a strong equatorial point at 71 Å and a ring with equatorial accentuation at 43 Å; a faint equatorial point occurs also at approximately 140 Å. Apparently drying causes a separation of lipoid components, one remaining oriented while another becomes somewhat disoriented. Another indication of the tendency of drying to separate the lipoid components of the myelin sheath is observed in the meridianally sickled 4.7 Å ring of medullated nerve. Upon drying the nerve this ring becomes resolved into a number of rings, of which the most prominent are those at 4.2, 4.7, 5.2 and 5.9 Å. These spacings are found also in dried lipoids extracted from cow spinal cord. The 4.2 and 4.7 Å rings are typical of dried lecithin, those at 5.2 and 5.9 Å of cholesterol. Moreover, such a separation of mixed lipoid crystals upon drying has been shown to occur in artificial mixtures of lipoids. The patterns obtained from such mixtures show considerable variability, depending upon the degree of hydration and the relative proportions of the individual constituents.

Although it was previously demonstrated[3] that the 15.5 Å equatorial sickles of fresh nerve are not due to connective tissue, as claimed by Boehm,[4] the present work shows that this spacing can be duplicated by wet nerve lipoids and is, therefore, interpreted best as a higher order reflection from the extremely well-oriented lipoids in the myelin sheath. This interpretation is strengthened by the fact that with drying this spacing fades out both in medullated nerve and in nerve lipoids.

The well-known tendency of lipoids to combine tenaciously with proteins,[5] their frequent association in living cells, and the wealth of diffraction spacings given by lipoids, as illustrated above, all indicate the necessity of distinguishing carefully between the lipoids and proteins in diffraction pictures of biological materials.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

METHOD FOR STUDY OF CRYSTALS FOUND IN AMOEBA BY MEANS OF X-RAYS

THE following method seems to present a very interesting way for finding out the nature of the crystals which are present in some of the vacuoles in Amoeba.

The crystals were prepared for the x-ray picture by putting a few Amoebae which had been carefully washed in several changes of redistilled water on a thin collodion membrane which was stretched over a small round hole which had been drilled in one end of an ordinary glass slide. After the amoeba had settled to the bottom, the excess water was drained off with filter paper, and the amoebae fixed with absolute alcohol. Another thin layer of collodion was added to cover these.

The x-rays were directed on one of these amoebae and then enlarged by means of a pinhole camera. The important features of the photograph obtained are presented in the diagram. On the photograph three or four faint Laue spots are present and the three most distinct ones are represented in the diagram by the spots A, B and C. These seem to indicate that there are one or more definite crystals present which can be investigated further by this method, but are insufficient for identification purposes. The faint outer circle surrounding the central part is probably due to the presence of the collodion membranes used to support the crystals. These investigations are now being continued and preparations of millions of crystals used instead of a few crystals. In this way it is hoped that we will get a series of diffraction spots and thus enable us to identify the crystals if they are like any that are already known.

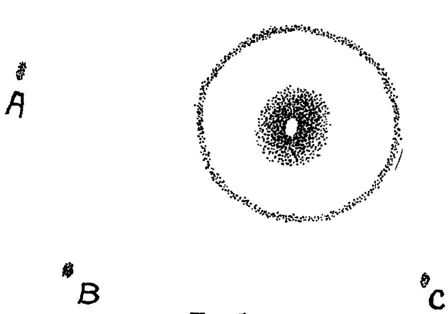

FIG. 1.

The author is greatly indebted to Dr. Maurice Huggins for supervising the taking of the x-ray pictures and explaining the results obtained.

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VARIABLE TENSION CLAMPS FOR PHYSIOLOGY EXPERIMENTS

THREE marking pens record nicely on the smoked paper, but the fourth drags. The fourth is fixed and

[3] SCIENCE, 80: 567, 1934.

[4] G. Boehm, *Koll. Zeitschr.*, 62: 22, 1933.

[5] See, for example, S. P. L. Sørensen, *Koll. Zeitschr.*, 53: 102, 170, 360, 1930.

the drum started when it is discovered the other points need adjustment. A scientific paper is no place to record the observations of physiologists under such conditions—even though they be accurate!

To meet the need for a low-priced variable tension clamp for the physiology laboratory two clamps of slightly different construction have been designed. The main differences in numbers 1 and 2, in the accompanying figure, are the springs and the construction of the joint between the two halves. In clamp 1 there is a helical spring (c) and the male piece A is held accurately in place by the u-shaped female piece B. Clamp 2 has a flat v spring held in place by notches in both A and B.

