from the silt of an extinct glacial lake, first noted by Dr. Frank Leverett and published by him in 1914. The date is placed by the same authority as about 20,000 years ago or before even the first stage of Glacial Lake Agassiz. The site has been carefully studied by Dr. Stauffer and Dr. Thiel, Minnesota geologists, who concur in Dr. Leverett's findings. The skull is of a nature to suggest an early dating, aside from the geological evidence. It is of a generalized type of *Homo sapiens*, showing distinct Mongoloid affinities. The teeth are unusually large and retain certain features of still earlier mankind. The rounding of the borders of the nasal opening is extraordinary and is strongly reminiscent of conditions seen in anthropoid apes. The extreme narrowness of the nasal opening, together with its lack of lower borders, and with its rudimentary spine, stamp this skull as a most unusual specimen.

(*To be concluded*)

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ADJUSTABLE METAL MOULD FOR PARAFFIN EMBEDDING

THE mould described here is unlike any of the types more or less commonly used, such as folded paper boxes, glass dishes and the adjustable metal moulds consisting of L-shaped bars for sides and a flat plate for bottom. It (see Fig. 1) consists of two metal

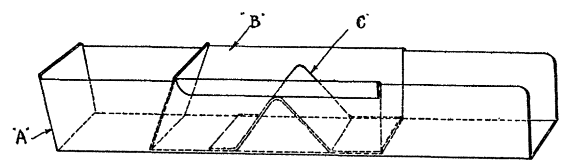


Fig. 1

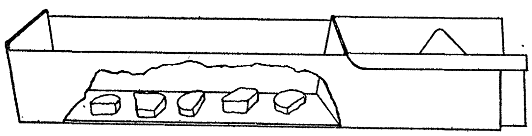


Fig. 2

troughs, A and B, both open at one end. Trough B fits snugly into trough A, closing its open end, and so forms a trough closed at both ends, easily adjustable in length by simply sliding B either to or from the closed end of A. The sides of both troughs slope outwardly, as also do the closed ends when the two troughs are fitted together to form the mould. The upper portions of the sides of trough B are folded over outwardly and, when B is in position as one end of the mould as shown in the figure, engage the upper portions of the sides of trough A, thus holding trough B securely in place anywhere within the working length of the mould. A folded metal strip C serves as a finger piece for conveniently adjusting the size of the mould. The dimensions of the mould from which the figures here shown were drawn are: Trough A, length 6 inches, inside width at bottom 1 inch, at top 1$\frac{1}{3}$ inch, depth 1 inch; trough B, length at bottom 2$\frac{1}{2}$ inches, other dimensions such as to fit snugly within trough A. Moulds of different dimension, of course, are simply matters of particular wants and individual preferences. As evident from the description and the figures, the sides and ends of castings from this mould will be plane surfaces sloping towards the bottom, or face, of the castings, a shape that will be appreciated when trimming them either before or after fastening them to the cutting platform of the microtome. From its constructional features, this mould has been found peculiarly well suited for specimens that are to be located in some particular plane or axis and, also, for such specimens as may be difficult to locate in castings when surrounded by considerable masses of paraffin, for instance, protozoa and scrapings of tissues. The mould can be narrowed in one axis and so adjusted that the specimens are enveloped on two sides by a minimum thickness of paraffin, while the sloping sides and ends afford a good view and easy access in arranging the specimens on the bottom of the mould, or face of the casting. In the case of very small bodies, such as Protozoa, the sloping sides of the mould focus them, so to speak, on the face of the casting. With small visible bodies the thin bar or edge of the semi-transparent paraffin permits them to be more or less clearly seen and properly located on the cutting platform of the microtome. As a permanent device, this mould saves both loss of time and minor inconveniences attendant on the making and using of paper box moulds; compared with the adjustable L-shaped metal moulds, because of its construction it is not subject to leakage of paraffin caused by dislocation of its parts by jars or other accidents, not infrequent occurrences with the L-shaped bars of such adjustable moulds.

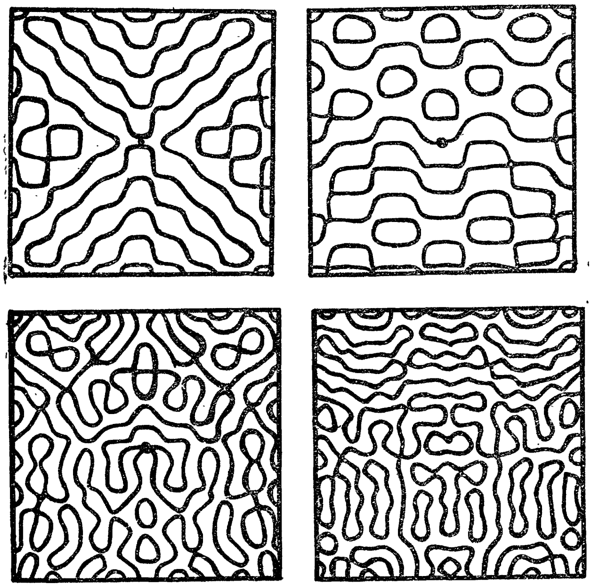
Should the mould herein described appeal to other workers with paraffin, information regarding it may be had of The Arthur H. Thomas Company, Philadelphia, Pa.

