pond. The calcium chloride crystals were mostly in the form of needles, as shown in Figs. 2 and 3.

The crystal is uniaxial and the optic sign is negative; the refractive indices measured by the immersion method are $n_0 = 1.550$, $n_e = 1.495$. These are in good accordance with those of the artificial crystals of calcium chloride hexahydrate ($CaCl_2 \cdot 6H_2O$) given by Winchell and Winchell (*2*). The powder patterns of six different crystals collected at the pond and of the crystal of pure calcium chloride hexahydrate (guaranteed reagent) were studied by x-ray diffraction (Table 2) and found to agree very well with each other and with the data for calcium chloride hexahydrate given in the A.S.T.M. x-ray diffraction data cards (*3*). The lattice constants of crystals calculated by comparing observed values with the silicon standard are as follows: hexagonal, $a_0 =$ 7.89 Å, $c_0 =$ 3.95 Å, and $c/a = 0.501$. The values are very close to those given by A.S.T.M., namely, $a_0 =$ 7.90 Å, $c_0 =$ 3.92 Å, and $c/a = 0.497$ (*3*).

The results of chemical analysis of one of the samples are shown in Table 3. In addition to the minor constituents magnesium, sodium, and potassium, the presence of strontium was confirmed by the emission-arc spectral analysis.

The concentration of the solution and the crystallization of the salts in the Don Juan Pond may have been effected by low temperature and extremely dry climate. There is little doubt that the crystals we have examined are naturally occurring calcium chloride hexahydrate. Because of the highly hygroscopic nature of the salt, its occurrence in nature has not been reported previously. We propose the name "Antarcticite" for this new mineral after the name of the continent in which it was discovered (*4*).

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4. The name of the mineral has been approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.
5. This work formed a part of some studies supported by the U.S. Antarctic Research Project being conducted by the NSF. We thank the staff members of NSF at McMurdo Sound and helicopter pilots of U.S. Navy Air Development Squadron Six. Thanks are also due to Drs. N. Yamagata, T. Cho, and Mr. Y. Yoshida who participated in the field study. Dr. M. Fleischer is acknowledged with thanks for his suggestion of the name for this new mineral. We thank Profs. K. Sugawara, E. Minami, and Y. Miyake for their encouragement and advice.

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Simple Microcentrifuge for Use in the Field

Abstract. *A novel, simply made, hand-powered microcentrifuge has been developed for use in the field. It handles as many as eight samples simultaneously. The principal materials are sheet nylon, polyester cord, and polyethylene tubing. Maximum speed of the centrifuge is 10,000 revolutions per minute; maximum radial acceleration, 8400g. Among other uses, the centrifuge serves to obtain plasma for immunoelectrophoresis and flocculation and agglutination tests and for determination of plasma cholinesterase and total solids (refractometrically). Hematocrit values may be obtained and blood parasites concentrated.*

In this age of automation and increasingly complex laboratory instruments, little has been devoted to the development of simple, practical instruments for use in the field under difficult conditions—notably the absence of electric power. Mainly from plastics, I have devised an extremely simple, hand-powered, portable centrifuge that works on the same principle as a well-known toy; spun by alternate tensing and slackening of cords, a nylon disc alternately rotates and contrarotates. A similar device (*1*) introduced by the de Laval Company proved to be impractical in service. My version has served admirably in West Africa, notably in separating plasma for determinations of cholinesterase activities by the Acholest method (*2*).

The main component, the centrifuge disc (Fig. 1), is a nylon elliptoid measuring 164 by 64 mm. The disc incorporates eight tubular channels, four pairs of parallels, paralleling the one side or the other of the disc; each pair occupies roughly one-quarter of the periphery. The bore of the channels is great enough to easily accommodate doubled lengths of certain polyethylene tubing that is described below. The length of each of the four outer channels is 75 mm; of the inner, 67 mm. The distance from the center of the disc to the ends of the outer channels is 75 mm; to the ends of the inner channels, 72 mm. The outer sections of the channels should preferably lie at an angle of 40 to 45 degrees from the radius of the disc. At the midpoint of each side of the disc, where two pairs of channels come together, a depression in the disc gives access to the inner ends of the channels so that tubes can be inserted; insertion and removal are facilitated by the fact that the outer ends of the channels debouch from the edge of the disc. A 30-mm diameter in the center of the disc is reinforced with sheet nylon; through this reinforcement are drilled four equidistant holes, each 12 mm from the center, large enough for passage of the cord to be described. Weight of the disc may be reduced by drilling in noncritical areas; a typical weight is 15 g. The finished disc should be polished to minimize air friction.

