mined that most of the serious injury attributed to disease in the heavy soils is, after all, due to lack of drainage. An examination of the root system of plants not diseased shows that the root system penetrates only a short distance, and the root terminals, instead of being tapered, have a rounded or blunt appearance.

CAUSE OF THE DISEASE

A microscopic examination of the galls shows the disease to be due to *Urophlyctis alfalfæ* (v. Lagerh.) P. Magnus. The galls are merely hypertrophied tissue of the host plant, and contain minute cavities which are filled with masses of the brown resting spores which measure approximately 40 micromillimeters in diameter. The fungus belongs to the Class Chlorophyceæ, Order Protococcales, Family Chytridiaceæ, Subfamily Olpidiæ. The sexual resting spores are formed by the union of two sporangia and the passing of the contents of one into the other. The mycelium which produces several fruiting bodies en masse is more or less developed. The fruiting bodies are almost spherical and brownish in color.

This disease was first recorded in 1892 by Lagerheim, who found it in Ecuador. He, however, placed the parasitic fungus in the genus *Cladochytrium*. Magnus, in 1902, found it in Alsace, Germany, and referred the fungus to the genus *Urophlyctis*. Until 1909, the disease had not been reported in the United States, although it had been found in South America, Germany, England and other foreign countries. In 1909, it was reported from both California and Arizona. A year later the writer found it in southern Oregon, but nothing was published until 1911, when a preliminary statement was made which appeared in the local press.

During the past season the writer has been doing considerable work on the histological effect of the fungus, as well as the determination of the manner of natural infection, etc. A detailed paper will be published later.

The literature on this disease is not very extensive; the references which the writer has at hand are as follows:

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P. J. O'Gara

Office of the Pathologist,
Medford, Oregon

A COMPARISON OF THE "MAMMOTH" AND SPANISH PEANUTS AS GROWN IN CENTRAL IOWA

In the spring of 1911, the writer procured seeds of two varieties of peanuts, a strain of the Virginia peanut known as the "Mammoth" and advertised as combining earliness and large size and as being very prolific, and the small Spanish peanut. The "Mammoth" peanut seed was obtained from the Mills Seed Co., Washington, Iowa, and the Spanish peanut from Burpee, of Philadelphia. Both kinds were planted the same day, May 8, and in neighboring rows in a rich soil, which was not, however, a good peanut soil, as it was rather heavy and liable to cement and run together. Both kinds received the same treatment and were gathered the same date, October 23, the date of the first killing frost, unusually late for this section.

The Mammoth peanut hills were only a few in number. They made much higher, larger stalks and were inclined to spread over

the ground more. They bore the peanuts rather loosely scattered, so that although they were not exactly the running type of plant one had to go over considerable ground to get the crop. They continued blooming profusely until frost and although the majority of peanuts were ripe they were found in all stages from the blossom to the fully ripened nuts. Of the few plants raised and examined the most prolific bore 26 nuts, the least fruitful 19, with an average of 21 per vine.

The Spanish peanuts bore their nuts in dense clusters all set close to the main stem, so they were much more easily gathered. Though they still continued to blossom at frost, the great majority of the nuts had ripened very solid and firm and a few had actually germinated so that young plants were breaking the soil when gathered. The most prolific plant bore 82 nuts, the least fruitful is somewhat doubtful as the plants had broken up somewhat. A stalk, very likely a broken branch, bore only 10 nuts, but the least prolific entire plant bore 23 nuts, the average number of nuts per plant being 53 per vine, or considerably over twice the yield of the Mammoth.

The nuts of the Mammoth peanuts were not so immense as some of the Burpee New Mammoth Bush Peanut seen several years ago, and the hulls were not so thick; however, they were somewhat larger than the common Virginia peanut of the markets. The following figures give the result of weighing and measuring a lot taken at random:

WEIGHTS, MEASUREMENTS, ETC., OF "MAMMOTH" PEANUTS

Measurement of Nuts			Measurement of Kernels		
Serial No.	Length, Mm.	Diam., Mm.	Serial No.	Length, Mm.	Diam., Mm.
1	44	17	1	23	12
2	46.5	16	2	20	10
3	48	14.5	3	21	10
4	49.5	17.5	4	20	9
5	46	17	5	21.5	9
6	42	15	6	22	9
7	45	19	7	18	9
8	50.5	16.5	8	20.5	8
9	42	16	9	21	9.5
10	45	14.5	10	23	9
Av.	45.85	16.3	Av.	21.0	9.45

It took 20 peanuts of this variety to weigh 50 grams; of these 5 peanuts were wholly bad, and the 20 nuts yielded 33 kernels, of which 8 were shrivelled, leaving 25 good kernels; the 33 kernels weighed 30.7 grams, or 61.4 per cent. of the entire weight of the nuts.

