HUMAN GENETICS

BY PROF. R. RUGGLES GATES, F.R.S.

HUMAN genetics was well represented at the Congress. Abstracts of a large number of papers were prepared, but like other sections their presentation was somewhat deranged by the approach of war. At different sessions the section discussed such topics as mental inheritance, feeble-mindedness, blood groups, statistical methods in human genetics, selection in human populations, twinning, normal and abnormal human characters.

F. Lenz showed that the twin method and the correlation method may give different results as regards the relative shares of heredity and environment in the formation of a character. Dr. R. J. A. Berry presented the results of a study of mental defect in 163 families with parents of normal mentality and 202 families in which the parents were mentally defective, insane or of very low mentality. Mental defectives were twice as frequent in the second group. The problem was regarded as one of the inheritance, not of mental states but of normal standards of growth. Dr. Brügger agreed that the majority of mental defectives show only retarded mental development, and concluded from the investigation of 2,380 sibs that there is a unified recessive inheritance, feeble-mindedness and imbecility generally appearing together.

Dr. Fraser Roberts pointed out that most defectives fall at the minus end of the normal continuous series and he believes there is multifactor inheritance, the low-grade defectives forming a very heterogeneous group. He concludes that there are a number of genes, any pair of which can determine idiocy or imbecility, abnormal susceptibility to non-genetic influences frequently being present. From a study of 3,400 school children by intelligence tests he concludes that normal intelligence is also graded and very largely determined by multifactor inheritance.

D. K. Henderson recognized a hereditary basis for the manic-depressive and schizophrenic states and emphasized that a eugenic programme must be largely educational. Helgi Thomasson, on the other hand, from a nine years study of manic-depressives in Iceland, was doubtful about the

inheritance element. He diagnosed 859 cases of manic-depressive psychosis, only 15 per cent of whom were treated in hospital. Probably his criteria of diagnosis differed from those of others, and perhaps the general climatic conditions in high latitudes may also account for the high incidence. Dr. F. J. Kallmann emphasized that the practical goal of human genetics is the determination of the various physiological, constitutional and dispositional factors governing the phenotypical manifestation of hereditary predispositions and the description of their structural equivalents in proper morphological terms. From a study of 500 pairs of schizophrenic twins and their families, he concludes that the schizophrenic genotype is specific, autosomal and probably single-recessive. Its manifestation is inhibited in about one quarter of the homozygotic taint-carriers by the aid of a strong constitutional resistance or by the lack of furthering dispositional factors.

In a discussion of rare psychological defects in a population, G. Dahlberg concluded that the effect of selection on its incidence is very small, that the effect of prevention of cousin marriage is also small, but that the breaking up of isolates in the population is most important.

Various workers have shown that an injection of cardiazol produces epileptic spasms in animals and man, but a hereditary epileptic will have fits after a smaller dose than a non-hereditary epileptic or a non-epileptic. Hans Nachtsheim finds that a strain of white Vienna rabbits has a gene, X , for leucism and an allele X_e which causes increased liability to spasms, X being dominant over X_e . Among 250 animals given minimal doses of cardiazol, 83 per cent of the homozygous X_eX_e rabbits but only 3 per cent of normal controls react with spasms.

Pick's disease was studied by J. Sanders in a family with sixteen affected members. The symptoms begin at 40-50 years of age, so that early diagnosis is important. The inheritance is dominant, and it was found that persons who gave queer answers in the ink blot tests developed the disease twelve to eighteen months afterwards.

In a study of twenty-nine families showing tooth deficiency, Barbara Burks found evidence of linkage with hair colour. D. J. Finney also obtained statistical evidence of linkage between allergy and the *ABO* blood groups; while Munro, Penrose and Taylor, from analysis of twenty-five sibships, found an indication of linkage between the blood groups and phenylketonuria.

As regards disorders, R. C. Robb reported on 100,000 hospital patients, and D. P. Murphy on 935 malformed children studied in relation to birth order, sibs, maternal age, reproductive rate, etc. H. Madissoon cited cases of absence of kidneys (in the foetus) conditioned by heredity. D. Ferriman found that oxycephaly and acrocephalosyndactyly are dominant conditions, probably allelomorphic, and that a third allele may be acholuric jaundice. Race, Taylor and Vaughan showed that a latent

form of the latter disease can be demonstrated by investigation of the blood. Dr. I. Lundholm showed that hypochromic anaemia, which is common in women in Sweden, is conditioned by a dominant gene which prevents the normal absorption of iron through the digestive tract.

J. B. S. Haldane pointed out that natural selection in man may act through survival, sexual selection or reproductive selection (fertility), and that in theory four types of selective process can be distinguished, involving slow or rapid selection of genes, selection of heterozygotes or elimination of rare mutants.

P. J. Waardenburg showed that the *X*-chromosomal eye defects, dystrophia retinae pigmentosa and extraocular nystagmus can be inherited as dominant or recessive sex-linked or dominant or recessive autosomal characters.

GENETICS IN RELATION TO EVOLUTION AND SYSTEMATICS

BY DR. W. B. TURRILL

THE Organizing Committee of the Congress, at the suggestion of the Association for the Study of Systematics in Relation to General Biology, arranged for a special section to be concerned with the wider aspects of genetical research. In spite of the numerous difficulties caused by the international situation both in arranging and carrying out the programme, the results not only justified the attempt but showed the desirability of making a general rule to include in specialist biological congresses a section devoted to overlaps of the special subject with other branches of biology.

The programme of the section was so arranged that papers were grouped under the following general titles: Hybridization, Comparative Genetics and Evolution, Micro-evolution, Experimental and Wild Populations, and Polyploidy and Reproductive Mechanisms. In the plenary session of the section, Th. Dobzhansky dealt with the genetic structure of natural populations. He urged that "according to the genetic theory the pressure of the evolutionary factors, such as mutation, selection, isolation, and migration is constant and unrelenting. A living species can hardly remain

static for any length of time. It is a task of the investigator to observe evolutionary changes not only *post factum* but also in *statu nascendi*, in nature as well as under laboratory conditions". There is a hidden field of variation, detectable not through observations on the phenotype but only by genetic and cytological means, and this must engage the attention of students of evolutionary mechanisms. The main part of his paper dealt with *Drosophila pseudo-obscura*, and it was shown that this is a dynamic species of local colonies which can pursue, within certain limits, independent evolutionary courses. Only secondarily through migration and selection of superior genotypes formed in such colonies can the texture of the species as a whole become gradually altered.

G. Tischler, under the (translated) title the "Role of Chromosomal Race Differences in Systematics and Plant Geography", stated that at least 400 wild cœnospecies of Angiosperms are known which contain races with chromosomal differences. Many species become capable of surviving in a climatically unfavourable environment through polyploidy, but within these species many type plants have