

produce a completely amorphous layer than liquefaction, for the resolidification of a liquefied surface layer might result in the formation of small crystals.

In his article on 'Polish,' the late Lord Rayleigh concluded that the material is worn away 'almost molecularly.' Some redeposition seems necessary in order to account for the amorphous layer. Probably the polishing, as distinct from an abrading agent, tends to remove particles of molecular dimensions; and the yielding nature of the support frequently used assists the molecules or atoms adhering to the polisher to come frequently into close contact with the glass or metal, and thus promotes redeposition.

N. K. ADAM.

University of Sheffield,  
Jan. 8.

**Fine Structure of the Balmer Lines of Hydrogen.**

Using two optical trains, (1) two crossed Lummer plates, the larger of resolving power 670,000, and (2) an echelon of resolving power 660,000, with a vacuum tube of the Wood form having a 1 cm. diameter capillary, cooled with liquid air, we have determined the wave-length differences between the two well-known components  $\lambda'$  and  $\lambda''$  of  $H_\alpha$ ,  $H_\beta$ , and  $H_\gamma$  ( $\lambda' < \lambda''$ ), and have sought to obtain still further resolution. The doublet separations are shown in the subjoined table together with those given by Houston (*Astrophys. Jour.*, 64, 2, 1926, pp. 81-92), which latter are, in our estimation, the most trustworthy thus far obtained.

Our values are somewhat higher, but this possibly is not to be wondered at, because of the different current densities employed, 250 against 25 milliamperes per sq. cm. A very trustworthy Lummer plate spectrogram, taken at 13 milliamperes per sq. cm., yields 0.1391 for  $H_\alpha$ , which is in harmony with such a current change.

The search for other components revealed a third on the longer wave-length side of  $\lambda'$ . This component is not fully resolved but is clearly present. Moreover,  $\lambda''$  is distinctly narrower than  $\lambda'$ , and under the discharge conditions employed is somewhat more intense.  $\lambda$  of  $H_\beta$  also shows an asymmetry of the same nature but about one-half as great. Hansen (*Ann. der Physik*, 78-6, 22, pp. 558-600, 1925) has noticed asymmetries in both these cases.

$\Delta\lambda$  IN TENTH-METRES.

Line.	Houstan.		
	(250 ma./sq. cm.)	Kent, Taylor, and Pearson. (25 ma./sq. cm.)	(13 ma./sq. cm.)
$H_\alpha$	0.1358	0.1370	0.1391
$H_\beta$	0.0782	0.0791	..
$H_\gamma$	0.0665	0.0669	..

Details will be published in the *Proceedings of the American Academy of Arts and Sciences*, or elsewhere.

NORTON A. KENT.  
LUCIEN B. TAYLOR.  
HAZEL PEARSON.

Boston University,  
Boston, Mass., Nov. 19.

**Ionisation Phenomena in Active Nitrogen.**

In some recent experiments with active nitrogen, it has been found that ionisation effects differ with the gases mixed with the nitrogen. When the active nitrogen alone was drawn past an ion trap into cylindrical condensers, the negative charges obtained were found to be proportional to the areas of the negative electrodes, indicating that the conductivity is due to photo-electrons emitted from the electrode and not to the production of free ions in the gas.

The same observations were made when hydrogen and mercury were added to the active nitrogen before it entered the condenser. With iodine (ionisation potential 9.4 volts), however, a different ratio of currents was obtained, showing that ionisation is produced in the gas. This suggests that the phenomena associated with active nitrogen may be due to a metastable state of the nitrogen molecule with energy between 9.4 volts and 10.4 volts. The effect of various gases on the deviation of the after-glow was examined, the most important result being that it is not affected by helium when the helium is made ten times the density of nitrogen.

PH. A. CONSTANTINIDES.

Ryerson Laboratory,  
University of Chicago,  
Dec. 17.

It may be remarked that I showed long ago that the ionisation associated with the decay of active nitrogen was dependent on the gases mixed with it (*Proc. Roy. Soc.*, vol. 86, pp. 60, 61, 184, 1911-12). In particular, sodium vapour greatly increased the effect obtained with nitrogen alone, and oxygen or nitric oxide greatly diminished it. Mercury had little effect, as in the experience of Mr. Constantinides. The views expressed by him scarcely seem adequate to cover all the above facts. But the subject is doubtless well worth pursuing, with the much greater theoretical illumination of the present time.

RAYLEIGH.

Jan. 5.

**The Problem of Secretion.**

THE summary of Bowen's recent discussion of the cytology of secretion in NATURE of Jan. 1, p. 30, fails to do justice (as Bowen himself has done in his papers) to the contribution of other workers to this difficult subject.

The earlier work of Golgi, D'Agata, Cajal, and Da Fano, and the investigations of Bowen's immediate predecessors and contemporaries, Nassonov, Brambell, Ludford, and Cramer, contribute so materially to the establishment of our present state of knowledge, that the impression conveyed by the summary in NATURE that this work is solely the achievement of Bowen is, we feel, unfair to the other investigators mentioned. As representing the institutes in which much of the work in Great Britain has been carried out, we think that this article should not be allowed to pass without comment.

JAS. P. HILL.  
J. A. MURRAY.

Department of Histology and Embryology,  
University College,  
Imperial Cancer Research Fund,  
Jan. 4.

Most of the short notice referred to was prepared as paragraphs for "Research Items," which accordingly were intended to be simply a summary of the position of the problem as presented by the author. The paragraphs were afterwards arranged, with little modification, in the form of a short notice. This was offered as a brief statement, not for the specialist but for the more general reader, of the present position as set forth in one of the latest accounts of the subject; it was not intended to be a review of the literature of the problem. Such a review, which would need to be much more extensive, would, of course, take full cognisance of the previous investigations referred to in the above letter.—EDITOR, NATURE.