tion may be regarded as a filling in of the eddy-space in such a way as to provide easy lines for the flow of the wind.

In waves into which freely drifting powders fall, the steep side is on the leeward instead of upon the windward, and this signifies that the eddy-space is *never* filled up. The whole eddy-space is, in fact, free to move forward, and does so when the snow is drifting, and this progression is the wave motion.

The relation between the profile of the snow-drift and that of the waves of drifting snow and sand may be further illustrated by drawing the profile of the wave, not in the usual way, from trough to trough, but from crest to crest. It is then seen that the unfilled space between the two ridges has the blunt nose and fine tail profile; that it is the profile of the hollows in snow round trees and of the fuljes of sandy deserts, tbe form proper to an eddy space.

The powder, when drifting in waves, has the "fine nose and blunt tail form," which is that of greater eddy-making resistance (the nose being that part turned towards the wind), and the powder, when in its complete accumulation near fixed obstructions, assumes the "blunt nose and fine tail" form, which is that of less eddy-making resistance. Both forms are simultaneously produced on a snow-field, and both are compatible with the removal by the wind of the maximum quantity of snow in the course of the winter. Thus, on the one hand, the maintenance of strong eddies in the drifting waves evidently increases the power of the wind to drive the snow before it; and the hindrance offered by a fixed obstruction is best minimised by filling in its eddy-space with a structure which shall thereafter absorb as little energy from the wind as possible.

Sometimes the freely drifting snow is accumulated in isolated hillocks, which have been called barchans or medaños. Sometimes their development from patches of drift snow can be observed. These patches have in ground plan a fine nose towards the wind and a blunt tail or lee end—a sort of delta shape, but with curved sides. The same thing may be seen in sand. This is in accordance with the habit of the freely drifting snow to adopt a fine nose and blunt tail arrangement in vertical profile.

Freely moving barchans of less or greater elongation probably fill in less or more of the narrow end of the ichthyoid curve. The crest of the cliff will be lower than the summit of the barchan if the former be beyond the broadest part of the curve. The erosion forms produced by wind when acting upon consolidated snow were also studied. Fig. 3 shows how the minute stratification of the snow is revealed by the action of the wind.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE following list of candidates successful in this year's competition for the Whitworth scholarships and exhibitions has been issued by the Board of Education, South Kensington:—Scholarships, 125*l.* a year each (tenable for three years):—William M. Selvey, London; Leonard Bairstow, Halifax; Isaac V. Robinson, West Hartlepool; Arthur Baker, Gosport, Hants. Exhibitions, 50*l.* (tenable for one year):—Charles Cook, Landport, Portsmouth; John S. Mitchell, Uddingston, near Glasgow; Charles J. Stewart, Fratton, Portsmouth; Arnold H. Gibson, Sowerby Bridge, Manchester; William E. W. Millington, Hollinwood, Oldham; Neil J. Maclean, Kelvinside, Glasgow; Henry J. Jones, Southsea; Harold Rawstron, Oldham; George H. Childs, Portsmouth; Norman L. Ablett, London; William E. F. Curror, Ilford, Essex; Walter L. Port, Brighton; John Alexander, Glasgow; Louis D. Stansfeld, London; Robert J. A. Pearson, Sheffield; William L. Perry, Plymouth; Arthur S. Angwin, London; Francis G. Steed, Devonport; Henry A. Bagg, London; Frederick J. Crabbe, Southsea; Arthur Garrard, Forest Gate, E.; Benjamin J. Thomas, Devonport; Maurice B. Dalby, Gateshead; Thomas Wadhams, Wolverton; Oliver S. Spokes, Crewe; James Crone, Charlton, Kent; Alexander B. Sowter, Glasgow; Fred Sykes, Huddersfield; Frederick E. Rebbeck, Belfast; Frank W. Harris, Swindon.

