

London) presented evidence obtained from experiments in guinea-pigs and sheep which demonstrated the action of the placenta on the myometrium, and indicated its possible function in labour. Dr. Jung (Universität Frauenklinik, Germany) demonstrated a substance of myometrial origin which activated the rat uterus, while inhibiting the human uterus.

Prof. Robson and Dr. Robinson (Guy's Hospital Medical School, London) presented evidence for the presence of an anti-inflammatory substance at sites of inflammation, with some preliminary data on its possible chemical nature. Dr. Masek (Institute of Pharmacology, Prague) described the pharmacological effects of palmitoyl ethanolamide, a compound which occurs naturally in some mammalian tissues, and which has been shown to possess anti-inflammatory, anti-anaphylactic, and analgesic actions.

Several papers dealt with various aspects of assay techniques used to estimate trophic factors associated with central control of endocrine function. Dr. De Wied (University of Utrecht, The Netherlands) reviewed the *in vivo* and *in vitro* methods available for the assay of corticotrophin releasing factor. Prof. Martini (University of Milan, Italy) then discussed a new technique known as the "pituitary depletion method", which has recently been developed in his department. This enables simultaneous evaluation of the activity of hypothalamic extracts on all pituitary hormones, and has facilitated investigation of the physiological significance of the hypothalamic control factors. Finally, in this sphere, advances in the techniques of extraction, separation and purification of human follicle stimulating hormone were reviewed by Dr. Reichert (Emory University, U.S.A.), who then went on to discuss the value of available biological assay methods. The preparation of purer samples of follicle stimulating hormone has, over recent years, made possible much greater accuracy in therapeutic dosage in cases of amenorrhoea, thus reducing the risk of multiple ovulation.

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constant beamwidth over a wide range of transmitted frequencies. These possibilities could completely revolutionize the design of echo-sounders, wide band sonars and transmit-beam scanning sonars. A small scale model of a non-linear sonar system was also demonstrated; a narrow beam of acoustic waves at a frequency of 100 Kc/s was formed from two primary waves in the region of 3 Mc/s. Professor Tjøtta made the further point that if one of the primary waves was used as a "pump" and the other consisted of an echo-signal from a distant target, parametric amplification of the weaker signal could be effected. During the discussion, the similarity between the parametric amplification of acoustic and electronic travelling waves was noted, particularly in regard to the need to suppress the sum frequency wave.

Mr. R. T. Smith (Imperial College of Science and Technology) showed that an initially sinusoidal wave of high amplitude becomes progressively more triangular owing to changes in the velocity of propagation of various parts of the wave. He also discussed the formation of shock waves in liquids and related this to the physical properties of the medium.

In the final paper Dr. V. G. Welsby and Mr. M. H. Safar of the University of Birmingham described investigations of the generation of harmonic and subharmonic frequencies when the amplitude of a single primary wave is increased to the region of the cavitation threshold of the medium. As the acoustic pressure is increased, the subharmonic level increases; but sometimes on approaching the cavitation threshold the subharmonic decreases slightly and then, after cavitation, rapidly increases. (On other occasions the dip near cavitation is less pronounced or even entirely absent; the factors governing its appearance have not yet been fully investigated.) On the basis of their experiments the authors posed a number of questions about the physical mechanisms involved, and discussion made it clear that there is considerable uncertainty on this topic.

The British Acoustical Society seems to have got off to a good start with a successful first meeting.

B. K. GAZEY

NON-LINEAR ACOUSTICS

SIXTY-TWO people attended the one-day symposium on non-linear underwater acoustics, sponsored by the newly formed British Acoustical Society and organized on its behalf by Professor D. G. Tucker, which was held in the Department of Electronic and Electrical Engineering at the University of Birmingham on July 19. Professor Tucker took the chair for the morning session and Dr. R. W. B. Stephens (Imperial College of Science and Technology) in the afternoon.

Three of the five papers presented discussed the sound field arising from the interaction of two coincident acoustic waves. Professor S. Tjøtta (University of Bergen) presented a rigorous mathematical analysis based on the hydrodynamical equations while Dr. H. O. Berktaay and Mr. B. V. Smith (University of Birmingham) gave alternative (and simplified) engineering approaches to the same problem. These papers showed that, as a result of the non-linear relationships of acoustic pressure with density on one hand and compressibility on the other, two coincident plane (or spherical) primary waves of differing frequencies produce virtual sources in the water at the harmonic and intermodulation frequencies. These virtual sources form a virtual acoustic array in the medium itself, and Dr. Berktaay discussed in detail some possible transmitting applications of the virtual array formed at the difference frequency and illustrated these by experiments. He showed that a number of desirable results could be obtained economically, including high directivity at low frequencies with small transducers and a substantially

OBITUARIES

S. E. Hollingworth

THE sudden death in London on June 23, 1966, of Professor Sydney Ewart Hollingworth, on the eve of retirement after 20 years in the Yates-Goldsmid chair of Geology at University College, London, was a shock to his many friends. He was the twelfth well-known British geologist to die since March, 1965. Before becoming professor he had served 25 years with the Geological Survey of Great Britain where he had established a high reputation as a field geologist with an independent and critical outlook.

He was born on November 7, 1899, and educated at Northampton School. After a short period of Army service, he went to Clare College, Cambridge, in 1918, where he graduated with first-class honours in both Part I and Part II of the Natural Sciences Tripos, and in 1921 he was awarded the Harkness Scholarship. In the same year he took the external B.Sc. honours degree of the University of London and joined the Geological Survey. In his first winter he revised some of the geological boundaries for publication of the Shaftesbury one-inch map. Hollingworth then took his place in the Survey's Cumberland unit first under B. Smith and later T. Eastwood to become part-author of the Carlisle, Brampton, Whitehaven, Gosforth and Cocker-mouth maps. Besides studying the Ordovician, Carboniferous and other bedded rocks, he showed that the Ennerdale Granophyre was a