by European authors. He corresponded with zoologists on both sides of the Atlantic and made every possible effort to avoid the publication of synonyms. He visited Colorado with Long's Expedition, and also carried on explorations in the northwest, as a member of the expedition of 1823 to "the source of St. Peter's River, Lake Winnepeek, Lake of the Woods, etc., etc." With Maclure he traveled to Florida (1817–18) and Mexico (1828). As the result of all these activities he was enabled to describe considerably over a thousand new species of American beetles, over four hundred insects of other orders, a large proportion of our common shells, as well as crustaceans, birds, mammals, reptiles and a certain number of fossils. His work has stood the test of time, and his species are for the most part currently recognized. Mrs. Say, who survived until 1886, drew the figures on sixty-six plates to illustrate Say's Conchology, and the figures were colored by hand with the aid of some pupils.

When Robert Owen established his socialistic community at New Harmony, Indiana, Maclure was drawn into the undertaking, believing that he could make the place the center and fount of American education. Say accordingly left Philadelphia and became a resident of New Harmony. We are told how disputes arose and the experiment ended in failure, as perhaps ought to have been foreseen from the beginning. But Owen's sons remained to do distinguished work in America and in a large sense the idealism of the movement was not wasted, but has continued to bear fruit down to the present time. Even the lessons derived from its failure have been valuable.

Say's shells are for the most part in the Academy of Natural Sciences at Philadelphia, but of his insects it seems they have only one specimen, the type of the famous White Mountain butterfly. The insects were destroyed by dermestids, and although it is not so stated, must have been thrown away after Dr. T. W. Harris returned the ruined collection to the Academy. It was not understood at the time that even the fragments would have been of great value to posterity. Fortunately the species were so well described that there is usually little dispute concerning their identity. It was however a defect in Say's work that he was accustomed to cite localities very vaguely. The book represents a very large amount of work and is full of interest. Every student of American zoology should read it, and then Dall's "Life of Baird," and thus learn how the science was developed in this country during the nineteenth century. It is a story of enthusiastic workers overcoming difficulties which seem terrific to us in these relatively easy days. When we are inclined to complain of the obstacles in our way, it is good discipline to turn to the life of such a man as Say, and see how he conquered what seemed to be the iron hand of fate.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A NEW SINGING TUBE

LAST April, while making a piece of apparatus from pyrex capillary tubing, I noticed that a piece about 10 cm long and 2 mm inside diameter began to emit a musical note when the bulb which I was blowing on the end reached a volume of approximately 2 cubic centimeters. Recalling that Dr. C. T. Knipp, of the University of Illinois, had developed a singing tube some ten years ago, I assumed this to be what he had observed.

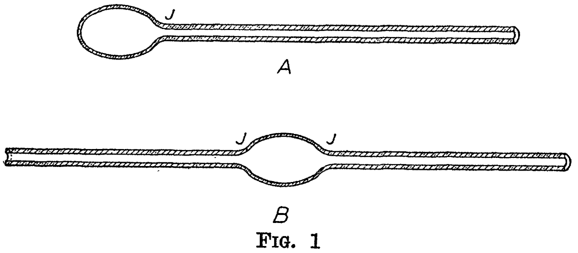

FIG. 1

On running across an account[1] of Professor Knipp's tubes recently, however, I think the difference in the two cases is worthy of notice. His tubes as reported were all substantially of the form of an ordinary mercury trap.[2] It appears that this special form is not necessary: a tube with a bulb on one end and the other end open (*A*, Fig. 1), or with the bulb in the middle and both ends open (*B*, Fig. 1) will sing, with various shapes of bulb. The note emitted appears to depend chiefly on the volume of the bulb and tube, the temperature at the junction (*J*) of bulb with tube, and the diameter of the tube.

The phenomenon has been observed with tubes of various lengths and from 1½ to 4 mm inside diameter; but outside these limits it has not been detected. When the junction of the bulb with the tube is heated to about the temperature of redness the oscillations begin. Heating elsewhere is not effective until this temperature is attained at the junction.

