ELECTRIC FARMING

By Robert H. Moulton

SHOWING THE DIFFERENCE IN GROWTH BETWEEN PLANTS ON ELECTRIFIED AND UNELECTRIFIED SOIL

ELECTRICAL TREATMENT APPLIED TO HOT-HOUSE CULTURE

CORN ON THE ELECTRICAL FARM SEVERAL WEEKS AHEAD OF THAT ON OTHER FARMS

NOW that scientists have discovered that high frequency electrical currents are powerful stimulants both of plant and animal life, the farm hand of the future may have to be a duly qualified electrical engineer before he can get a job.

It will not be enough for him to know how to manipulate the motors and transmission gear by which the farm machinery will be run. He will have to be up on the chemistry of electricity. He will have not only to know the use of violet rays in purifying the drinking water, but will also have to know whether ground wires are better for beets, ruby lights for radishes, mercury vapor for tobacco and electric sprinkling for something else.

He will have to be something of a plant neurologist, too. When the corn in the south forty is getting "nerves," or when the oats in the new ground is becoming too somnolent, he will have to make correct diagnoses and prescribe the proper treatment.

THE ELECTRICAL FARM

Electrification for plant growth has arrived. And when the canny American farmer learns that he can double or even treble the output of his fields by the use of electricity, somebody will have to find a way for him to use electricity and make a good profit out of his crops.

A few weeks ago there was a convention of practical electricians in Philadelphia. Among the addresses one virtually escaped the attention of the corps of reporters. Yet of all the addresses, none was more pregnant of great possibilities.

It was really part of the report of the convention's committee of progress and was read by the committee chairman, T. C. Martin of New York, an authority on things electrical. He gave facts and figures to show that plants electrically treated grew much more rapidly than those growing under normal conditions. Why this was so, he did not assume to say. He simply gave the results of experiments.

The work was started on Moraine farm in the fertile Miami river valley, four miles south of Dayton, Ohio. Dr. Herbert G. Dorsey, an expert, had charge of the experiments, which were fostered by the efforts of F. M. Tait, a former president of the National Electric Light association.

In preliminary tests, according to Martin's report, small plots were marked off for exposure to different kinds of electrification. To insure that the soil of one plot was not better than that of another, top earth was collected, mixed and sifted and then was laid to the uniform depth of seven inches over the entire area.

In the soil of plot No. 1 was buried a wire screen. Over the plot was a network of wire, stretched about fifteen inches from the ground. Connecting the network above the ground and the screen below were several wire antennae. The screen was connected to one terminal of a Tesla coil and the network to the other. A transformer stepped a 110-volt alternating current up to 5,000 volts, charging a condenser of tinfoil and glass plates, which discharged through a primary of the coil. About one hundred and thirty watts were operated for an hour each morning and evening.

Plot No. 2 was illuminated by a 100-watt tungsten lamp with a ruby bulb. The light was turned on for three hours daily, beginning at sundown. Plot No. 3 was illuminated the same way, except that a mercury vapor lamp was used. No. 4 had no artificial stimulation of any kind, being intended as a comparison between electrically excited plant growth and that of natural conditions.

SHOWING FLOURISHING CONDITION OF THE CROPS ON THE ELECTRIC FARM

In plot No. 5 was buried a wire network connected to the terminal of a 110-volt direct current. The positive terminal was attached to a small sprinkling can with a carbon electrode in its center. The can being filled, the water was subjected to electrolysis for several minutes. The plot was then sprinkled from the can, the theory being that the current might flow from the can, through the streams of water to the soil.

Plots Nos. 6 and 7 were subdivided into four individual boxes, two feet square, separated by porcelain insulators and arranged with carbon electrodes at each end. To these electrodes were applied both direct and alternating currents.

After radish and lettuce seed had been planted and germination had begun, the various methods of electrification were tried with extreme care. The result of the experiments showed that the plants in plot No. 1 grew in every instance far more rapidly than those in the other beds and more than double the normal growth as shown in the unelectrified bed.

From this the experimenters became convinced that electrification of the ground by high-frequency currents stimulated plant life to an extent that warranted a more complete investigation. So they selected two acres of flat, rich ground.

First a network of sprinkling pipes was built 15 feet above ground. The pipes ran east and west a distance of 200 feet and were spaced at 50-foot intervals. In the northeast corner of the tract seven copper wires were stretched north and south, each being 200 feet long and an interval of 15 feet separating them. The wires were elevated sufficiently for the soil to be plowed with horses. The ends of the wires were attached to insulators on top of gas pipes set in concrete.

At the eastern edge of the house the experimenters built a small transformer house and installed machinery which would yield 10,000 volts. A choke coil and a Tesla coil were used. The whole thing was connected up so that by means of antennae current from the wire network was sent to the network of sprinkling pipes, which, of course, furnished proper connection with the ground.

By the latter part of last July the system was in readiness and the currents were tested. At that time a pressure of 50,000 volts was obtained and the frequency of the oscillatory currents was estimated to be about thirty thousand cycles a second. Birds alighting on the wires were stunned and thrown the ground, but none was killed.

