

matters arising

Douc Langurs

SIR.—Relevant to Dr Kavanagh's observations (*Nature*, 239, 406; 1972) of food sharing among captive douc langurs (*Pygathrix nemaeus*), I should like to describe some of my own observations of these monkeys in the wild. Between May 1967 and May 1968, I made fourteen visits to Mount Son Tra (elevation 696 m above sea level), about 10 km north of Da Nang on the northeast coast of South Viet Nam. Here I watched two groups of douc langurs as they fed in the canopies of the trees which they inhabited. At the time the animals were relatively tame, benefiting from partial protection afforded by being on a military base, but recently they have declined on Son Tra (Van Peenan *et al.*, *Mammalia*, 35, 127; 1971). The first groups consisted of four adults, apparently one male and three females (distinguishable when external genitalia were visible), and a baby. The second group consisted of five adults (apparently two males and three females), a half-grown monkey and a baby. The members of a group foraged in close

proximity, usually within 10 m of each other, although not always in the same tree, and they rarely came to the ground. Often two or three animals fed in the same terminal clump of foliage, and occasionally when one pulled down a branch, an adjacent individual also fed on it. This type of passive food sharing was noted by Kavanagh.

I also observed active food sharing on two occasions. In the first group of langurs an adult female bit a small section of leafy twig and passed it to the male who quickly stripped off and ate the leaves. The two animals continued to forage within 2 m of each other, but no further interaction was noted for about 30 min. Then, however, the female solicited copulation from the male who subsequently mounted her, but the animals were disturbed by a passing vehicle before intromission was achieved, and they disappeared from view. In the second group I saw a similar case of food being passed from an individual of unknown sex to a female who had a baby clinging to her. I observed no further inter-

action between these two animals in the few minutes before they disappeared in the foliage.

In each case the passing of food seemed to be spontaneous. The recipient did not appear to threaten or beg, although as Kavanagh pointed out there may be subtle communication patterns inapparent to the human observer. Further observations of these animals in the wild may reveal, as Kavanagh suspected, that food sharing is not rare in family groups in natural conditions. I should add that the species is endemic to the Indochina Region, including Hainan Island, where much of its environment has suffered profound changes, and it is considered an endangered species¹.

Yours faithfully,

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¹ *Red Data Book: Mammalia* (IUCN, Morges, 1972).

obituary

Frederick James Dent

FREDERICK JAMES DENT, FRS, OBE, leader of the 1971 MacRoberts Award winning team, died on October 5 at his home in Malta after a short illness. He was 67.

Dr Dent was born in 1905 and was educated at the Modern School, Leeds. He was a student at the University of Leeds under Professor J. W. Cobb, CBE, obtaining his doctorate in 1929 for an original piece of work on the carbon steam reaction. In the same year he was appointed research chemist in charge of gas production investigations carried out by the Joint Research Committee of the Institution of Gas Engineers and the University of Leeds. In this period he conducted a classical study of the water gas process on the full scale which led to a detailed laboratory investigation of

the gasification of coal in steam and oxygen at high pressure.

It was during this latter work in 1937 that he discovered that methane produced during gasification under pressure was formed by the direct action of hydrogen on the coal substance. During this same period he carried out a study of the catalytic synthesis of methane from carbon monoxide and hydrogen and identified and solved the problems associated with the application of this reaction to the production of town gas. Both these discoveries, the one relating to coal hydrogenation and the other to methanation, have currently enormous significance in the work going on today in the United States to counter the growing natural gas shortage by the gasification of coal to methane as a substitute for natural gas.

On the day of his funeral the success-

ful start-up of a methanation demonstration plant at the coal gasification plant of Scottish Gas, at Westfield, was announced in the press. The previous week this plant, the essential features of which are directly based on Dent's work, produced the first substitute natural gas from coal on a commercial scale, fore-running new plants in the United States which will produce billions of cubic feet of synthetic natural gas per day in the future. The new generation of processes now being developed in the United States for the production of substitute natural gas will practically all also incorporate the coal hydrogenation reaction which he discovered at Leeds and first demonstrated on a pilot plant scale at the Poole Research Station of the Gas Research Board.

