of Devils Lake, and, lastly, the schistose and massive rhyolites exposed on the Lower Narrows of the Baraboo River, at which place the quartzite is in vertical position and likewise the original surface of the rhyolite on which deposition took place. No evidence of incorporation of rhyolite fragments in the quartzite was found.

The conference adjourned at 1 P. M. on Sunday, October 21.

W. H. TWENHOFEL

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PHYSIOLOGICAL STROBOSCOPE

A NEW physiological stroboscope has been developed primarily for the study of the vocal cords during phonation. Stroboscopy, in this application, dates to a suggestion of Töpler[1] in 1866 and its first utilization by Oertel[2] in 1878. However, the instrumentation to date, although having seen much change in form, has shown little change in principle from that of original conception. These apparatus essentially consist of a light source of rapid quenching characteristic, some means for interrupting the light such as a shutter or switch, and a variable speed motor or actuator capable of covering the frequency range of the voice. A further elaboration provides for a tone source or loud speaker in conjunction with the interruptor, whereby the subject has established for him the tone frequency he is to take.

In contra-distinction, the authors' apparatus permits the subject to take any tone or series of tones arbitrarily, and the stroboscope automatically responds to the variation as it occurs. Inasmuch as no manual adjustment or compensation is necessary for the reestablishment of syntony upon a variation of frequency, either in the voice or the mechanism of interruption, it is possible to follow the cordal configuration throughout a tonal transition. Thus a limitation of large proportion has been lifted from this field of study.

A microphonic pick-up element, a series of band pass filters, a high gain amplifier, a set of phasing impedances and an oscillator with the output feeding a gaseous discharge lamp substantially comprise the instrument. The phasing circuit permits the study of the cords during any portion of the cycle from the fully closed to the fully opened positions. Entrance into the viewing position is accomplished with an endo-laryngoscopic device which has been fitted with the gas discharge lamp.

A series of investigations utilizing the instrument has been projected and reports will follow.

LEO A. KALLEN
H. S. POLIN

DISSECTION AS A METHOD OF EMBRYOLOGICAL STUDY

AT the meetings of the American Association for the Advancement of Science held in Berkeley in June of this year one of the demonstrations was an exhibit of most of the equipment for the dissection and stereoscopic photography of embryos, together with a display of stereoscopic photographs of various dissections of the developing rat. Although a detailed description is being prepared, the following summary is offered.

The chief pieces of apparatus consist of the following: A specially designed lamp, for using flashlight bulbs, by which light is concentrated to a small spot at a distance of 7 inches from the lamp; an electrically operated vibrating knife, made from a piece of safety razor blade, supported and controlled by racks and pinions; a dissecting needle fashioned from a hypodermic needle mounted on a system of levers so that the motion is reduced by about 4; ball and socket mounts for holding embryos during dissecting and during photographing. The camera bellows consists in part of a telescoping bellows and in part of boxes by which the total length can be increased to about 6 feet. It is supported on a long piece of steel tubing which in turn is so mounted vertically that it can be inclined to right and to left in order with the same lens to take in succession two different photographs of the same embryo, which give a stereoscopic effect. A support for the embryo so that it can be kept in the axis of inclination of the camera and also be illuminated from beneath as well as from above.

Other items include such things as fine-tipped forceps, brushes made of fine silk thread, turn table, etc.

J. A. LONG

UNIVERSITY OF CALIFORNIA

THE DEVELOPMENT OF THE PRINCIPAL ARTERIAL VESSELS IN THE RAT FROM 11 TO 16½ DAYS

THIS study traces the vascular changes through a critical period of development and determines the embryonic relationships of certain adult vessels. It also offers a reconciliation of inconsistent embryological terminology with the B.N.A. as used by Greene.[1]

The embryos were injected with diluted India ink, dehydrated, dissected in benzol, for which a method was devised, and finally cleared by Reagan's modified

[1] Topler, *Annalen d. Phys. u. Chem.*, p. 108, 1866.

[2] M. J. Oertel, "Uber eine Neue Laryngo-Stroboskopische," *Zentral. Med. Wiss.*, 1878.

[1] The writer wishes to gratefully acknowledge the generous cooperation of E. C. Greene in advancing information from her manuscript on the anatomy of the adult rat soon to be published.