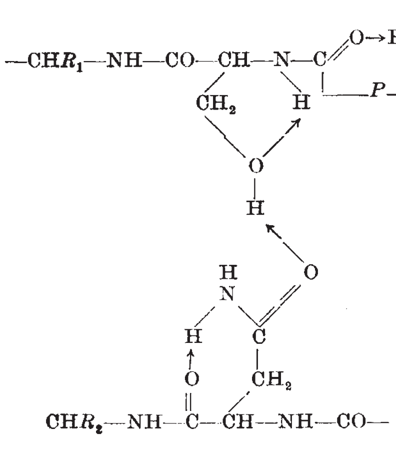
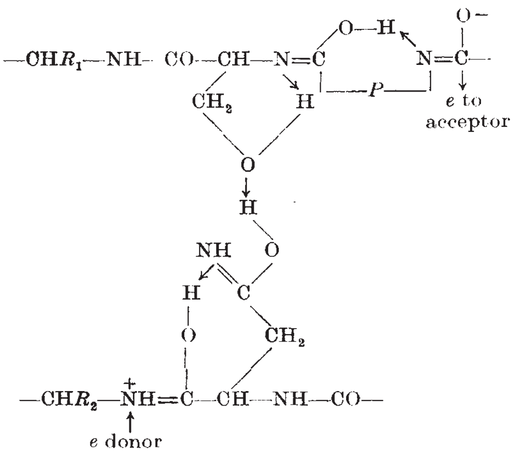


(a)



(b)

Possible mode of hydrogen-bonding between serine and asparagine residues in adjacent polypeptide chains in (a) the keto form and (b) the extreme enol form. P = protein chain

to those which characterize the enzymic proteins. While more analyses, especially of enzyme proteins, are desirable before any final conclusions are drawn, we consider that the range of enzyme types covered by existing analyses is sufficiently broad to warrant an attempt to interpret the results. We regard these ratios as implying the existence in enzymic molecules of frequent interchain hydrogen-bonds, probably largely of the carboxyl-hydroxyl type, which reinforce the intra-chain hydrogen-bonding of peptide links to form a highly resonating network over which electron flow can occur. We think it is significant that, for many of the side-chains we have considered, it is possible to envisage hydrogen-bonding not only between the side-chains but also simultaneously between each side-chain and an adjacent peptide bond. An example of such a system involving residues of asparagine and serine is shown in the accompanying formulæ. The side-chain of glutamic acid with its additional CH_2 group does not lend itself so readily to such a configuration, and this may explain the preponderance of aspartic acid in enzyme molecules shown in the first relationship in the table.

We hope to publish a fuller account of these and other implications in the near future. [Aug. 15.

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EFFECT OF THE ANNULAR ECLIPSE OF MARCH 7, 1951, ON RADIO-WAVE PROPAGATION*

DURING the annular eclipse on March 7, 1951, observations were made at Quartz Hill, Wellington, N.Z., to ascertain the effect of the eclipse on radio-wave propagation. The eclipse occurred at Quartz Hill at 1907 G.M.T., which was too soon after sunrise to obtain satisfactory discrimination of some of the effects, and this difficulty in discrimination was increased by the occurrence of a magnetic storm of moderate intensity which commenced on March 7, and lasted intermittently until March 14.

As was expected, medium-wave signal strengths increased to near night-time values and short-wave signals faded out as the umbra crossed the transmission paths. Along the line of the eclipse, observations were made of signals from the B.B.C. station *GSD*, 11·75 Mc./s., beamed on a London azimuth of 260°. On March 7, this station was not heard until 1940 G.M.T., but its signal strength then rose steadily to 1945 G.M.T., when it remained at a steady value some 20 db. below that received on the preceding days. The low signal strength and the fact that the station was not heard prior to 1940 G.M.T. may have been partially due to effects of the magnetic storm in northern latitudes. It was of interest that the fading characteristic of the station during the eclipse was identical with that obtained when the transmission path is in darkness.

Short-wave observations across the path of the eclipse were confined to the signals from station *WWVH* (10 Mc./s.) at Hawaii. The strength of signal from this station decreased at 1847 G.M.T., faded out at 1902 and returned suddenly at 1936 and then increased steadily to reach its usual strength at 1945 G.M.T.

Noise on the lower short-wave frequencies, 1·4–6 Mc./s., was higher, and noise on 30 Mc./s. was lower during the period of the eclipse as compared with the same period on the control days. The normal increase in noise on 30 Mc./s. following sunrise occurred some 90 min. later on the day of the eclipse, and a sudden drop of 4 db. in this noise occurred at 1920 G.M.T. some 13 min. after the

* Substance of a paper at the New Zealand Geophysical Conference by L. H. Martin, N.Z.B.S. Receiving Station, Quartz Hill, Wellington, N.Z.

maximum phase of the optical eclipse: this may have been due to asymmetry of noise sources on the solar disk. From 1920 until 1932 G.M.T., no signals were audible on antennæ bearing 082° directed towards the station *GSD* except sharp pips of high-intensity noise covering a frequency range 9·5–11·1 Mc./s. These noise 'pips' reached a maximum in both intensity and frequency of occurrence at 1925 G.M.T., and were characteristic of the noise usually associated with sunspots and normally only heard on much higher frequencies. Reception of this type of noise on frequencies so low as 9·5 Mc./s. therefore indicates a substantial drop in oblique-incidence critical frequency coinciding with the time of maximum phase of the eclipse over that portion of the ionosphere. This does not explain why this noise should have cut off sharply at the upper terminal frequency of 11·1 Mc./s., unless it was radiated on a limited spectrum, as appears to be the case with the large bursts of noise associated with solar flares.

