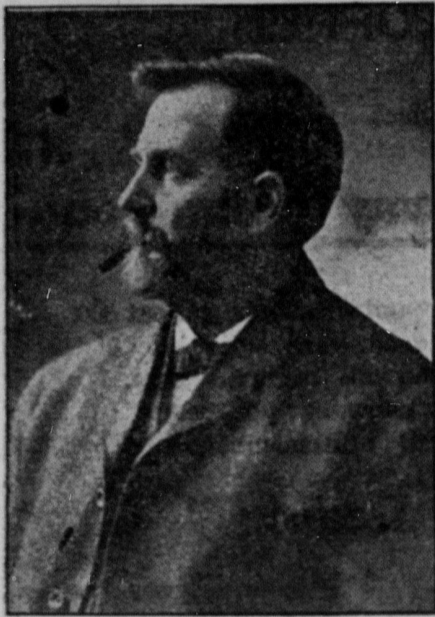


FARMER and PLANT BREEDER.

Work of Assistant Secretary Willet M. Hays.

GUY ELLIOTT MITCHELL.

The country has realized for some time that it has in its Secretary of Agriculture a real farmer; its new Assistant Secretary is likewise a farmer, and unless all records and appearances are false, a good one. He has the valuable faculty of knowing how to do things, and at the same time to be able to tell others how. This Assistant Secretary is Willet M. Hays. Professor Hays was Secretary Wilson's choice for Assistant Secretary, after Colonel Brigham's death, and it appears as though Professor Hays' appointment was anything but a political one. There is a fine entente cordiale between these two broad-gauge men and the work of the Department has taken a distinct forward sweep since Mr. Hays' appointment. He put his shoulder to the wheel at once and seemed able to dispense with the usual two or three months of "breaking in."



WILLET M. HAYS, ASSISTANT SECRETARY OF AGRICULTURE.

which an Assistant Secretary for a big department usually undergoes. He fits his environment well wherever he happens to be. Instructing his classes in the field at the University of Minnesota, located just between the Twin Cities, you would have suspected that Professor Hays seldom visited St. Paul or Minneapolis; on the other hand, when you see him walking along the streets in Washington you would scarcely expect him to be able to drop a straight furrow. But in coming cityward and wearing a crease in his trousers he has not lost his straight-

gratifying results. The average wheat yield of the Northwestern States—Minnesota and the Dakotas—ranges, as I remember, from thirteen to fifteen bushels to the acre, which is about the average for the entire United States. Increase this say one-fourth by simply using this new seed, as in the case of thousands of acres in the State of Minnesota, and figure out the gain to the country. And this is only from results already obtained in seed improvement.

To Double the Wheat Yield.

The wheat breeding work is going on steadily, and Professor Hays says that he has probably not yet reached the half-way point in increased yield. In the work of simple wheat breeding by selection each grain is planted and cultivated separately, a thousand of them in rows, each one like a tree, and then the best ten heads are selected from those thousand plants, and the plumpest grains again selected from those ten heads. Then you are ready for the planting of next year. And so on for ten years. In hybridization there are many more pains taken. Here the best specimens of two different varieties are crossed upon each other by hand pollination and the complex system of selection simultaneously carried on year by year. But the labor is more than justified by the results.

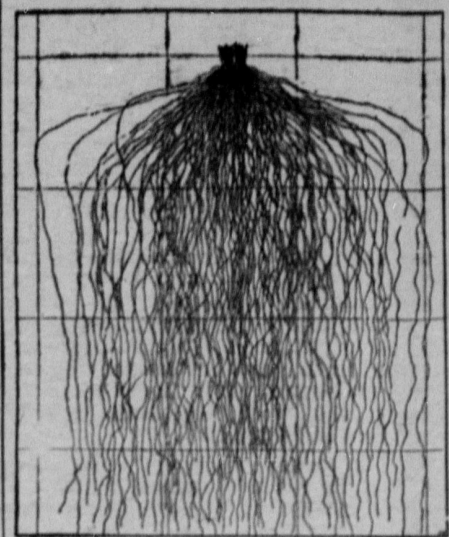
Other experiments have been successfully carried along under Professor Hays with the idea of changing the constituents of the crops—putting more protein or muscle-producing elements in the grain and forage crops just as the beet grower works to put more sugar into his beets.

