendencies manifest themselves in the study of the ancient remains of man, particularly of those belonging to the paleolithic period. It is recognized more and more clearly that metrical values must be considered merely as a means of a quantitative statement of descriptive features.

Professor Dixon's attempt to unravel the racial history of man runs counter to this whole development. His book is based on the thesis that three measurements of the head—length, breadth and height—and two measurements of the nose—height and breadth—have remained stable since paleolithic times. The second hypothesis on which his analysis is based is the assumption that all those human types which are characterized by the extreme forms of the length-breadth and length-height index of the head and the height-breadth index of the nose are primary forms and that all intermediate forms are due to intermixture between these primary forms. In this way he obtains necessarily eight fundamental races, representing the eight possible combinations of three independent features.

From a biological point of view it is difficult to see how these two fundamental hypotheses could be maintained. First of all, we have no evidence that human types may be considered as absolutely stable. It is true that not all types of organisms react equally energetically to environmental influences, but there is no evidence that would permit us to assume that man is absolutely resistant to them. We have the best possible evidence that the size of the body and proportions of the limbs are strongly influenced by environment and, so far as I can see, no observations have been made that would contradict my own observations on the changes of head and face form of immigrants in the United States and of the descendants of Spaniards living in Porto Rico. The proof may not have been given that the differences between town population and country population ob-

[1] Fritz Sarasin, Anthropologie der Neu-Caledonier und Loyalty-Insulaner, Berlin, 1916-1922.

served in Europe is due to direct environmental influences, but even if we assume with Ammon[2] that it is due to selection, it would show that the constitution of a group of people may be materially changed.

The strongest argument in favor of the plasticity of skeletal form is shown in observations of domesticated animals. Changes in head form and in size of the skull have been observed not only in many domesticated animals, but also among animals born in captivity. Differences have been observed between wild lions and lions born in zoological parks and between wild rats and rats raised in cages. Attention has been called by Eduard Hahn and by the writer to the fact that men must be considered a domesticated form and this thesis has been most fully worked out by Eugen Fischer and recently by Berthold Klatt.[3] With these observations in mind, the thesis of the absolute stability of human forms from paleolithic times to the present would require proof before it could be accepted. This view is practically a restatement of the thesis of J. Kollmann, who considered the modern human types as "dauerformen."

In order to maintain the second hypothesis, Professor Dixon has assumed (page 17) that the three features which he discusses are not subject to Mendelian inheritance. While we do not know in detail how the three features are inherited, there is fairly conclusive evidence that there is a tendency towards reversion to parental types. A study of the data collected by Walter Scheidt[4] shows clearly that the formation of middle types as a result of crossings is not probable.

It would seem to the reviewer that an attempt to establish the extremes of a variable series as fundamental types is based on a misconception of the meaning of variability. We know from the studies of inbreeding carried out by Miss King[5] on rats and by Johannsen[6] on beans that even in extreme cases of long continued inbreeding there will always remain a considerable amount of variability. This is not surprising considering the complexity of the organism and the many ways in which it is subject to formative influences which can never be fully controlled. We are fairly familiar with the variability of the two head indices and of the nasal index. If we assume for a moment that we have a human type which, in regard to the three classes established by Professor Dixon, occupies exactly a middle position and if we assume furthermore that the variability in this group were equal to one half of the space occupied by the middle group and if, furthermore, we disregard the correlations between the various measurements, we should find that in a group of this kind all the extreme groups would be represented by 0.5 per cent. of the whole series; all the groups containing two extreme forms and one middle form would be represented by 1.8 per cent.; those representing one extreme and two middle forms each by 7.6 per cent. and those representing three middle forms by 28.7 per cent. As a matter of fact, the variability here assumed for the three ratios considered by Professor Dixon is lower than the normal variability that occurs in any given type and we would have to say, therefore, that in a group of people of this kind all the extreme forms would be represented. Professor Dixon would go on and say that all the middle forms are mixed and he would thus obtain 12.5 per cent. for each one of his primary types as the ancestry of the group. The assumption that the variability of a series of this kind is due to mixture is entirely arbitrary. In short, the proof is not given that the extreme forms are actually fundamental forms. On the contrary we should rather be inclined to assume that the extreme forms are due to certain excessive conditions that determine the particular form of the individual in question.

