There is no reason to suppose that the epinephrin, present in larger or smaller amount in the extracts, could have had any appreciable influence in prolonging life. No effect of this kind was observed when epinephrin equal to the maximum amount which could have been contained in the dose, given on the assumption that none of it had been destroyed, was injected. Much of the epinephrin was destroyed in making the extract.

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AN INQUIRY INTO THE MOTION OF DROPLETS OF JUICE EJECTED FROM AN ORANGE[1]

WHEN an orange is divided into hemispheres and eaten with a spoon, it has often been observed that droplets of the juice emerge and proceed with extraordinary rapidity and uncanny accuracy into the eye of the observer. The phenomenon is a subtle one and explanations which have been offered are conflicting, so that recently certain experiments have been undertaken with a view to its elucidation. Although much remains to be done, it is believed that the results obtained are of sufficient importance to warrant a preliminary report at this time.

Earlier observations in this field, rather sketchy perhaps, may be mentioned briefly. Adam[2] is recorded as saying "damn" violently at the breakfast table (with, of course, the inevitable remonstrance from Eve). This may be regarded as very precise evidence that the oranges of that epoch delivered their droplets with unerring aim. Although the conditions were not quite the same the fact was evidently well known to Atlanta[3] who dropped oranges (the Greek word is ωραμσε, wrongly interpreted by the commentators as "apple") in the path of her competitors in races, thereby removing them from the competition. More recently the Spanish Dons were wont to present oranges to their ladies with a view to rendering them incapable of choosing other partners. In the late war no doubt only the high visibility of oranges prevented them from being used in the most bitter offensives.

In the present experiments a large concave ladle, 2,000 karat, served as a source of energy. The crossed fields were impressed by a cuneiform magnet, the usual precautions being observed when adding the cracked ice. It was soon found absolutely necessary to apply a relativity correction. This was done, however, carefully in Latin so as not to injure any of the finer sensibilities, if there were such present.

The results of the measurements showed that the diameters of the droplets were of the order of 10^{-21} cm, which accounts for their being able to enter the smallest crevice of the eye. Their speeds varied over a considerable range, but on the whole were high, averaging about a tenth of the velocity of light. It was found that the droplets were attracted towards the eye with a force varying with the inverse seventh power of the distance. These facts are all seen to be but details bearing out the surprising frequency with which the droplets steer for the eye, and are best explained by an appeal to the 1st law, *i.e.*, the innate cussedness of inanimate things. An exhausting series of experiments developed the remarkable fact that the right hand invariably propels the droplets into the left eye. A little thought, however, indicated that this was so because the right hand didn't wish the left to know what it was doing.

It is hoped to present in a future paper a mathematical explanation based on the flirtation theory of Einwein and Drinkemoffski.

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USE AND DISUSE IN THE CHROMOSOMES

THE writer expressed his theory of use and disuse in the chromosomes as an explanation of phylogenetic development in the article "Factors in Phylogenetic Development" in the May–June, 1927, number of the *American Naturalist*. Further study of the principles expressed in this paper has led to the conclusion that the uniformity of genes in the various parts of the body need not be limited to the coordinative forces of the organism, although coordination is an obvious essential to such uniformity.

Since the chromosome complex characteristic of the species persists in most cells of the body, it follows that most cells contain a great number of genes which find no expression within those cells. It seems improbable that the millions of genes in this category are entirely without effect in the expression of inherited characters.

The only logical interpretation of this condition is then that a given character is the product of certain genes not merely in the cells taking part in the expression of the character but throughout the body. According to this view the distribution and influence of genes are not coincident. The development of a cell may be due to the influence of a multitude of genes rather than of one or a few within itself, and consequently any increase in the functional capacity of a gene due to repeated use would be at the outset an attribute of all genes of that kind throughout the

[1] Read before the Royal Society of Sultry Yachtsmen.
[2] Eden "Scientific Papers," 1, 35 (6721 B. C.).
[3] Homer, Canto 7.

body, primordial germ cells included, since they are subject to the coordinating mechanism of the organism.

