soils and drainage patterns. The first chapter entitled, "Concepts of Photo Geology", deals almost exclusively with elementary physical geology, and barely mentions photo geology. The emphasis is on landscape forms which are well illustrated with vertical stereo photographs. The only photo relating to soils is a nine panel multi-band print containing a considerable amount of useful information which, unfortunately, the author does not adequately utilize or explain.

The first part of the third section deals with the air photo interpretation of streams, rivers and lakes, while the second half gives three interesting and rather unusual examples of the use of aerial photographs in the study of water pollution, aquatic vegetation surveys and fish kills. The only colour photographs in the book are four obliques used to illustrate these three topics.

It is obvious that the author's main interest and experience is in the field of photo hydrology. The problems of water supply and water pollution are both major and world wide, and the author has clearly shown that the utilization of aerial photographs can play an important part in tackling these problems.

The book is extensively illustrated and contains many half-tone reproductions of aerial photographs, but no originals. Most of these are small stereopairs which show considerable variation in print quality. For "home study" students it would have been useful to have had a selection of ground photographs to illustrate some of the main features shown on the aerial photographs. The references are not systematically listed but are given in the text, or in footnotes, or at the end of each section.

As a textbook dealing with the "techniques" of air photo interpretation it has some deficiencies; nevertheless, it is a valuable book in that it shows some of the more unusual fields in which aerial photographs can usefully be used.

W. Gordon Collins

FIELD DATA

The Collection and Processing of Field Data

(A CSIRO Symposium.) Edited by E. F. Bradley and O. T. Denmead. Pp. xix+597. (New York and London: Interscience Publishers, a division of John Wiley and Sons, 1967.) 165*s*.

Advances in research are often retarded because scientists and technologists trained in different disciplines frequently find it difficult to appreciate each others' problems and to pool techniques to deal with them. This difficulty is especially common between scientists who study environmental and biological phenomena, which by their nature create special problems of instrumentation, sampling, recording and data treatment, and engineers who design and manufacture the apparatus used. This collection of thirty-six papers is an attempt to improve methods of collecting, processing and interpreting field data, by defining the problems common to various field disciplines, including plant and animal ecology, hydrology, meteorology, oceanography and soil physics, and by fostering an interest between field and engineering scientists. The publication contains a wealth of up-to-date information on the design of measuring techniques, data collecting and processing systems, and computers, and no doubt those present at the symposium derived great benefit from their discussions.

Unfortunately, in the printed form, the aim of the symposium is not fully realized. This is partly a result of the wide scope of the field subjects included; for example, soil physics and animal ecology have little in common at the levels considered. It is also because the editing is poor. It is not enough that editors should rearrange papers and discussions for publication; they should insist that the onus of making the text intelligible lies on the author, not on the reader, and that technical or specialized terminology be kept to a minimum. Failing this, a glossary of technical terms and jargon would help. Some of the contributions, for example, by Van Bavel on "Use and Abuse of Information Processing by Machine" and Chapman on "Measurements for Water Resource Assessment" are lucidly conceived and presented, showing that mutual understanding and stimulation can develop when contributors look beyond their own narrow interests. It is a pity, therefore, that much of the value of this unique collection of papers may be overlooked by the intended audience because of hurried and superficial editing.

Nevertheless, it is recommended to any scientist concerned with the collection and processing of complicated field data, though it will disappoint many biologists with its single contribution on plant ecology and only three on animal ecology; micro meteorologists, hydrologists and oceanographers will probably find it more helpful, and engineers will appreciate better the complicated interactions between the variables that field scientists attempt to measure. At £8 5*s*. per copy and with only a small proportion of the book relevant to most individual scientists, it is a volume to borrow rather than to buy.

T. Lewis

University News

Professor F. L. Whipple, director of the Smithsonian Astrophysical Observatory, has been appointed Phillips professor of astronomy in **Harvard University.**

Appointments

Mr D. E. Warren has been appointed the director of overseas surveys of the Ministry of Overseas Development in succession to **Mr W. D. C. Wiggins.** The directorate provides aid to developing countries overseas in the fields of land survey, air photography, basic mapping and land resource investigation.

Dr M. A. T. Rogers has been appointed acting secretary of the Royal Institution on the resignation of **Brigadier H. E. Hopthrow.**

Announcements

The following four engineers have been elected to the council of the US National Academy of Engineering: **Henri Busignies,** senior vice-president and chief scientist, International Telephone and Telegraph Corporation, New York City; **Walter R. Hibbard, jun.,** vice-president for research and development, Owens-Corning Fiberglas Corporation, Granville, Ohio; **L. Eugene Root,** president, Lockheed Missiles and Space Company and group vice-president, Lockheed Aircraft Corporation, Sunnyvale, California; **Chauncey Starr,** dean, College of Engineering, University of California at Los Angeles.

CORRESPONDENCE

Climate versus Man and his Animals

Sir,—In your issue of May 18 (*Nature* **218**, 641; 1968) R. E. McDowell examines some of the physiological limitations which hold back livestock production in the tropics, but no mention is made of the means of greatly extending these limits that lies in the potential for new domestication among wild herbivores.

The tropical environment is inhospitable to existing domestic species and presumably McDowell's intention was only to consider how the environment affects the production of cattle. But his paper is cast in more general terms as "climate versus man and his animals", and while it is stated that "to attain the desired level of animal performance all elements contributing to the environment and their interactions must be considered", it would also be appropriate to consider how the balance might be swung in man's favour by the recruitment of new species to "his animals".

