or geologic earthquakes, and (II) external dynamics earthquakes, which include volcanic and landslide earthquakes, both relatively unimportant. Under (I) are to be found practically all the great earthquakes of history, and these de Montessus subdivides into (1) epeirogenic, (2) tectonic or orogenic earthquakes and (3) epeirogenic and tectonic earthquakes.

The reviewer believes that neither in its plan nor in the allocation of individual earthquakes is the Count's classification satisfactory. The fact that the earthquake of Casamicciola (Ischia) in 1883 was centered on the flanks of the volcano of Epomeo does not show that it was volcanic in origin, for Cassamicciola is well known to lie at the intersection of dislocation lines. It is also difficult to understand why the earthquake of Assam in 1897 or various Chilian earthquakes should be placed in the epeirogenic class, since they occurred either within or close to the zones of mountain growth. The reviewer believes, moreover, that it will in most cases be found impossible to determine in how far epeirogenic movements in the sense employed by de Montessus may or may not be combined with orogenic ones; and that it would have been both simpler and more nearly correct to make of the glyptogenic (better, tectonic) class two subdivisions only, one called orogenic and connected with mountain growth, and the other epeirogenic and not so connected but related to block faulting *per se*.

The Count's isolation, because of his residence in Chili during the last eighteen years of his life when he was preparing the "Seismic Geology," imposed a handicap which was to a large extent overcome by his wide correspondence, by his large personal library and by his intimate familiarity with many European languages.

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LABORATORY APPARATUS AND METHODS

A CULTURE TUBE FOR USE WITH COLLODION SACS

IN the course of recent studies of bacteria, the associated growth of gas formers and non-gas formers was under observation. It was desirable to cultivate the organisms in the same medium separated by a collodion membrane. After several tests, the method of preparing permeable membranes, as described by Gates,[1] was followed. This method, if carefully followed, gives excellent results.

For anaerobic non-gas formers the V-shaped glass tubes as designed by Gates[2] were used. This apparatus, however, is unsuitable for cultures of gas formers. To meet the conditions of these gas producers it was found desirable to develop an apparatus as shown in Fig. I.

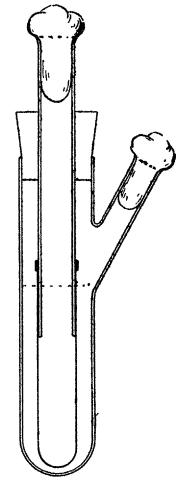

FIG. 1

The illustration shows a simple arrangement for the culture of bacteria and other micro-organisms on opposite sides of a collodion sac. These tubes have also been found convenient in experiments where a membrane is interposed between solid bodies and bacterial cultures as in the Noguchi method. They are convenient to handle and may be inserted into the common type of test tube stand. The side arm of the tube affords an easy means of inoculating culture media or withdrawing solutions from outside the sac, while material inside the sac may be reached through the glass supporting tube to which the sac is attached. These tubes may be used with either a rubber stopper or a cotton plug carefully fitted to the supporting tube and pressed into the larger tube.

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CADAVERA WITH FLEXIBLE JOINTS

THE rigidity of the joints of the cadaver as ordinarily prepared impedes the progress of the dissection. In the study of muscle action it is especially desirable to have a flexible specimen. In such a specimen the orifices of the body may be approached naturally. Any method resulting in flexibility should be of ready application and preferably should call for no great alteration in the preserving fluids used.

For the past thirty months the following simple method has given us satisfactory results. Upon bringing the cadaver into the embalming room the joints are manipulated so as to secure free and complete mobility. By steady traction each joint is once com-

[1] Gates, F. L., *Jour. Exp. Med.*, XXXIII, 25 (1921).
[2] Gates, F. L., *Jour. Exp. Med.*, XXXV, 635 (1922).

pletely carried through its characteristic movements and counter movements. This produces the maximum lengthening of the muscles acting upon the joint. This lengthening is permanent.

