Paris, which were stimulated by papers by A. Banos and G. Goubau, that no completely satisfactory answer to the problem has yet been reached. Also, in the general theoretical section of the colloquium there was extensive consideration of diffraction problems, a leading part being played by V. A. Fock, who presented a comprehensive paper dealing with the application of complex integrals to these problems.

A treatment of the scattering of high-frequency radiation by dielectric spheres was given by D. S. Saxon and Z. Sekera. It would seem that, while satisfactory theories exist for scattering processes when the wave-length is short compared with the scale of the inhomogeneities of the scattering medium, they are not valid at longer wave-lengths.

A matter of considerable importance in propagation studies is the reflexion of radio waves at rough surfaces. Various aspects of this subject were discussed by W. S. Ament, who gave quantitative results for surfaces conforming to certain simple models; and also by V. Twersky, who presented a generalized theory—though here again only simplified models are amenable to numerical treatment.

Current interest in long-wave transmission has been stimulated by recent theoretical work on the problem, notably that by K. G. Budden in which the space between the Earth and the ionosphere is treated as a wave-guide. It is hoped that new experimental work will help to resolve some of the difficulties in the theory which still exist. In this connexion the study of atmospherics is important, and it was interesting to hear a report in Paris by J. Aarons that measurements have now been made down to frequencies as low as 0·5 cycles per second, to supplement those which have been made for a number of years at higher frequencies.

It is proposed that the papers presented at the colloquium shall be published in a special number of *L'Onde Electrique* which will appear in the spring of 1957.

PHYSIOLOGY OF THE PRE-WEANING PERIOD

A CONFERENCE, in commemoration of E. Babák, was held by the Czechoslovak Academy of Sciences at Liblice, near Prague, during November 14–17, 1956. The subject of the conference was "Problems of the Physiology of the Pre-weaning Period in Man and other Mammals". Countries represented included the German Democratic Republic, Great Britain, Hungary, Rumania, the United States, U.S.S.R. and Yugoslavia.

A central topic was the development of thermo-regulation, on which extensive researches are being carried out in Prague, at the Institute of Physiology of the Academy of Sciences and at the Charles University. P. Hahn, J. Křeček, J. Křečkova and J. Martínek (Prague) contributed papers on the development of thermo-regulatory mechanisms in the rat, and on adaptation to cold and warm environments in infant rats. Other papers in this field included those of S. A. Barnett and B. M. Manly (Glasgow) on the effects of low environmental temperatures on young mice; K. W. Cross (London) on the reaction of the human new-born to lack of oxygen; A. Holub and others (Brno) on the development of thermo-regulation in piglets; and A. McLaren and D. Michie (London) on the effects of low and high temperatures on growth and variability in mice.

Other aspects of homeostasis were dealt with by J. Cort (Prague), who described work on the renal tubular excretion of acids in the human new-born; and Gertrude Falk (Washington), who discussed endocrine factors in the post-natal development of water diuresis. In addition, M. Hašek (Prague) gave an account of his important work on the adaptation of homeotherms to foreign antigens during early ontogeny.

Another major theme was the development of the nervous system. P. K. Anochin (Moscow) described an extensive series of researches on the relationship between functional maturation in the nervous system and the appearance of innate responses. I. A. Arshavsky (Moscow) gave a paper on the nervous system in the development of gastro-intestinal and circulatory function. K. Čapek and J. Jelinek described experiments on the external stimuli required to establish reflex micturition in puppies. P. Jílek and others discussed the development of normal brain function. J. Lát described researches in which individual variation in food choice in rats was found to be related to metabolic differences. J. L. Malcolm (London) reported on the pattern of response of motor neurons of the spinal cord in kittens, and the relationship between anatomical and functional development. A. D. Slonim (Leningrad) described a study of innate alimentary reflexes during ontogeny.

Visits were made to research institutes and medical centres in Prague. It was provisionally decided to hold a similar conference, again in Prague, in three or four years time. S. A. Barnett

FATIGUE IN METALS

IN the hundred years since the term 'fatigue' was first introduced to define a certain type of unexplained service failure, a great deal of empirical knowledge has been accumulated, but there is still much to learn regarding the fundamentals of the processes involved. The Institution of Metallurgists has published a series of five papers*, presented as lectures during 1955, which together summarize, possibly better than has been done before, what is known and what is not known about this obscure phenomenon.

Dr. J. Holden deals with the fundamental considerations so far as they are known in a condensed but clear manner. It has been realized for a long time that fatigue depends greatly on the nature of the surface of the part under consideration, and Mr. G. Forrest is concerned to summarize the effect of notches and surface finishes, such, for example, as nitriding, shot-blasting, decarburization, etc., on the resistance to fatigue, and concludes that "the only general conclusion which can be reached is that the behaviour of materials with respect to notches and surface finishes is so complicated and related to so many variables that we are still a long way from being able to estimate the strength of complicated engineering components from fatigue tests on normal laboratory specimens".

* The Fatigue of Metals: Lectures delivered at the Institution's Refresher Course 1955. Pp. 148+16 tables. (London: Institution of Metallurgists, 1956.) 25*s*.