peatedly by other workers to be associated with respiratory phenomena in cells (*cf.* Crozier[4] and[5]).

HUDSON HOAGLAND

THE PHYSIOLOGICAL LABORATORY
CLARK UNIVERSITY

THE ISOLATION OF CRYSTALLINE TOBACCO MOSAIC VIRUS PROTEIN FROM DISEASED TOMATO PLANTS

THE isolation of a crystalline protein possessing the properties of tobacco mosaic virus has recently been described.[1] This protein was obtained from Turkish tobacco plants infected with this virus, by fractionation of the globulin in the plant extract with ammonium sulphate, celite and lead subacetate. The same general procedure with certain improvements[2] has been applied to extracts from tomato plants infected with tobacco mosaic virus and an active crystalline protein has been obtained from this host plant.

The protein from mosaic-diseased tomato plants and that previously isolated from mosaic-diseased Turkish tobacco plants have the same crystalline form, optical activity and chemical composition. They likewise give the same protein color reactions and are precipitated from solution under the same conditions. When solutions of the protein from diseased tomato plants are made more alkaline than about pH 11 or more acid than about pH 1, the protein is denatured and the virus activity is lost. It is completely coagulated and the activity lost on heating to 94° C. These results are similar to those obtained with solutions of active crystalline protein from diseased tobacco plants. Cataphoresis experiments, carried out by means of the Northrop-Kunitz apparatus, on the crystals obtained from tobacco plants and on those obtained from tomato plants show that the isoelectric point of each is about pH 3.2. At hydrogen-ion concentrations more alkaline than pH 3.2 the crystals from both sources migrate to the positive electrode, whereas at more acid reactions they migrate to the negative electrode.

No significant difference between the infectivity of protein from tobacco plants and protein from tomato plants was detected in several tests in which the half leaf method of inoculation was used. One cubic centimeter of a solution containing but 10^{-9} grams of the crystalline protein from either source has usually proved infectious. The crystalline protein from mosaic-diseased tomato plants, when present in solution at a concentration of 10^{-5} or more grams per cubic centimeter, gives a precipitate when mixed with the sera of animals previously injected with either the crystalline protein obtained from diseased Turkish tobacco plants or with the juice from such plants.

The isolation from a different host plant of a protein possessing the same physical, chemical and biological properties as those previously found for the protein from mosaic-diseased tobacco plants offers additional evidence for the identity of the protein with the agent responsible for the tobacco mosaic disease.

W. M. STANLEY
H. S. LORING

THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
PRINCETON, N. J.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

"KARO" AS A MOUNTING MEDIUM

IN recent years "Karo"[1] has been used as a mounting medium for zoological and botanical material by a number of investigators. It is a mixture of maltose, dextrose and dextrin.

The writer has found it useful for mounting algae. With delicate forms, it is necessary to concentrate the solution gradually, as in the glycerine jelly technique. Finally when the "Karo" is concentrated a hard mount is obtained which is as firm, and seems to be as permanent, as a balsam or damar mount. It is also useful in mounting pollen grains. The preparations are more permanent than those made with glycerine jelly, and the advantage of the glycerine jelly method is retained in that the grains, when so mounted, may be studied in their expanded condition. It is also a speedy, efficient medium for making whole mounts of insects. Clearing the animal, which is often a difficult process due to the presence of air in the tracheae, is not necessary. Animals which are mounted in "Karo" have a more natural appearance than those mounted in damar.

Ordinarily ringing the cover glass is not necessary. It is advisable only if the slides are exposed to very moist conditions or when thick whole mounts are made. The addition of a few crystals of Thymol or any preservative of this type prevents the growth of fungi, although fungi rarely develop, even when the preservative is lacking. "Karo" has the advantage over balsam or damar in that material may be mounted into it directly from water or the lower alcohols. Thus the hardening and shrinkage, which often occur with the use of alcohols and clearing agents, may be prevented. The sugars present do not crystallize. Slides which were made six years ago are still in perfect condition.

[4] W. J. Crozier, *Jour. Gen. Physiol.*, 9: 531, 1925–26.
[5] W. J. Crozier, *Jour. Gen. Physiol.*, 7: 189, 1924–25.
[1] W. M. Stanley, SCIENCE, 81: 644, 1935.
[2] W. M. Stanley, *Phytopath.*, 26, No. 2, (Abst.), 1936.

[1] "Karo" is a white corn syrup produced by the Corn Products Company.

An article describing the techniques employed in the use of "Karo" by various workers is being written.

RUTH PATRICK

BIOLOGY DEPARTMENT
TEMPLE UNIVERSITY

A SIMPLE COMPARATOR FOR ABSORPTION SPECTROGRAMS

THERE is here described a simple device for reading spectrograms with fair accuracy and with a minimum of fatigue. Instead of being viewed through a low power microscope, as is customarily done, the image on the photographic plate is projected on a ground glass screen.

