TABLE 2

Effect of crystal violet on the rate of initiation (R_i) of MMA

Concentration of crystal violet (mol/l × 10^5	R_i (mol/l/sec.) × 10^7
1	4·52
3	3·64
5	3·20
7	2·41
10	2·12

[MMA] = 7·05 × 10^{-2} mol/l
[AIBN] = 2 × 10^{-4} mol/l
Polymerisation temperature = 60° C.

of which gives the value of K_i as 1.4 litre mol^{-1} sec^{-1} at 60° C. This study therefore shows that the crystal violet reduces the primary radical in the initiation step.

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1. Kar, I., Mandal, B. M. and Palit, R. S., *Makromole Chem.*, 1969, **127**, 195.
2. Srivastava, A. K. and Mathur, G. N., *Indian J. Chem.*, 1980, **A19**, 1118.
3. Overberger, C. G. and Yamamoto, N., *J. Polym. Sci.*, 1966, **4**, 3101.
4. Srivastava, A. K., Misra, P. K. and Mathur, G. N., *Indian J. Chem.* (in press).
5. Burnett, G. M., *Mechanism of polymer reactions*, Interscience Publishers, New York, 113, 1954.
6. Taninaka, T., Ogawa, T. and Minoura, Y., *J. Polym. Sci.*, 1975, **13**, 681.
7. Burnett, G. M., *Mechanism of Polymer reactions*, Interscience, New York, 1954, 188.
8. Srivastava, A. K. and Mathur, G. N., *Polymer*, 1980, **22**, 391.

OCCURRENCE OF NEPHELINE SYENITE WITHIN QUARTZ SYENITE OF SETTUPALLE, PRAKASAM DISTRICT, ANDHRA PRADESH

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IN the recently recognised alkaline province of Andhra Pradesh[1,2] minor occurrences of nepheline syenite are reported from Kotappa Konda[3] and Podili[4]. The present note reports the occurrence of a minor nepheline syenite body within the silica-saturated alkaline pluton near Settupalle (16°01′ N; 79°52′ E) in the Prakasam District of Andhra Pradesh.

The nepheline syenite body, measuring (100 × 10 m), is oval in outline and is exposed amidst quartz syenites; the actual contact between these two rock types is covered by soil. The body does not contain xenoliths of country rocks.

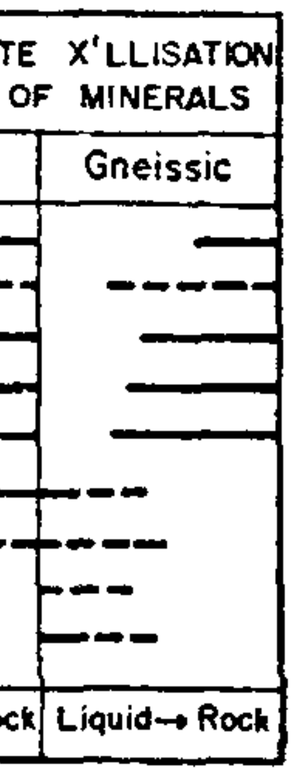
The nepheline syenites are grey in colour, coarse grained and generally gneissic in appearance; however, those occurring at the central portions of the body are massive. The mafic minerals in the massive nepheline syenites are uniformly distributed, while they are aligned into well-defined bands in the gneissic types. These bands trend NE–SW and dip SE; the width of mafic bands (which are defined by the prisms of amphibole and flakes of biotite) is always less than that of felsic bands (which are chiefly composed of K-feldspar and nepheline)

The approximate modal compositions of both massive and gneissic rocks, and the approximate crystallisation sequences of the minerals in the two varieties are given in figure 1A and 1B respectively.

A

APPROXIMATE MODAL COMPOSITION		
Minerals	Massive	Gneissic
Microcline	64	48
Plagioclase	8	17
Nepheline	15	20
Amphibole	9	7
Biotite	3	2
Sphene	1	2
Apatite	tr	1
Zircon	—	1
Calcite	—	2
Colour Index	13	11

B



Under the microscope, the rocks exhibit hypidiomorphic texture, and contain K-feldspar (microcline/microcline perthite), plagioclase and nepheline, with subordinate amounts of amphibole and biotite; apatite, calcite and sphene occur in trace amounts. The rocks are characterised by the total absence of clinopyroxene.