The ground was planted to radishes, lettuce, beets, cabbages, cucumbers, turnips, muskmelons, watermelons, tomatoes, parsnips, beans, peas, corn and tobacco. All were planted in rows running east and west, so that one-half of each row was electrified and the other half was not.

As a result it was found that practically all the plants in the electrified area grew much more rapidly than those out of it. In almost every case the electrified vegetables were ripe two weeks earlier than those outside the zone.

The electrified end of the tobacco crop was cut and it was found that each plant weighed 1,687 grams. It was two weeks before the untreated tobacco could be cut and then it weighed only 1,632 grams to the plant. Taking into consideration that the most rapid growth of the tobacco plant is in its last two weeks before ripening, the experimenters estimated that the actual increase in weight of the plants in the electrified zone was 20 per cent greater than that in the unelectrified zone. If this could be followed out on a grand scale, it is apparent that the effect of electrification on the annual tobacco output of the nation in a single season would be tremendous.

In his formal report to the association, Martin said that many questions had yet to be answered before the use of electricity for the general stimulation of plant life could be considered economically possible. He declared, however, that many of these questions are being worked out in greenhouses over the country.

Just as these American experimenters proved the importance of electrification to plant life, a group of English experimenters proved its importance to animal life. They took two large brooders, filled with newly hatched chickens of the same breeds. One of them was subjected to the influence of high-frequency currents and the other was not. Those in the former were found to grow much more rapidly than those in the other.

Following is a tabulation of the results of electrical stimulation of vegetables. It will be observed that in every particular the plants in the first plot, where the high-frequency current and Tesla coil were used, excelled those in plot No. 4, where natural conditions prevailed:

	Plot 1—Tesla Coil	Plot 2—Ruby Light	Plot 3—Mercury Vapor	Plot 4—Normal	Plot 5—Electric Sprinkling
Radishes (ten plants selected at random):					
Total plant weight, grams	265.70	137.80	109.50	180.00	78.50
Edible portion, grams	139.50	57.40	40.90	79.40	31.00
Edible portion, per cent	51.15	41.65	37.34	44.11	39.49
Tops and leaves, grams	120.50	75.70	65.90	95.00	41.50
Tops and leaves, per cent	43.35	54.92	60.18	52.77	55.66
Roots, grams	9.30	4.70	3.20	5.60	6.00
Roots, per cent	3.50	3.43	2.43	3.12	4.85
Lettuce (ten plants selected (at random)	67.00	52.60	56.50	46.10	31.30
Edible portion, grams	60.70	47.30	50.20	41.80	28.20
Roots, grams	6.30	5.30	6.30	4.30	3.10
Roots, per cent	9.41	10.08	11.15	9.33	7.99
Edible portion, per cent	90.59	89.92	88.85	90.67	92.10

CAMERA MEN IN DANGER

Amateur photographers at the seaside or even in London and other big cities must be more careful than ever how they take snapshots during wartime, for a thoughtless use of their cameras may easily cause them to find themselves in prison for a few days, to say the least, Pearson's Weekly remarks.

In the early days of the war, for instance, a perfectly innocent Hull ship chandler, on a holiday in London, with his wife, was arrested by the police for taking photographs of Battersea bridge. After being detained the best part of the day, during which inquiries were made, the authorities were satisfied that he was merely a harmless snapshotter, but nevertheless they warned him to keep his camera out of use until the war is over!

There are probably many thousands of amateur photographers who, wishing to snap scenes in the neighborhood of barracks, or other military or naval places, find themselves arrested as if they were spies. If they must take photographs in these war days let them resort to the woods and country lanes, as far from military scenes as they can get.

At the outset of the war the military authorities issued an order that no aeroplanes or airships must be photographed at a distance of less than forty yards, or of an air station at all, without the permission of the authorities.

Germany has always been the most dangerous country for the amateur photographer, and more than one tourist has found himself roughly handled by the German police for innocently taking photographs. A special bill was passed a few years ago threatening tourists with a fine of £50 or two months' imprisonment who took photographs without permission.

The French officials in the towns on the Franco-German frontier have always objected to anyone taking snapshots, and, indeed, many a tourist has had his camera temporarily confiscated, to find afterward that his plates have all been rendered useless.

Italy not only bars people taking photographs near fortifications, but forbids the use of a camera in most of the picture galleries and museums.

THEIR DESCENT.

Hampton—Dinwiddow told me his family is a very old one. They were one of the first to come across.

Rhodes—The grocer told me yesterday that now they are the last to come across.—Judge.

SUITS HERSELF.

