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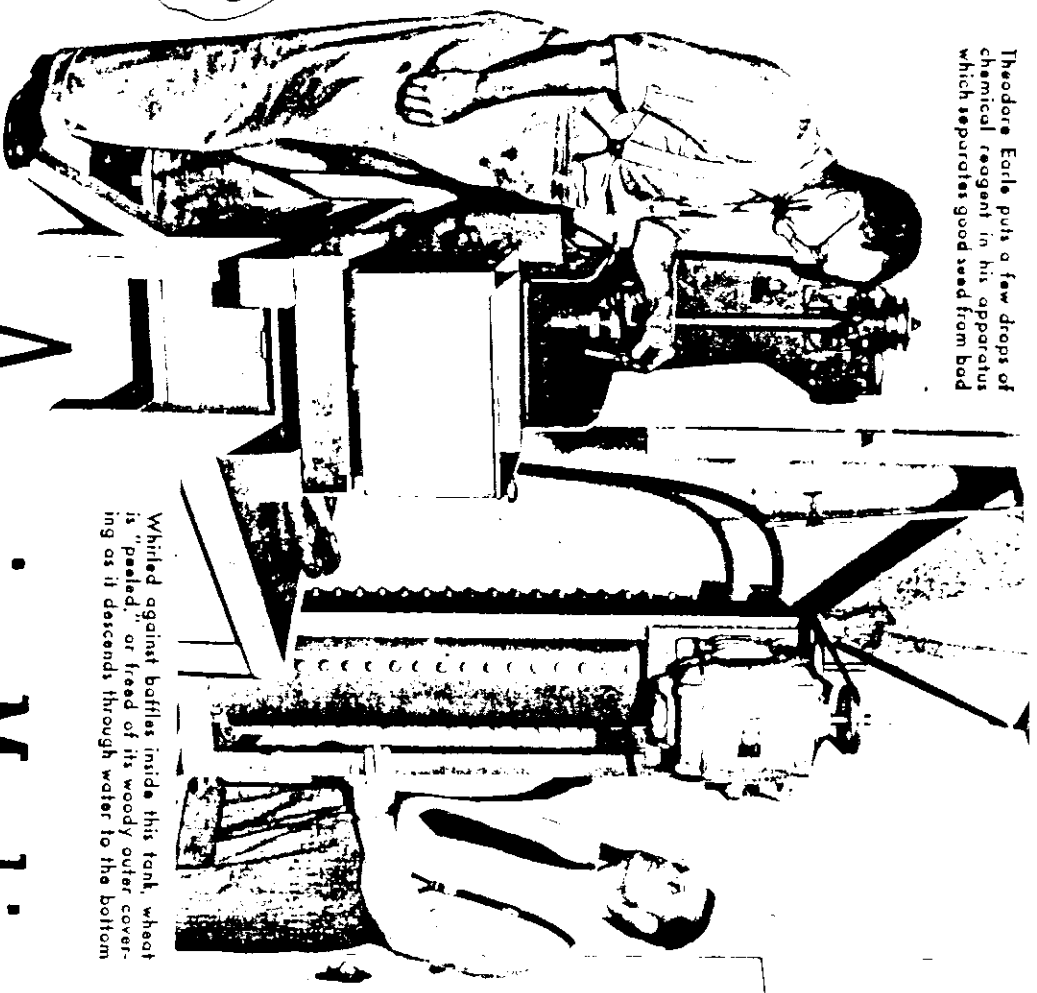
TITLE:

ELECTRO-CULTURE

#2

081-EC2 ELECTRO-CULTURE # 2 --- More of the above, including: Electrical Rain-Making..Electrogenics (Flow-through seed pre-treatment revitalizes weak seeds and super-boosts germination).. "Orthomolecular MWO Generator" & "Tower of Power"...Benson: "Yaard-Vark" electric ant-killer..Tesla Coil system for large farm field arrangement..Bibliography..10 Articles..