THE metropolitan and most of the provincial medical schools will be opened at the beginning of October. Among the addresses to be delivered, the following are announced:—*Charing Cross Hospital.* The fourth biennial Huxley lecture on "Recent Advances in Science and their Bearing on Medicine and Surgery," by Prof. W. H. Welch, of the Johns Hopkins University, Baltimore. *St. George's Hospital.* Address by Dr. T. T. Whipham. *St. Mary's Hospital.* An address by Sir A. W. Rücker, F.R.S. *Middlesex Hospital.* Mr. Stephen Paget will give an address. *University College.* An address by Mr. Percy Flemming. *London (Royal Free Hospital) School of Medicine for Women.* Address by Mr. Charles Burt. *School of Pharmacy.* Address by Dr. W. Palmer Wynne, F.R.S. *Royal Veterinary College.* Address by Prof. Bottomley. *Yorkshire College, Leeds.* Address by Mr. A. W. Mayo Robson. *University College, Sheffield.* Address by Sir H. G. Howse. *Owens College, Manchester.* Address by Sir Dyce Duckworth. *University College of South Wales and Monmouthshire, Cardiff.* Address by Dr. Berry Hart.

A SUMMARY of the more important recommendations contained in the report of the Indian Universities Commission, which has now been published in India, is given in the *Pioneer Mail* of August 8. Among other points, it is recommended that in addition to holding examinations, all universities should be recognised as teaching universities, and that there should be no more than five faculties, viz. arts, science, law, medicine and engineering. One regulation is certainly a tribute to the power of memorising possessed by the oriental mind; it is prescribed that "text-books to be read should be so long as to exclude the possibility of all of them being committed to memory"; another lays it down that "students should not be required to pass in science before entering on the University course. Instruction should include practical experimental work, and in examinations for the B.Sc., the practical examinations should be passed independently of the written examinations, and should have a separate minimum of marks. . . . The degree of D.Sc. should require original research." The improvement of the equipment of medical colleges is urged, as well as the establishment of a diploma of sanitary science. The universities are not recommended to undertake instruction in engineering, but are advised to encourage agricultural and commercial studies. We agree with the concluding remark of the commissioners, that "it is better for India that a comparatively small number of young men should receive a sound and liberal education than that a large number should be passed through an inadequate course of instruction leading to a depreciated degree."

SCIENTIFIC SERIALS.

Bulletin of the American Mathematical Society, (2) vol. viii. No. 10 (July).—E. J. Wilczynski, account of the first meeting of the San Francisco section, with abstracts of the papers read.—Mary M. Newson, a translation of Hilbert's lecture on mathematical problems (delivered at the Paris Congress, 1900).

American Journal of Mathematics, vol. xxiv. No. 3 (July).—S. Kantor, types of linear complexes of elliptic curves in space of r dimensions.—R. E. Moritz, generalisation of the differentiation process.—H. D. Thompson, simple pairs of parallel W-surfaces.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 24.—"On Skin Currents. Part iii. The Human Skin." By Augustus D. Waller, M.D., F.R.S. (from the Physiological Laboratory of the University of London).

In freshly removed healthy skin, the normal current is always ingoing and the response to electrical excitation by the induction coil is always outgoing. This response, called by Dr. Waller the "blaze," is a sign of its vitality, is independent of the normal current and amounts to from 0·0100 to 0·0400 volt, if tested, within forty-eight hours after removal, by tetanising currents of alternating direction in both pairs of direction.

Moribund skin and skin from post-mortem room give small reactions of variable direction amounting to not more than ten-thousandths of a volt.

In all cases, the electrodes were carefully tested and the skin subsequently killed by boiling, tested and found to give negative results.

The following observation is illustrative. A piece of skin of breast one-and-a-half hours after removal gave 0·0180 and 0·0230 volt in response to single shocks of both directions. On the third day the reactions were 0·0050 and 0·0175, on the fourth day 0·0025 and 0·0035. In all cases, this was abolished by boiling.

A remarkable feature was the great diminution of resistance of living skin caused by tetanisation. The resistance of dead skin is far below that of living skin and is unaltered by tetanisation. Fatigue is exhibited more in human skin than in frog's kin.

