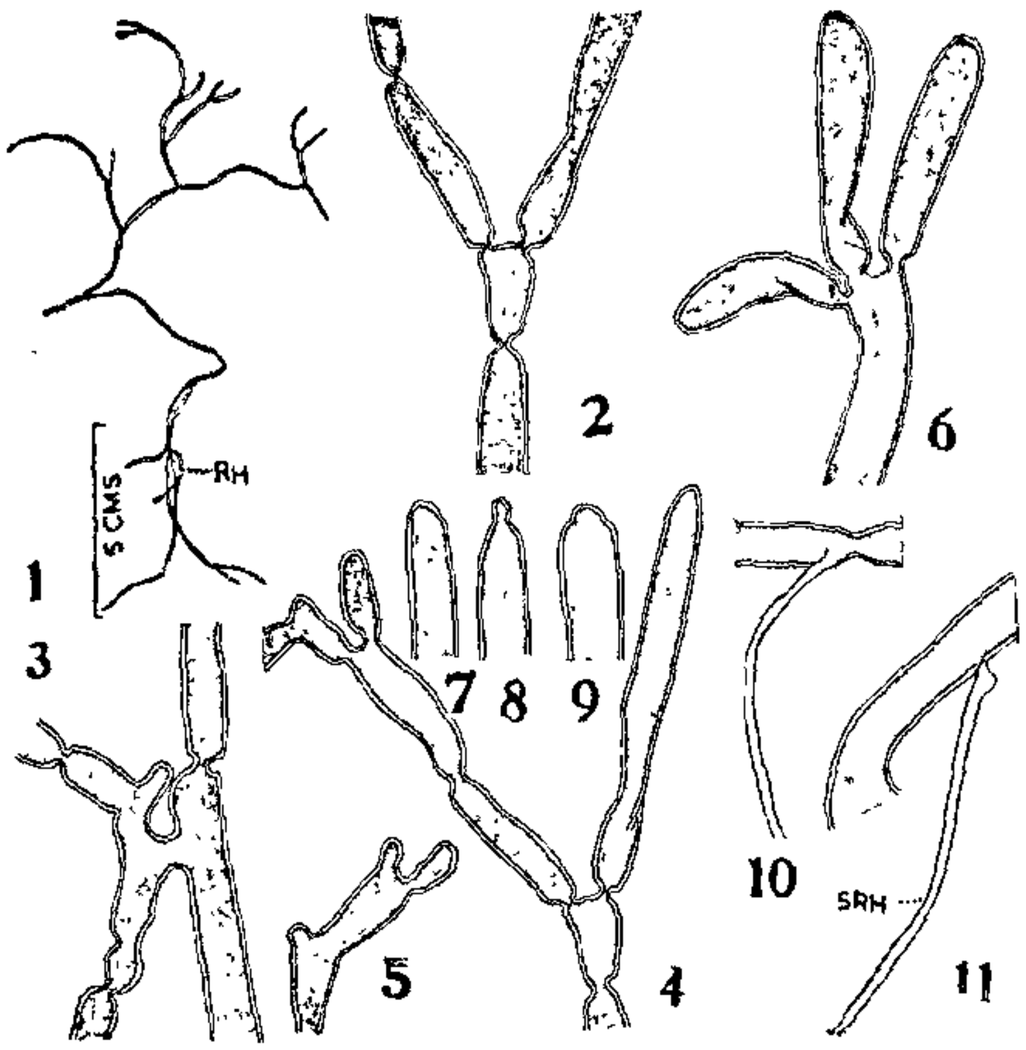
are stoloniferous (Figs. 1, 10 and 11) and are slightly brownish in colour and measure 30 μ across.



FIGS. 1–11. Fig. 1. Entire coenocyte with two rhizoids (RH) and showing branching. Fig. 2 Coenocyte showing dichotomy. Fig. 3. Coenocyte showing "H"-shaped branching. Note a single branch below the constriction in the lower part of the sketch and unequal dichotomy in the upper left. Fig. 4. Coenocyte showing dichotomy in series; the lower equal and the upper unequal. Fig. 5. A coenocyte tip showing unequal dichotomy. Fig. 6. Coenocyte showing trichotomy. Figs. 7–9. Coenocyte showing tips bluntly rounded, acutely papillate, and broadly papillate apices respectively. Fig. 10. Stoloniferous rhizoids arising from near constriction. Fig. 11. Stoloniferous rhizoids (SRH) arising from an intercalary position on the coenocyte. (Magnification of all figures except Fig. 1 is 100. Fig. 1 only 11.)

Although repeated visits to the same locality were made the alga could not be obtained. Probably the drying up of the feeder channel during the shutdown of water in the canal may be responsible for it.