Theodore Earle puts a few drops of chemical reagent in his apparatus which separates good seed from bad

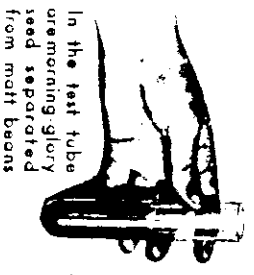


Whirled against baffles inside this tank, wheat is "peeled," or freed of its woody outer covering as it descends through water to the bottom

Amazing Machine

Picks Seeds That Will Grow

POP. SCI.
JAN. '40



In the test tube oreminating glory seed separated from mott beans



MATT BEAN

WORKING secretly for three years in a tiny, vine-covered laboratory at Pacific Palisades, Calif., Theodore Earle, a retired mining engineer, has perfected a startling new process for separating seeds according to their ability to grow. To substantiate laboratory tests, he has made some 1,200 plantings of wheat, barley, sugar beets, corn, carrots, oats, and other farm products at three



Earle's vine-covered laboratory at Pacific Palisades, Calif., which may be the cradle of a new era in farming. Right: a ten-pound beet grown from selected seed

BY ROBERT E. MARTIN

southern California ranches. Increased yields and crops of better quality have come invariably from the "separated" seeds.

Early in 1936, Earle planted blue-grass seed in his lawn. It failed to grow properly, and weeds sprouted in the seeded area. That started the retired engineer on the research which now seems likely to form an outstanding milestone in American agriculture. Earle, who had taken out forty different patents relating to mining, was familiar with the froth-floatation process by means of which gold is separated from baser minerals. It occurred to him that a similar system might be used to separate good seeds from bad.

Into an apparatus filled with water and resembling an electric washing machine, he dumped several pounds of blue-grass seed. After it had become thoroughly wet, he added a few drops of pine oil and set the agitating mechanism in motion. Bubbles formed in the water and a soapy froth covered the surface. Some of the seeds, becom-



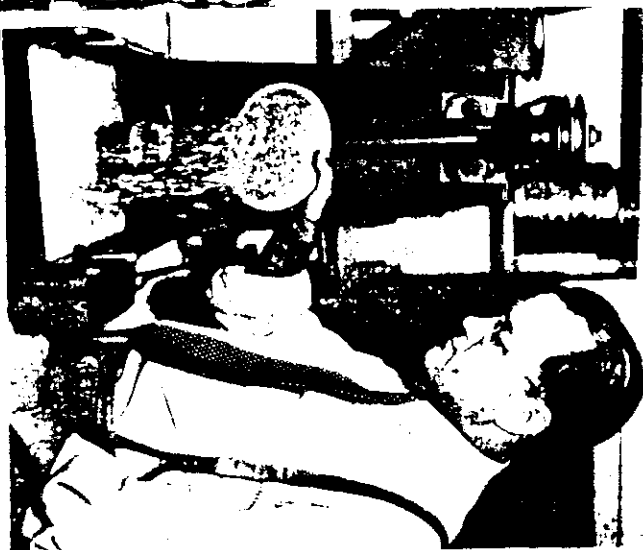
ing attached to the rising column of air bubbles, rose to the top and were skimmed off. Others sank to the bottom.

Earle planted both kinds of seed in greenhouse trays and awaited results. The seed which had sunk to the bottom, he discovered, produced a thick, beautiful blend of grass. The seed that had floated, on the other hand,

For practical field tests, the experimenter plants his "separated" seed on the farm of a neighbor, J. C. Perry. The Indian corn below is a sample of the results he gets.



produced only spindly shoots or devil grass. Spurred on by this success, he tried his flotation system on other seeds. He bought wheat, barley, corn, and oats. In each case, the seed which sank produced the strongest fertile. Exactly why this occurs, the inventor is unable to explain. At first, he thought it was because fertile seeds were heavier. Laboriously, he counted and weighed separated seeds of the same variety. Their weights were often approximately the same. He concluded finally that the chemical composition of the seeds varied and the reagent poured into the water, usually pine oil or synthetic alcohol, had an affinity for the less fertile seeds. As a result they became at-



Pouring barley grains into the frothy mixture in the "separator." When the liquid is agitated, less fertile seeds rise to the top with bubbles

tached to the rising bubbles and were carried to the top.