The results obtained from these observations confirm those of previous observers in that they show that ultra-violet radiation from the sun is the main cause of atmospheric ionization, and that when this radiation is intercepted by the moon, the density of ionization and the critical frequencies of the ionized layers decrease. The results of the observations of noise are of interest, though not conclusive, and indicate that this aspect of the effects of an eclipse should receive greater attention when the opportunity again arises.

PAUL EHRLICH

ON December 5, 1951, the New York Academy of Medicine celebrated the deposition at the Academy of *memorabilia* of Paul Ehrlich, which were the gift of the Schwerin family. The president, Dr. Wm. Barclay Parsons, receiving the *memorabilia* on behalf of the Academy, described the Academy's library of 270,000 volumes and numerous pamphlets and its valuable historical treasures. Prof. Perrin H. Long, professor of medicine in the State University of New York, summarized Ehrlich's scientific work, and Prof. S. A. Waksman, chairman of the Department of Microbiology, Rutgers University, who graduated in 1915, the year of Ehrlich's death, gave an interesting account of Ehrlich's character and development as a man of science.

A brilliant scholar at school, Ehrlich was extremely modest and escaped when he could to the room at home that he had fixed up as a laboratory for chemical experiments with dyes and for his biological collections. His later work with Koch on tuberculosis, which Ehrlich himself contracted, his work on diphtheria antitoxin with von Behring (full credit for which was not given to Ehrlich at the time), and the development of his well-known later work, were all outlined by Prof. Waksman. A notable feature of his address was the glimpse it gave of Ehrlich's method as a scientific worker and of his personal character.

Ehrlich, said Prof. Waksman, left little to chance and believed strongly in careful planning of research; but he had the ability to use effectively unexpected observations. It happened, for example, that his kitchen-maid forgot to remove from the stove some stained preparations of tubercle bacilli, and this led Ehrlich to realize the value of heating slides stained with certain dyes. It was, however, his systematic driving power and faith in finding the right answer that led, in Prof. Waksman's opinion, to Ehrlich's greatest discoveries. He represents, said Prof. Waksman, the "true scientist who does not sit idly by in deep contemplation waiting until a chance will come his way, but who searches for information in every branch of science that can only elucidate his particular problem".

Always an optimist, Ehrlich struggled throughout his life for the advance of human health. His temperament was hasty; but he was also very kind. He always gave his assistants full credit for their work. Friendly and jovial to all around him, he neglected his own health, ate irregularly, worked and smoked continually and was indifferent to the comforts of life. Richard Willstätter, who went, in 1914, to Frankfurt to take part in the celebration of Ehrlich's sixtieth birthday, wrote that Ehrlich's "working cabinet" and laboratory were small and that the chairs and tables were covered with books, reprints, memoranda, flasks and tubes of every possible form, and cigar boxes in which were either imported cigars or tubes full of chemical preparations. Ehrlich knew and could find everything that was there, even if it took him a long time to look for it. The imp that was in him, which made him make joking remarks with an absolutely serious face and his habit of making fun of himself, confused—so said Miss Marquand, his secretary—people who were not used to that kind of thing. But the man, as we see him through these isolated comments, must indeed have been the man of whom Prof. Bulloch said: "Ehrlich was the most extraordinary man I ever met; with his wonderful inspiration, his enormous power of work, his astonishing knowledge, he was the greatest man in the medical world of his time. He was modest, sincere, noble-minded, and with the greatest kindness and consideration towards everybody".

At the present time, when, to use Prof. Waksman's words, "so much energy is being spent for machines of destruction", we do well to remember that Ehrlich, and the many others, alive and dead, who resemble him, are the true representatives of the scientific spirit. The world, which benefits from their work and nowadays demands these benefits as elementary human rights for which nothing, not even gratitude, need be paid, should be told much more about those who have given, and are giving, their busy lives to the single-minded service of their fellow men.

G. LAPAGE

ASPECTS OF FOAM FORMATION

AT the concluding 1951 meeting of the Society of Cosmetic Chemists of Great Britain, Dr. Raphael Matalon gave a lecture on "Some Aspects of Foam Formation". This was of particular interest because of Dr. Matalon's long experience in the study of molecular interactions at interfaces and his ingenious investigations into the foaming properties of detergent solutions, which were first undertaken at the University of Lyons. Following a period of fruitful collaboration with Dr. J. H. Schulman and others, in the Department of Colloid Science, University of Cambridge, he began his present work, on visco-elastic media and related phenomena, at King's College, London, where he