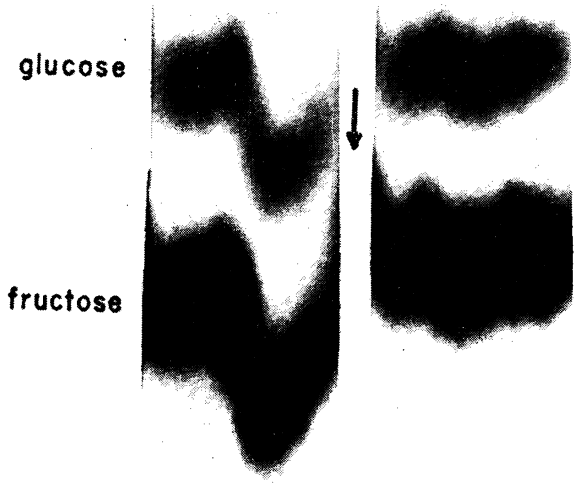

FIG. 1. Radioautograph of chromatogram of glucose and fructose.

10 mg of fructose was eluted from the paper by boiling the paper with 80% alcohol, followed by Soxhlet extraction for 5 hr. The alcohol was removed by vacuum distillation, water being added from time to time. The aqueous solution was extracted with ether to remove traces of phenol. To remove other impurities, the solution was passed through ion exchange columns (Amberlite 100-H and Duolite A-4) with 30 mg of carrier fructose added. The resultant solution (about 300 ml) was concentrated at 35° C to a small volume and finally concentrated to a syrup in a vacuum oven at 35° C.

The syrup was crystallized as described by Putman *et al.* (*5*). Thirty mg of fructose was added during the crystallization. Since the amount of fructose was small, it was found convenient to carry out the crystallization steps in a centrifuge tube and to collect the fructose by centrifuging in a refrigerated centrifuge. The purity of the fructose was determined by paper chromatography, using as solvent butanol and water saturated with propionic acid (*2*). Only one band was found. The final product had a specific activity of 1.2 mc/mg of fructose. A portion of the fructose was degraded by the microbiological method of Wood, Lifson, and Lorber (*6*) and found to be uniformly labeled.

Many groups of compounds other than sugars—for example, amino acids, peptides, and carboxylic acids—can be subjected to chromatography on paper in milligram quantities. This large capacity and the simplicity of the technique make paper chromatography valuable for the isolation of such compounds as well as for their assay.

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A Megalonyx Tooth from the Northwest Territories, Canada

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Among a miscellaneous collection of fossils submitted by Galen B. Smith to the junior author for identification, there was one specimen which deserves special attention. It was a tooth of a ground sloth, and according to Mr. Smith was obtained at Lower Carp Lake, north of Great Slave Lake in the Yellowknife region.[1] It was associated with fragments of a mastodon tooth. The specimen was sent to the senior author for detailed study.

The tooth (No. 15208, Academy of Natural Sciences, Philadelphia—Fig. 1a,b), is like the second lower cheek tooth of *Megalonyx* in shape and straightness of crown. It also resembles in cross section the second upper cheek tooth in this genus. While the wearing surface of the

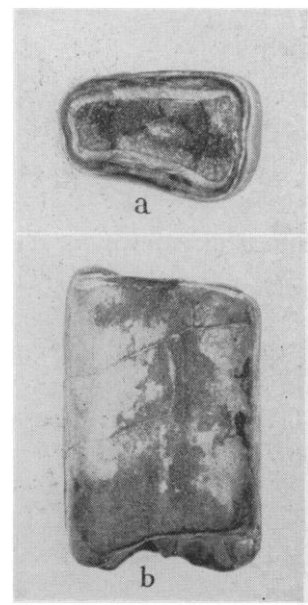

FIG. 1. *Megalonyx* cf. *jeffersonii* (Desmarest). Lower cheek tooth, No. 15208 Academy of Natural Sciences, Philadelphia. (a) Occlusal view; (b) anterior (?) view. Natural size. Pleistocene, Yellowknife region, Northwest Territory, Canada.

tooth is somewhat abraded, the features which result directly from its occlusion with opposing teeth can be ob-

[1] 63° 35′ N; 114° 10′ W. See Rae sheet (85 NW-NE) National Topographic Series of Canada.

served, and these are similar to the characters noted in the second lower cheek tooth. The specimen resembles, but may be slightly smaller than, the comparable tooth of *Megalonyx jeffersonii*. Dimensions, in mm, of the Academy of Natural Science's No. 15208 are: transverse diam 25.9; anteroposterior diam 17.7.