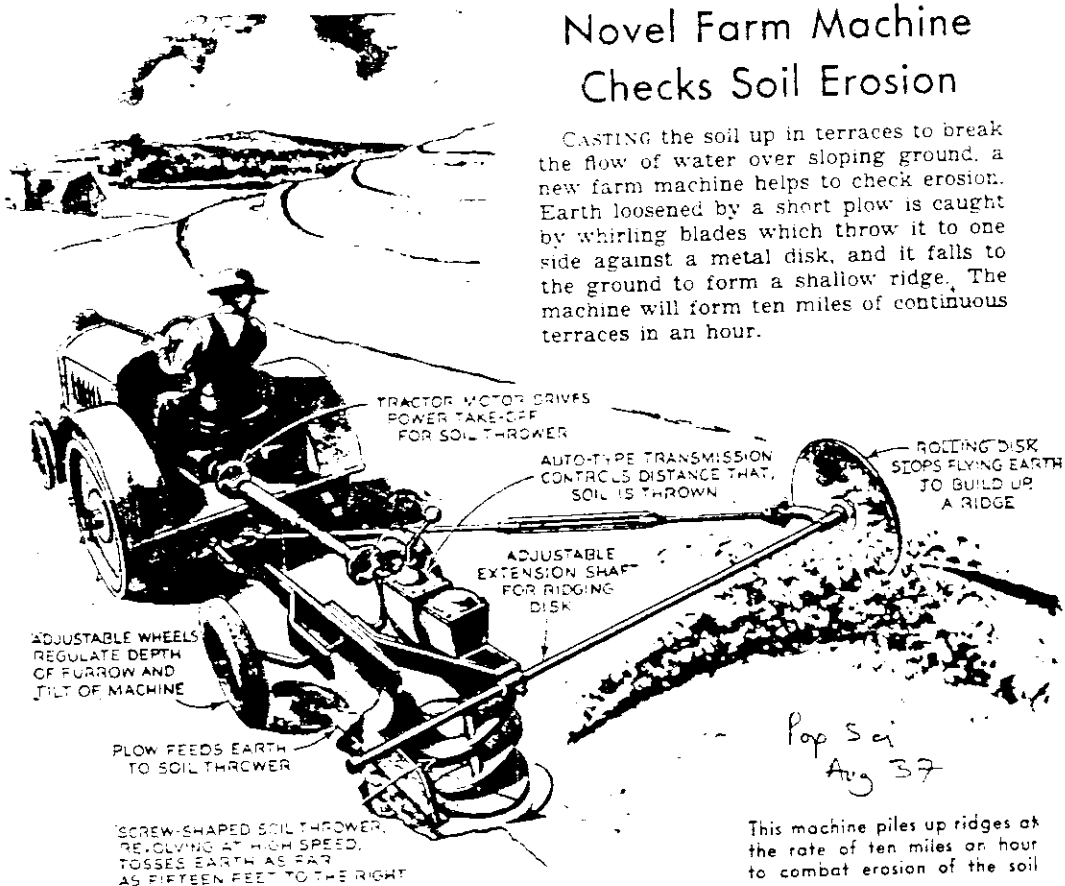
In his earliest tests, the experimenter divided seeds into groups of 100 each and planted them on moist paper. Later, he used ranch plots where the seeds grew under natural conditions.

Spectacular results reported from the California laboratory, however, are not confined to grains. Plants which sprang from selected muskmelon seed were bearing four weeks after others had died of mildew. Sugar beets grew much larger than their neighbors, many weighing ten pounds before harvest time. And, in a test of carrot seed, Earle found that the good seed produced twenty-one pounds against fourteen pounds from the poor seed.

Other work which Earle's machine accomplishes is stripping the woody coating from wheat and other grains, removing tiny spores of fungus, and eliminating insect-infested seeds. In future years, Earle believes, farmers will harvest wheat, corn, oats, and other grains and then take them to mills where they will pass through giant vats and froth-fotation cells to be separated. The most fertile grain will be sacked for planting in the spring; the rest will be marketed for food.

Novel Farm Machine Checks Soil Erosion

CASTING the soil up in terraces to break the flow of water over sloping ground, a new farm machine helps to check erosion. Earth loosened by a short plow is caught by whirling blades which throw it to one side against a metal disk, and it falls to the ground to form a shallow ridge. The machine will form ten miles of continuous terraces in an hour.

