DR. WILLIAM T. SANGER, secretary of the Virginia State Board of Education, has been elected president of the Medical College of Virginia in succession to Dr. Stuart McGuire.

DR. LESLIE B. AREY, recently appointed chairman of the division of anatomy at the Northwestern University Medical School, has been made the first incumbent of the newly established Robert Laughlin Rea professorship in anatomy. This chair was created through the gift of $100,00 by MRS. Mollie Manlove Rea as a memorial to her husband, at one time professor of anatomy in the university.

DR. HARRY C. TRIMBLE, assistant professor of chemistry at the University of North Dakota, has resigned to become assistant professor of chemistry at the Harvard University Medical School.

DR. ALEXANDER ELLETT, National Research Fellow, who has been working at the Bureau of Standards, has been appointed assistant professor of physics at the University of Iowa.

DR. WILSON L. MISER, associate professor of mathematics, Armour Institute of Technology, has been appointed professor of mathematics at Vanderbilt University.

DISCUSSION AND CORRESPONDENCE

SERIES IN THE ARC SPECTRUM OF NITROGEN

IN the issue of SCIENCE for September 12, 1924, I presented some series regularities which I attributed to the quintet system of the spark spectrum of nitrogen. Quite recently Merton and Pilley (*Proc. Roy. Soc.*, A 107, p. 416, 1925) have published an excellent list of lines which they attribute to the *arc* spectrum of nitrogen. The occurrence of multiplets among these lines involving the same terms as occur in the infra-red multiplets has led to the conclusion that the infra-red lines are also members of the arc spectrum, and that the multiplets previously published belong to the quartet system and not to the quintet system. An analysis of Merton and Pilley's lines and additional infra-red lines measured at the Bureau of Standards has revealed the existence in the arc spectrum of nitrogen of doublet and quartet series systems consisting of combinations between P, P′, S, D and F, terms. In each system the lowest term so far found is a P term. Three PD multiplets of the quartet system have been found which can be represented very accurately by a Ritz formula, giving a value of 33992 to the low $^4P_3$ term. The details of the investigation will be presented in a forthcoming paper.

C. C. KIESS

THE UNDERTOW

THERE are many geologists grateful to Professor Davis[1] for calling attention to the rather careless acceptance of the undertow without adequate consideration of what it is and where it is. Everybody will agree with him that there is an undertow phenomenon produced in every wave trough, that the undertow becomes exceptionally concentrated and powerful off pocket beaches, that when the wind is blowing on shore the undertow effects are greatest, and that there is commonly confusion between undertow, littoral currents and tidal currents. However, it should be borne in mind that sea waves are of two kinds: deep sea waves which are oscillatory and which involve theoretically no translation of water longitudinally, and roll waves in which there is no oscillation and a maximum amount of translation of water. The reality of the undertow becomes evident when one considers the case of waves approaching the shore at time of low tide. For a distance upon shallow shores of half a mile there is a constantly renewed pouring shoreward of water where the oscillatory waves change into roll waves. This series of forward surging roll waves actually achieves a shoreward movement of water of prodigious quantity which returns to the sea only as undertow.

The very configuration of a shore indicates the reality of undertow. Material eroded and broken loose by wave action lies exposed at the shore, but although shingle forms well-marked beaches, it is not usually distributed upon the wave-cut terrace. In some manner the broken material is carried away from the beach, across the wave-cut terrace, and deposited in the wave-built terrace. Although it is certain that the undertow is notably concentrated at pocket beaches, nevertheless it is in existence elsewhere as wave-cut terraces and the wave-built terraces which skirt cliff bound shores past bay and headland alike clearly demonstrate. There seems little question that confusion between littoral currents, tidal currents and undertow is very difficult to avoid because they are all in existence at certain times in the same places.

Nevertheless, wherever waves break, irrespective of the direction of wind or shape of the shore line, there is a forward movement of water at the surface which can return only as an undertow; over wave-cut terraces where oscillatory waves are rare and where waves of translation are the rule the total amount of undertow return must be great and extensive in a direction offshore.

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[1] W. M. Davis, SCIENCE, Vol. LXI., February 20, 1925, pp. 206–208.