When compared with the only known species, *i.e.*, *Dichotomosiphon tuberosus* (A. Br.) Ernst so far recorded from North India and elsewhere the present alga differs in being more profusely branched and larger in size. The rhizoids also do not arise in star-shaped clusters as in *Dichotomosiphon tuberosus* (A. Br.) Ernst. Although the vegetative features and dimensions of the alga described in the note suggest that it might be a new species, different from the type, yet we refrain from giving it a new specific name till the sex-organs are discovered.

Another collection of *Dichotomosiphon* unfortunately sterile and collected in the vicinity of Dehru Dun (U.P.) was handed over to us for investigations. This however agrees with the well-known species *Dichotomosiphon tuberosus* (A. Br.) Ernst and already reported in India by Randhwa (1942) and Sharma and Moghe (1957). But this collection is being mentioned here since it serves to indicate a new locality in North India where the alga could be found. We wish to record our thanks to Shri Kumar for the material.

We are indebted to Dr. M. Nagaraj for the facilities for carrying out this work. Part of the material was collected by Shri V. S. Yalvigi during the tenure of a University Grants Commission grant.

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SHORT SCIENTIFIC NOTES

Translocation of Radionuclides in Plants*

Studies on absorption and translocation of radioactive nuclides of radiobiological significance, namely, the long-lived naturally occurring nuclides and fission products, in plants are essential for the understanding of mechanisms by which these nuclides are transferred to plants from soil. After their entry into plants the radionuclides are transferred through the food chain thereby becoming sources of internal radiation to animals and man.

Recent investigations carried out at this and other laboratories have established that, next to potassium-40, radium isotopes are the main naturally occurring radionuclides which enter plants. Further, the maximum limits of *per capita* daily intake of radium-226 and radium-228 recom-

* Summary of paper presented at the Symposium on Mechanisms of Biological Transport held during the 38th Annual Meeting of the Indian Academy of Sciences (See *Curr. Sci.*, January 20, 1973, p. 44).

mended by the International Commission on Radiological Protection are the lowest among naturally occurring as well as man-made radionuclides; this indicates the high degree of radiotoxicity of radium to man. However, relatively little information is available on the distribution of radium in plants, mechanisms involved in its uptake and upward transport and the relationships between radium and lighter alkaline earths, calcium and strontium, during their entry and translocation in plants. The present paper reports results of our recent studies on these aspects. These investigations form a part of a continuing programme aimed at understanding the behaviour of long-lived radionuclides in the food chain.

Nutrient culture experiments indicated massive accumulation of radium in roots. Distribution of radium in aerial tissues of plants grown to maturity exhibited a marked acropetal gradient; little redistribution of the radionuclide occurred even when comparatively high concentration gradient exists between different organs. A large fraction of radium in plant tissues is associated with the cell wall. A predominant non-metabolic process operates for the retention of radium on the root surface. Treatment with 2, 4-dinitrophenol and chloramphenicol significantly reduced the amounts of radium transported to aerial tissues indicating that its translocation is mediated by metabolic processes.

Studies on relationships between radium and calcium in plants grown in nutrient solutions revealed that radium was preferentially retained by roots and discriminated against in passage to the shoots. The absorption and transport of radium was profoundly influenced by the presence of chelating ligands such as ethylenediaminetetracetic acid (EDTA) and citrate in the external solution. The strikingly different effects of EDTA and citrate on the mobility of radium in plants but not of calcium and strontium indicate that the translocation of radium throughout plants, unlike that of strontium, is not primarily determined by the concentration of calcium.

Discrimination between radium and calcium in the soil-plant continuum was also examined in contrasting Indian soil types. Distribution of radium between the soil and soil solution phases was in the same general direction as that of calcium but the degree of retention of radium by soil surfaces was much higher. These findings suggest that the markedly lower availability of radium as compared to that of calcium in these soils contributes, in the main, to the strong discrimination against radium in its transfer to plants grown in these soils.

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Spectrophotometric Determination of Nickel (II) with 3-Nitroso-4-Hydroxy-5 : 6-Benzocoumarin

3-Nitroso-4-hydroxy-5 : 6-benzocoumarin has been prepared by nitrosation of 4-hydroxy-5 : 6-benzocoumarin, obtained by the method of Bhargava *et al.*[1]. The purity of the compound was checked by TLC and the m.p. of the sample (178–180°). Solution of 3-nitroso-4-hydroxy-5 : 6-benzocoumarin was prepared in acetone. Solution of nickel (II) was prepared by dissolving nickel ammonium sulphate (A.R., B.D.H.) in double distilled water and it was standardized gravimetrically.

All other chemicals used were of reagent grade.

A Unicam, SP-600, spectrophotometer was used for absorbance measurements and a Metrohm pH meter, E-350, for measuring pH's.