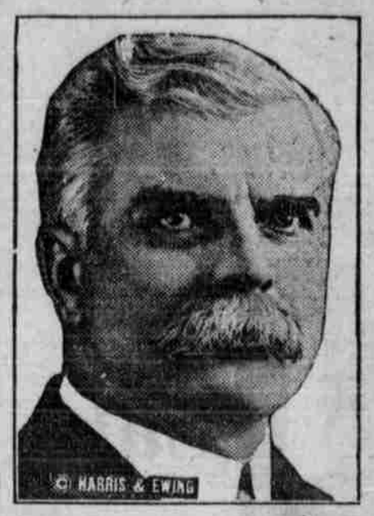
"My wife is always asking me what I would like to eat."

"That's kind of her."

"Oh, I don't know. When I tell her she says, 'The idea!' and orders something else."

In the PUBLIC EYE

LEADER OF THE ENGINEMEN



From farm boy, with few educational opportunities, to a leader of men now representing 55,000 fellow workers in their fight for better working conditions and higher wages, is the record of Warren S. Stone, grand chief engineer of the Brotherhood of Locomotive Engineers.

Mr. Stone has been the principal figure in the hearings of the federal arbitration board which undertook to settle perhaps the most serious controversy that has ever arisen between capital and labor—the differences existing between 98 western railroads and their 55,000 engineers and firemen.

Mr. Stone was born in Ainsworth, Iowa, in 1860, and when not working on the farm managed to pick up bits of knowledge in a small country school. Six months in an academy also enlightened him somewhat, he claims.

When nineteen he entered upon his career, where he was destined to become the champion of his fellow workers. He was a fireman for five years and six months and later became an engineer.

During his 25 years in a railroad cab he worked for the same road, the Rock Island, and had the same run. This was from Rock Island, Ill., to Eldon, Iowa, a run of about 113 miles, and it passed his home. Mr. Stone delights in telling how every day when he'd come within distance of his home, he'd let out the whistle and the folks, usually his mother, would always come to the door and wave.

ENGLAND'S NEW SEA LORD

John Arbuthnot Fisher, Baron Fisher of Kilverston, who succeeded Admiral Prince Louis of Battenberg as first sea lord of the admiralty, has long held as his motto, "The frontiers of England are the coasts of the enemy." The son of an obscure Highlander captain and a high-born Singhalese woman, Fisher combined a certain amount of oriental craft with traditional British tenacity and reasoning. By sheer force of mind, strict attention to duty and persistent labor Fisher rose, step by step, to the highest rank in 1904. But even then the commander accepted promotion with reservation. He had plans for a reorganization of the British fleet. British naval power then was not nearly so great as it is today, nor was it concentrated. In the old days the Mediterranean was regarded as the scene of possible activities. Fisher saw a change had been brought about in England's political relations and that consequently the North sea would be the future fighting place. As a result, when the British empire entered the present war perhaps 86 per cent of the country's naval strength was in home waters.

Fisher knows his officers. "Confound him!" said one who served in the West Indies, "I believe he knows how many drinks I take every time I go ashore." Fisher is silent and discreet. He is averse to publicity.

WOTHERSPOON'S NEW JOB

Governor-elect Whitman of New York sprung a surprise on the politicians by announcing that he had selected Maj. Gen. William Wallace Wotherspoon, late chief of staff of the United States army, for state superintendent of public works, and that General Wotherspoon had accepted the post. Mr. Whitman described him as "the best man in the country for the position." General Wotherspoon was retired from the army on November 1 because he was sixty-four years old. His pay on the retired list is $6,000 a year. His salary from the state of New York will be $8,000.

General Wotherspoon is not a West Point graduate. A son of the late Assistant Surgeon Alexander S. Wotherspoon, who served in the Mexican war, he enlisted in the navy. He found he preferred the army and won an appointment as second lieutenant in the Twelfth infantry. He served in many parts of the West under General Miles, General Crook and others. In 1891 he took charge of Geronimo's Apache band when they were exiled to Alabama. In 1899 he went to the Philippines and stayed there three and a half years.

SAVED THE NATION MILLIONS

"The man who has saved the nation millions" is the manner in which David Watson Taylor, the new chief constructor of the United States navy, has been described. His achievement in this particular is not the product of economy alone, but directly the fruit of his rare scientific attainments.

"Dave" Taylor, as his intimates call him, was born in Louisa county, Va., March 4, 1864. In 1881 he entered the United States Naval academy as a cadet engineer. In those days 26 cadet engineers were appointed yearly to the academy, and their admission was determined by competitive examinations of candidates from the country at large. For a country-bred lad educated mostly under his father's roof the manner in which young Taylor acquitted himself at the entrance examinations was spectacular. Out of 130 candidates he passed No. 2, and soon after entering Annapolis he showed that he would not be content with second place. At graduation he not only headed his class, but he had won by his work the highest percentage of marks of any naval academy graduate up to that date. The record he made has never since been equaled at that institution. With his academic days finished he was ordered to sea for the usual two years' tour afloat, but after a short cruise on the European station he was detailed, in October, 1885, to the Royal Naval college, Greenwich, England, for a three-years' course in naval architecture.

Chief Constructor Taylor is even more than a naval architect; he is a marine engineer besides. This is an unusual combination of technical talents.