has not yet revealed the frond structure characteristic of *Archæopteris,* which is typically upper Devonian the world over. Dawson's *Psilophyton* (?) *glabrum,* from the "Fern Ledges" at St. John, has after examination been referred by Stopes to *Dicranophyllum. Psilophyton* seems to have a rather extended vertical range in the Devonian.

The trunks from the Hamilton, at Gilboa, New York, described by Dawson as *Caulopteris* and *Psaronius,* lack the distinctive features of those genera, which, furthermore, seem to have borne Pecopterid fronds and to be confined to formations of Pennsylvanian and Permian age. The Gilboa trunks are, on the contrary, associated with, and, if I am not mistaken, belong to the trees described by Goldring as *Eospermatopteris.*

Sphenophyllum, the name of another genus unknown in rocks earlier than Carboniferous, was without warrant applied by Lesquereux[7] to a minute fragment, apparently algal, from the Silurian at Covington, Ky. The pre-Carboniferous record should be deleted.

The genus *Idiophyllum* (monospecific; *I. rotundifolium*) was founded by Lesquereux[8] on a single specimen of *Neuropteris,* probably *N. rarinervis* Bunbury, in circinate vernation. On the basis of the misleading figure in the "Coal Flora," in which the ultimate divisions of the rachis are drawn as lateral nerves, the name *Idiophyllum* was penciled by Schenk, in some at least of the copies of his Chinese flora distributed by him, in place of the printed *Megalopteris* Schenk (preoccupied by *Megalopteris* Hartt). Later he substituted a second name, *Gigantopteris,* by which the plant from the lower Permian is still known.

The generic correlation of the wide-spread Gondwanaland plant *Dancopsis hughesi,* present also in the Permian of the Far East, with Lesquereux's *Protoblechnum,* which it resembles, is evidently untenable, the Asiatic frond being dichotomous in structure, while *Protoblechnum* has a straight, undivided and broad petiolate frond. The American genus is probably confined wholly to the Pottsville, though it is apparently closely related to Sellards' *Glenopteris*[9] from the Permian of Kansas.

Callipteridium sullivantii Lesquereux, from the Appalachian Allegheny, is Alethopteroid in general features, including its architectural plan. In America the genus *Callipteridium* as now defined is very rare and has not been found in beds older than Conemaugh. In fact, most of the Dunkard plants referred to it are unquestionably Pecopterids; some may be *Cladophlebis.*

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[7] L. Lesquereux, *Proc. Am. Phil. Soc.,* Vol. 17, p. 167, pl. 1, figs. 3–5, 1877.

[8] L. Lesquereux, *op. cit.,* Vol. 1, p. 160, pl. 13, fig. 11, 1880.

[9] E. H. Sellards, *Kans. Univ. Quart.,* Vol. 9, ser. A, p. 180, 1900.

A STARCHLESS POTATO INDUCED BY THE INTRODUCTION OF FOREIGN ENZYMES

Following on a series of recent researches carried out in the laboratory of one of us (H. H.) relating to the synthesis and structure of polysaccharides from common sugars by bacterial action, such as levan obtained by the action of *B. subtilis* and *B. mesentericus,* dextran by the aid of *Leuconostoc dextranicus* and *mesenterioides* and cellulose by the use of *Acetobacter xylinus,* the possibility suggested itself of bringing about a change in physiological characteristics through the introduction into the growing plant of foreign bacteria or their corresponding enzymes with a resulting change in the nature of the polysaccharide formation. Previous investigations have established the structure of levan as a polymerized 2, 6-fructofuranose anhydride, so that a very close relationship exists between this polysaccharide and that formed in the Jerusalem artichoke, namely, inulin, which is known to be a polymerized 1, 2-fructofuranose anhydride.

In view of the similarity in structure of the artichoke and the common potato plant, the idea was conceived of introducing into the latter during growth, through the main stem, the levan enzyme, or its corresponding bacterial culture, with a view to bringing about the replacement of the starch in the potato tuber by another polysaccharide.

Young potato plants about 5 to 6 weeks old (10 to 12 inches high) were taken for this purpose. The tip of the main stem was removed and the bacterial culture (*B. subtilis*) was introduced by means of an attached tube. The treatment was repeated at intervals of several days for two and one half months.

From four plants out of about 30 investigated there was obtained a new type of potato, namely, one practically free from starch as indicated by the entire absence of any color on placing a section in iodine solution, except for a peripheral ring of tissue about one eighth of an inch wide.