The light from a 100 watt lamp (L) contained in a ventilated metal housing (V) is focussed by a condenser (C) on to the lens (R) which may be an ordinary rectilinear or anastigmat camera lens, and which is in turn focussed on the ground glass screen (G). Immediately in front of the camera lens is placed a totally reflecting right-angle prism (P) of good optical quality, large enough to cover the field. The plate to be read (S) is inserted in a slide (D) between the condenser (C) and the lens (R) in such a position as to be brought to a focus on the screen (G). The slide (D) moves on a double rack and pinion (Y, Z) device, whose shaft (I) supported by the flat springs (Sp) is connected to a flexible steel shaft (U) terminating with a knob (K). Directly behind the screen (G) is a thin vertical wire (W) whose shadow produces the hair line. This wire (W) is attached at the top of the frame in a fixed position, and at the bottom to a short spring (B) which keeps the wire taut. The other end of this spring is attached to a sliding member (E) having the horizontal spring (F) and the screw (H). Thus by turning the knob (M) the hair line is aligned with the wave-length scales at top and bottom projected from the plate. This is necessary since the plates vary slightly in size; the slide (D) must be made a trifle oversize, and the plates will not always be precisely square with the slide (D). A movable pointer (J), sliding on a square or rectangular metal rod (N) and having a thumbscrew (O) so that it may be set at any position, serves to locate the particular pair of spectra under observation. The ground glass screen (G) is provided with a vertical row of numbers which are seen through an opening in the pointer (J) and which correspond to settings of the plate rack on the spectrograph.

The entire instrument is constructed on a rigid wood framework and is covered with masonite or similar material. Doors are provided for access to the lamp and optical system. The ground glass screen (G) may be removed from the metal frame (Q) in which it is held in position by four flat phosphor-bronze springs (Ph). A switch in the lamp circuit is provided near the operating end of the device. Rubber feet (T) are fixed to the bottom to eliminate vibration.

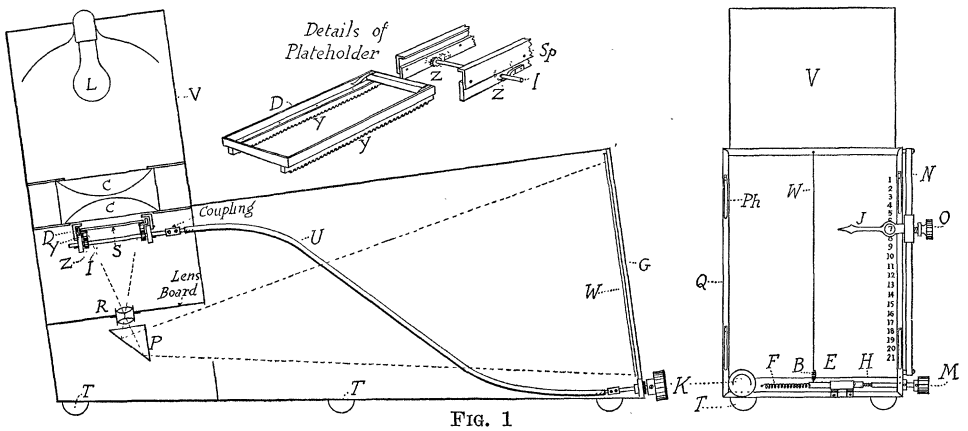

FIG. 1

In addition to its use as a comparator for spectrograms, the device can be used to study any photographic plate or for classroom demonstrations. Various other uses will suggest themselves.

FRED ROSEBURY

DEPARTMENT OF BIOLOGICAL CHEMISTRY
COLLEGE OF PHYSICIANS AND SURGEONS
NEW YORK, N. Y.

BOOKS RECEIVED

DWYER, HUGH L. *Your Child in Health and in Sickness.* Pp. xvi + 333 + xii. Illustrated. Knopf. $2.75.

HARRIS, L. J. *Vitamins.* Pp. xix + 240. Illustrated. Macmillan. $3.00.

RICHARDS, A. and A. I. ORTENBURGER. *Practical Comparative Embryology.* Pp. 112 + 10. Illustrated. John S. Swift Company, St. Louis. $1.45.

Tôhoku Imperial University. *Science Reports.* First Series. (Mathematics, Physics, Chemistry.) Vol. XXIV. No. 4. Pp. 391–564. Illustrated. *Science Reports.* Fourth Series. (Biology.) Vol. X. No. 3. Pp. 417–638. Illustrated. Maruzen, Tokyo.