if the parallelism between the two conditions is as we surmise, one would expect the greater severity of symptoms which occurs in human beings.

30 (1612)

Dissection and injection studies on the Amœba.

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The species used was *Amœba proteus*. By means of a micropipette liquids of various kinds were injected and the effect noted.

Oils form spherical droplets which are carried about in the cytoplasmic currents. A large drop is usually expelled. Immediately on being extruded the drop tends to flow over the surface of the *Amœba* thus partially engulfing it.

Distilled or spring water diffuses through the granular endosarc diluting it. The dilution is followed by a contraction of the endosarc and the massing of a hyaline fluid between the endosarc and the external pellicle of the *Amœba*. This dilates the area usually termed the ectosarc. The fluid soon accumulates on one side of the *Amœba* in the form of a blister which is ultimately pinched off.

A number of acid indicators were injected. The color reactions showed that the protoplasm of the *Amœba* is more acid than its environment. Upon death the colors change to those characteristic of the surrounding medium.

The difference in behavior of living protoplasm to "basic" and to "acid" dyes is striking. The "basic" dyes used were all chlorides of colored basic radicles and the "acid" dyes, potassium or sodium salts of colored acid radicles. In every case the "basic" dyes had a coagulating and the "acid" dyes, a liquefying effect on the protoplasm.

In the case of the "acid" dyes, when the effect is local, the healthy non-colored portion of the endosarc shrinks away from the colored liquefied area. This liquid accumulates under the pellicle in the form of a blister and is ultimately pinched off.

If the "basic" dye be relatively nontoxic its injection results in a coagulated area which is localized as a colored lump of inert material. This lump is carried about in the protoplasmic currents. The color gradually diffuses out of the lump and stains many of the cytoplasmic inclusions in the *Amœba*.

Dissection indicates that the granular endosarc is capable of easily reverting from a fluid to a solid state and vice versa. Peripheral to the endosarc is a hyaline liquid zone, the ectosarc, which is bounded externally by a very thin, extensible, pellicle. The extosarc can be enlarged by a hyaline liquid extruded from the endosarc.

In the formation of a pseudopod a localized area of the pellicle softens. The accumulation of liquid in the ectosarc immediately under this area produces a bulge. The more jellied endosarc at the base of the bulge liquefies and a liquid suspension of granules streams into the bulge and up to its tip where it spreads out and flows back peripherally in the manner of a fountain flow. The granules heap up around the base of the bulge where, by means of a jellying process, a semisolid wall is built about a central liquid channel. Retraction of a pseudopod is accompanied by a reversal of the jellied to a liquid state.

An undisturbed *Amœba* usually forms numerous pseudopodia. Upon continued agitation a broadly lobate pseudopod is formed. The jellying process of the backward flowing endosarc is diminished. The base of the pseudopod, consequently, broadens more and more until all of the endosarc reverts to a liquid state and the entire body of the *Amœba* becomes transformed into what one may term a single pseudopodium within which vortical currents occur analogous to those of a chloroform drop creeping along a bed of shellac under water.

The motile activities of an *Amœba* depend upon a delicate balance between the liquefying and solidifying tendencies of its protoplasm. The most recently solidified regions are the ones that most readily liquefy. In this way a gradient exists with a definite antero-posterior axis. The posterior end consists of a heaped up mass of jellied material which is more resistant than other parts to the liquefying process necessary for the formation of pseudopodia. In an actively moving *Amœba* the amount of

such material is very small and pseudopodia may form on either side thus tending to mask its presence. Exceptionally the posterior end may be made to liquefy but usually the inert posterior end compels an *Amœba*, in order to retrace its path, to turn about.

31 (1613)

Concerning the antiseptic action of some aromatic fumes.

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The recent World War was instrumental, in connection with the impetus given to the search for antiseptics and parasiticides, in calling attention to the powerful antiseptics and germicidal properties of various essential oils; as for instance so well described by Cavel[1] and Fränkel[2]. This antiseptic action of volatile oils is undoubtedly responsible for the remarkable medicinal virtues of ancient balsams, especially in relation to the treatment and healing of wounds. An ethnological study of the habits and customs of ancient peoples, especially in the Orient, cannot fail to call attention to the extensive employment of incense, perfumes and fumigations among these people. Incense was burned in connection with the religious and sacrificial offerings on the one hand, and for esthetic purposes in private homes on the other. Again, powerfully odoriferous substances are in great vogue in the Orient as perfumes and not only are such drugs applied to clothing but very frequently the orientals fumigate their naked bodies directly with the smoke of aromatic herbs and spices, burned over glowing coals. These circumstances suggested to the authors the possibility that such perfumes and fumes may serve a hygienic as well as esthetic purpose by exerting an inhibitory effect on the growth and spread of microörganisms. Accordingly some experiments were undertaken in order to ascertain the value of such an hypothesis.

The authors subjected a number of gums, spices and other

[1] *Comp. rend.*, 1918, clxvi, 827.

[2] Theropmonatofte, June, 1915.