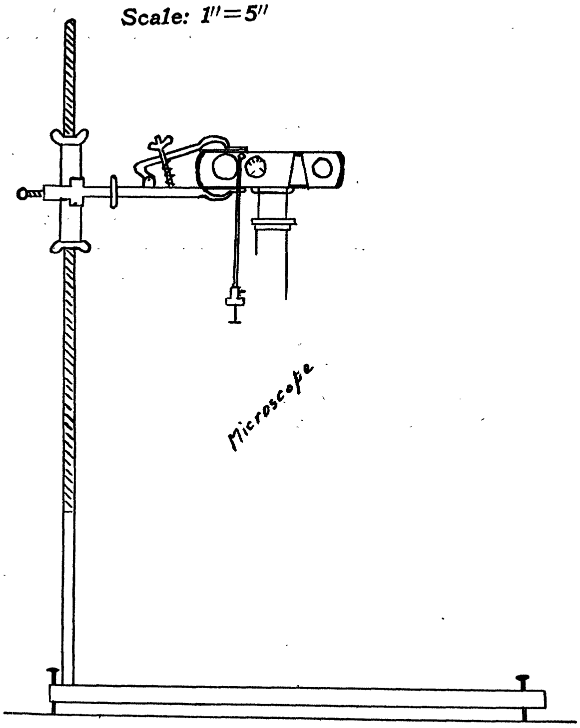
SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE APPARATUS FOR TAKING PHOTOMICROGRAPHS

WHEN making photomicrographs much time is involved in setting up the apparatus preliminary to making the exposures. Hence it is often inconvenient to take just two or three pictures. The writer has devised a stand for supporting a small camera over a microscope. The camera used is a small one made by a well-known German manufacturer of microscopes and other optical equipment. It uses standard size motion picture film and has a fast lens that enables the operator to take photomicrographs with very short exposures. The support here described



permits one to set up the apparatus in about two minutes.

The stand for supporting the camera over the microscope consists of a steel base, 15 inches long by 6 inches wide, drilled and threaded at each corner to take a thumb-screw. These are used for leveling. At one end, midway between the two thumb screws, an upright from an ordinary laboratory ring-stand is fitted into a threaded hole in the base. This upright is threaded from the top to within about 5 inches of the bottom. A wing-nut is screwed on to the upright, a loose fitting three-inch section of brass tubing is placed over the upright and on top of the first nut, then another wing-nut is screwed down on to the brass sleeve. One end of a short burette clamp is attached to the middle of the sleeve and the camera secured at the other end, lens down. By loosening the lower wing-nut and tightening the upper, the camera may be lowered and clamped firmly at any desired elevation.

The microscope is placed directly under the camera and the latter lowered until the rim of the metal mounting of the lens is in contact with the mounting of the eyepiece of the microscope. With the particular camera and petrographic microscope used, the ocular of the microscope fits snugly within the raised edge of the camera lens mounting.

Since the human eye at rest is focused at infinity, it is unnecessary to focus on the object with the camera; the camera is simply raised a bit, swung aside, the microscope focused on the object to be photographed, the focusing screw of the camera set at infinity, the lens opening set at f.3.5, and the whole swung back and lowered into place over the microscope. Of course the length of exposure will have to be determined according to existing conditions.

The accompanying figure is self-explanatory.

MARCELLUS H. STOW
WASHINGTON AND LEE UNIVEPRSITY

A METHOD FOR THE PRESERVATION OF BOOK BINDINGS

IN an earlier communication[1] a method of preserving manuscripts was discussed. In the present paper is described a continuation of the work to the protection of book bindings, etc. The dressing of the British Museum employs beeswax dissolved in hexane. We have used a wax which has advantages over beeswax and a solvent which is cheaper and more readily obtainable.

A solvent is made of equal volumes of carbon tetrachloride and benzene and kept in a tightly stoppered bottle to prevent evaporation. The carbon tetrachloride makes the solution less dangerous in the presence of fire. However, the solution should be kept away from flame.