It is now only necessary to use a fluid that will not make the joint capsule rigid. This means that liquor formaldehyde (U. S. P.) can not be used, for as little as 500 cc per cadaver produces rigidity. The fluid we use in this laboratory, like the majority of those fluids used in this country, consists of varying mixtures of phenol (pure crystalline), alcohol and glycerine.

Rigor mortis when present ordinarily does not interfere with the mobilization of the joints. Very muscular cadavera may be conveniently left at room temperature over night so that the rigor may subside. The entire manipulating of the body, including the mobilization of the vertebral column and the temporomandibular joint, does not require more than ten minutes. Torn muscles have not been found in the dissection of over one hundred cadavera prepared by this method. It is of course possible to obtain similar results by using an arsenic fluid without manipulation; however, arsenic fluids are at present not in favor as preserving media for routine class material.

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SPECIAL ARTICLES

THE SURFACE EQUILIBRIUM OF COLLOIDAL SOLUTIONS. II

ANTAGONISTIC ACTION OF COLLOIDS

WHEN a trace of powdered sodium oleate is added to pure water or to a salt solution contained in a watch-glass, the surface tension decreases instantaneously and becomes very small. If the amount of sodium oleate added is smaller than (1/1,000), the drop will continue for over one hour until a certain minimum value is attained. This value will then remain practically constant.[1] But when the same amount of sodium oleate is added to the same watch-glass containing some other colloid in solution, instead of pure water or saline, the surface tension, after reaching instantaneously its bottom value, starts up immediately and in a few minutes, according to the concentrations, tends towards its original value or even reaches it. Of course, if the amount of sodium oleate (or any other strongly surface active colloid, such as sodium glycocholate) is too large, the final value will be smaller than the original value of the surface tension of the solution. The same thing will happen if the amount of the second colloid (antagonistic) is too small. Table I shows the results of one experiment.[2]

TABLE I

RISE OF SURFACE TENSION OF SERUM IN FUNCTION OF TIME AFTER A DROP DUE TO THE ADDITION OF SODIUM OLEATE

Pure Dog Serum, No. 1

Temperature 22° C.

About 1/10,000 in weight of powdered sodium oleate was used.

Time	Surface tension dynes
Before addition of sodium oleate	57.5
After addition of sodium oleate	39.0
After 15 seconds	44.0
After 30 seconds	48.0
After 1 min.	51.0
After 1.5 mins.	52.5
After 2 "	53.5
After 3 "	55.0
After 4 "	56.8
After 5 "	57.3
After 6 "	57.6
After 9 "	58.0
After 20 "	57.6

After having dropped from 57.5 dynes to 39.0 dynes (18.5 dynes drop) instantaneously, it comes back to 57.5 in less than 6 minutes. When the phenomenon is plotted in function of the time, it gives a very smooth logarithmic curve. Of course, in order to study this phenomenon, it is clear that the Tensiometer[3] previously described must be used, since measurements of the surface tension of the *same* layer of liquid are required at least every minute.

As far as we could see, this phenomenon is general for all colloids studied. In other words, the less surface-active colloid will tend to adsorb the more active colloid so as to counteract, sometimes completely according to their nature and relative concentration, the effect of the second on the surface tension of the solution. This explains why, in jaundice, relatively large amounts of sodium glycocholate and taurocholate can exist in the circulation without causing hemolysis of the whole blood.

II

ACTION OF COLLOIDS ON THE CRYSTALLIZATION OF SALTS

It has been shown in a previous paper[4] that col-

[1] du Noüy, P. L., "Surface Equilibrium of Colloidal Solutions. I.," SCIENCE, 1924, Vol. LIX, No. 1539, p. 580.

[2] *Compt. rend. Acad.*, 1922, clxxiv, 1258; *Compt. rend. Soc. biol.*, 1924, lxxxix, 1148.

[3] du Noüy, P. L., *J. Gen. Phys.*, 1919, i, 521; *La Nature*, 1920, No. 2391, p. 63. Holmes, H. N., "Manual of Colloidal Chemistry," New York, Wiley, 1922.

[4] du Noüy, P. L., *J. Exp. Med.*, 1922, xxxv, 732; *Compt. rend. Acad.*, 1922, clxxiv, 963.