On this basis there can be no possible question of the association of somatic characters with the germ-cells. It has been shown that any character which has significance in evolution is already a part of the heritage at least to the extent that it is a product of inherited functional capacity responding to some condition within or without the organism. If we are justified in the interpretation of the functions of genes here expressed, any change in functional capacity accruing from use or disuse is no less a part of the heritage.

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TYPE CULTURES

A COMPLETE catalogue has been issued by the American Type Culture Collection. This catalogue can be obtained upon request to the Curator, American Type Culture Collection, John McCormick Institute for Infectious Diseases, 637 S. Wood Street, Chicago, Illinois. The collection now contains about 1,450 cultures including 256 fungi and 200 yeasts. A charge is made for cultures to help defray the cost of maintaining the collection.

L. A. ROGERS
Chairman, Executive Committee

THE ORIGIN OF THE PRAIRIE

A PHENOMENON heretofore unsatisfactorily explained by scientists is the occurrence of the natural grasslands of the Middle West, particularly the extensive prairies of Illinois, Indiana and Iowa. Though most of the theories advanced explain their existence altogether in terms of present physical conditions, I am convinced that rapid drainage prevailing at the time of their origin is a determining factor in their development.

It is generally agreed that lakes or marshes are destined in the course of time to become either forest or prairie. One of the factors which may determine which of these shall be the ultimate stage has not been reported. It has come to my observation that if lakes or marshes are drained quickly prairie develops, if drained slowly forest develops. This relationship occurred to me after I had observed small ponds in Albemarle County in Piedmont, Virginia, for a period extending over twenty-five years. One pond observed was that on my father's land near North Garden, Virginia, which was built in 1888 by filling the lower end of a ravine with dirt and pine brush. This ravine contained a small stream which rose at the foot of a forest made principally of poplars (*Populus balsamifera*), black locust (*Robinia*), white (*Quercus alba*), red (*Quercus rubra*) and black (*Quercus velutina*) oaks. The pond, however, was more directly surrounded by a jack pine (*Pinus virginiana*) forest. Black porters loam soil had been washed down into the pond from the forest mentioned first until there was a deposit of two and one half feet and the pond was then left two feet deep. In the summer of 1904 the dam of the North Garden Pond was broken by a storm. The succeeding vegetation was grass, in which no seedling trees appeared. Though the dam was rebuilt in 1905, since then the pond has been neglected. Due probably to slow leakage caused by crayfish, the water level of the dam has been gradually falling. Following this gradual drainage, the exposed edges have been passing through the willow (*Salix nigra, Salix longifolia*) and cattail (*Typha*) into the pine (*Pinus virginiana*) stage without the intervention of grass.

Another pond observed through a period of years was the Coles Pond on top of Green Mountain, 1,000 feet above sea-level, and surrounded by a virgin oak forest consisting mainly of white (*Quercus alba*) and black (*Quercus velutina*) oaks. The pond was made by an artificial mound of dirt between two hills. When I first saw this pond in 1901 it was covered with coarse grass. Mr. Butler, the manager of Stutsville (the name of the farm), informed me it was broken two years previously by the water after a thunder storm. Mr. Butler refilled the pond in the fall of 1901. Since then it has been gradually drained by seepage. Algae first appeared on the edges such as *Oscillatoria, Spirogyra, Oedogonium* and *Vacheria,* followed by mosses on the edge, but not sphagnum. As the water level dropped, these were replaced in the following sequence: cattail (*Typha*), bottombush (*Cephalanthus occidentalis*), black willow (*Salix nigra*), sand-bar willow (*Salix longifolia*), maple (*Acer saccharinum*), jack pine (*Pinus virginiana*), and at the present time the black oak (*Quercus velutina*), red oak (*Quercus rubra*), sassafras, *Vertifolium,* intermingled with wild grape (*Vitris vulpina*).

Recently, further study under Dr. H. C. Cowles in the Chicago region has provided additional data. Prairies, for example, are developing to-day from Calumet Lake near Chicago. Sedges are encroaching rapidly upon the bulrushes as the new soil is gradually raised higher and higher above the lake, and in turn the encroaching of grasses upon the sedges is resulting in a prairie. Skokie marsh and hog marsh are also undergoing transformation of this character. Sometimes with the prairie grasses are a number of