The yellow water-insoluble complex formed as a result of interaction of Ni(II) with the above reagent is soluble in aqueous acetone medium and shows maximum absorbance at 395 nm. The complex was found to be stable for 24 hours, after which measurements were discontinued. The absorbance of the complex, measured at 395 nm, remains constant in the pH range 4·9–10·2. Below and above this pH range, the absorbance falls. The system obeys Beer's law up to 1·75 ppm of nickel. The optimum concentration range for the determination of nickel, as found from Ringbom plot, is 0·29 to 1·30 ppm and the sensitivity of the reaction is 0·0023 μg Ni(II) cm^{-2} for 0·001 absorbance. The molar absorptivity is 24,800. The slope ratio method and Job's method of continuous variations suggest that 1 : 3 (metal : ligand) complex is formed in the system.

The amounts of foreign ions (in ppm) tolerated in estimation of 1·17 ppm of nickel at pH 6·5 are: 5,000 ppm of NO_3^-, Cl^-, Br^- and I^-; 3,500 of NO_2^-, F^-, SO_3^{2-} and PO_4^{3-}; 2,000 of thiourea; 1,000 of tartrate; 900 of BO_3^{3-}; 750 of SCN^-; 100 of $S_2O_3^{2-}$, Ca, Sr, Ba, Hg(II), 50 of Cd, Mo(VI). UO_2(II), Mn(II) and Os(VIII); 10 ppm of Cu and Pd(II). Pb(II) and Bi(III) get precipitated at pH 6·5, which were removed by centrifugation. 100 ppm each of the two foreign ions could be removed by this method. Also 10 ppm of each of Al(III), V(V), and Fe(III) can be tolerated after masking with F^-.

One of us (N. K.) thanks CSIR (India) for the award of a Junior Fellowship.

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University of Delhi, R. P. SINGH.
Delhi-7, *December* 15, 1972.

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Occurrence of Eclogitic Rocks in the Jutogh Formation of the Chaur Mountain Area Simla Himalaya

In the course of revision geological mapping of the Jutogh Formation in the Chaur Mountain area of the Simla Himalaya, the authors came across two occurrences of eclogitic rocks from the area in the northern part of the Chaur Mountain.

1. In the Sarpat area of Simla District, Himachal Pradesh, the eclogitic rock crops out along a *nala* course. It is a small outcrop measuring about 60 m long and 10 m broad. It occurs within the G Member of the Jutogh Formation[1].

The eclogitic rock is dirty pink in colour and is massive to poorly foliated. Enclosed within the eclogitic rock there are lenticular patches of pyroxenite. The eclogitic rock is broadly rimmed by a banded rock mainly comprising garnetiferous amphibolite. The other associated rocks are mainly the quartzose gneiss and certain carbonate rocks.

The eclogitic rock has a sp. gr. of 3·67. At places the eclogitic rock contains veins of pyroxene, garnet, quartz and calcite. In thin section it has a coarse allotriomorphic granular texture. It consists mainly of pink garnet and pale grass-green clino-pyroxene. The clino-pyroxene, in some sections, shows alteration to amphibole. The modal analysis has shown that garnet constitutes 55 to 70% and the clino-pyroxene 35 to 20% of the rock. Calcite is the chief accessory mineral.

2. The second outcrop is located along the Jadoldhar in the same area as above. It is associated with gneisses, pyroxenite, calc rocks and quartz carbonaceous rock. The outcrop is weathered due to humus.

The eclogitic rock is dirty brown in colour. It shows veins of pyroxene and quartz. In thin section eclogite has a granulitic texture. It contains pink garnet and grass-green clino-pyroxene. Calcite, plagioclase felspars and opaque iron ore are the accessory minerals.

Tectonically the eclogitic rocks form part of the Jutogh nappe which occupies the topmost tectonic level in the Simla Himalaya.

C/o P.H. and H.P. Circle, S. V. SRIKANTIA.
Geological Survey of India, B. L. JANGI.
98–99–100, Sector 17-3, K. P. REDDY.
Chandigarh-17, *December* 15, 1972.

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Identification of Some Crude Oils Through the Optical Density Ratios in Cambay Basin

The oils coming from the same source are expected to have related chromophoric distribution. Optical density studies were utilised by Van Eggelpoel[1,2] to investigate the effect of migration and evolution on crude oil composition and by Chandra[3] to differentiate the Naphthabitumens extracted from various outcrop facies of Subathu sediments, Himachal Pradesh. An attempt is made in this note to identify the oils of two tectonic blocks (Ahmedabad-Mehsana and Narbada) of Cambay basin, Western India, using the optical densities at 420 mμ and 490 mμ. Measurements were made on suitably diluted original crude.