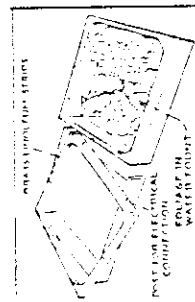


This machine piles up ridges at the rate of ten miles an hour to combat erosion of the soil

Electrically are attached to the strips, making a barrier similar in effect to electric fences on farms. Wandering insects that crawl up the inside walls of the box come into contact with the electrified strips. This isn't fatal, but it is discouraging.



ELECTRIC FENCES in miniature are used by entomologists at the Insect Pest Control Research Laboratory at Wilmington, Del., to keep crawling insects within bounds. The insects, large numbers of which are used in experiments, are given the freedom of open, panlike boxes central in growing plants on which they feed. Around the rim of the boxes are two of the narrow metal strips normally used in linoleum. When carrying low-voltage





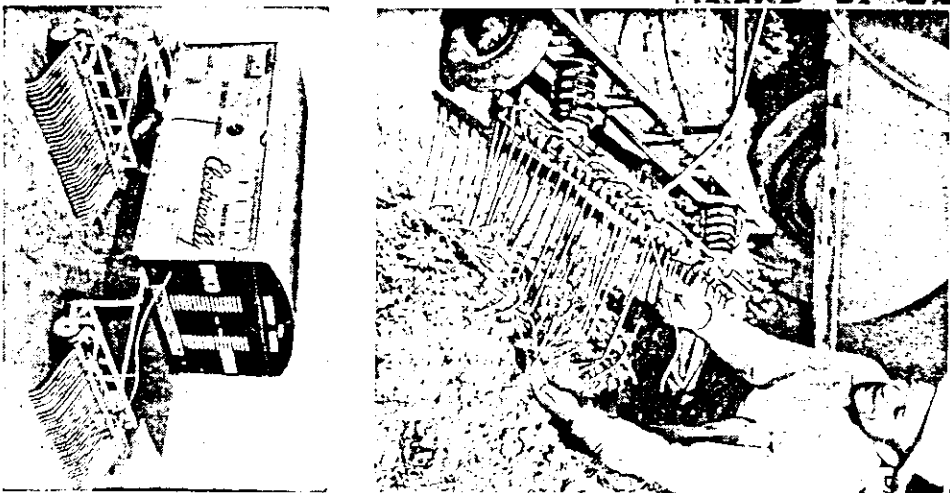
A MOBILE electrocution chamber that shocks weeds to their root-tips is the newest weapon in the battle against weed infestations that cause U. S. losses of more than \$5,000,000,000 a year in crops and land values. The machine, called an Electrovorator, is the invention of Gilbert M. Baker, of Mendota, Calif.

It is a trailer containing a gasoline-driven 12.5 kilovolt-ampere generator and a special transformer. Two rakes with copper electrodes for teeth transmit the high-voltage,

Shocking Weeds to Death

Low-ampereage current to weeds as the machine is drawn at one mile an hour by a jeep or tractor. The weeds burn, from tops to root-tips, leaving the land ready for new crops. The treatment can be repeated for successive growths at a cost of \$10 per acre per treatment. The Avco Corporation, of Los Angeles, distributes the machines.

POPULAR SCIENCE



The bare patches of ground in a cotton field (top) show where the weed killer has been at work. In inset, Mr. Baker displays the "singers" of his machine—flexible rods, connected to the transformer, that ride along the surface of the ground. A control panel in the towing vehicle varies the charge transmitted by the rods to suit different kinds of weeds and soil. Above is the Electrovorator itself, showing the overlapping arrangement of the two rakes and their connections for towing and power.

Fence Shocks Fish

OUT in California, foolish fish who try to swim into irrigation ditches are going to get the shock of their lives. A marine version of the electric cattle fence keeps fish out—without hurting them—while passing water or debris. Shown at right, it consists of a free-swinging row of electrodes, connected to a generator. The electrodes slightly charge the water around them.

Invented by Henry T. Burkley, of Hollywood, Calif., the fish screen uses a generator he developed jointly with Westinghouse. Nettings in California have shown that at times as many as 25,000 salmon have been lost in a single irrigation ditch in a 24-hour period. Hydroelectric plants and industrial pumps are other hazards.



