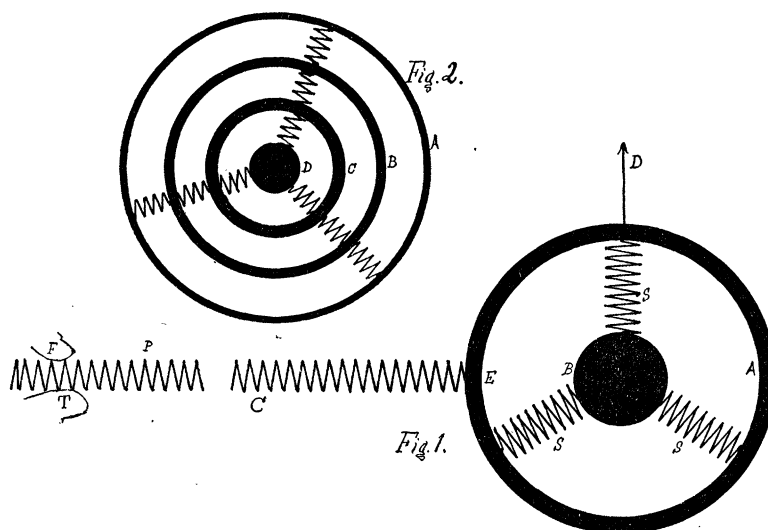


is the same as its own inherent period. If the length of *C* be now slightly changed, the phenomenon of beats is readily apparent.

An electric arc will throw a sharp shadow of this apparatus upon a screen and make the experiment visible to a large audience. The spring *C* may be replaced by an electri-

casts or impressions. The materials commonly used for this purpose are beeswax (either pure or mixed with some stiffening substance, such as ozocerite or paraffine), dentists' modeling composition (which must first be softened in water heated nearly to the boiling point), glue, gelatine, melted



cally excited tuning fork or other mechanical appliance.

The armature of a small electro-magnet may be attached to the ring at *E* and the current interrupted by some mechanical circuit breaker whose rate can be varied.

A molecule like Fig. 2 would have several inherent rates depending upon the relative masses of *A*, *B*, *C*, *D* and upon their connecting springs. Ingenuity will suggest many variations or improvements upon these suggestions.

WILLIAM HALLOCK.

PHYSICAL LABORATORY,  
COLUMBIA UNIVERSITY.

#### PLASTILINE, A NEW MODELING COMPOUND.

PALEONTOLOGISTS have constantly to deal with organic remains preserved in the rock in the form of natural casts, molds and impressions, for the proper study of which it is indispensable to take reverse

sulphur, and, of course, the common plaster of paris. One writer\* has suggested the use of tinfoil for taking repoussé impressions, the foil being afterwards coated with varnish to insure retention of its shape.

Each of the above-named substances has its own special advantages and applicability in certain cases. But a comparatively new plastic material which is especially well adapted for modeling purposes, and hence is of interest to the taxidermist, cartographer and others, is that known as *plastiline*. This is the invention of Professor Luighi Giudice, of Genoa, Italy, by whom it has recently been perfected, and is,

\* Goodchild, H. G., How to take Impressions of Fossils (Geol. Mag. [3], Vol. IX., p. 206), 1892. See also, for various hints on modeling: Osborn, H. F., Models of extinct Vertebrates (SCIENCE, Vol. VII., p. 841), 1897. Davis, W. M., and Curtis, G. C., The Harvard Geographical Models (Proc. Boston Soc. Nat. Hist., Vol. XXVIII., p. 85), 1897.

we believe, exclusively prepared. It was brought to the writer's attention not long since through his friend Miss Hyatt, the well-known sculptor of Cambridge, who states that it has come into general use among artists during the past few years. It does not appear, however, to have become known, or at least extensively employed in natural history laboratories, as it certainly deserves to be.

The following properties are claimed for plastiline in a circular obtained by the principal dealers in this country, Messrs. L. P. Pastorini & Co., of 1140 Third Avenue, New York :

"It is lighter than clay, does not dry nor contract, and remains firmly attached where it is placed, whatever be the quantity employed. It will not mildew nor produce any other fungus growth ; will preserve indefinitely the shape given it, its color, and its adhesive and plastic properties. Heat or cold, and dryness or moisture of the atmosphere, have no effect upon it, whether exposed or hermetically sealed. Another great advantage is its harmlessness to health.

"Plastiline is used in exactly the same way as clay. A layer or two of painters' glue applied upon the wooden framework of the model or base will prevent any absorption of plastiline and greatly facilitate the latter's adhesion. To take the impression of an object and to prevent the composition from adhering to the original, powder the plastiline with pulverized talcum (glove powder). Plastiline does not adhere to the plaster when a cast is made. To insure the easy removal of the latter, simply bathe with water the outside of the plaster cast, when it will detach readily.\* To give a finer finish to certain parts of the model, the application of a brush with alcohol or spirits of turpentine is recommended."

Plastiline is supplied in three grades of consistency ; No. 1 being the softest, or about the same as glazier's putty ; No. 2 being medium soft, and No. 3 medium hard. For taking impressions of fossils we have found No. 2 very satisfactory, but to render it more plastic one has only to knead it with a little vaseline or sweet oil. The best

\* For taking plaster casts directly from natural objects no better lubricant can be employed than a mixture of vaseline and refined kerosene oil.

modeling tools are those used by sculptors, which consist of fine iron or brass wire wound evenly about a stiff wire loop and fastened to a short handle. One should always make his own tools, however, taking care to get the coils fine and even. Box-wood spatulas, sand-papered down to a thin edge, or even steel ones, such as plasterers use, are convenient for shaping in the rough.

The chief advantages of this compound consist in its non-liability to crack or dry up—hence it retains the most delicate impressions indefinitely ; in its durability, as the same material can be used over again ; in the ease with which plaster casts can be taken from it ; and finally in its general convenience, being always ready for use and not requiring any care. For these reasons we have thought it worth while to bring it more prominently before the notice of naturalists.

C. R. EASTMAN.

#### SCIENTIFIC BOOKS.

*The Structure and Classification of Birds.* By FRANK E. BEDDARD, M.A., F.R.S., Prosecutor and Vice-Secretary of the Zoological Society of London. London, New York and Bombay, Longmans, Green and Co. 1898. Pp. xx + 548, with 252 text figures. Price, \$6.00.

Mr. Beddard is to be congratulated upon having brought to a successful issue a task contemplated, and even commenced, by his predecessors, Garrod and Forbes, and as these by their labors have done much to further the work, and as their note-books have been freely drawn upon, they too may be credited with a share in the finished product. While we may admit that a hand-book on avian anatomy is scarcely so much needed now as it was when conceived by Garrod, the present volume is none the less welcome. The monumental treatise of Fuerbringer and the detailed work of Gadow are not at everyone's disposal, and there are still ornithologists who, to their sorrow, have failed to acquire that knowledge of German which is now almost indispensable to the orni-