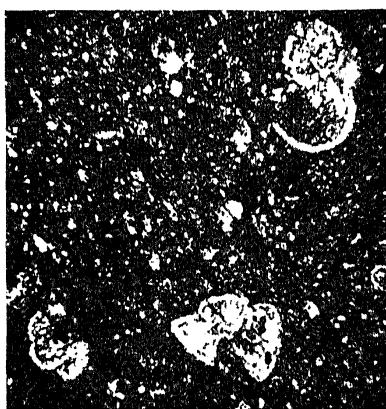


He has further pointed out that the Mesozoic beds thin south-eastwards along the range with gaps in the sequence and at Nammal gorge, the Lumshiwal sandstones and Belemnite shales have not been deposited and the Baroch limestones are succeeded by the Ranikot beds. No Mesozoic beds have been recorded east of longitude 72°.

The Upper Cretaceous foraminifera we are now recording are from the Baroch limestones of the Nammal gorge which Dr. Gee has classified as Jurassic. The upper part of the gorge from which our collections were made is shown in the accompanying photo. The sequence seen is as follows: (a) Khairabad limestones; (b) Dhak Pass beds; (c) Baroch limestones; (d) Kingriali dolomites.



View of the upper part of the Nammal gorge showing the following sequence: (a) Khairabad lst., (b) Dhak Pass beds, (c) Baroch lst., (d) Kingriali dolomites. (Photo: S. C. Sah).



Globotruncana rosetta and *Globigerina* sp. $\times 46$. Baroch lst., Nammal Gorge.

In thin sections of the limestone the forms frequently seen are the pelagic genera *Globotruncana* and *Globigerina*. The value of the genus *Globotruncana* for the recognition and correlation of the Upper Cretaceous throughout the world is now widely recognised^{3,4,5} and *G. rosetta*, the species seen in the Baroch limestones is, in other parts of the world, confined

to the Campanian-Mæstrichtian. The other foraminifera recognised are: *Lenticulina* sp., *Textularia* sp., and *Nodosaria* sp. One of the sections contains a fragment of the orbitoid *Omphalocyclus macropora* which furnishes critical evidence for a Mæstrichtian age.

From the above, it is obvious that the Lumshiwal sandstones and Belemnite beds which intervene between the Ranikot beds and the Baroch limestones at Kalabagh should also be late Cretaceous in age.

Dept. of Geology, S. R. NARAYANA RAO.
University of Lucknow, B. TRIPATHI.
Lucknow,
November 8, 1949.

1. Gee, *Proc. Nat. Acad. Sci.*, 1944, **14**.
2. —, *Ibid.*, 1946, **16**.
3. Glaessner, "Studies in Micropalaontology" (Moscow, 1937).
4. Thalmann, *Eclog. Geol. Helvet*, 1934, **27**.
5. Renz, *ibid.*, 1936, **29**.

RANDOM ASSOCIATION OF POINTS ON A LATTICE

THE author has recently (1948 and 1950) discussed a number of distributions arising from mn points possessing one of k characters with probabilities p_1, p_2, \dots, p_k , arranged in the form of a lattice of m columns and n rows. It was not possible to give earlier the third and the fourth cumulants for the distribution of the total number of joins taken along mutually perpendicular axes between points of varying characters. The present note gives the third and the fourth cumulants of this distribution.

$$\begin{aligned} \kappa_3 = & 2(32b - 37a + 36)a_2 + 4(111b - 147a \\ & + 157)a_3 + 24(22b - 31a + 36)a_4 - 24 \\ & (30b - 37a + 38)a_2^2 - 48(15b - 20a + \\ & 22)a_2a_3 + 64(29b - 37a + 39)a_2^3. \end{aligned}$$

$$\begin{aligned} \kappa_4 = & 2(128b - 175a + 220)a_2 \\ & + 4(1041b - 1635a + 2292)a_3 \\ & + 24(557b - 938a + 1408)a_4 \\ & - 4(1784b - 2617a + 3476)a_2^2 \\ & + 120(87b - 156a + 244)a_5 \\ & - 24(1983b - 3252b + 4788)a_2a_3 \\ & + 32(1548b - 2361b + 3228)a_2^3 \\ & - 192(282b - 477b + 712)a_4a_2 \\ & - 864(31b - 52a + 77)a_3^2 \\ & + 192(867b - 1404a + 2016)a_2^2a_3 \\ & - 32(3126b - 4899a + 6828)a_2^4 \end{aligned}$$

In the above expression, a and b stand for $m+n$ and mn respectively, while