Microcline is subhedral, equidimensional in character and is generally associated with plagioclase and nepheline. Plagioclase occurs either as granular or tabular crystals. Nepheline is subhedral in outline, equidimensional and usually carries minor inclusions of amphibole and biotite especially along the *c*-axis. It also contains inclusions of other minerals like

plagioclase, microcline and calcite. Feldspar is infrequently developed as rounded or embedded inclusions in equidimensional nepheline grains and very rarely with serrated edges. Amphibole occurs as subhedral to anhedral crystals with slight alteration at the edges and along cleavage traces. It is strongly pleochroic with X = greenish yellow, Y = yellowish green and Z = bluish green colours. Flaky biotite is generally seen associated with amphibole, and it is moderately pleochroic with X = Yellowish green and $Y = Z$ = dark greenish brown. Slender needles of apatite and ameboid sphene are seen in association with mafics, while subhedral or rounded crystals of polysynthetically twinned calcite occurs in association with nepheline.

The massive variety is characterised by the presence of weakly perthitic microcline with subordinate amount of plagioclase, whereas in the gneissic type the K-feldspar is invariably a non-perthitic microcline with considerable amount of plagioclase. The discrete plagioclase in massive type is relatively fine grained, invariably untwinned and generally interstitial to K-feldspar. In the gneissic type the plagioclase is medium to coarse grained, rarely twinned, and K-feldspar is interstitial to it. Felsic mineralogy and absence of clinopyroxene are similar to those exhibited by the Kotappa Konda rocks[3] and the marginal facies of the Elchuru Pluton[5].

Detailed studies of the Settupalle pluton are now in progress and will be published elsewhere.

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1. Leelanandam, C., *Curr. Sci.*, 1980, **49**, 550.
2. Leelanandam, C., *Curr. Sci.*, 1981, **50**, 799.
3. Narasinga Rao, K. and Leelanandam, C., *J. Indian Acad. Geosci*, 1974, **17**, 53.
4. Murty, M. S., *J. Geol. Soc. India*, 1977, **18**, 297.
5. Madhavan, V. and Leelanandam, C., *Neus. Jb. Miner. Abh.*, 1979, **136**, 276.

DRAINAGE BASIN ANALYSIS IN THE WESTERN TERMINATION OF THE BHAVANI LINEAMENT

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THE great majority of rivers of Kerala that originate from the Western Ghats flow west and fall into the Arabian sea. Bhavani on the other hand flows east. This river follows an almost SSE straight course from the foothills of Billimalai up to Mukkali in the Attapadi valley. Here it takes a sharp turn and flows through the Attapadi valley, following an almost straight NE course for about 20 km before entering Coimbatore District, Tamil Nadu (figure 1). The river in the past has been suggested to be flowing towards SW from Mukkali as against its present NE course[1]. The sudden sharp bend in the course towards NE at Mukkali has tempted the authors to undertake the analysis of the drainage nets in an area of 150 km^2 on either side of the river along its NE course in Kerala.

The area is made up of Precambrain crystalline rocks and their products of weathering. While in the northern part of the area hornblende gneiss with patches of quartz-biotite schist and hornblende-actinolite schist are the main rock types, in the southern part quartz-biotite schist with patches of hornblende gneiss and schist predominates[2].

The structure of the present area has been investigated[2]. The area constitutes the western termination of the Bhavani lineament, one of the major NE-SW trending penetrative lineaments of Peninsular India. This lineament, which is a zone about 10 km wide, can be traced from Mukkali for over 300 km in a general NE direction. Three generations of folds with axes of the first two generations trending ENE–WSW and the last one N-S have been recognised. The dominant trend of steeply dipping foliation (60–80°) is NE–SW. The development of the first two generations of folds is controlled by movements along the Bhavani lineament[2]. Foliation attitude shows considerable variation on account of superposed folding by the last generation of folds. Joints are well-developed especially in hornblende gneiss. Detailed analysis[3,4] of the joint pattern has revealed three major trends *viz.*, WNW-ESE, NNW-SSE and NE-SW, maximum number of joints trending NNW-SSE.

A drainage map of the area was prepared from Survey of India toposheet No. 58 A/12. Third order basins were delineated on the map (figure 1). The different morphometric properties of third order basins namely basin area, basin perimeter, stream length, drainage density, basin elongation and slope and third order stream trends were determined.

The basins were grouped into two—those in the hilly region and those in the low land. The statistical morphometry[5] method was followed. Correlation between each morphometric property was computed for the two groups and the significance was tested at 5% level.

The correlation coefficients for the basins in the hilly region (table 1) reveal an interdependency of basin area, basin perimeter, stream length and basin