As regards the locality of the reaction, Dr. Waller finds that the blaze currents arise exclusively from the malpighian layer of the epithelium, not from the superficial keratinised cells, or from the subcutaneous tissue and the corium; he demonstrates this by means of a three-way key leading off from three electrodes, of which one, A, is on the external surface. B on the internal opposed surface, C on an external indifferent part. Excitation is made through A B and the result is led off from A C and from B C; there is response from A C, but not from B C, showing that the under surface B gives no reaction. The blaze reaction is quite local and is not propagated to any distance from the excited spot, and adjacent portions exhibit different degrees of vitality.

The apparent duration of vitality is surprising, lasting as long as ten days after excision.

The remarkable augmentation of conductivity by tetanisation may be due to, first, a "Kataphoric" migration of water, second, to a dissociation of electrolytes. Dr. Waller is inclined towards the second alternative.

Alterations of temperature produce alterations of resistance as in any moist conductor. In the case of living skin, Dr. Waller has witnessed at the moment of congelation ($-4°$ to $-6°$ of the cooling chamber) a sudden electromotive discharge of 0·0080 volt attributable to the sudden excitation of living matter in the act of congelation. On return of the frozen skin to the original temperature, the resistance was found to be much reduced and the response to excitation was abolished.

PARIS.

Academy of Sciences, August 23.—M. Bouquet de la Grye in the chair.—Short period solar and meteorological variations, by Sir Norman Lockyer, K.C.B., and Dr. William Lockyer. A comparison of the curves, for a period of from fifteen to thirty years, of sun-spots, prominences, atmospheric pressure and rainfall in India. By comparing the solar data with the terrestrial atmospheric pressure, the conclusion is reached that the eruptions of prominences, coinciding with the variations of latitude shown by the spots about every three and a half years, are the true causes of a variation of air pressure on the earth.—The relation between the solar protuberances and terrestrial magnetism, by Sir Norman Lockyer, K.C.B. An examination of Italian observations made during the last thirty years has shown that the epochs of the solar storms classed as great by Ellis are identical with those of the greatest chromospheric activity near the poles of the sun, whilst the general curve of terrestrial magnetic activity is very nearly the same as that of the prominences observed near the solar equator.—The theoretical study of resistance to compression of mortar, by M. Considère.—On the methods of concentrating liquids used for food, and especially wine, by M. F. Garrigou. By distilling wine in a vacuum, it has been found possible to reduce the wine to one-fourth of its original bulk, without losing any of its aroma or alcohol.—Mechanical treatment in the milk industry, by MM. F. Bordas and Sig. de Raczkowski. The number of bacteria in a cubic centimetre of milk capable of forming colonies under plate cultivation was determined in the milk as it left the udder, in the mass of milk 24 and 36 hours after milking, in the one case where it had not been touched by hand, and in the other after the usual amount of handling. In some cases, special antiseptic precautions were taken. The results show that there is no difficulty in keeping the various pipes and taps used in connection with the mechanical treatment sterile, and at the same time there is greater safeguard against accidental contamination.—The structure of the suprarenal bodies of the Plagiostoma, by M. E. Grynfeltt.

NEW SOUTH WALES.

Royal Society, July 2.—Prof. Warren, president, in the chair.—Notes on two chemical constituents from the Eucalypts, by Mr. Henry G. Smith.—In this paper, the author records the results of continued investigations on the ester (geranyl-acetate) contained in the oil of *Eucalyptus Macarthuri*, and also on the oil itself. These data show that the ester does not fall, at any time of the year, below 60 per cent. and that the amount of free alcohol, considered as geraniol, diminishes in amount as the ester increases. The greatest amount of naturally formed ester occurring at any time of the year was 74·9 per cent. in September, but the free alcohol was only 6 per cent., at that time. It has been found from numerous determinations that when the oil is acetylised the ester content will be but little removed from 80 per cent. The oil does not contain phellandrene at any time of the year, and eucalyptol appears to be always absent. Eudesmol is always present, but as it varies in amount the specific gravity of the oil varies also. The crude oil appears to be always slightly dextrorotatory. From the results of investigation of the oil obtained from more than 100 distinct species of Eucalypts, this is the only one found to contain this valuable oil.—The aboriginal languages of Victoria, by Mr. R. H. Mathews.—The parks of Sydney; some of the problems of control and management, by Mr. J. H. Maiden.

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