The four cords (Fig. 1), 90 cm long, are of long-fiber, three-ply, left-twined polyester yarn (*3*) with a tensile strength of 45 to 50 kg; they are plasticized. They are threaded through the holes in the disc, and one set of four ends is formed into a loop for

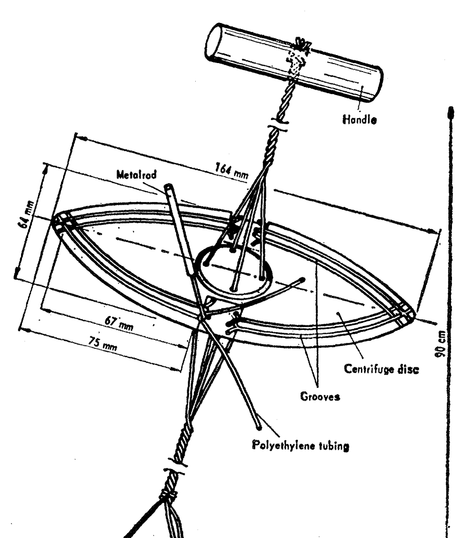

Fig. 1. The complete centrifuge.

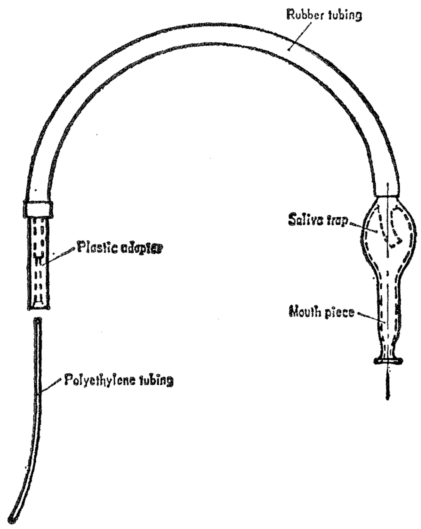

Fig. 2. Oral suction device.

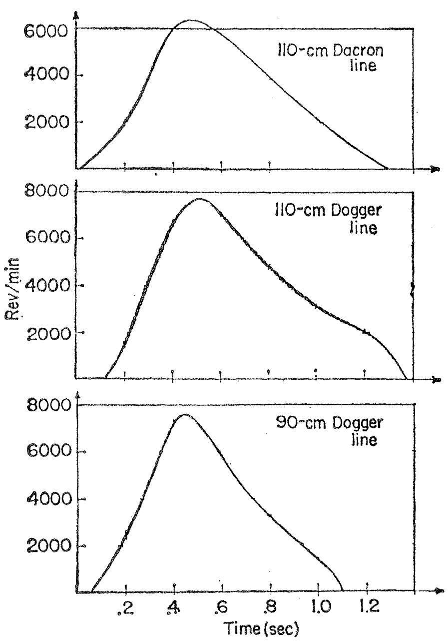

Fig. 3. Test speeds attained with two lengths of two different types of cord.

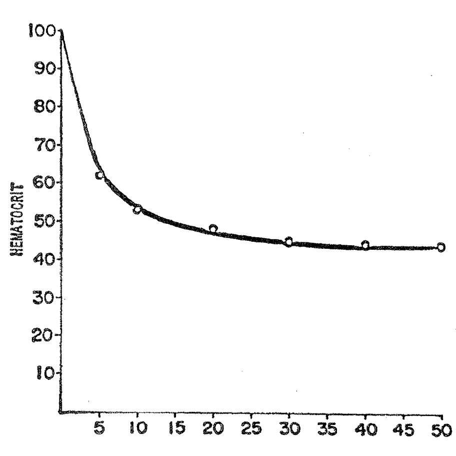

Fig. 4. Hematocrit values obtained with microcentrifuge.

attachment to any solid object; the other four pierce a wooden handle, beyond which they are knotted.

