sensitivity. Modulation of the light beams is produced by a mechanically resonant system requiring little power. The optical system employs a minimum of mirrors and is asymmetrical. The asymmetry is used to advantage in the design of the attenuator. This has a linear calibration throughout the transmission range. Errors due to the inhomogeneous intensity of the light beam are eliminated by the design. The performance of the instrument is such that a change of 0.005 in an optical density of 2 may be detected using a light intensity of 10^9 quanta/sec. The scope of the instrument for work on activation of colour centres in alkali halides was indicated.

Dr. R. McWeeny gave a brief survey of "New Methods in the Wave Mechanics of Molecules", with emphasis on his recent revision of the valence bond theory (to be published). A molecular wave function may always be constructed from terms which, individually, represent electrons occupying a set of 'orbitals'. The molecular orbital approach employs one such term, the orbitals being non-localized; newer developments admit additional terms representing 'excited configurations'. But the valence bond theory employs localized, atomic orbitals and is essentially a many-term theory, a group of terms corresponding to each possible set of 'chemical bonds'. It is possible to work with such 'structures' only by assuming negligible overlap between different atomic orbitals; but this assumption is now found to be entirely untenable. The new theory employs orthogonalized atomic orbitals, the overlap assumption thereby being properly validated; but the resemblance between this 'valence bond theory' and its predecessor is found to be purely formal, the character, function and interpretation of the valence bond structures being quite new.

Drs. J. A. Abbott and H. C. Bolton presented an account of the theoretical polarizability of the helium atom. The unperturbed ground-state wave function was discussed in terms of junctions arising from different configurations (using the recent work of Taylor and Parr), and the consequent correlation between the positions of the two electrons was shown. The perturbed wave function contains a term proportional to the electric field, and it was shown how this term can be constructed from functions of the right symmetry using the ground-state configurations and the perturbing potential. A variational method was employed to get the best values of the parameters in the perturbed wave-function. With the successive addition of configurations, there was a satisfactory convergence from the lower side on to the true value of polarizability. The method should be suitable for any wave function constructed from configurational functions.

¹ *Proc. Roy. Soc., A*, **202** 127 (1949); **208**, 277 (1951).

INTERNATIONAL CONFERENCE OF PARAPSYCHOLOGICAL STUDIES

AN international Conference of Parapsychological Studies met in Utrecht during July 30–August 5 under the auspices of the University and with the financial support of the Parapsychology Foundation, Inc., of New York. Some sixty members of fourteen nationalities, comprising physicists, chemists, biologists, psychologists, philosophers, engineers and mathematicians took part in discussions of problems

which arise in the investigation of those purported types of communication between individuals which are hitherto not explicable in terms of contemporary physics and biology.

After preliminary sessions, four working groups were established: the first dealing with quantitative experimental studies of various classes of alleged paranormal activity; the second with the interpretation of material gathered in psychiatric practice; the third with qualitative and spontaneous (that is, not experimentally controlled) phenomena; and the fourth with the psychological study of those persons who appear to display a large amount of paranormal sensitivity.

Attention was given to the establishment and maintenance of scientific standards, the development of appropriate experimental and quantitative methods, and the most profitable ways in which to combine and extend the concepts and methods of the various sciences in an attempt to understand more fully the relations between the living organism and the environment.

Marked interest was shown at the Conference in the problem of various methods of 'unorthodox' healing, and a medical committee was established and empowered to take preliminary steps towards the organization of an international research centre for the investigation and interpretation of outstanding cases.

At the conclusion of the Conference it was resolved to establish a secretariat and publication centre at the University of Utrecht, a series of committees being charged with arranging subsequent meetings of specialized groups in order to discuss more fully the experimental problems presented. The choice of Utrecht as the centre appears to be appropriate, since in 1951 the University founded an Institute for Parapsychology and in 1953 Dr. W. H. C. Tenhaeff was appointed as professor (*extra-ordinarius*) of parapsychology in the University.

THE MEDICAL RESEARCH COUNCIL

THE report of the Medical Research Council for the year 1951–52* is, like its two predecessors, selective, and it is emphasized that it omits many investigations being done by the Council's workers. The scope of the Council's work is nowadays so wide that this omission may be necessary; but some readers will regret that it is so and that we are given no more than the titles of so many interesting lines of research.

The report this year chooses for particular treatment the developments in clinical research, which has, until recently, been almost entirely observational, partly because of the difficulty of devising suitable experimental tests of generalizations derived from observation. Chemical and instrumental tests are, however, now available for use without risk to the patient, and statistical techniques have refined methods of planned observation and controlled clinical trials. Clinical investigation is therefore better able to study groups of sick persons and whole communities.

The Medical Research Council, when it was formed in 1913, gave its chief attention to clinical research, and its first clinical research unit, the Department of

* Committee of Privy Council for Medical Research. Report of the Medical Research Council for the Year 1951–1952. Pp. iv+241. (Cmd. 8876.) (London: H.M. Stationery Office, 1953.) 6s. 6d. net.

