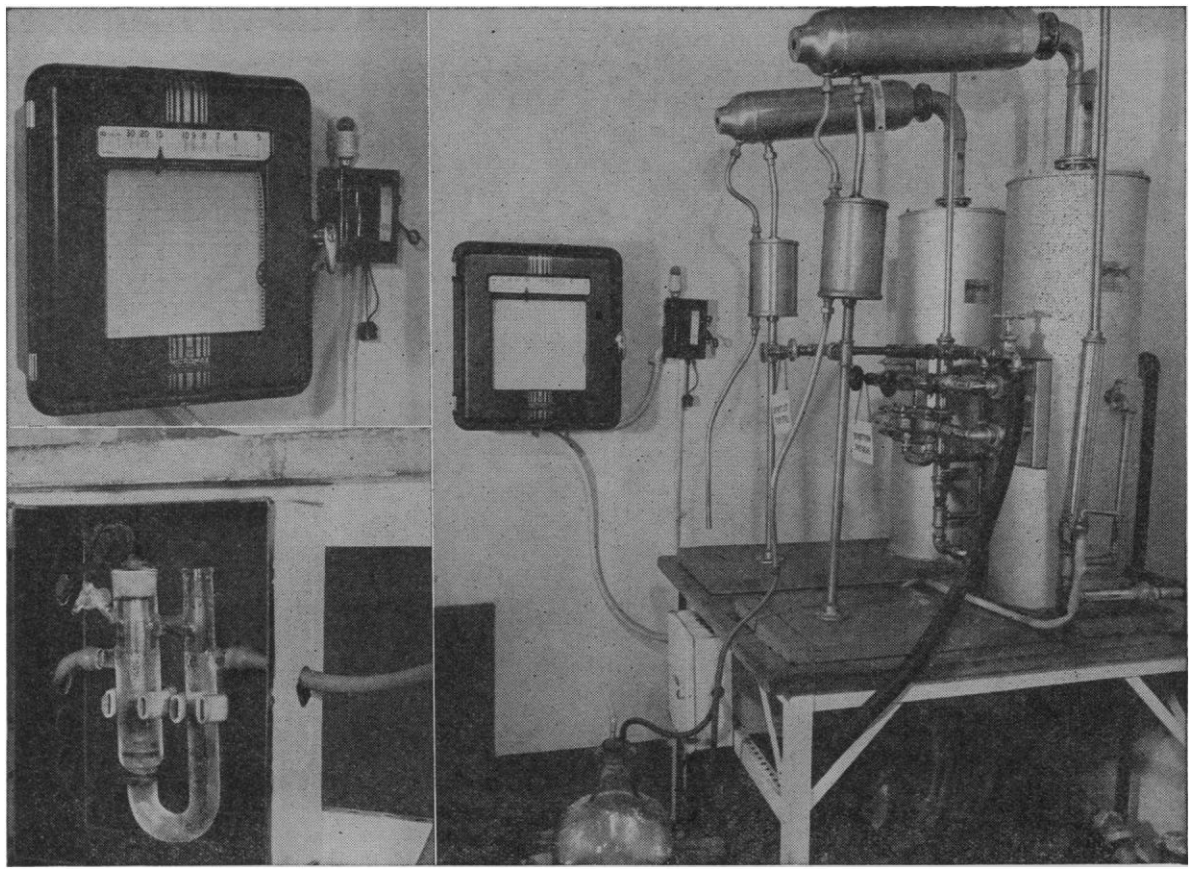
SCIENCE

NEW SERIES
VOL. 93, NO. 2424

FRIDAY, JUNE 13, 1941

SUBSCRIPTION, $6.00
SINGLE COPIES, .15

Science: published weekly by The Science Press, Lancaster, Pa.
Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.



Automatic equipment providing water for intravenous and other parenteral solutions in Jefferson Hospital, Philadelphia. One of the two stills is for standby service. Micromax recorder and cell, which record purity of distillate from still in use, are shown close-up at left.