Inside and outside diameters, respectively, of the tubing used (*4*) are 0.76 or 0.86 mm and 1.22 or 1.27 mm. Any similar good polyethylene tubing would serve. The tubing must be heparinized by (i) blowing through the coil 1-percent heparine solution in saline, (ii) blowing air through the coil, and (iii) leaving the tubing to dry.

A suction device ("filler") for filling and emptying the polyethylene tubes is shown in Fig. 2. Other accessories are a metal rod for aiding insertion and removal of the tubes in and from the disc, small forceps, and scissors.

A length of tubing, inserted in the plastic adaptor of the filler (Fig. 2), is sucked almost full of the sample. Doubled into U-form, the filled tubing is then inserted in one of the disc channels, doubled-end first, from a midpoint of the disc. The procedure then is to grasp the handle, tauten the cords, and manually rotate the disc (located at the center of the cords); release the disc, allowing it to spin, and then accelerate the spin by alternately tensing and slackening the cords; spin the disc ten or more times at top speed until separation of the sample is visibly complete; and withdraw the tubing and separate the separated components of the sample by cutting the tubing with scissors. A gentle blow through the filler deposits a component on glass slides.

A disc was tested electronically with three cords of different length or construction; the results appear in Fig. 3. With traction of 19 to 20 kg, the disc repeatedly exceeded 10,000 rev/min, radial acceleration exceeding 8400*g*. The speed of the disc is great enough to seriously injure anyone contacting it.

A test determination for (female) hematocrit (Fig. 4) yielded a result of 44 percent; the normal range is 35.8 to 45.4 percent, with a standard deviation of 2.3 percent (*5*). The constant change in direction of rotation, with accompanying deceleration and acceleration, has no practical effect.

Among other uses, the centrifuge serves to obtain plasma for immunoelectrophoresis and flocculation and agglutination tests and for determination of plasma cholinesterase and total solids (refractometrically). Blood parasites may be concentrated in the red-cell layer. The centrifuge may be useful in other biological sciences as well as in medical research.

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3. Yarns No. 250/10 or 250/12 made by Nils Wennerström, Lidingö 1, Sweden. Corresponding English cotton numbers are 12/15 and 12/18, respectively; the latter is preferable.
4. Tubing made by Clay-Adams, Inc., 141 East 25 Street, New York 10010.
5. *Documenta Geigy, Series chirurgica* "Scientific tables" (1956), p. 335.
6. Development supported by WHO; a detailed report is available as WHO/Mal/486.65. The centrifuge is being manufactured by Ingenjörsfirman Instrumenttjänst, Box 57, Sundbyberg 1, Sweden. I thank Pehr Clementz, Gösta Lundgren, and Lars Sjöstedt for assistance.

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Lidar Observation of Cloud

Abstract. *Lidar (from "light detection and ranging") is the optical counterpart of meteorological radar. At optical wavelengths, very much smaller atmospheric particles can be detected than at microwave wavelengths. With a laser power source, a transmitter uses a lens system to beam very intense pulses of monochromatic light of extremely short duration. Light backscattered by the atmosphere is collected in a receiver system that is essentially a telescope coaligned with the transmitter, and a narrow-pass filter allows only light of the transmitted frequency to be detected by a photomultiplier. Data are presented on an oscilloscope as a trace of signal intensity versus range (the A-scope of radar practice) and photographed.*

Since August 1963 an experimental program at Stanford Research Institute has used single-shot, giant-pulse ruby lasers in certain systems whose specifications appear in Table 1. In these systems, peak powers of many megawatts are attained in pulses having an equivalent length of some 4 m. The coherence and monochromaticity of the laser-generated light make it