These results would seem to establish the possibility of bringing about a change in the physiological characteristics by the external introduction of a foreign enzyme or bacterial culture into the growing plant.

The experiments are being continued with a view to ascertaining the reproducibility of such, and the effect of introducing a variety of other bacterial cultures into the potato and other plants is being investigated.

Further details of this work are to be published in the *Canadian Journal of Research* in the near future.

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A PROMISING CONTROL FOR PSYLLID YELLOWS OF POTATOES

THE feeding of the psyllid, *Paratrioza cockerelli* Sulc., causes a very serious disease condition in potatoes and tomatoes, known as psyllid yellows. It is the most serious problem for the potato growers of many western sections, and tomatoes are often very seriously injured. It has been estimated that the condition reduced the 1932 potato crop in Colorado as much as 8 million bushels.

Practically all sections of the state were infested, with some suffering a total crop loss. Production has become so uncertain in some important sections that the acreage has been very materially reduced. Reports indicated that the loss has been equally heavy in other western states.

The condition is characterized by an upward rolling of the basal portion of the terminal leaves, which may be somewhat smaller than normal and stand more or less upright. They early take on a chlorotic appearance that may develop to a distinct yellow and in extreme cases an early dropping of the leaves. The nodes become enlarged and all buds are abnormally active. The effect upon the tubers is just as pronounced. If the set has taken place the growth is checked. When the tubers are not definitely formed, numerous stolons are thrown out with small tubers forming into a chain effect. Such tubers frequently give rise to sprouts. In advanced cases aerial tubers are characteristic.

Considerable work has been done to determine the exact cause of this abnormal development, without evidence that it is of bacterial or virus origin. The best evidence supports the theory that it is of the nature of a toxin injected into the plant by the insect. This theory is strongly supported by the rather remarkable recovery shown by plants upon removal of the insect parasites.

Numerous tests are under way with a large series of possible controls with outstanding early results being shown from lime-sulfur applied as a spray. It shows a very definite lethal effect upon the insects and apparently has a positive residual effect in preventing the location of the small scale-like nymphs. Plants showing distinct psyllid yellow symptoms have after spraying shown almost complete recovery, as evidenced by a normal top growth and good tuber production. In an early field of the Irish Cobbler variety the checks produced at the rate of 51 bushels of marketable potatoes while a block receiving only one application of lime-sulfur, testing 33 degrees Baume, used at the rate of one gallon to 40 gallons of water, produced at the rate of 209 bushels of much better quality and size. In another field the check produced at the rate of 128.9 bushels and the sprayed portion 378.5.

Extensive tests are being carried on in the late-producing areas and several hundred acres have been sprayed by commercial producers. The early indications of results are promising. A more complete report will be made after the harvest.

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WHERE DID THIS REALLY HAPPEN?

RECENTLY, in rereading Darwin's account of his journey around the world in the *Beagle,* I read in Chapter VII of an attack by a jaguar on priests in a church at Santa Fé, in the Argentine, a few years previous to his visit in October, 1833. Two priests were killed by the animal. When I read this I at once recalled that Seton, in "Lives of Game Animals" (Vol. I, pp. 28–29), quotes from Baird's "Mammals of the Mexican Boundary Survey" an account of a jaguar attacking and killing four people in the church of the convent of San Francisco, which it seems was situated on the Rio Grande 18 miles from Santa Fé! Seemingly, this convent is no longer in existence. This attack was on the tenth of April, 1825. I have looked up this account in Baird, and he apparently copied it from Kennerly's notes.

Knowing that Dr. Alexander Wetmore had been at the South American Santa Fé, I wrote to him, asking if he could tell me if there was a convent of San Francisco there, and he apparently took the trouble to ascertain for me that there is both a church and a convent of the San Franciscan Order at that place. A few years previous to 1833, the time of Darwin's visit to Santa Fé, could very well be 1825.

Baird's account is an abridged translation from the Spanish, and is prefaced by the following remarks:

> Many stories about the ferocity of this animal are told among the inhabitants of the western regions, but none substantiating the fact that a jaguar unprovoked will attack man. In the annals of the Convent of San Francisco, in Santa Fé, a bloody occurrence is recorded which contains some indication of the jaguar's nature.

Then follows the account.

Where did this attack actually take place? It would be strange, indeed, if two such attacks occurred at about the same time at places of the same name so widely separated as these two Santa Fés. Therefore,