A tube 13 cm long, 2.3 mm inside diameter and having a bulb of 1.8 cubic centimeters (approxi-

[1] *Phys. Rev.*, xii, December, 1918, p. 191.

[2] SCIENCE, April 22, 1921, p. 393.

mately) emits middle C. As the temperature at the junction is increased the pitch is raised; but it has not been determined whether this is due to the temperature alone or to the gradual shrinking of the bulb, as the temperatures required are above that at which pyrex softens. To avoid this difficulty, it is planned to continue the investigation using tubes of quartz.

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A SIMPLE MICROSCOPE EYEPIECE POINTER

THE use of an eyepiece pointer to augment the value of a demonstration under the microscope is usually appreciated by both student and instructor in the laboratory. The customary procedure of gluing a short hair to the rim of the ocular diaphragm is simple and effective. When, however, the eyepiece is in demand both with and without a pointer, the necessity of having to adjust the hair each time is highly inconvenient.

To meet the need for a pointer that could be readily inserted and removed from the ocular, the writer has devised the accessory here described.

A round 18-mm coverglass, free from imperfections, is selected and cleaned with acid alcohol. This forms a base upon which a pointer may be mounted. The pointer itself is drawn from a thin glass rod to a fiber-like thickness. With a little care and practice the glass can be drawn to a diameter appreciably less than that of even a fine human hair.

The tapered end of the pointer is then placed on the base, a drop of Canada balsam added followed by a second coverglass, likewise perfectly clean. By means of the protruding end of the pointer its tip may be centered and its axis adjusted parallel to the radius of the two coverglasses. In this way the fine rod is sealed, free from disturbance between the two coverglasses. After the protruding end of the pointer is snapped off the finished product results.

If actually embedded in the balsam the glass pointer appears highly refractory when viewed through the microscope. If this is objectionable, the pointer can be held in place by applying the cement only to the edges of the coverglasses. When so mounted it is seen as a black line.

A dozen or so of these pointers can be made and mounted in half an hour and they may then be kept permanently on hand for instant use when needed.

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SPECIAL ARTICLES

OBSERVATIONS CONCERNING THE CAUSATIVE AGENT OF A CHICKEN TUMOR[1]

IN early publications on the chicken tumor group, some of the properties of the filterable agents causing these neoplasms were described. Recently additional observations have been reported from this laboratory which may be summarized as follows: The agent of Chicken Tumor I, a spindle-cell sarcoma, is selectively adsorbed and fixed by certain mesodermal tissues from susceptible animals, but not by similar tissues from non-susceptible animals. The plotted curve of the amount of ultraviolet light of selected wave lengths required to inactivate the tumor agent shows a significant qualitative and quantitative variation from the curves for bacteria, typical viruses and bacteriophage. The tumor producing activity of the tumor filtrates can be precipitated out with a protein fraction and somewhat purified.

Certain extensions of the work will now be recorded.

Steps in Purification of the Tumor Agent

Precipitation. As already reported, the agent active in a tumor filtrate can be precipitated out by electrodialysis or by increasing the hydrogen-ion concentration with acid or buffer. The pH at which the precipitate comes down is between 4.4 and 4.8. It carries all of the agent with it and can be dissolved in alkali and reprecipitated repeatedly without destruction of the agent.

The average amount of nitrogen in the precipitate is about 12 per cent. and varies little with the method of preparation of the extract. The phosphorus ranges from 0.16 per cent. to 0.69 per cent., being lower when the extract is prepared with water and higher when an alkali or Ringer's solution extract is used. Hydrolysis of the precipitate shows the constant presence of a considerable amount of reducing substance in all the active precipitates tested. The Feulgen reaction is positive, becoming more intense with each reprecipitation of the material. With the Mallory connective tissue stain the first precipitates give generally a maroon red, tending more to yellow red with the specimens showing a stronger Feulgen reaction.

Purification by Adsorption. Adsorption on colloidal aluminum hydroxide, a method already employed by other investigators, was utilized in attempts to purify the agent. The results were disappointing in that so little of the agent could be released after adsorption that inoculation produced at best tumors much smaller and less vigorous in their growth

[1] From the laboratories of the Rockefeller Institute for Medical Research.