cate the different thicknesses of the cells used, which were 0·01 mm. and 0·02 mm. in the case of benzene and 0·014 and 0·02 mm. for

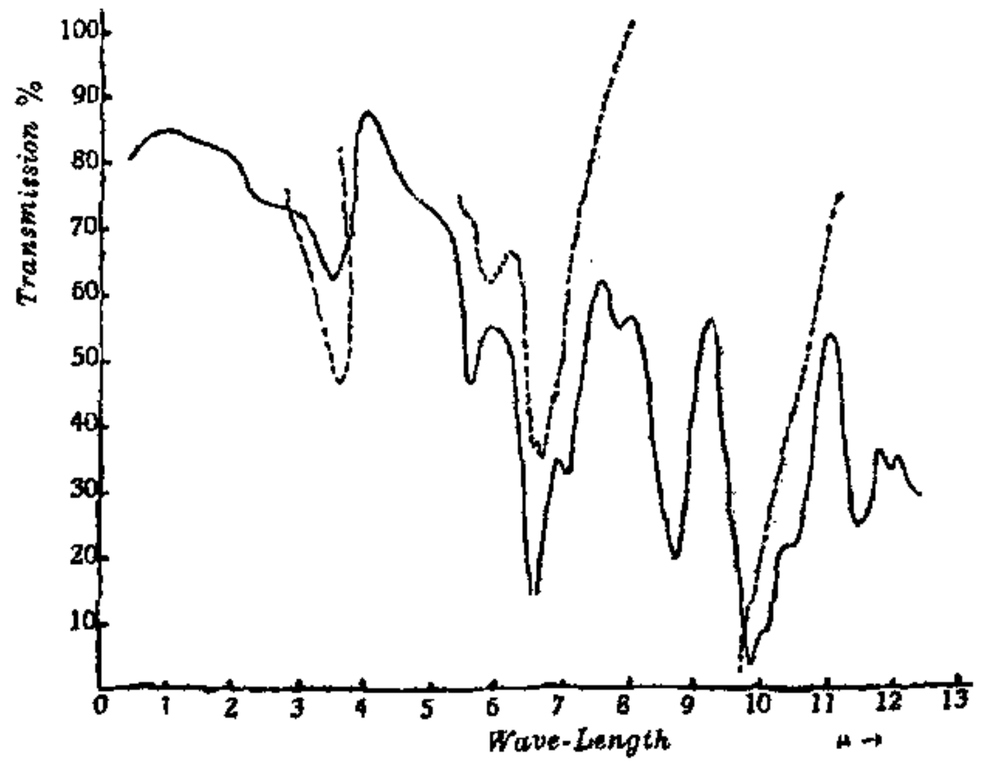

Fig. 4.

Nitro-Benzene—$C_6H_5NO_2$.
t=0; ·015 mm.

nitro-benzene. (They were calculated afterwards by direct measurements.)

The benzene spectrum showed a great transparency throughout the whole spectrum upto 14·2μ when it became suddenly opaque. The bands at 3·25μ and 6·8μ are to be noted very carefully as they occur in all the complex derivatives of benzene, and lead to the conclusion that the vibration of the benzene molecules is not destroyed.

The spectrum of nitro-benzene on the whole showed numerous and well-defined absorption bands. From the comparison of the curves for benzene and nitro-benzene it appears that the introduction of NO_2 group does not very much affect the benzene spectrum. Besides, there does not appear to be any other characteristic vibration due to this group, but there is a likelihood of 1·15μ band to be associated with it as this band is often found in all the spectra of the compounds having NO_2 group.

The other characteristic bands found from the curve were at 3·3μ, 6·25μ, 8·6μ, 9·85μ, and 11·4μ.

A. P. MATHUR.

Bombay,
October 24, 1932.

Thermo-Hardening of Shellac.

SHELLAC and the Australian Acaroids, alone amongst the natural resins possess the property of thermo-hardening. This property is similar to the 'going-over' under heat exhibited by the phenol-formaldehyde class of synthetic resins, the commercial possibilities of which have been so energetically and successfully developed. The possibility of developing this property of shellac on similar lines has been investigated in this laboratory.

