of an alteration in the chemical nature of the products as no drastic chemicals are employed in the process. Almost the same result is achieved by extracting lac with aqueous alcohol of the proper strength.

Known volumes of distilled water were added drop by drop to a measured quantity of an alcoholic solution of lac with vigorous stirring, the resulting suspensions centrifuged in each case and the acid values of the residues and supernatant were determined along with the quantities of resin distributed in the two phases. For the determination of acid value of the hard lac resin, the solution was prepared with aqueous alcohol containing the same amount of water as was present in the soft lac resin solution. The results are shown in Table I.

The hard lac resin prepared by this method can be directly used with the requisite quantity of plasticiser for the manufacture of varnishes. There is no need to get rid of the little residual moisture present since it has a very high tolerance for water.[6]

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On Some Foraminifera from the Tertiary Beds near Surat and Broach (Western India) with Special Reference to the Occurrence of *Siderolites*

THE Tertiary nummulitic limestones occurring between Surat and Broach have long been known to Indian geologists, and although the earlier workers like W. T. Blanford[1] thought that a part of these Tertiary rocks were Lower Eocene in age, subsequent studies mostly based on the nature of the molluscan fauna tended to obscure this view and led to the conclusion that the lowest Tertiary beds in this locality are much younger and are equivalent to the Kirthar series (Middle to Upper Eocene) of Sind,—a view which is the one now generally accepted.

I have recently had an opportunity of examining the tertiary rocks of this area with special reference to their foraminiferal contents, the value of which in the exact age determination of lower tertiary strata is coming to be increasingly realised—thanks to the recent work of Davies, Nuttall and others. In this note, I should particularly like to refer to the foraminiferal fauna which I have noticed in a thin band of limestone confined to the western fringe of the tertiaries, and very closely associated with the Deccan trap in this area. In this limestone, we see foraminifers like *Nummulites thalicus* Davies. *N. globulus* Leym., *Operculina* cf. *canalifera* d'Arch., and also a large variety of *Discocyclina*, closely similar to, if not identical with, *D. ranikotensis* Davies, an assemblage which is clearly indicative of a Ranikot age. In addition to these, we also notice in this limestone the important form *Siderolites* (Fig. 1), the occurrence of which is evidently of great interest and significance, seeing that elsewhere this form is considered as characteristic of the Upper Cretaceous, and forms apparently similar to this seen in Ranikot beds have now been shown to belong to another genus altogether—*Miscellanea*.[2,3] The form I have noticed in the Surat–Broach area is a true *Siderolites* and is here found in association with typical Ranikot species of *Discocyclina* and *Nummulites*. Thus it would appear that the limestone containing this foraminiferal assemblage is of Ranikot age, and represents its lowermost horizon, probably equivalent to the Hangu shales.[4]

The occurrence of a Ranikot bed as part of the Tertiary sequence in this area has evidently an important bearing on the problem of the extent of the Ranikot sea in India, and shows

that this sea must have extended as far south as Surat and Broach. A detailed study of the relationship between this Ranikot bed and the

FIG. 1

Section of *Siderolites*-bearing limestone from Tarkeshwar, near Surat. × 20.

Deccan trap of the area with which it is closely associated, will also be of great value in discussing the age of these traps.

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The Ovule and Embryo-sac Development of Some Malpighiaceæ

SCHÜRHOFF[2] (1924) who investigated the development of the embryo-sac in some Malpighiaceæ, *Malpighia coccifera*, Linn., *M. urens*, Linn., and *Bunchosia nitida*, Jacq., has recorded sixteen-nucleate embryo-sacs developing after "Peperomia-type". A similar type of development has been recorded in *Hiptage madablota*, Gaertn., *Banisteria laurifolia*, Linn., and *Stigmatophyllum aristatum*, Linn. (Subba Rao,[4] 1937) and *Malpighia punicifolia*, Linn. (Narasimhachar,[1] 1938). Stenar[3] investigated the development of the female gametophytes in *Malpighia urens*, Linn. and *Galphimia gracilis*, Bartl., and confirmed the observations of Schürhoff on *Malpighia urens*. But he records an "Allium-type" (Scilla-type) of embryo-sac development in *Galphimia gracilis*.

The characteristic orientation and development of the ovule in *Malpighia urens* are described by Stenar as follows:—When the ovule contains a magaspore-mother cell the inner integument is very small and the outer passes on the ventral side of it up to the very top of the nucellus. Later the outer integument grows fast and forms an arch over the nucellus by the time the embryo-sac is four nucleate. The inner integument forms a ring round the nucellus which passes out of the big aperture and enlarges. A longitudinal section of the apical part of the nucellus gives the appearance of a soleshaped structure.

The megasporangium in the genera Hiptage, Banisteria, Stigmatophyllum and Malpighia takes its origin on a lateral outgrowth of the carpellary wall. In the very young stages it points towards the base of the ovary, but as it grows it bends near the middle of the outgrowth and points upwards. The integuments take their origin early in the history of the ovule. Their development in *Malpighia coccifera*, *Banisteria laurifolia* and *Stigmatophyllum aristatum* is similar to what has been described for *Malpighia urens* by Stenar. The big "Nucellar-beak", which is best developed in *Stigmatophyllum aristatum* (Fig. 6),—formed