It was at Poole, where he was Assistant Director of the Gas Research Board

from 1943–51, that many of Dent's studies on gas production processes, both paper and experimental, were initiated. For example, it was here that the first coal and oil were hydrogenated in fluidised beds and methanol was first catalytically gasified. It was not until he was appointed Director of the Gas Council's Midlands Research Station in 1951, however, that the funds needed to enable him to develop his ideas to commercial reality became available.

The move to Birmingham and later to Solihull coincided with the start of a change in the fuel situation and a shift in emphasis from coal to oil as a feedstock for gas production. The work on the hydrogenation of oil to gaseous hydrocarbon-rich gas accelerated with the construction of a large fluidised bed hydrogenation pilot plant, followed later by two more specially designed ones which led to the development of the Gas Recycle Hydrogenerator. This process, designed specifically to hydrogenate distillate oils, was quickly adopted by the industry and more than fifty units were installed in this country and abroad for the enrichment of over one billion (10⁹) cubic feet per day of town gas.

At the same time, he pursued the development of the Catalytic Rich Gas (CRG) process and, with a highly effective catalyst, brought this also successfully to the commercial stage. Some forty-four units of CRG-based town gas plants have been built, ten of them abroad, while more recently two streams of CRG-based substitute natural gas plants have been commissioned in the United States with a further nine streams in various stages of construction. A further plant is shortly to start up in Japan. The combined thermal output of all these plants, some of which are the biggest in the world, matches the size of the present British gas industry.

During this period of intense activity on oil processes, Dent found time to extend the development of the Lurgi fixed bed high pressure coal gasifier to slagging operation. Two pilot plants were built and operated in the late 1950s and early 1960s and the world's first high pressure steam and oxygen slagging gasifier was satisfactorily developed and demonstrated at Solihull to prove the potential advantages which Dent had predicted for this system from his earlier laboratory studies at Leeds. Increasing interest is currently being shown in this gasifier by companies and government agencies concerned with coal gasification in the United States.

Dent's outstanding contributions to the development of processes for the gasification of coal and oil received worldwide acclaim. His work was recognised by the award of the Birmingham Medal (the highest award of the Institution of Gas Engineers) the Melchett Medal of the Institute of

Fuel, the Walton Clark Medal of the Franklin Institute of Philadelphia and the Coal Science Medal of the British Coal Utilisation Research Association. He was awarded an OBE in 1958 and was elected a Fellow of the Royal Society in 1967. These honours culminated in 1971 with the engineering profession's highest prize, the MacRobert Award, which he received jointly with the chief members of his team.

His success stemmed perhaps mostly from his ability to interpret his creative scientific work into practical chemical engineering and process technology. His unbounded enthusiasm and the real enjoyment he had in his work, however, produced the drive in others which was essential to the rate of progress he achieved, a factor which he always generously recognised. He was modest to a fault, impatient with the less well informed and demanded complete technical integrity. Amongst those with a common interest in gasification and gas production processes he made many friends who will retain a memory of a cheerful and kindly man with a deep and detailed understanding of both the theoretical and practical aspects of his subject.

He leaves a widow, a son, a daughter and three grandsons.

Announcements

Appointments

Professor A. D. Bradshaw is to be chairman of the **Nature Conservancy Council's** advisory committee on science.

Derek A. Ratcliffe has been appointed Chief Scientist of the **Nature Conservancy** and **Ian Prestt** is to be Deputy Director.

Professor W. A. Holmes-Walker has been appointed Director of the **British Plastics Federation**.

Harry Hookway, Chief Executive and Deputy Chairman of the **British Library** has been elected President of the Institute of Information Scientists.

Joan Eileen Walsh has been appointed to be Professor of Numerical Analysis of the **University of Manchester**.

Miscellaneous

The **Lomonosov Gold Medals** for 1973 have been awarded to **Academician Aleksandr Pavlovich Vinogradov** for his work in geochemistry and to **Vladimir Zoubek** for his work in geology.

The **Council of Systematics Association** Department of Biology plan to offer an **Essay Prize** in 1974.

Erratum

IN the article "Pharmacologically induced behavioural supersensitivity to apomorphine" by Daniel Tarsey and Ross J. Baldessarini (*Nature new Biol.*, **245**, 262; 1973) the following sentence should be added. "Dr Tarsey is a member of the Department of Neurology, Boston University School of Medicine and the Boston Veterans Administration Hospital, Boston, Massachusetts".