The adverse effects of high temperature and associated high humidity, or drought, on exotic domestic animals are manifest as decreased food intake, depressed weight gains and recurrrent loss of weight in the dry season, depressed milk yield, and decreased resistance to disease and parasitism. In addition, the fecundity of the stock may be very low. In producing low efficiency the physiological mechanism on which the environment places stress are the animal's ability to dissipate heat, to conserve water and to use nutrients that are of limited availability. Moreover, behavioural reactions play an important part, as in tolerance of discomfort and the feeding patterns adopted.

Large herbivores that are indigenous to the tropics exhibit adaptations that could be of the greatest value as attributes of domestic stock. Buffalo (*Syncerus caffer*) and oryx (*Oryx gazella*) tolerate wide fluctuations in body temperature and so lessen the need to lose water for the purpose of temperature regulation[1]. The eland (*Taurotragus oryx*) voids faeces of low moisture content and this enables it to gain more preformed water. An estimated 4 l. of water per 100 kg body weight per day is available to the eland from food and metabolic sources, so that the animal can be almost independent of surface water[2]. Grant's gazelle (*Gazella granti*) lives through the dry season without drinking water[3]. Ruminants have evolved an effective means of nitrogen conservation by urea-recycling through the salivary glands and those adapted to the arid zone can be expected to be particularly efficient in this regard and to thrive on herbage of exceptionally low protein content. Indigenous tropical ungulates, exemplified by eland[4] and by wildebeest (*Connochaetes taurinus*)[5], have high fertility and fecundity and exhibit a shorter calving interval than cattle. Finally, in their selectivity towards the plants that they graze or browse, indigenous mammals probably exhibit superiority over exotic species, and the antelopes can select a high proportion of the most nutritious parts of plants. If these natural adaptations were harnessed, then the contrasting lack of appropriate physiological and behavioural adaptations in cattle, and their restricted ability to acclimatize or acquire immunity to disease, would no longer set the limits to production or to man's contention with climate.

Eland have been domesticated in the Soviet Union[6] and on a small scale in Southern Africa[4]. Buffalo, blesbok (*Damaliscus dorcas*) and springbok (*Antidorcas marsupialus*) have at least reached the stage of "animal keeping". What is needed, however, is the development of such projects on a large scale so that the forms in a state of incipient domestication may be rigorously selected for docility and efficiency and strains produced that can be compared with cattle on a ranching basis. The productive superiority of communities of indigenous large herbivores on range land, at least in Africa, has been convincingly established[7,8] and currently the means of exploiting this advantage is through game cropping. The technical problems in making a cropping scheme efficient, however, compared with ranching cattle, where the beasts can be rounded up and handled, are formidable. Would it be justified to fully domesticate a new range of species? I believe it would[9]: the cost would be high, but so would be the cost of raising the productivity of traditional systems. The four major meat producers—cattle, sheep, goats and pigs—were domesticated by prehistoric man from species indigenous to S.W. Asia some 6,000 to 9,000 years ago[10]. It seems unnecessary that we should today be limited by his choice.

Yours faithfully,

P. A. JEWELL

Department of Zoology,
University College London,
Gower Street, WC1.

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Paraffin Sections

SIR,—Difficulties I have experienced in finding technical assistance in the preparation of paraffin sections for research work have led me to the discovery that there is a large number of histology technicians (mainly married women) who are keen to do work at home cutting sections. Owing to the sporadic nature of the requirements for paraffin sections by many investigators, and to the difficulties that they have in finding, equipping and supervising competent technicians, it seemed that some arrangement for meeting their requirements with the services of part time technicians might be a useful service.

However, it is hard to assess what the actual demand for such a service might be, and I am therefore writing to ask through your columns if those who are interested would care to address their enquiries to

Yours faithfully,

PAUL D. BYERS

146, Harley Street,
London, W1.

ERRATUM. In the communication "Complex Protein-Prodigiosin in *Serratia marcescens*" by Ramón Cruz-Camarillo and Atilano A. Sánchez-Zúñiga (*Nature*, **218**, 567; 1968) 10,000*g* in the ninth line of the second paragraph should read 100,000*g*.

ERRATUM. In the sixth line of the fifth paragraph of the communication "Ordovician Conodonts from New Zealand" by A. J. Wright (*Nature*, **218**, 664; 1968) *trigonious* should be spelt *trigonius*, and in the eighteenth line Llaneilian should be spelt Llandeilian. *Cytroniodus* in the sixth paragraph should be spelt *Cyrtoniodus*.

ERRATUM. In the communication "80 MHz Photography of the Eruption of a Solar Prominence" by J. P. Wild, K. V. Sheridan and K. Kai (*Nature*, **218**, 536; 1968) the times in the ninth line of the fifth paragraph should read 04h 18m and 04h 30m. In the same paragraph Fig. 3 (ii)–(viii) should read Fig. 3 (iii)–(viii). The last sentence of the sixth paragraph should read: "Assuming the shock wave to have originated from near the photosphere when the Hα prominence erupted, we infer a radial shock velocity of 550 m s^{-1}, which is typical for such phenomena[3]". The address of the authors of this article is Epping, New South Wales, and not Sydney.