As a preliminary, a study was made of the factors influencing the time of heating required to 'cure' shellac. The possibility of considerably retarding or accelerating the process by additions of small quantities of certain materials has been established. These materials can apparently be classified into certain groups; *e.g.*, retarding substances include alkalis and solvents, while accelerators include acids, ester-forming catalysts, ammonia and ammonium liberating agents.

The effect of pressure was shown to be of great importance as it produces a very big retarding influence. This is a serious obstacle to the use of shellac as a moulding binder as the time of curing *in the press* is extremely long. It was found necessary to cool the mould before removal from the press and subsequently complete the cure at a low temperature, *i.e.*, about 80—90°C. Moulding prepared by this method, with addition of certain accelerators, have been shown to possess improved heat-resistant properties.

It is hoped that a paper will shortly be published describing the above work.

R. W. ALDIS.
S. RANGANATHAN.

Indian Lac Research Institute.
Namkum, Ranchi,
October 20, 1932.

Coronium Spectrum.

THE identification of the Coronium Spectrum with the spectrum of oxygen by T. L. de Bruin has evoked considerable interest recently in astrophysical circles, and in spite of the strong combinations which he has observed in the new terms of the oxygen spectrum, explaining some of the most important line of Corona, it must be admitted that the criticism of some of the very careful workers in the field of spectroscopy cannot be easily met. Theoretically there is no place for the new terms discovered by de Bruin. And with our past experience with the modern theory of spectra it is hard to believe that our present-day methods for calculating the spectroscopic terms are not materially correct. This, therefore, leaves

the question of the Coronium Spectrum still open.

We have during the last winter and summer attempted several times to excite the spectra of gases under a variety of conditions to look for the Coronium Spectrum. While it is difficult to say how far our experiments have been successful, we have observed a few facts which need recording. In all our discharge tubes when the pressure becomes very low, of the order of ·01 mm. or less and a powerful electrodeless discharge is passed, the whole visible region becomes practically free from lines, except for a few belonging to the secondary spectrum of hydrogen. As must have been observed by many, the production of these lines does not necessitate an external source of hydrogen supply and the minute traces of hydrogen evolved from the grease, etc., are enough to impart considerable intensity to them. One of these lines—one of the strongest in the secondary spectrum of hydrogen—is 5303·15 and another is 6375. We identify these lines with the two corresponding lines of Corona. There is *a priori* a strong case for the presence of hydrogen in the solar Corona, this being the lightest element, which, therefore, is expected to reach great heights. An examination of the spectroscopic data for the innermost transitions of most of the lightest elements on the basis of selection radiation pressure theory did not help us in any way except to strengthen the suggestion made here with regard to the presence of hydrogen.

The correspondence between 5303·15 and the coronal line is very close but the difficulty of the explanation of other lines still remains.

P. K. KICHLU.
B. M. ANAND.

Lahore,
October 31, 1932.

The Affinities of Chætognatha.

IN upholding the theory of the Annelidan ancestry of Chætognatha, Dr. John* attempts to explain the absence of a Trochophore stage in their development as due to the fact that they are pelagic. This explanation ignores the existence to-day of several pelagic forms (such as pelagic Mollusca and Crustacea) with a larval history. His analogy with the Oligochæta will not stand, for the Oligochæta have become so terrestrial that they do not go to water to lay their eggs and a free-swimming larval stage is not possible. Yet, even in them, a stage which can be compared to the free-swimming larvæ of other Annelids can be distinguished. The developing embryo bursts the vitelline membrane and floats in the albumen of the cocoon, feeding independently on it. A ring of delicate cilia surrounding the mouth and comparable to the prototroch has been distinguished in a species of *Lumbricus* and an adoral ciliated zone is recorded in the embryo of another genus (*Criodrilus*.) The embryos of the Oligochæta have in fact been described as degenerate larval forms.

S. G. MANAVALA RAMANUJAM.
Presidency College,
Madras.
November 1, 1932.

Current Science, 1, 66, 1932.

Studies in the Life-History of *Balanophora indica*.

