moisture condition, is revealed by a bushy growth of vegetation (figures 1D and 2D) which runs as a well-defined dark band clearly demarcating the contact between phyllite and the overlying platy quartzite.

To prevent the forest fires, the forest department has removed the vegetation along the slopes to serve as "fire breakers" which appear as well-defined linear band (figures 1F and 2F).

Thus, *D. crotonifolia* serves as an excellent litho-logical indicator of phyllite. The striking contrast in the geobotanical response to different lithological units at different altitudes can be employed for rapid and precise geological mapping, including aerial photographic techniques of the hilly terrains which are devoid of outcrops and covered by soil and vegetation.

ACKNOWLEDGEMENTS

Grateful thanks are due to Sri T. Hanumantha Rao, Chief Engineer, and his staff of the Department of Minor Irrigation for providing the necessary facilities to carry out field work. Dr K. Narayana Rao, kindly provided the taxonomic terms of the plant species.

12 March 1986; Revised 25 April 1986

1. Billings, W. D., *Ecology*, 1950, **36,** 62.
2. Nicolls, O. W., Provan, D. M. J. and Cole, M. M., *Inst. Mining Metall. Trans.*, 1965, **74,** 696.
3. Cole, M. M., In: *Geochemical exploration* (ed.) R. W. Boyle, pp. 415–425, *2nd Int. Natl. Geochem. Explor. Symp.*, Toronto, Canada, 1971; *Inst. Mining Metall., Spec.* **11,** p. 594.
4. Prasad, E. A. V., Geobotany and biogeochemistry in mineral exploration in the tropics (abs), *11th Int. Natl. Geochem. Explor. Symp.*, Toronto, Canada, 1985.
5. Prasad, E. A. V. and Sankaranna, G., Geobotany and biogeochemistry in lead, zinc, and copper of Agnigundala mineralised belt, Guntur district, A.P., (abs): *Int. Sem. Geobotany and Biogeochemistry in Exploration for Ground Water and Mineral Resources*, Sri Venkateswara University, 1984.
6. Rose, A. W., Hawkes, H. E. and Webb, J. J., *Geochemistry in mineral exploration* (2nd edn), Academic Press, 1979, p. 657.
7. Prasad, E. A. V., Bioindicators for nonbiotic natural resources in Varahamihira's *Brihat Samhita, Int. Natl. Seminar. Geobotany and biogeochemistry in exploration for ground water and mineral resources*, Sri Venkateswara University, 1984, p. 74.
8. Press, N.P., *Proc. 9th Int. Symp. Remote Sensing Environ.*, 1974, **3,** 2027.

NEWS

ESTER-PULPING PROCESS—A MAJOR CHANGE IN PAPER MAKING

Wood can be processed into pulp for making paper with almost no air or water pollution and with an 80 per cent decrease in production costs, says Raymond Young of the University of Wisconsin (Madison, Wis.). Young uses a mixture of water, acetic acid, and ethyl acetate to dissolve the wood's lignin to produce the pulp-wood. The chemicals can be recovered through distilling towers. Wood is usually processed to pulp-wood by being cooked with highly polluting sulfites. Building a typical paper mill costs $500 million; pollution control systems cost between $2 million and $3 million more. Young estimates that fitting a paper mill with the ester-pulping process costs about $50 million with a 10–20 year payback. Biodyne Chemicals (Neenah, Wis.) is building a 10–15-t/d pilot plant in Neenah to test the ester-pulping processes, which Young says is the first major change in paper making in a century. (*Environ. Sci. Technol.*, Vol. 20, No. 6, 1986, p. 537; The American Chemical Society, 1155, 16th Street, N. W. Washington D. C. 20036, USA).