Practical Farm Teaching.

All this work is technical; it might be the doings of the recluses. The other side of Professor Hays' make-up stands forth when he gets out on a swing 'round the circle and preaches what he knows; when he distributes literature and delivers lectures to the farmers in halls or from the rear platforms of trains—a practical educator.

More agriculture in our national system of education is his slogan, practical farm education that will enable a man to farm better and make more money at it. He urges the consolidation of the small rural schools—bringing four or five of them into one good-sized school where more competent teachers can be hired and a much broader education afforded. The interesting thing about his boys at the University of Minnesota was that they were there to study plants and animals and then go back to the farm. They were at a college, to be sure, but

by breeding. And Professor Hays draw a parallel, step by step, between the improvement of the Wealthy apple, tracing its history and improvement from the tree developed by Peter M. Gidden of Minnesota, and Messenger, an imported English racing horse, which became the leading progenitor of the American racing or trotting



WHEAT ROOT SYSTEM.

horse, and he thus showed that plants were capable of the same development by breeding as are animals.

If you are interested in learning something about plant breeding you might write to your Congressman for a copy of Bulletin 29 of the Department of Agriculture, or probably Professor Hays himself has a few extra copies.

FROM POLE TO EQUATOR.

Arctic Explorer Now Penetrating the Heart of Africa.

Whether in the frigid grip of the north polar country or the burning sands of tropical Africa, the Duke of Abruzzi seems equally at home. This Italian scientist, who made such a high reputation by his recent arctic explorations, has started for unknown regions of Central Africa with a fully equipped expedition, proposing to explore the Ruwenzori Mountains and climb their highest peaks. This range crosses the Equator in the vicinity of the Lakes Nyanza, whence flow the waters of the Nile. It is some eighty miles long, a vast pile of black rock hurled upward in some ancient convulsion of Nature. The English explorer, Stanley, found Ruwenzori twenty years ago. It was pointed out to him as a big salt mountain. As the sun ascended, it assumed shape before his view—a great mountain clothed in snow—and it took him weeks of travel to find out that it belonged to a range. Stanley believed that the Ruwenzori range and the Mountains of the Moon, which can be found on old maps, are identical. According to the old geographies, the waters of the Nile rise in the Mountains of the Moon.

The Duke of Abruzzi has a difficult task before him to conquer the Mountains of the Moon, even though their summits fall somewhat short of that orb. A large quantity of supplies must be carried on the backs of natives, and though the start will be made in the most torrid of tropical climes, the party will soon ascend into temperate regions and then trudge for months in a truly polar climate.

Milk in Your Tea.

"The use of plenty of milk with tea," says The Lancet (London), "is a wise precaution and must be regarded as a sound physiological proceeding, since the proteids of milk destroy astringency and probably prevent the otherwise injurious action of tannin on the mucous membrane of the stomach. In the intestinal juice the proteids are separated and the tannin probably combines with the sodium salts. The immoderate drinking of tea is an unquestionable evil, but, on the whole, we are inclined to think that the evils of tea-drinking have been exaggerated. The real difficulty is to convince people that a lightly drawn infusion gives them their money's worth."



SCHOOL GARDEN WORK.

The Department of Agriculture is just issuing an attractive illustrated bulletin on school gardens. In his introductory, Dr. Galloway, Chief of the Bureau of Plant Industry, says, that as agriculture in its broadest sense is the primary basis of wealth in the United States, it seems essential that efforts should be made in our general educational system to bring early to the mind of the child facts which will be of value as emphasizing the importance and necessity of agricultural work. There is no better way to do this, he says, than through a well-managed and well conducted system of school garden training which early awakens interest in an industry which means much to the future prosperity of the country.

