In such an arid and hot climate, evaporation alone would probably prolong the time of flooding for hundreds of years : indeed, the time might be prolonged indefinitely, for the loss by evaporation might ultimately be equal to the supply by inflow. We have a case in point in Pyramid Lake, in Nevada, into which the bold and rapid outlet of Lake Tahoe (Truckee River) perpetually flows without flooding it. Of course, by increasing the dimensions of the Inlet Canal, or augmenting the velocity of the inflowing water, the computed time of flooding might be proportionately shortened ; but, after all, the feeble efforts of man are insignificant in relation to the great hydraulic systems of nature.

JOHN LECONTE.

Berkeley, Cal., June 29.

A dissolving smoke-ring.

The remarkable breaking-up of a smoke-ring from a locomotive in Chicago was observed by me, a few days since, in company with a mechanical engineer of New York, whose estimate of size and height I adopt. The ring rose to an elevation of about one hundred and fifty feet, and attained a diameter of twenty or twenty-five feet, as nearly as could be estimated. It broke up suddenly with a rush of the smoke *along the line of the ring* toward two centres ; namely, the smoke of the south half coming together in the centre of that half of the line, and the smoke of the north half correspondingly to a centre in the north. After these momentary and confused aggregations, all semblance of form disappeared. A vortex ring is different from the theoretic planetary ring breaking up into satellites, but aggregation of the dissolving smoke-ring is suggestive.

H. W. PARKER.

Grinnell, Io.

Surface tension and muscular contraction.

I would offer as an attempt to explain the nature of muscular contraction the hypothesis that the contraction is due to the phenomena of surface tension.

By surface tension of a liquid is meant a peculiarity presented by its surface, due to a difference in state between the molecules in the surface and those in the interior of the liquid. That there must be an essential difference between the surface of a mass and its interior follows from the fact that the molecular forces acting on any particle within the mass are equal in every direction, and so must balance one another ; while the particles in the surface film, having no particles above them, are acted on only from below and at the sides, and so are constantly drawn down against the mass : so that the liquid must be under a definite surface tension.

This surface film behaves as a perfectly elastic membrane stretched in every direction by equal tensions, and takes the form of smallest area consistent with the conditions. This tendency of the film to become as small as possible is well illustrated by the soap-bubble, which may be considered as a layer of water with two surface films. So, when left to its own molecular forces, a drop of liquid assumes that form having the smallest superficies, with a given content, which is the sphere.

When a drop of liquid rests upon a surface which it does not wet, it assumes the form of a sphere more or less flattened out ; and the greater the surface tension of the liquid forming the drop is, the more nearly does it approach the spherical form, and whatever alters its surface tension causes a corresponding alteration in the form of the drop.

Many substances, even in small quantity, exert a considerable influence on the surface tension of liquids.

If a drop of water resting upon a greasy surface, which it does not wet, be touched with a little alcohol, its surface tension is diminished, and it immediately spreads out over a larger area ; but, when the alcohol evaporates, the surface tension of the water is increased, and it again contracts into a more globular form.

Remarkable changes in form are caused when a globule of mercury is electrically polarized. In organic substances the surface tension increases with the increase of certain elements entering into their composition, and diminishes with the increase or diminution of others ; e.g., in butyric acid and acetic anhydride the increase of oxygen and diminution of hydrogen increase the surface tension.

Now, to see the bearing of this upon the contraction of a muscular fibre, it is necessary to remember that the surface tension of a liquid may be changed by a change in its composition, that the contracting elements of a muscular fibre are the cells, and that the composition of the cells is changed at the time of a contraction.

The cells are of an oblong shape extended in the axis of contraction ; and when contraction occurs the cells grow shorter and thicker, just as an oblong drop of water grows shorter and thicker when its surface tension is increased.

Now, a tendency to contraction must follow an increase in the surface tension of the cell ; and that there probably are changes in the surface tension of the cell during contraction, follows from the fact that there are chemical changes in the cell, more rapid during contraction than rest. The changes occurring in acting muscle may be identical with those in resting muscle ; but in resting muscle, restoration keeps pace with destruction, while in contraction, destruction largely exceeds restoration : so any thing hastening the decompositions within the cell may cause contraction.

Exhaustion is explained by the accumulation of products of decomposition, since fatigue in muscles in which circulation has ceased may be readily removed by renewing the current of blood.

This hypothesis may be thus summed up : the active shortening of the fibre is due to an increase in the surface tension of the substance of the cell, caused by an increase in the proportional amount of the products of decomposition. Equilibrium is restored — after the stimulus which hastened the chemical changes has ceased — by a part of the products of decomposition finding their way into the blood-current, and possibly by the remaining products helping to build up the original compound.

ELMER STARR, M.D.

Buffalo, N.Y., June 25.

Trenton natural history society.

So far as my own communications to the Trenton natural history society are concerned, the report thereof in *Science* (viii. No. 178) is a wilful misstatement. As what I did state will soon be published, it is unnecessary to enter into explanations.

CHAS. C. ABBOTT, M.D.

Trenton, N.J., July 2.