THE study of *Balanophora indica* was undertaken three years ago with the object of working out the life-history, germination of the seed and its further development.

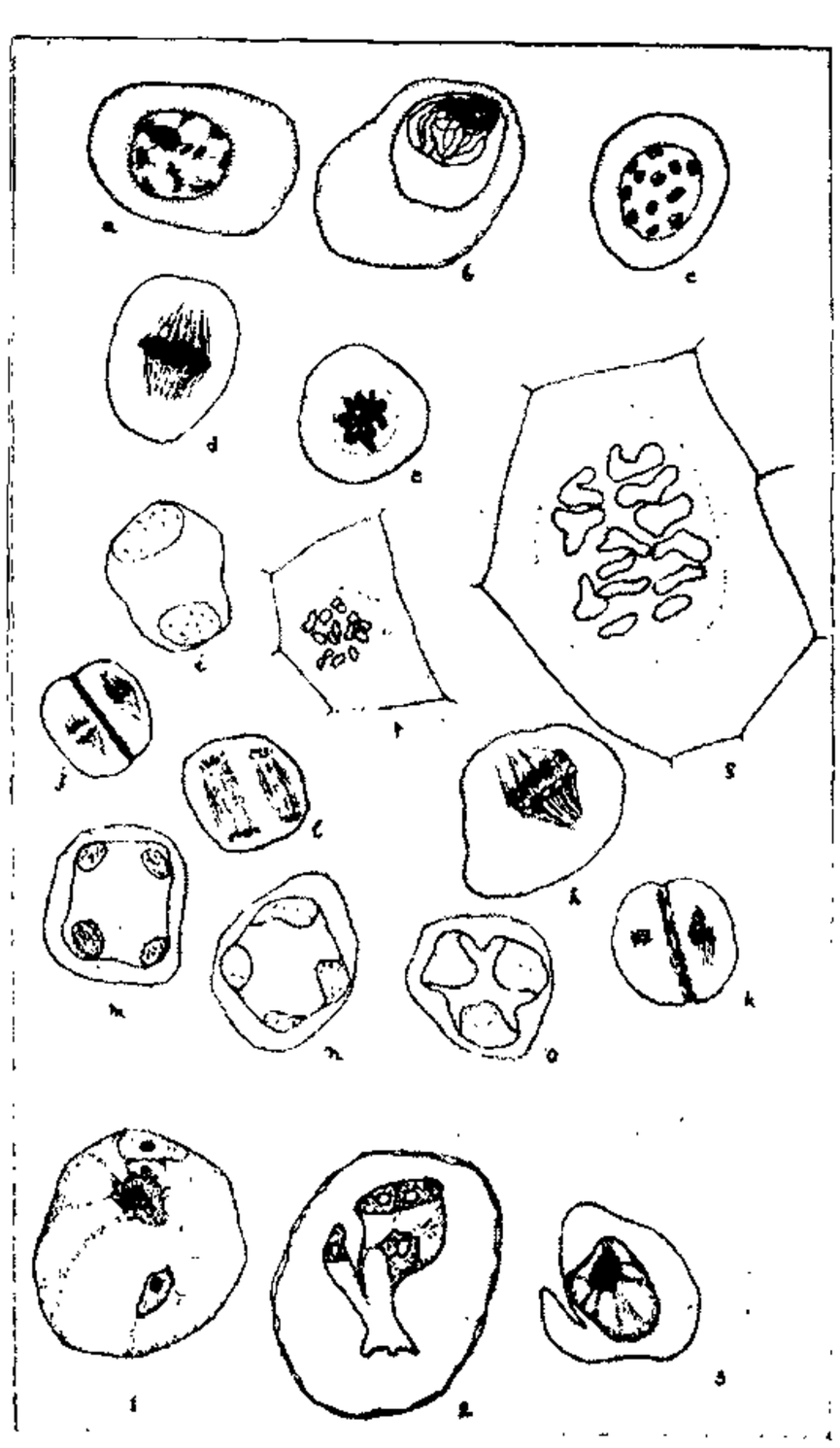

Plate I.