W. F. R. PHILLIPS

MEDICAL COLLEGE OF THE STATE OF SOUTH CAROLINA

A VACUUM TUBE OSCILLATOR FOR CHLADNI PLATES

THE three-element vacuum tube used so extensively in radio telephony may be made to act as a detector, an amplifier or an oscillator, depending upon the circuit in which it is connected. As an oscillator, it will give out vibrations varying from several a second to millions a second. The lower or audible vibrations of a triode valve are produced by connecting the valve with a large inductance and capacity. Several years ago, it occurred to the writer that a valve oscillator



might be used to vibrate Chladni plates and so produce sand figures which had not been found before. The triode valve is connected in a circuit so as to produce audible notes from four to twelve kilocycles per second; both the inductance and the capacity are variable. The note from this circuit is passed into a power amplifier and thence into a telephone receiver or an electrodynamic loud speaker. One type of the complete set-up is illustrated in another article to which the reader is referred.[1] The vibrating member of the loud speaker is mechanically coupled to the Chladni plate by a small metal rod, one end of which is rigidly attached to the center of the vibrating diaphragm, while the other end is pressed against the underside of the Chladni plate. This connection corresponds to "loose coupling" in radio circuits. Sand is strewn upon the plate and the note changed by means of the variable condenser; when a suitable note is reached, the plate oscillates vigorously and nodal lines are formed. With this instrument, thin plates may be vibrated at high frequencies, thus producing extremely complicated but regular patterns. A few of these are shown in the figure. Andrade and Smith have used a similar device for the same purpose, but their coupling is magnetic and not mechanical.[2] Their method requires an electromagnet in place of the loud speaker and is applicable immediately to steel plates (or any other magnetic material). It would be necessary to attach a small steel button to a brass plate before the magnetic field could set it in vibration. Either method is an improvement on the violin bow.

R. C. COLWELL

WEST VIRGINIA UNIVERSITY

[1] *Phil. Mag.*, Vol. XII. Suppl., Aug., 1931, p. 320. See also *Jour. Franklin Inst.*, Aug., 1932, p. 199.

[2] Andrade and Smith, *Proc. Phy. Soc.*, 43, pp. 405–411, July, 1931.

SPECIAL ARTICLES

THE ARSENIC FUNGI OF GOSIO[1]

REFERENCES to poisoning in some way attributable to arsenic in coloring substances used upon wall paper, hangings or in carpets, or as a component of certain paints, began to appear about 1815. In the later years of the nineteenth century, such poisoning began to be correlated with the presence of arsenical gases such as arsine and with moldy conditions in the buildings in which the cases occurred. Then Gosio,[2] in 1892, demonstrated in laboratory experiments that certain fungi called by him the "arsenic fungi," were capable of setting such gases free, by their action upon compounds of arsenic.

The biochemical experiments of Gosio were accepted generally as showing that at least part of these poisoning cases were due to arsine or some other volatile compound of arsenic, produced by moldy areas in the rooms occupied by those injured. The exact nature of the gases produced seems still to be debatable and is under investigation by the insecticide division of this bureau. Maasen[3] restudied the biochemistry of Gosio's organism, *Penicillium brevicaule*, and drew distinctions between the gases produced by its activity upon arsenic, selenium and tellurium. By 1914, the number of studies had so increased that Huss included fifty-five titles in his bibliographic survey. Since that time comparatively few studies of this kind have been reported, and apparently very few

[1] This article is No. 1027 of the outside publication series of the Bureau of Chemistry and Soils.

[2] B. Gosio, "Azione di alcune muffe sui composti fissi d'arsenico," in *Rivista d'Igiene e Sanita Pubblica III*, (8/9): 201–230 and 261–273, 1892.

[3] Albert Maasen, "Die biologische Methode Gosio's zum Nachweis des Arsens und die Bildung organischer arsen-, Selen-, und Tellurverbindungen durch schimmelpilze und Bakterien," *Arbeiten aus dem Kaiserlichen Gesundheitsamte*, 18 (1): 475–489, 1902.