It seems, therefore, that the theoretical basis of the whole investigation would require proof of the two fundamental hypotheses and this the author fails to give and it is my belief that it cannot possibly be given.

It is, of course, true that the human races have intermarried to such an extent that the attempt to find a pure race anywhere is futile. Notwithstanding this fact, we ought not to

2 O. Ammon, Zur Anthropologie der Padener, Jena, 1899.

3 Mendelismus, Domestikation und Kraniologie, *Archiv für Anthropologie*, 1921, xviii, 225.

4 Familienkunde, Munich, 1923, pages 75-109.

5 Studies on inbreeding, Philadelphia, 1919.

6 W. Johannsen, Elemente der exakten Erblichkeitslehre, Jena, 1909.

overlook the similarity of the phenomenon to the analogous variability of plants and animals which occur over extended areas. Exactly the same method might be applied to forms of bears or to forms of mice. Here also extreme forms might be established and all the intermediate forms might then be explained as due to mixture. This simplification of the problem would, however, hardly appear justifiable because here, also, the dogmatic assumption would be made that the forms are permanent and not in any way subject to environmental influences.

The difficulties of these hypotheses made by the author appear very clearly when he compares his fundamental types as occurring in different parts of the world. As might be expected he does not find any kind of correlation between the ratios which he studies and other anatomical traits such as pigmentation, hair form and so on. It is quite obvious that when we compare long-headed, high-headed, flat-nosed individuals living in the Alps of Europe with similarly proportioned individuals from Australia and West Africa, there must be serious differences in regard to other traits. Because Professor Dixon assumes that these three values are fundamental, he is compelled to assume that none of the other traits are permanent and are all subject to change. No attempt is made to prove this conclusion which is merely an inference drawn from the assumed permanence of the given traits. It is, of course, true that there is a possibility that features like kinky hair may have developed independently in different races, as Sarasin assumes, but this assumption does not overcome the objections based on the failure to consider any other bodily features.

On account of our fundamental disagreement with the general position of the author it does not seem advantageous to enter into a detailed discussion of the distribution of the various types which is given in a number of maps. It must be understood, of course, that the maps are analogous in character to the usual maps showing the distribution of, for instance, short statures and tall statures, or low cephalic index and high cephalic index and that all of these are only fragmentary reproductions, because the plotted values depend upon two factors, the average and the variability of the measurements. The author's maps ought to be labeled as expressing approximately the frequency of occurrence of certain combinations of features. The maps certainly do not prove that these are fundamental races.

It is quite impossible to check up the data contained in the book because the general tables are not given. This is obviously impossible in a book which evidently is intended to appeal not only to the specialist but also to the general reader, but furthermore, the summary tables given on page 22 and those contained in the conclusion do not agree and the numbers are so small that any general inferences drawn from them seem rather risky.

In the final chapter Professor Dixon tries to prove that those groups which agree in regard to the selected ratios also agree in regard to other metric features. He uses for this purpose a series of fourteen measurements, eight of which are the length, breadth and height of the head and length and breadth of nose and the three ratios on which his whole system is built up. He tries to show that the six remaining measurements agree. One of these is the breadth-height index which is derived from the same material as the length-breadth and length-height indices. The others are the bi-zygomatic diameter, two facial indices, the gnathic index and the capacity of the skull. It is not surprising that the measurements on which his classification is based should agree fairly well. However, in my judgment, the rest do not show any satisfactory agreement, particularly considering the small number of individuals upon which the comparisons are based.