Hospital Has Continuous Proof of Water Purity

Among many interesting features of the Jefferson Hospital centralized sterilization room is an automatic device for checking and recording the purity of distilled water.

Water is provided by a ten-gallons-per-hour Barnstead automatic still. The effluent flows through a conductivity cell which is connected to a Micromax strip-chart recorder. This combination measures and records the electrical resistance of the distillate. A resistance of 82,000 ohms per cc. has been adopted by this hospital as satisfactory for parenteral use, and since the conductivity cell used with the equipment has a constant of 0.1, the resistance shown by the recorder becomes 8200 ohms. When the still is started and until the resistance is above this figure, the red light is on. If the effluent should drop again to that figure, the recorder would flash a red light to summon one of the station nurses.

Principal advantages of this method of analysis are that it largely eliminates the human equation, and that it provides a graphic record, always available for consultation. It checks every drop of water instead of occasional grab samples. It wastes no water. Since the purity is recorded, the station supervisor can watch not only for sudden or temporary changes but for gradual ones, due to aging of equipment, seasonal differences in raw water, etc.

Catalog EN-95, sent on request, describes the equipment.

SCIENCE

VOL. 93 FRIDAY, JUNE 13, 1941 NO. 2424

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

Lancaster, Pa. Garrison, N. Y.
New York City: Grand Central Terminal

Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary in the Smithsonian Institution Building, Washington, D. C.

THE EXPANDING HORIZON OF INORGANIC CHEMISTRY[1]

By Professor B. S. HOPKINS
UNIVERSITY OF ILLINOIS

IT is doubtful if the history of science has ever experienced a broader and more general advancement in an equal period of time than the world has witnessed during the years 1921–1941. Developments in all phases of science have been startling in their scope, their influence upon modern life and in the possibilities which they reveal for still further advancement.

Chemistry has produced or assisted in the production of its full share in these developments. The various branches of chemistry have been busy in expanding their own fields of endeavor and in contributing, as opportunities offer, to the sum total of human progress. So diverse has chemistry become and so technical in its diversity that no modern tries to keep himself informed concerning the developments of the science as a whole because the changes come with bewildering rapidity and in overwhelming numbers. The chemist of to-day feels well satisfied with himself if he can keep abreast of advancing thought in the definite field in which lies his major interest. He must of course be at least dimly conscious of the progress made in adjacent fields and in the realms of the sister sciences. But the modern chemist must be a highly specialized worker in an ever narrowing field in order that he may be able to keep up with his competitors whose training is likewise restricted to an intensive study of limited phases of the subject. It is true that we still insist in our graduate training on a suitable background of prerequisites and minor subjects, but it is quite evident that the background is slowly but surely fading into the remote distance. Perhaps at no time in the history of our educational

[1] President's address, Illinois Chapter of Sigma Xi, May 14, 1941.

bubbles of air. The excess oil will be displaced to form a perfect seal. Immediately, the liquid portion of the medium spreads out between the oil and the cover-slip and the more solid portion of the medium is held firmly in place. The reason for this is apparent when one considers the free surface energy of the system in the light of the high surface tension and low adhesion tension of the oil and the relatively low surface tension and high adhesion tension of the solution in preferentially wetting the glass.

The practice of placing the chamber on the microscope stage and then placing the whole apparatus in an incubator was found to be objectionable. In a prolonged observation of a specific germinating spore or a dividing cell, any movement of the microscope will cause the organism to be carried from the field by the fluid flow or to gravitate. The many warm stages previously described in the literature were found to be unnecessary. In this method, the substage mirror is removed and a standard frosted 40-watt electric light bulb resting on a sheet of asbestos is inserted into the horseshoe base of the microscope. This is capable of providing the optimum temperature ($37 \pm 2°$ C.) for the germination of the spores of the butyl alcohol-acetone group of anaerobes. For other organisms the required temperature can be obtained by changing the distance between the bulb and the stage or by using bulbs of varying intensities.

