Surface Structure Beneath the Pacific

IN *Science Abstracts*, *A*, July 25, 1935, No. 2944, which reached here yesterday, one reads that calculations by R. Stoneley from data for an earthquake in Mexico at Apia point to an upper layer of granitic material beneath the Pacific about 10 km. thick resting on ultrabasic rock.

A month ago I came here to relieve Mr. J. Wadsworth (director), on furlough, and have since interpreted records of a few minor shocks with origins less than 10° from Apia. I found, unexpectedly, that velocities given in Jeffreys' "The Earth" (second edition, par. 6–9, p. 116) very closely fit particularly the transverse waves, for upper, intermediate and lower layers, as for thicknesses cited therein. *P* phases are much fainter, but phases corresponding to longitudinal wave velocities appropriate to these three layers do seem to exist too, on some records studied so far.

Such layers exist in New Zealand, but publications read there created the impression that these layers may be absent near Samoa. My deductions, both in method used and as an attempt, have been quite independent of those by Stoneley. However, both results are favourable to a 10 km. granitic layer. References available here so far leave a doubt as to common agreement on the intermediate layer, because some writers call only the lower layer "ultrabasic". In my judgment, Wiechert records here are as clear on this point as are some published by Jeffreys cited earlier.

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Sept. 3.

Microscope Technique

IT is proposed to bring out shortly a tenth edition of the "Microtomist's Vademecum". I shall be glad to hear from other laboratory workers of any new and special methods which would be suitable for inclusion in the new edition. Correspondence from North and South America should be forwarded to the American editor, Dr. Theophilus Painter, Department of Zoology, University of Texas, Austin, Texas, U.S.A.

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Oct. 15.

Points from Foregoing Letters

In order to find out at what height of the atmosphere large-scale mixing (winds) ceases to occur, Prof. F. A. Paneth and E. Glückauf have determined the percentage of helium in samples of air obtained by means of sounding balloons sent up from Kew. Up to a height of 18 km., the percentage remains practically constant, but at 21 km. a noticeable increase (8 per cent) was observed. The authors ask the co-operation of stratosphere investigators in various parts of the world in order to obtain small samples of air from high altitudes.

The intensity of cosmic rays in the upper atmosphere—up to a height of 22 km., corresponding to an atmospheric pressure of 37·5 mm. mercury—has been determined by Prof. E. Regener and G. Pfotzer with an apparatus recording only vertical rays. The curve shows a 'hump' in the intensity at a height corresponding to 300 mm. pressure, and a maximum at 100 mm. pressure, apparently due to primary or secondary components of cosmic rays. At greater heights there is a rapid fall in the intensity of vertical cosmic rays, but the authors expect that a certain definite intensity of cosmic rays (coming from interplanetary space) will be found at the top of the atmosphere.

By means of the new technique of registering the tracks of ionised particles upon photographic plates in the emulsion of which a small amount of a suitable substance (in this case, samarium sulphate) has been incorporated, Prof. H. J. Taylor has confirmed the emission of α-particles by samarium. The element also emits particles of greater penetrating power, which appear to be positively charged hydrogen atoms (protons).

The energy and relative number of positive electrons from a radioactive source has been determined by Prof. A. I. Alichanow, A. I. Alichanian and M. S. Kosodaew, and compared with the similar 'positron spectrum' produced by γ-rays in thin lead foil. From these, and from further results obtained by irradiating lead with γ- and β-rays together and with γ-rays alone, the authors conclude that when lead (or aluminium) is submitted to rays from such a source, most of the positrons produced are due to the γ-rays of radium C.

Dr. G. I. Finch and A. G. Quarrell submit photographs and measurements of 'extra' rings obtained by electron diffraction—by passing electrons through thin films of metals. The rings differ according to the nature of the metal and the treatment it has received. The authors emphasise that when studying the absorption of gases by metals by this method, it is important to exclude the formation of 'extra' rings due to the presence of grease or to amalgamation.

Prof. L. Vegard states that he has obtained good X-ray diffraction photographs by the powder method with γ-oxygen, one of the three forms of solid oxygen. He deduces that its crystalline structure may be represented by a cubic cell containing eight rotating oxygen molecules grouped into pairs (O_2–O_2), the distance between the two molecules of a pair being somewhat smaller than the minimum distance between neighbouring pairs. γ-Oxygen, Prof. Vegard states, represents the closest cubical packing of pairs of oxygen molecules, and its structure is similar to that of α-nitrogen and α-carbon monoxide.

Cinematographic records showing the transition and growth of crystals of α-iron (magnetic) in the original γ-iron (non-magnetic) in the neighbourhood of the transition point 900° C. have been obtained by Dr. W. G. Burgers and J. J. A. Ploos van Amstel, by means of an 'electron-microscope' with one magnetic lens.

Sir Joseph Larmor directs attention to the difficulty and expense involved in obtaining scientific periodicals and other publications with restricted circulation, and protests against the high price of certain Government publications.