Clinical Research at University College Hospital Medical School, London, made important contributions to cardiovascular medicine. But it was Sir Thomas Lewis, a man in advance of his age, who trained a generation of research workers in the application of scientific method to clinical problems, and these men became available in the 1930's, when methods of clinical research were being elaborated. The Council itself established clinical research units and it is now spending more than £400,000 a year on investigations directly concerned with patients. When the National Health Service Acts gave virtually all facilities for clinical research to the Health Departments, close liaison and unanimous agreement were established between these Departments and the Medical Research Council. It is now proposed that there should be a central organization for the promotion of clinical research, which should be a part of the Medical Research Council, that provision should be made for decentralized research with the greatest possible freedom from supervision and that careers in clinical research should be equated with careers in the National Health Service.

The main interest of scientific readers of this report will no doubt be in the section of it entitled "Some Aspects of Medical Research", which reviews the results obtained by the Council's workers in certain fields. Dr. A. J. P. Martin, of the Division of Physical Chemistry, National Institute for Medical Research, and Dr. R. L. M. Synge, of the Division of Biochemistry, Rowett Institute, Aberdeen, have been jointly awarded the Nobel Prize for chemistry for 1952 for their work on partition chromatography. This section of the report gives an interesting account of the development of chromatography since 1906. Mental deficiency is discussed and the impressive work of the Council's Research Unit on Occupational Psychiatry is described. The Council's work on the causes of maternal and child mortality and on the social aspects of this important subject has as its ideal a pregnant mother who feels well and has a spontaneous and easy labour and gives birth to a lusty child which she is able to feed successfully, and the results obtained have done more for the nation than many people realize. The importance of the glands which produce internal secretions has long been recognized, and the Council's workers at Cambridge who have been studying the close relationships between the central nervous system and the posterior pituitary gland during lactation have shown that the action of sucking excites a nervous reflex in the mother which causes secretion by the posterior pituitary gland and the liberation of a hormone which acts on the mammary glands and causes the 'let down' or ejection of milk. The oxytocic hormone is the most powerful in this respect, and this hormone also stimulates the contraction of the uterine muscle. This work thus provides an explanation of the age-old observation that suckling the young helps the contraction of the uterus after labour. The Cambridge workers are also studying the anterior pituitary gland and the control of the secretion of corticotrophin by this gland.

The section of the report mentioned above also considers work on bacterial food poisoning, the development by bacteria of resistance to drugs, the etiology, mechanism and diagnosis of hæmophilia, hearing-aids and diseases of the ear, the thyroid gland and the uses of radioactive iodine in medicine, the epidemiology, pathology and treatment of poliomyelitis, the physiology of the red blood cells, each

of which lives for an average period of 120 days, the synthesis of porphyrins and hæmoglobin in the body and the formation of bile pigment.

The rest of the report provides details of the various units of the Medical Research Council, the names of their staffs and bibliographies of papers published by them and by members of that valuable organization, the Public Health Laboratory Service, and by workers in the Institute of Cancer Research.

All those who work for the Council, whether they are members of the Council itself or are research workers, or perform those unpublicized but highly skilled tasks upon which all modern scientific research depends, deserve the gratitude of the public for whose health and welfare all this devoted work is so patiently and efficiently done.

G. LAPAGE

SCIENCE AND FREEDOM

THE International Congress of Science and Freedom held a meeting in Hamburg during July 23-26, which was attended by more than one hundred delegates from nineteen countries, including fourteen from the United Kingdom. The purpose of the meeting was to discuss the danger to cultural freedom which has arisen in totalitarian countries, especially those behind the Iron Curtain. The delegates, among whom were four Nobel laureates, included leading representatives of other branches of learning in addition to science.

The opening session in the Rathaus was addressed by Dr. Max Brauer, mayor of Hamburg, Prof. Bruno Snell, rector of the University, Prof. Denis de Rougemont (Geneva), president of the executive committee of the Congress for Cultural Freedom, Prof. James Franck (Chicago), Prof. J. Pieper (Münster) and Prof. Max Hartmann (Tübingen). The twenty communications which were considered during the meeting included papers by Prof. Michael Polanyi (Manchester) on pure and applied science and their appropriate forms of organization; Dr. J. R. Baker (Oxford) on scientific authority and the system of scientific publications; Prof. S. K. Allison (Chicago) on requirements of security and academic freedom; Prof. T. Dobzhansky (New York) on biology in the U.S.S.R.; Prof. G. v. Rauch (Marburg) and Prof. V. Gittermann (Zurich) on history in the U.S.S.R.; and five papers devoted to "Neutrality or Profession of Faith" and "Moral Responsibility and Science". The various communications aroused much discussion, and it was often difficult for the respective chairmen to keep the speakers to the prescribed time limits.

It was generally agreed that totalitarianism to-day constitutes the greatest and most potent threat to cultural freedom, and the infiltration of Communist ideas into the circles of academic teachers and students has often given rise to a general distrust of the universities as seed-beds of intellectual insubordination. This has led frequently to the demand that universities should recognize without question existing economic and social systems in their respective countries.

The independent position of universities has been further impaired by the fact that they have become increasingly dependent on government grants. These tend to foster those fields of science in which some practical or economic advantage is to be expected. In addition, the Second World War has resulted in the suppression or corruption of many of the older