News of Science

Urine of Anthropoid Apes

The comparative biochemistry and physiology of the order Primates represent almost unexplored fields. The few existing studies, however, indicate their value in assessing phylogenetic relationships. Hence any contribution in this area is of considerable interest. Gartler, Firschein, and Dobzhansky [*Am. J. Phys. Anthrop.* **14**, 41 (March 1956)] have recently studied the urinary amino acids of anthropoid apes (37 chimpanzees, six gorillas, three orang-utans, two gibbons) using techniques of paper chromatography.

Several striking differences between man and apes are apparent. Experiments indicate that diet is not an important factor in their production. Man excretes much more creatinine and histidine, whereas the apes excrete much more glutamic and aspartic acids. Urinary beta-alanine seems to be absent in orang and gibbon and is rare in man, but it is quite common in both chimpanzee and gorilla. The authors note that although fundamental differences in intermediary metabolic mechanisms are suggested, definitive evaluation requires thorough investigation of metabolism, particularly of renal clearances, in the apes.

In their high glutamic and aspartic acid concentrations and low creatinine content, anthropoid ape urines resemble those of human infants, rather than those of adult men. On the other hand, the histidine content is not particularly low in infant urine, nor is beta-alanine frequent.

Differences between the several ape genera appear less pronounced than those between apes and man. Histidine excretion rates are probably higher in chimpanzees than in other anthropoids, and gorillas seem to possess uniquely high excretion rates of aspartic and glutamic acids, glycine and alanine. But more observations are needed.

Various excretion rates differ not only between ape genera but also between individuals of a genus, coefficients of variation often being of the order of 100. Chimpanzees vary most, at least as much as men.

Since complete daily urine samples are difficult if not impossible to secure in nonhuman primates, the water content of samples varied greatly. Concentrations of most substances were therefore expressed in terms of milligrams per milligram of creatinine excreted. Creatinine was chosen as a standard because it is excreted in man at daily rates that vary less than those of other substances, being strongly correlated with total muscle mass. The authors note, however, that use of this standard presents a problem when comparing amino-acid excretion rates. For creatinine concentration is much the highest in man, being three times that of the chimpanzee and seven times that of the gorilla. Consequently, an apparent difference in amino-acid rates may merely reflect a difference in creatinine concentration. This must always be kept in mind when comparisons are made.

The meaning of this striking dissimilarity in creatinine concentration between man and anthropoids is not clear. It appears most likely to the authors that a difference in volume of urine passed per unit of body weight in a given time is a major factor. They conclude that if creatinine excretion is a measure of muscle mass, a gorilla must excrete at least as much as, and probably more than, a man. Consequently, considering the average creatinine content, a gorilla must produce about seven times as much urine per diem as a man. But, since adult gorillas may attain a body weight of some 600 pounds, this figure seems far too low; rather, on this basis, one would expect the daily urine output of an adult gorilla to be at least 15 or 20 times that of an adult man. Because this appears more than unlikely, some other factor must be involved. Perhaps the answer lies in unlike renal-clearance mechanisms.

This study is a valuable contribution to primatology. But it is obvious that the real significance of a study of this sort can hope to become apparent only after it has been broadly extended to include other primates as well.—W.L.S., Jr.

Trailmarkers for Arctic

An electronic technique for marking trails in the arctic has been developed by the Army's Engineer Research and Development Laboratories, Fort Belvoir, Va. A system consisting of two parallel wires and a vehicular-mounted radio-type receiver has been successfully tested on the Greenland Ice Cap.

An alternating current is fed into the wires, which are buried beneath the snow on either side of the trail to mark the route electrically. The receiver, on a tracked vehicle commonly known as a "weasel," detects the current in the wires. Indicators in the vehicle give the driver his position within the trail. Warning devices alarm the driver when the vehicle gets out of bounds and crosses a trail wire.

Poor visibility during the polar night, snow storms, and dense arctic fog make free movement over the ice cap virtually impossible. Travelers face the possibility of getting lost and falling into hidden crevasses. Bridged over slightly with snow, crevasses are dangerous even in good visibility. An electronic trail is now being extended over 100 miles on the ice cap.

Work is continuing at the Fort Belvoir Laboratories and at General Mills, Inc., Minneapolis, Minn., to improve existing techniques and equipment. A new design is already under test on the ice cap, and a simplified one-wire trail-marking system that may reduce installation and maintenance costs is also under consideration.

Tarnishing of Silver Mirrors

The behavior of front-silvered mirrors is of considerable interest to the laboratory physicist and chemist. The material presented here was contained in an article by H. Koenig and E. Kirste that appeared in the June issue of *Die Naturwissenschaften*.

It is commonly assumed that tarnishing is caused by silver sulfide. Some time ago it was found that the reflectivity of a silver mirror can be considerably increased if its silver surface is exposed to vapors of nitric acid or hydrogen peroxide immediately after evaporation in a high vacuum. X-ray diffraction shows only the rings corresponding to silver. Therefore, silver layers of about 30-angstrom thickness were deposited on collodion; immediately after they were prepared, they were exposed to nitric acid or hydrogen peroxide vapor and investigated by electron diffraction. The resulting diagram showed definitely the formation of silver chloride. This also was proved by chemical tests.

It is therefore necessary to assume that very small traces of chlorine in the chemicals or in the air of the laboratory produce the silver chloride on the surface of the silver mirror. Actually, it is possible in 1 or 2 weeks' exposure to the air to get the strongest silver chloride rings in electron diffraction, and only after more than