Comments and Communications

Cloudiness in Relation to Choice of Astronomical Sites

THE remark of Seymour L. Hess (SCIENCE, **115**, 655 [1952]) that "there are good physical reasons for believing that the spatial distribution of daytime cloudiness may be quite different from that of nocturnal cloudiness" is confirmed by the observations of daytime and nighttime cloudiness made at the Royal Greenwich Observatory at its new site at Herstmonceux and its old site at Greenwich.

At both sites observations are being made of the total amount of sunshine during the day and of clear sky at night. The night records are made with a small camera pointed to the pole, and the amount of clear sky is determined from measurements of the lengths of the circular trails of Polaris and of δ Ursae Majoris.

The sunshine recorded at Herstmonceux is in excess of that recorded at Greenwich by about 40 per cent, whereas the night sky records give an excess at Herstmonceux over Greenwich of about 6 per cent. The difference is attributable to the tendency for cumulus clouds to form inland; at Herstmonceux, which is near the coast, the amount of cumulus cloud is noticeably less than further inland.

The night sky records can give some useful information about the quality of the sky by comparison of the trails of circumpolar stars of different magnitudes. At Herstmonceux the ratio of the total monthly amount of "clear" sky as indicated by the trails of δ Ursæ Minoris and of Polaris has ranged between 0.84 and 0.95.

A night sky recorder is an easy instrument to construct. A simple lens, costing a few cents, is adequate, and the records are made as a quarter plate. High cirrus clouds are readily shown up by their effect on the trails of faint stars, those of the bright stars being unaffected.

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On the "Contractility" of Bacterial Flagellae

ASTBURY (*1*) has shown that the x-ray diffraction pattern of bacterial flagellae is similar to that of myosin. Recently de Robertis (*2*) reported that the addition of ATP to isolated flagellae of *Bacillus brevis* causes a contraction of these particles as viewed in the electron microscope. These studies suggested that bacterial flagellae might be similar to myosin in their behavior toward ATP, and it therefore seemed desirable to check the point by methods that have been applied to myosin in our laboratory.

Four harvests of *Proteus vulgaris x-19* were treated by the method of Weibull (*3*) to obtain pure suspensions of flagellae. Seven attempts to detect ATP-ase activity were made using (total) nitrogen concentrations of the order of .01% and ATP concentrations of 5.8×10^{-4} *M*. Of these only one showed any ATP-ase activity, and this activity was 1/25 that found in myosin (*4*). The presence of flagellae was checked in the electron microscope. In five light-scattering experiments, ATP addition failed to cause any turbidity change, implying that ATP addition caused no change in state of aggregation or in shape. By contrast, myosin under these conditions showed very drastic changes (*5*). The dephosphorylation and light-scattering were done with and without the addition of Ca^{++} (.001 *M*) and Mg^{++} (.01 *M*).

We are at present unable to explain the contradiction between our results and those of de Robertis.

We are greatly indebted to L. Barnes for supplying a pure culture of *P. vulgaris* and to E. Kafig for the electron microscope observations.

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A Tissue-to-Metal Adhesive Useful in Geiger Counting[1]

IN SOME biological isotopic tracer work, we encountered the problem of keeping thin blood and tissue samples from flaking after being weighed and dried on counting planchettes, from shifting into positions of poor counting geometry with slight jarring, or from being blown away by the whistling of exuberant passers-by. The fragility of the samples made even temporary storage before counting a hazard. In attempting to rectify this situation, we explored a variety of possible adhesives, including albumen in water and glycerin, Canada balsam, gum acacia, gum tragacanth, fish glue, casein glue, Duco cement, and lecithin, and we wish to report what seems to us to be an ideal solution.