STANLEY THOMAS

LEHIGH UNIVERSITY

ATTEMPTS AT TAGGING SMALL SALAMANDERS IN LIFE HISTORY STUDIES

AMONG the vertebrates, with the exception of small salamanders, fairly satisfactory methods of marking individuals for ready future identification are known. Jaw-tags probably will be satisfactory for tagging larger individuals of such species as *Cryptobranchus* and *Necturus* as they have proved to be with frogs.[1] However, the writer is not aware of any satisfactory tag, commercial or otherwise, which may be used to encircle the jaw of such small salamanders as *Triturus, Desmognathus, Plethodon, Eurycea,* etc. The failure of another method is recorded here, namely, that of inserting a clip through the musculature of the back or tail.

On July 28, 1939, at the Edmund Niles Huyck Preserve, Rensselaerville, New York, a number of adult newts, *Triturus viridescens viridescens,* averaging 95 mm in total length, were tagged with small surgeon's suture clips. These clips are smaller and considerably lighter than any of the commercial types of strap tags which are now on the market. However, they can not be bent over and locked at the tip. Clips were placed on the newts at various points such as through the musculature of the lower hind leg and about the jaw. They appeared at once to be much too large and heavy and when the newts were liberated in an aquarium they were quickly carried to the bottom and were able to reach the surface again only by great effort. The most satisfactory point to attach them appeared to be through the dorsal part of the tail muscles back of the anus. A few were also marked by inserting a clip through the musculature of the back just anterior of the anus. Several tagged specimens were placed in an aquarium and 17 were liberated in a small pond in a bed of emergent grasses near shore where they had originally been obtained.

After five days this grassy area was seined and several specimens were recovered very close to the spot where they had been liberated. Only one newt which had been tagged through the muscles of the tail was holding the clip securely. In five other recovered newts it had either pulled out, leaving a large hole in the tail or back, or was very loose, and the nearby flesh had a putrid appearance. The entire tail, posterior to the point of attachment of the suture clip, had dropped off in one newt. The tagged specimens placed in aquaria had lost their tags.

Dr. William C. Senning tagged over 500 *Necturus maculosus maculosus* in a limited area in Cayuga Lake near Ithaca, New York, by inserting strap-tags through the muscles of the tail near its base. These tags held well for at least two weeks, the period over which the actual tagging was done. After a lapse of two years the area was collected again, but no tagged *Necturus* were recovered, although many specimens were taken. It can not be assumed that the *Necturus* lost their tags since the marked specimens may have moved out of the area. However, in the absence of evidence to the contrary the success of this method of tagging must be viewed as questionable with *Necturus.*

EDWARD C. RANEY

CORNELL UNIVERSITY

[1] E. C. Raney, *Amer. Midl. Nat.,* 23: 733–745, 1940.

BOOKS RECEIVED

BABOR, JOSEPH A. and ALEXANDER LEHRMAN. *Introductory College Chemistry.* Pp. xiii + 662. 138 figures. Crowell. $3.50.

DAVIS, TENNEY L. *The Chemistry of Powder and Explosives. Vol. I.* Pp. xi + 216. 50 figures. Wiley. $2.75.

GAUSE, G. F. *Optical Activity and Living Matter.* Pp. 162. 18 figures. Biodynamica, Normandy, Missouri. $2.75.

GUYER, MICHAEL F. *Animal Biology.* Third edition. Pp. xix + 723. 423 figures. Harper. $3.75.

HARTSHORN, L. *Radio-frequency Measurements by Bridge and Resonance Methods.* Pp. xiii + 265. 99 figures. Wiley. $4.50.

HUETTNER, ALFRED F. *Fundamentals of Comparative Embryology of the Vertebrates.* Pp. xiv + 416. 168 figures. Macmillan. $4.50.

PERKINS, HENRY A. *College Physics. (Abridged.)* Pp. ix + 591. 450 figures. Prentice-Hall. $3.50.