as if the rods were in process of division. They take the methylene blue and gentian violet stains readily and frequently show polar, more deeply stained spherules and other structures in the interior. These rods are not bacteria since even sterilization of the agar for fourteen hours or more in the autoclave at pressures varying from eighteen to twenty-two pounds fails to destroy them, and since besides the original agar suspension does not contain them but a few minutes' heating produces them.

A discussion of this discovery with Professor J. W. McBain, of Stanford University, convinces me that I have discovered a colloidal phenomenon which is the result of the assumption of one form of structure among the compounds of the agar which takes expression in the type of aggregates just described. This form is evidently fairly insoluble and fairly stable. An account of the studies carried out respecting the properties of these artificial bacilli will be published later.

As regards the foregoing statements it may be said that we are dealing with facts which can be easily confirmed by any one. It is fascinating, however, and irresistible to speculate as to whether or not these artificial bacilli may, under the proper environmental conditions, take on the properties of living cells. While of course this seems like a wild notion, I am investigating this possibility.

To Mrs. Dorothy Doyle Thomas, who is assisting me with the laboratory investigations, I wish here to express my thanks.

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ACTION OF BACTERIA AND ENZYMES ON CARBOHYDRATES AND THEIR BEARING ON PLANT SYNTHESIS

THE question of the nature of plant synthesis is an important one not only for the plant physiologist but also for the scientist concerned with the structure and industrial application of products of plant metabolism. This is particularly true with regard to the utilization of derivatives such as sugars, starch, inulin, cellulose, etc.

One interesting mode of attack appears to lie in an investigation of the action of bacteria and their corresponding enzymes on carbohydrates and polysaccharides, a method which has been followed with some success by two of my coworkers, Messrs. H. L. A. Tarr and R. S. Tipson. It has long been known that *Bacillus mesentericus* converts cane sugar into "gum levan," and it is now found that the same change is apparently brought about by the enzyme isolated from the bacteria. "Gum levan" has been definitely identified by methylation, acetylation and hydrolysis experiments as a polymerized form of an anhydro fructose derived from "active" or "gamma" fructose. It is closely related to inulin, which is the fructose-anhydride-polysaccharide found in the dahlia and artichoke.

Complete methylation of "levanose" (gum levan), followed by hydrolysis, yields crystalline trimethyl γ fructose, which, so far as known, is the first crystalline active or gamma sugar to be isolated.

The action of *Bacillus mesentericus* and its enzyme is specific. They do not bring about any changes with carbohydrates and sugars in which the active form of fructose is absent. Raffinose apparently yields the same product as cane sugar. The action on gentianose and melezitose is to be investigated.

Bacillus xylinum (Aceto bacter xylinum) acts upon glucose, mannose, galactose, maltose, sucrose, fructose, "levanose," etc., with "pellicle" formation and change of the carbohydrate into a polysaccharide. It appears to convert glucose directly into cellulose. Of the sugars already examined the only one on which it exerts no action is lactose.

The action of both bacteria and enzymes on a variety of carbohydrates is being actively investigated and the preliminary results are to be published in the immediate future in the *Canadian Journal of Research*.

Of considerable interest is the fact that *Bacillus xylinum* is apparently able to carry the polymerization of "gum levan" to a further, more complex, stage.

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THE MONTANA TICK PARASITE EXPEDITION TO AFRICA

IT is now possible to summarize the 1928 African tick parasite expedition of the Montana State Board of Entomology. The purpose of the venture was to get as much information as possible on parasites that destroy ticks and particularly to discover new parasites which might be brought to America to be used in the possible control of the Rocky Mountain spotted fever tick, *Dermacentor andersoni* Stiles. The procedure was to collect as many ticks as possible from all kinds of domestic and wild animals, hold them under observation alive and determine if parasites were present. Effort was made to extend the collecting over as wide areas as possible and, at the same time,