The oils of Ahmedabad-Mehsana block irrespective of the depth of occurrence (1311–2071 metres), stratigraphy (Palaeocene—Middle Eocene) and the reservoir temperature (82°–114° C), have the ratio of optical densities at 420 mμ and 490 mμ in the range 2·00–2·31. The Narbada block oils occurring at 670–1203 metres depth interval in Upper Eocene at 61–80° C have the ratio between 3·30–3·40.

Thus the oils of the two tectonic blocks of Cambay basin can be identified using the above speedy method. Besides, the technique has the advantage of demanding only a very small sample quantity. The difference in the ratio of optical densities of the two tectonic blocks may be related to their precursor source material.

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Exploration,
Oil and Natural Gas Commission,
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Chromosome Spreading by Zinc Ethelene Bisdithiocarbamate 'Zineb Ciba"

The Carbamate Fungicides form an important group among fungicides, and those that are now commercially available are derivatives of dithiocarbamic acid. Zineb is used increasingly to protect crop plants against fungal attack. Its solu-

bility in water is only a little over 10 ppm. It is unstable in the presence of light, heat, moisture[1]. It is one of many fungicides and pesticides currently employed in agriculture and has been selected for study as the related substances have been reported to interfere with mitosis and induce chromosomal aberrations by root cells of higher plants.

In this preliminary study we have investigated the cytological effects of a "Zineb Ciba" on the root tips of *Allium cepa*. All solutions were prepared freshly for each test. Two concentrations (0·25% and 0·5%) and two time intervals (6 and 8 h) were used initially. After the designated period of treatment the immersed roots of each bulb were thoroughly washed in tap-water and fixed in freshly prepared acetic alcohol (1 : 3) and stained by the Haematoxylin squash technique[2].

The predominant cytologically observable effect was C-mitotic action. The concentration giving rise to complete C-mitotis is much lower when compared to other C-mitotic agents. We find effective concentration to lie between 0·25 to 0·5% and effective time between 4–6 h at room temperature. Concentrations as low as 0·1% caused extensive cell death. Though contraction of chromosomes was variable it is sometimes ideal for chromosome analysis.

We are grateful to Sri G. S. Chary, Principal, for his interest.

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Occurrence of Barrage Phenomenon in *Aspergillus nidulans*

Formation of several mm wide zone between two colonies of a fungus due to mutual inhibition is called barrage phenomenon[2]. The phenomenon has been reported between two strains (*i.e.*, colonies) of *Podospora anserina* and *Neurospora crassa*[1,2]. In the present study, the above phenomenon has been observed between two strains of *Aspergillus nidulans*.

The barrage was accidentally observed on potato dextrose agar plate contaminated with two strains of the fungus *A. nidulans*. Both the strains were found to be nonsexual variants having smooth-walled conidiophores terminating in hemispherical vesicles. The conidial heads were short, columnar and dark green in colour. Conidia were globose, echinulate and perithecia were absent.

A clear 4 mm wide zone was observed between two colonies of the fungus. The fungus was then divided into two strains, S. and *s*. Both the strains were subcultured on potato dextrose agar in which they were grown near to each other, *i.e.*, S with *s*. By this method a total of eight zones were produced between sixteen colonies of the fungus. In the later study, sixteen colonies of both the strains were produced in separate potato dextrose agar plate and it was observed that no barrage formed between S- or *s*-strain. The above study thus reveals that a barrage is produced only when S-strain is confronted by *s*-strain. This is a new record of barrage phenomenon in *A. nidulans*.

Grateful acknowledgement is due to Prof. H. H. Patel, Head of Microbiology Department and to Dr. N. M. Bhatt, Principal, for their interest, encouragement and the facilities provided.

Microbiology Dept., Sir P.P. Institute of Science, Bhavnagar, Gujarat, *January* 12, 1973.

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A Note on an Anthracnose of Hybrid Orchid

A hybrid orchid (*Phalaenopsis* sp.) in Pantnagar was found affected by anthracnose in November 1972. The lesions were circular to oval in shape and measured 1 to 2 cm in diameter. Black coloured fruiting bodies (acervuli) were observed on the lesions. The pathogen was isolated on potato-dextrose-agar. The conidial suspensions were spray-inoculated on healthy leaves of the hybrid orchid and incubated in humid chamber. After 5 to 6 days, characteristic lesions were seen. In advanced stages of infection the lesions coalesced.

The pathogen was reisolated and found to be identical with the original fungus. The acervuli measured 84–144 μ in diameter. The setae were black in colour and measured 54–93 μ long. The conidia were subhyaline, oblong to cylindrical in shape and measured 10·5–19·5 $\mu \times$ 3–6 μ.

Pape (1927) observed the occurrence of a anthracnose of orchids in Germany. He identified the pathogen as *Colletotrichum orchidearum* Allesch. The description of the fungus under study is similar to *Colletotrichum orchidearum* and hence it is identified as *Colletotrichum orchidearum* Allesch[2].

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