Interest in the specimen arises largely from its occurrence so far north on the American continent. In 1942, Stock (*2*) reported the occurrence of a ground sloth at a locality 15 miles southwest of Fairbanks, Alaska. This identification was based on a phalanx, representing apparently a species of *Megalonyx*. The tooth from north of Great Slave Lake is the second occurrence of the ground sloth *Megalonyx* to be noted in the northwestern region of North America, but the locality is considerably east of Fairbanks, Alaska.

The Yellowknife specimen is undoubtedly of Pleistocene Age, although its exact position within the Pleistocene is uncertain. It is perhaps not surprising to find the genus ranging this far north during Pleistocene time, in view of its usual association with forest faunas. The Yellowknife and Fairbanks specimens are the only two records of a ground sloth north of the United States-Canadian boundary. These specimens may date from the warm phase of postglacial time, or they may be older and date from an interglacial stage. An interglacial age of some of the Quaternary mammals from Alaska has been suggested by Johnston (*1*).

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Infrared Spectrometry of Small Samples with the Reflecting Microscope

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It has been shown (*1*) that the usefulness of infrared spectrometry may be extended through the application of the Burch (*2*) reflecting microscope. As this microscope is a custom-built instrument available only at Oxford, we investigated the possibility of using American reflecting microscopes in connection with infrared spectrometry.

The Bausch and Lomb Optical Company's Grey design Type V apochromatic reflecting microscope condenser and objective of 0.72 NA (*3*) were placed at our disposal, through the courtesy of Mr. L. V. Foster of that company, for tests in the infrared region of the spectrum. From the standpoint of infrared spectrometry these units are not as useful as totally reflecting systems because of their limited frequency range (from the ultraviolet to 2500 cm^{-1}) imposed by the inclusion of refractive and infrared absorptive elements. It was possible, however, to obtain infrared spectra from the visible region to the carbon dioxide absorption near 2400 cm^{-1}, using samples of microscopic size.

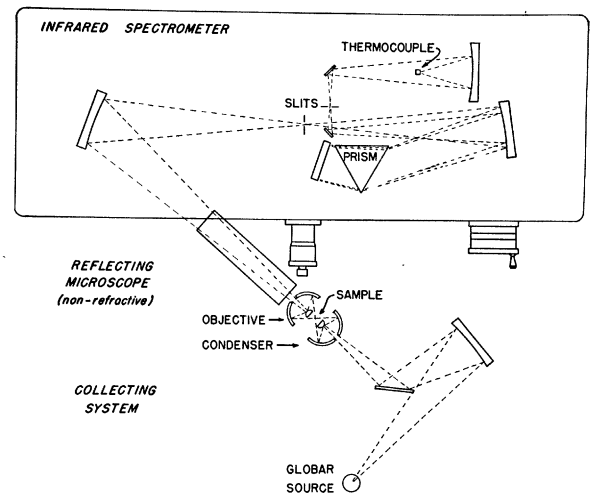

FIG. 1.

The promise shown by this study made it desirable to investigate the utility of the Bausch and Lomb Grey design, Type IV, 0.4 NA condenser and objectives (*3*). This design includes only reflecting elements. One model existed at the time of this investigation, and it was owned and operated by the Polaroid Corporation; its loan was made possible through the great courtesy of Dr. E. R. Blout of the Research Laboratories of that company and Prof. E. G. Rochow of Harvard, who kindly and carefully transported the microscope to and from Stamford.

It was not possible to introduce obvious optical refinements into the system because of the shortness of the time of trial, so the microscope was added to the optical system of a Perkin-Elmer model 12B infrared spectrometer, as shown in Fig. 1. An auxiliary Globar source collected the radiation and focused it into the reflecting condensing system. The focused radiation, after passage through the sample, was collected by the objective. The condenser and objective were mounted on a standard microscope which had been turned on its back. Any microscope equipped with a swinging stand for horizontal photography, or the Bausch and Lomb Type DDE, could be used (if the large reflecting optics would fit). The radiation emerging from the draw tube, without the use of an ocular system, was collected by the first spheroidal mirror of the spectrometer. This mirror then focused the enlarged image of the specimen onto the entrance slit. The physical dimensions were adjusted so that the diameter of this image was equal to the length of the slit.

The portion of the image of the specimen subtended by the entrance slit could be controlled by adjustment of the specimen on the mechanical stage of the microscope. The sample could be suspended in mineral oil on a rock salt plate or between plates, according to the customary infrared technique, placed in solution, or attached to a

[1] The author wishes to acknowledge the interest and help of Dr. T. G. Rochow and Mr. E. J. Thomas of the Microscopical Department of the Stamford Research Laboratories.