To one liter of the solvent mixture is added 100 grams of Halowax No. HXRD–2–25. The wax is allowed to dissolve in the solvent. Halowax is a commercial product with a melting point of 252° F. It is a flexible material, and the melting point is far above the highest temperature reached during summer

[1] Sanders and Cameron, SCIENCE, 74: 1924, November 13, 1931.

weather. After the halowax is dissolved, 200 grams of anhydrous lanolin is dissolved in the mixture. If hydrous lanolin is used, about 300 grams is required, since hydrous material contains approximately 35 per cent. of water. In case anhydrous lanolin can not be obtained and the hydrous material is used, after solution has taken place a layer of water mixture collects at the top, on standing. The lower layer should be separated by use of separatory funnel. After the halowax and lanolin are completely dissolved, 50 ml of cedarwood oil is added. This solution should be kept in a tightly stoppered bottle.

The solution may be applied to the book bindings as a spray, but we have found it preferable to use a camel's-hair brush. Care is taken that a uniform coating is applied to the book. The book is held or placed in open position until dry. The solvent mixture dries quickly, since the solvent components have a high vapor tension. When dry, if too much wax appears in places it may be smoothed by the brush dipped into the solvent.

Carbon tetrachloride and benzene can be obtained on the market cheaply and in pure form. A mixture of the two in equal volume forms a solution that is not explosive. However, reasonable precautions should be observed. This solvent, aside from being cheaper and easier to obtain, forms a more homogenous solution than does hexane. The halowax used has a higher melting point and gives a better polished surface than beeswax.

The lanolin gives the oil protection to the book bindings, especially in the case of leather bindings. The lanolin does not become rancid on standing. The quantities of halowax and lanolin may be varied, depending on the particular binding to be treated.

This treatment protects the book from the atmosphere, the halowax and lanolin forming a waterproof film after the solvent has evaporated. Any breaks in the film due to bending may be smoothed by brushing with the solution.

The halowax itself is an efficient repellent towards fungus diseases and towards insects and rodents. In case that further treatment with insecticides or fungicides is desired, these may be added to the solution (provided they are soluble in the solvent) and applied at the same time.

Book bindings so treated can be cleaned and washed without damage to the bindings. The coating produces no change in color and the dye does not "run" in the solution.

This formula was worked out at Dartmouth College with the advice of Professor C. E. Bolser. The formula was tested by the Baker Library of Dartmouth and proved very satisfactory.

Halowax may be obtained from Halowax Corporation, 247 Park Avenue, New York City, the cedarwood oil from any drug store and the other materials from any chemical supply house.

J. P. SANDERS

STEEL CHEMICAL LABORATORY OF
DARTMOUTH COLLEGE,
HANOVER, NEW HAMPSHIRE

SPECIAL ARTICLES

WOOD OPALIZATION

ABSENCE of petrified dicots in older Mesozoic sedimentaries, though many other forest types, either calcified or silicified, occur the world over from Paleozoic times down, even twenty-five years ago seemed primarily due to non-existence of the dicots. Then the antiquity of flowering types began to come into view; and presently Dr. Marie Stopes was able to describe four well-defined genera of dicot stems (partly calcified?) from the lower Greensand. Nextly, Kraeusel reported a further type from the weisser Jura of Germany. While a Trochodendron-like stem fully silicified from the mid-Jurassic of India has just been described by Sahni.

Valid reasons for a sparsity of dicot stems in many pre-Tertiary horizons are purely physio-chemic. In lignites, due to easy liability to bacterial decay, dicots are often found much broken down where conifers still retain their finer structures. In accord the beds of coal are made up of decay-resistant types. Also, chalcedonized logs, with coaly centers or surfaces, are often noted in the field; and since much partly lignitized, partly silicified material occurs, the suspicion is emphasized that in all probability, in fresh-water beds at least where change is slow as compared with what goes on in eruptives, it must be woods in the lignitic condition that are replaced by silica or calcium carbonate. The lignitic or lightly carbonized stage once passed, there is little further replacement, else there should be notable silicified bands in bituminous and anthracite coals, in the various forms of durain and vitrain. Such are quite unknown.

Evidently siliceous or calcareous replacement depends on what are termed "reversible" chemical reactions; and once log rafts reach the lignitic condition any abundance of lime with calcitic deposition and some desiccation must be peculiarly favorable to a later course of opalization. Filling in of desiccated lignites by sheets of calcite was seen by Brown in one of his Pleistocene mammal quarries in Eastern