When the work of handling Congressional free seed distribution was turned over to the Bureau of Plant Industry several years ago efforts were made to arouse interest on the part of members of Congress with large city constituencies, who might be able to encourage the school garden movement through the distribution of specially prepared seed packages. Since then millions of packages of seeds have been distributed

GROWTH OF RAILROADS.

INTERSTATE COMMERCE COMMISSION PLACES PAR VALUE AT 13 MILLIONS.

More than Three Quarters of a Billion Dollars Paid Out Annually by the Companies in Salaries to Over a Million Regular Employees.

The annual report of the Interstate Commerce Commission, giving railroad statistics at the end of 1904, shows the enormous total of 297,073 miles of railroad in the United States. More recent railroad construction has brought this figure up to more than 300,000 miles. The number of railroad corporations included in the report was 2,104. That the railroads are prosperous is shown by the fact that only 1,323 miles of road were in the hands of receivers.

The total number of locomotives in use was 46,743 and of cars, exclusive of those owned by private companies, 1,798,000. Of these, 39,000 were in the passenger service and 1,692,000 engaged in hauling freight. Practically all the passenger locomotives and cars were equipped with air brakes and automatic couplers, and the same was true of freight locomotives and a large majority of freight cars.

The number of persons on the pay rolls of railroads in the United States was 1,293,000, with annual wages and salaries amounting to \$817,598,000.

The par value of the amount of railway capital was \$13,213,124,000, or a capitalization of \$64,205 per mile.

Six Per Cent. Dividends.

Of the total capital stock outstanding, 42 per cent. paid no dividends. The amount of dividends declared during the year was \$221,941,000, or a little over 6 per cent. on dividend-paying stock. The number of passengers reported as carried by the railroads in the year was 715,419,000. The number of tons of freight carried was 1,809,800,000, an increase over the previous year of over five and one-half million tons.

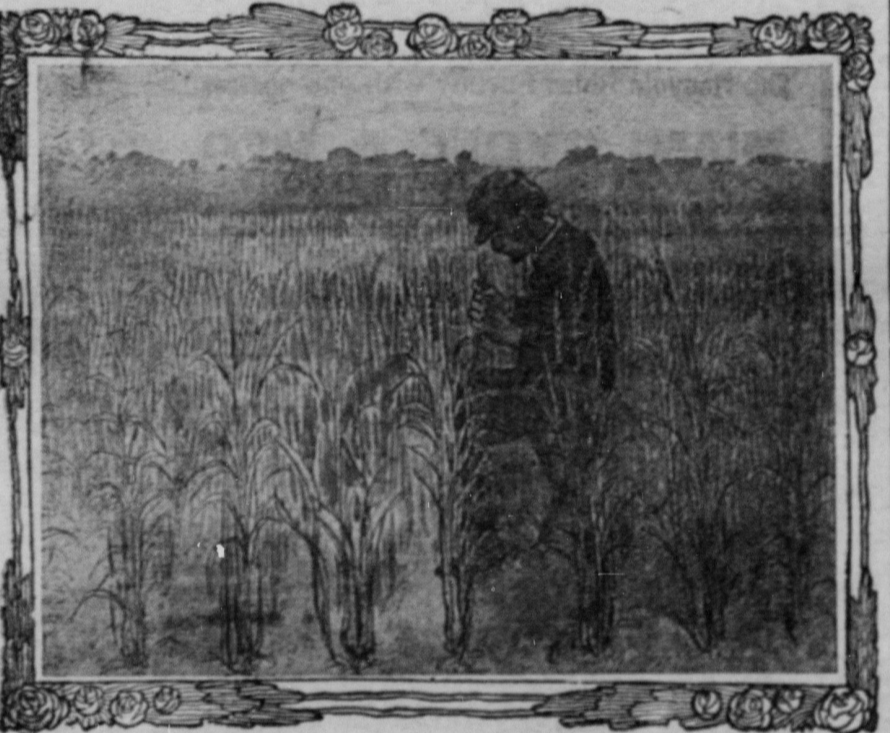
UNEXPLODED PROJECTILES.