Reports and Publications

not included in the *Monthly Books Supplement*

Great Britain and Ireland

A Guide to the Use of Terms in Plant Pathology. Prepared by The Terminology Sub-Committee of the Federation of British Plant Pathologists. (Phytopathological Papers, No. 17.) Pp. iv + 54. (Kew, Surrey: Commonwealth Mycological Institute, 1973.) £1.30. [2611]

Principles of Free Radical Chemistry. By Dr J. I. G. Cadogan. (The Chemical Society Monographs for Teachers, No. 24.) Pp. 83. (London: The Chemical Society, 1973.) £1. [2811]

The British Council. Annual Report, 1972/73. Pp. 102. (London: The British Council, 1973.) [2811]

The Royal Society. Report of Council for the year ended 31 August, 1973. Pp. 109. (London: The Royal Society, 1973.) [2911]

Research Supported by the Social Science Research Council 1973. Pp. 318. (London: Social Science Research Council, State House, High Holborn, 1973.) 75p net. [2911]

Inter-Research Council Committee on Pollution Research. Cadmium in the Environment. (Report of a Seminar held at Alhambra House, Charing Cross Road on 15 March, 1973.) Pp. 39. (London: Natural Environment Research Council, 1973.) [3011]

Other Countries

Tecnia Generale del Lavoro Umamo, Volume Primo. By Pier Sergio Vassallo. Pp. 101. (Milano: Pier Sergio Vassallo, c/o CFM-Via Clerici 10, 1973.) [2611]

Australia: Commonwealth Scientific and Industrial Research Organization. Annual Report of the Division of Tropical Agronomy, 1972/1973. Pp. 128. (Brisbane: CSIRO, 1973.) [2611]

Dynapol: Forging Safer Links in the Food Chain. Pp. 16. (Palo Alto, California: Dynapol, 1454 Page Mill Road, 1973.) [2611]

Republic of South Africa: Department of Industries. Sea Fisheries Branch Investigational Report No. 101: Growth of the South African Maasbanker *Trachurus trachurus* Linnaeus and Age Composition of the Catches 1950–1971. By N. D. Geldenhuys. Pp. 24. (Sea Point, Cape Town: Sea Fisheries Branch, Beach Road, 1973.) [2711]

Australia: Commonwealth Scientific and Industrial Research Organization. Twenty-fifth Annual Report, 1972/1973. Pp. 99. (Melbourne: CSIRO, 1973.) [2811]

Republic of South Africa: Department of Industries. Division of Sea Fisheries Investigational Report No. 98: Marine Alpha-Radioactivity Off South Africa. 1. Gross Alpha-Activity, Radiation Dose, Alpha-Spectrum and Variations in Alpha-Activity of Marine Life. By L. V. Shannon. Pp. 80. (Sea Point, Cape Town: Division of Sea Fisheries, Beach Road, 1973.) [2811]

Our Agricultural Future. By Dr M. S. Swaminathan. (Sardar Patel Memorial Lectures, 1973, at India International Centre, New Delhi.) Pp. 54. (New Delhi: All India Radio, 1973.) [2811]

Priorities for Action: Final Report of the Carnegie Commission on Higher Education, with Technical Notes and Appendices. Pp. x + 243. (New York and London: McGraw-Hill Book Company, 1973.) \$4.95. [2811]

Nuclear Energy Agency, OECD. Radiation Protection Standards for Gaseous Tritium Light Devices. Pp. 23. (Paris: Nuclear Energy Agency, OECD, 1973.) [2811]

Republic of Cyprus: Ministry of Agriculture and Natural Resources. Annual Report of the Geological Survey Department for the year 1972. By Y. Hadjistavrinou. Pp. 33. (Nicosia: Geological Survey Department, Ministry of Agriculture and Natural Resources, 1973.) [2811]

OECD. Nuclear Energy Agency. Thirteenth Annual Report of the ORCD Halden Reactor Project 1972. Pp. 178. (Paris: OECD, Nuclear Energy Agency, 1973.) [2811]