The qualifications of lecithin as a plastic substance, as a good emulsifying agent, and as a binder, used commercially in confections, seemed to offer great promise. The promise has been fulfilled, for it has been found that a saturated alcoholic solution of com-

[1] Work done in connection with AEC Contract (30-1) 1093 and partially supported by funds from an anonymous donor, administered by James C. White.

mercial lecithin, painted thinly on the bottom of a planchette, is an admirable tissue adhesive. It has the advantages of (1) rapid arrival at a constant weight, (2) excellent adhesive properties, (3) resistance to heat treatment, (4) low surface tension, which promotes spreading of fluid samples into thin layers, and (5) permanence for storage.

The method we have used is to swab a thin layer on as many planchettes as are needed, allowing them to dry to equilibrium with room air. In our air-conditioned laboratory, it has been found that the moisture content is so stable that planchettes can be preweighed and stored, with errors of only a few tenths of a mg in subsequent use. We then weigh the wet tissue on the planchette and dry thoroughly on a slow hot plate. In this process, the tissue and lecithin form a tenacious bond that prevents the tissue from curling or flaking and keeps it so adherent to the metal that even accidental dropping to the floor seldom disrupts it. The lecithin film promotes the spreading of drops of blood or of standard solution, thus assuring better and more consistent geometry in the counting chamber. Lecithin remains plastic and sticky even after heating, and long half-life isotopes can be stored safely and counted several days later.

We have not made quantitative measurements of the effects of the lecithin film on back-scattered β-activity from the metal planchette, but it is assumed that, since the film is quite thin and its density low, this effect will not be important, especially if the standard isotope solutions and tissues are handled similarly. Furthermore, the more consistent geometry of tissues bonded to their planchette by lecithin should give a more uniform back-scattering from sample to sample, thus offsetting the slight losses.

Among the other adhesives, it was found that albumen promotes spreading but readily flakes on drying; acacia, although adhering well to tissue, forms a very poor bond to the metal; hydrophobic adhesives, on the other hand, such as Canada balsam, acetate cements, and fish glue, although bonding well to the metal, do not stick to tissue.

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Book Reviews

The Nature and Properties of Soils: A College Text of Edaphology (Lyon, Buckman, and Brady). 5th ed. revised by Harry O. Buckman and Nyle C. Brady. New York: Macmillan, 1952. 591 pp. $5.75.

This is an extensive revision of the earlier text of the same title. In the revision the authors have not only brought the material up to date to conform to the rapid progress made in the field of soil science in recent years, but they have also extensively revised and rewritten large sections of the book.

The text closely follows the excellent sequence found in previous editions. The initial chapters are devoted to a general discussion of soils, designed not only to provide the student with a degree of orientation in the field of soil science and an appreciation of the importance of soil, but also to acquaint him with some of the problems. The authors begin the detailed treatise with a discussion of the physical and chemical make-up of soils and soil materials. Succeeding sections of the book treat, respectively: soil life and its influence on soil properties, soil water and its control or management, soil air, the genesis of soils and the principles and schemes of soil classification, and organic soils. The concluding chapters cover plant nutrients and their availability in soil, the use of manure and green manure, and the principles of practical management of field soils. In general the book gives a good, balanced discussion of soils, their formation, and use.

The book is intended for beginning students in soil science, but the authors have presumed a general knowledge of elementary chemistry and physics on the part of the reader, courses commonly taken during the freshman year in college. The text, therefore, is best adapted for general courses in soil science taken during the sophomore or junior year.

Numerous subheads and a generous supply of figures make the text easy to follow and enhance the presentation of the technical material. The book is a good text for beginning students in soils, as well as a valuable source of general up-to-date information for all who are interested in soil science.

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Molybdenum Compounds: Their Chemistry and Technology. D. H. Killeffer and Arthur Linz; with a chapter on "The Structural Chemistry of Molybdenum" by Linus Pauling. New York–London: Interscience, 1952. 407 pp. $10.50.

Molybdenum has found its chief technical use in nonferrous alloys and more importantly in alloy steels. The current interest in the use of the unalloyed metal as a material of construction, when the problems of high temperature become critical, promises further metallurgical importance. However, the chemistry of molybdenum has received, by comparison, little attention either in inorganic texts or in the chemical literature. As the authors also say, the comprehensive trea-