Danger Lurks Therein—Chinese Inquisitiveness Proves Fatal.

The dispatch coming from the Far East of the killing of nearly a dozen people by the explosion of a mine near Chefoo, brings to light incidents going to show that the land in the vicinity of Port Arthur is a fertile field of unexploded land mines and shells.

When the Russians were shelling the Japanese positions near the village of Sunshiyang many shells fell in the localities desired by the gun pointers, but the ordinance was of such a defective quality that they failed to explode. A good lot of these projectiles have lain where they fell, objects of the careful investigation and inspection of the wondering and speculative villagers. On one occasion a dispute arose as to the danger in these innocent-looking pieces of iron, and a bold native, to prove his contention that they were harmless, as well as his bravery, struck one of the missiles with a big stone. This was going a little too far, and unfortunately he hit it on the nose, the tender spot of projectiles. It exploded with a terrible noise, killing ten of the interested spectators.

Another Chinese discovered a shell which had found a resting place in the fresh water lake just behind the Russian naval dockyard of Port Arthur. At that time the lake was one mass of ice and the head of the shell was just sticking up through the frozen mass. John Chinaman was attracted by the shining brass screw at the top and went out on the ice to try to get it off. Good metal was worth having in the land of the Orient, and this is what attracted him. He used an old nail to remove the tempting object. His inquisitiveness was a dear lesson for his family, although the pieces were never found.



HYBRIDIZING WHEAT IN THE FIELD.

forward way of taking people at their word and believing just what they say. I asked him for a photograph to accompany this letter, remarking that I would like to have one of him as he looked as I first saw him "down on the farm" (he would be arrested if he went around Washington looking as he was then), and he gravely responded that he had no photograph such as I wanted, but that he would send me one taken at a later date.

Breeding up Plants.

The work which has made Professor Hays most famous is his plant-breeding



SHOWING IMPROVEMENT IN TIMOTHY BY BREEDING.

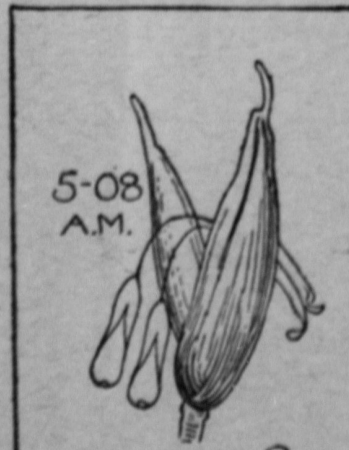
experiments. He is the wizard of farm plant life as Luther Burbank is of horticulture. He has taken wheat and bred it up, by selection and hybridization covering periods of five and ten years, so that the improved strain yields probably 25 to 30 per cent. heavier. He has done the same with flax and with timothy and with corn and other farm crops. This has entailed the most painstaking work, continued year after year, but always with

they were taking a sort of high school agricultural course, many of them for one or two years, and were not figuring on getting a diploma and then leaving the farm and striking out for some city, as is unfortunately the history of so many of the graduates of the agricultural colleges.

Working through the Boys.

"Do your new methods stick with the boys when they get back on the old farm?" I asked. "How do the boys' fathers take it?"

"Oh, they think at first when the boys go home and want to make changes that we are teaching them a lot of new-fangled notions. After the first year perhaps they let the boy take a try on a small scale. Then with the good results shown by the trial they are more than likely to come around by the second or third year and there is apt to be quite a shaking up of methods in the work on the old place. You can't expect to make much headway teaching the older farmers, but you can get at them through the boys."



A WHEAT FLOWER (ENLARGED).

A seventy-page bulletin which Professor Hays wrote for the Department of Agriculture some four years ago on the subject of plant breeding brought his work into great prominence. In it he outlined numerous possibilities of increased production of all crops through plant breeding. Every man knows that the American trotting horse has been wonderfully improved

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