WEIGHTS, MEASUREMENTS, ETC., OF SPANISH PEANUTS

Measurement of Nuts			Measurement of Kernels		
Serial No.	Length, Mm.	Diam., Mm.	Serial No.	Length, Mm.	Diam., Mm.
1	24	10	1	13.5	9.5
2	24	11	2	12	8
3	24	11	3	11	8.5
4	24	12	4	11	8.5
5	25	11	5	12	9
6	26	10.5	6	10	8
7	25	10.5	7	11	8
8	25.5	11	8	12	7.5
9	28	11	9	13	8
10	24.5	12	10	10	8
Av.	25.0	11.00	Av.	11.55	8.3

It required 47 of these peanuts to weigh 50 grams. All the peanuts were good, and produced 91 kernels, of which only 1 was shrivelled. The weight of these kernels was 38.5 grams, or 77 per cent. of the entire weight of nuts.

Comparing plant by plant of the 2 varieties, the average plant of the Mammoth peanut yielded 21 peanuts, weighing just a trifle over 50 grams. Of these, about 5 would be unripe or otherwise bad, and one would get 30 kernels weighing about 30 grams. Of the Spanish variety the average plant yielded 53 nuts weighing about 56.4 grams, the whole amounting to 102 kernels, weighing in the aggregate 43.1 grams.

Comparing the net output then in kernels, the Mammoth peanut yields 30 grams to 43.1 grams yielded by the Spanish peanut, or a little over 68 per cent. as much.

At the outset, it appears that the Spanish peanut, which is so much more easily gathered and yields so much more heavily, would be the most desirable form to cultivate. On account of the more compact habit it could in-

deed be planted somewhat closer and the yield correspondingly increased.

A comparison of the nuts yielded by the two varieties shows points of favor for each one. The Mammoth nuts are much larger and handsomer and would be more attractive on the market. This is offset by the fact that the shells are much thicker and the kernels do not wholly fill the cavities but rattle around loosely, while the Spanish peanut has a paper-thin shell, closely surrounding the kernel, so that there is no waste space. The kernel of the Spanish peanut is short, almost like a pea, and remarkably solid.

An unexpected difference, much to the advantage of the larger peanut, lies in the labor involved in shelling the nuts. The thin, close-fitting shell of the Spanish peanut makes it exceedingly hard to shell the kernels rapidly, while this process is easy in the larger nuts. The extra work required when the Spanish nuts are to be shelled by hand more than offsets the ease in harvesting them.

Which variety would be most desirable to grow depends upon conditions. Where the season was rather short the Spanish would be better, and where the peanuts were raised for pig-pasture it would be much superior, as the only disadvantage of the Spanish nut, that of the labor of shelling the kernels, would here not be considered.

The purpose of taking the diameter of the nuts and kernels was to show the difference in waste as regards cross-section. The shells differed markedly in thickness, and this could not be satisfactorily compared, as the irregularities made such measurements of little value in themselves; moreover, there was an empty space between the kernel and shell of the Mammoth variety to be taken into consideration. The measurements of whole nuts and kernels show that the diameter of the kernel of the Mammoth peanut was about 58 per cent. that of the entire nut, while in the Spanish peanut it was a little over 75 per cent.

H. Walton Clark

Bureau of Fisheries Biological Station,
Fairport, Iowa

Contact Action of Gabbro on Granite in Warren County, New York.[1]

While engaged in detailed field-work on the North Creek (Warren county) New York quadrangle, the writer found a fine example of contact action of gabbro on granite, which it is the purpose of this paper to describe.

The rocks of the region are all pre-Cambrian and these, named in relative order of ages, comprise the Grenville sedimentary series of various gneisses, limestone, and quartzite; the great syenite-granite intrusive masses; gabbro stocks or dikes; pegmatite dikes; and diabase dikes. The Grenville and syenite-granite series are highly metamorphosed and clearly gneissoid; the gabbro is only moderately metamorphosed; while the pegmatite and diabase are wholly unaltered.

The gabbro, which is of special interest here, almost invariably occurs in the form of small stocks or bosses (rarely as dikes) which break through the country rock (Grenville, syenite, or granite) in vertical, plug-like or pipe-like forms which on the geologic map show elliptical or nearly circular ground-plans. The gabbros are generally medium to coarse-grained, always holocrystalline, and they show every evidence of having been intruded under true plutonic conditions.

The contact metamorphism here described may be seen at the southern end of the gabbro stock (length ¾ of a mile) which lies just south of Mountain Spring lake or at a point 2 miles southwest of Pottersville. In a recently opened stone quarry, about 75 feet higher than the road on its east side, the rocks are laid bare in such a manner as to afford an excellent opportunity for the study of the contact zones.

The following nine zones, passing from the typical gabbro to the typical granite (country rock), have been studied in detail in the field and by means of thin-sections and hand-specimens:

[1] Published by permission of Dr. J. M. Clarke, New York State Geologist.