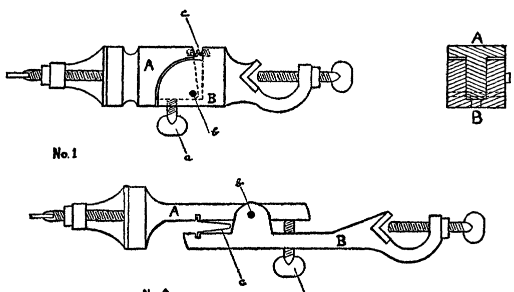

FIG. 1.

Part A of both clamps holds recording devices, while the other half goes on the support. The friction of the writing points against the smoked paper is easily changed by regulating the screw (a) which pushes against the flat surface of part A. The pin (b) holds the two halves of the clamp in place.

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A DEVICE FOR PERMANENTLY MARKING LABORATORY ANIMALS

TATTOOING is probably the best of the methods for marking laboratory animals such as rabbits and monkeys, but is seldom used because of the cost of commercial electrical tattooing machines and because of the undue labor necessary to properly tattoo by hand. Below is described a simple and inexpensive machine.

The apparatus is made from a commercial type of

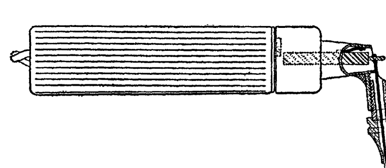

FIG. 1. A device for permanently marking laboratory animals.

electric razor[1] which can be purchased for about one dollar. The guard and a portion of the removable head are cut off and a special head, constructed as shown in Fig. 1, is soldered or brazed into position. The adjustable housing for the needle, which serves both as a guide for the tattooing needle and as a reservoir for the ink supply, is made from a hypodermic needle of the proper gauge to permit free motion of the needle within it. The tattooing needle is made from a sewing needle, one end of which is softened in a flame and shaped to fit without binding over the vibrating member of the head. The needle must be retempered before use by plunging it, after heating to a red heat, into an oil bath. The housing should be adjusted so that the needle extends about 0.5 mm beyond the tip when at its maximum point of oscillation. To facilitate marking, the apparatus should be connected in series with a foot switch[2] to the 110 volt alternating current supply.

The ear of the animal to be tattooed is cleaned with acetone or ether, then the tip of the apparatus, previously filled with India ink, is pressed firmly against the ear and the current turned on. Marking is done at the rate of 2–3 mm per second. Excess ink should be removed with acetone.

Incidentally, this apparatus can be used to excellent advantage in preparing fine designs on mimeograph stencils. For this purpose a sheet of paper on which the desired design has been traced should be placed over the stencil.

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1 Tark razor.

2 Floorboard switch for double beam headlights, as used on General Motors cars.

BOOKS RECEIVED

Le Travail Par Équipes A L'École. Pp. 230. Bureau of International Education, Geneva. Fr. suisses 4.–

LUCK, J. MURRAY, Editor. *Annual Review of Biochemistry.* Pp. vii + 639. Volume IV. Stanford University Press. $5.00.

MCCRAE, THOMAS, Editor. *The Principles and Practice of Medicine* by the late Sir William Osler. 12th edition, revised. Pp. xxvii + 1196. 22 figures. Appleton-Century. $8.50.

MARTIN, THOMAS. *Faraday's Diary.* Vol. VI, Nov. 11, 1851, to Nov. 5, 1855. Pp. xiv + 495. Illustrated. Bell and Sons, London. 12/12/0 net per set of seven volumes.

Smithsonian Institution. *Annual Report.* Pp. xiv + 476. 59 plates. Government Printing Office. $0.70.

WADE, R. T. *The Triassic Fishes of Brookvale, New South Wales.* Pp. xiv + 111. 47 figures. 10 plates. British Museum. 10/.

WHITE, JAMES C. *The Autonomic Nervous System: Anatomy, Physiology and Surgical Treatment.* Pp. xv + 386. 96 figures. Macmillan. $7.00.

Erratum: The date at the end of the article by Professor M. S. Kharasch and Dr. R. R. Legault, page 615 in the issue of SCIENCE for June 21, should be 1933 instead of 1923.