A word should be said also in regard to Professor Dixon's general attitude towards the question of the relation between racial ability and anatomical form. In one place he expresses himself as quite convinced that achievement proves hereditary ability (page 518). I can not consider this argument conclusive. If it were valid, then at different periods it would justify entirely different views. It is not very long since Russia would have seemed in cultural achievement very much inferior to western Europe. The conclusion as to racial inferiority is in this case contradicted by the considerable number of eminent scientists

and artists produced by Russia since social conditions have changed. If the ancient Greeks or still earlier the Egyptians or Chinese had used the same argument, they would have classified the northern Europeans as belonging to an inferior race, incapable of ever attaining cultural eminence. The proof of racial superiority certainly has to be based on other evidence. It is curious to note that when it suits the author's emotional attitude he changes his argument completely and indulges in flings at the assumed claim of racial preeminence on the part of the Germans—an attitude which hardly helps to make convincing a treatise that attempts to be scientific.

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SPECIAL ARTICLES

PHYSICO-CHEMICAL BASIS OF PSYCHIC PHENOMENA

EVER since Galvani discovered the relation between an electric current and muscular action there has been a feeling among scientists that the nerves are electrical conductors and that nerve impulses are really electrical currents. There has, however, been no satisfactory explanation as to how the conductivity of the nerve could be changed by the action of narcotics and nerve stimulants, as it must be changed to account for the effect of these substances on nerve impulse and psychic phenomena in general.

The explanation of the action of these compounds on the nervous tissue is very simple and in accord with the known facts concerning the composition of nervous tissues and the chemical and physical properties of narcotics and nerve stimulants. It is also based on well-founded laws of physical chemistry and is subject to laboratory verification.

This explanation postulates that the nervous tissue, which is composed of from 10 to 15 per cent. of lipins and from 70 to 85 per cent. of water, is essentially a two phase system of two immiscible liquids. One of these phases is a water solution, the other is a lipin solution. The relative dispersion of these two phases will depend upon their interfacial tension and on their relative internal pressure.

Any substance which will dissolve in the lipin phase and lower its surface tension but will not dissolve in the water phase will have a tendency to cause the lipin phase to become more continuous and for the water phase to become less continuous. Since the lipin phase is a poorer conductor than the water phase the conductivity of the nerve will be reduced as the lipin phase becomes more continuous. Any substance that will produce this result will be a narcotic. On the other hand any substance which will dissolve in the water phase and lower its surface tension but will not dissolve in the lipin phase will cause the water phase to become more continuous and the lipin phase less continuous, thus increasing the conductivity of the nerve. Such a substance will be a nerve stimulant.

This hypothesis will coordinate the following well-known, but apparently isolated facts:

A. The nervous tissue has a very high percentage of lipins.

B.[1] In a two phase system where the phases are immiscible liquids, either phase can be made continuous by dissolving in them a substance having the proper distribution coefficient and at the same time having the desired effect on surface tension.

C.[2] The narcotic action of a compound depends on its distribution coefficient between lipins and water.

D.[3] Not all substances which have a distribution coefficient which shows them to be much more soluble in lipins than water are narcotic in their action. In addition to this solubility in lipins the substance must lower the surface tension of the lipin phase to be narcotic.

E.[4] Narcotics do not form a definite chemical compound in the nervous tissue but are adsorbed.

F.[5] Surface tension is a factor in the action of narcotics.

G.[6] Too great a preponderance of sodium

[1] Clowe's *Jour. Phys. Chem.*, xxix, 407, 1916.

[2] Overton, "Studien über narcose," Jena, 1901.

[3] Curliny, "Text-book of Pharmacology," p. 128, 1904.

[4] Moore and Roaf, *Proc. Roy. Soc.*, 73, 1904.

[5] Traube view as reported on page 48 of "The chemistry of synthetic drugs," by Percy May, 1921.

[6] Frederick F. Tisdall, Vol. LIV, 35, 1922.