He Tells How You Can Blitz the Termites

You can assure J. H. T., Palo Alto, Calif., that it is possible to kill termites, or any other living organisms in wood, by subjecting them to high frequency on the order of 20 megacycles. This high frequency will heat the wood throughout to temperatures that will kill termites without injuring the material. The work can be done with a portable high-frequency machine brought to the premises. Radio Corporation of America, as well as others, manufacture such units.—L. C. Little Silver, N. J.

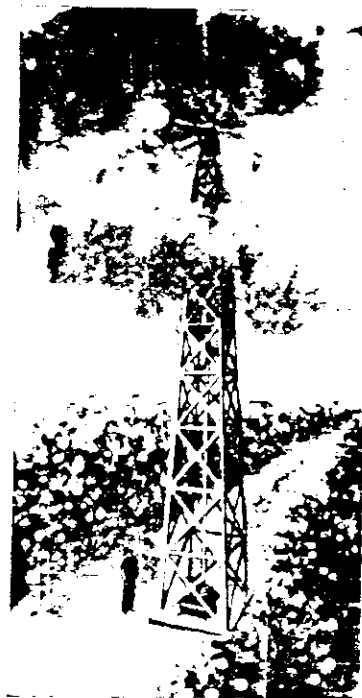
Oct '47

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Tower Sprays Blanket of Fog To Save Crop

Pop Sci Aug 37

TO PROTECT delicate crops from summer heat and winter cold, Arthur S. Martin, of Tujunga, Calif., devised the novel fog tower illustrated. The 100-foot steel column has atomizer jets at the top which spray a mist of tiny water particles into the air to shield the fruit from a scorching sun, or to blanket the orchard in winter to help it retain its stored-up heat.

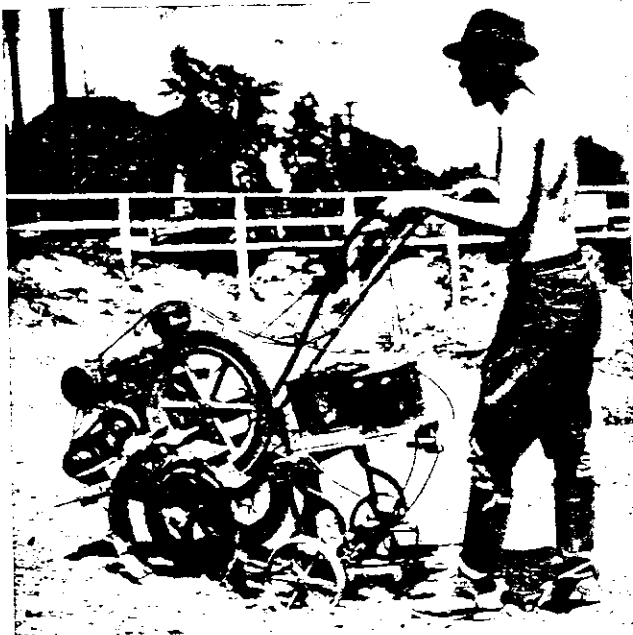


Pump in base of tower forces water through tiny jets to form a mist.

Garden Cultivator Uses Electricity To Fertilize Soil

Pop. Sci. Oct. '39

A NEW portable agricultural machine applies a high-tension electric current to the soil. According to Fred Opp, of Costa Mesa, Calif., the designer, the current increases the nitrogen content and stimulates bacteria growth in the soil and thus improves its fertility. A generator with an output of 110 volts A.C., a storage battery for exciting the armature field, and a transformer that steps up the current to 15,000 volts, are mounted on a walking-type garden tractor equipped with a small gasoline motor that drives both the tractor and the electric generator. Current is conducted through a pair of electrodes to furrows in the soil made by a cultivator. As the electrodes are dragged along, soil falls on top of them, making the contact.



Electric soil fertilizer in use. A gasoline engine propels the machine and generates current shot into the soil by electrodes.

Ingenious Foot Plow Is Hauled by Man Power

LEG-POWER plowing is accomplished by the ingenious but muscle-taxing apparatus invented in Germany and pictured below.

Pressure on a foot lever lifts the nose of the device, while a toggle joint causes the nose to be dropped a short distance ahead of its former location. The operator then pushes forward on a bar that pulls the plow a distance equal to the forward movement of the nose.



Hand and foot levers drive the plow

Carbonic-Acid Gas Said to Fertilize Gardens

INCREASES in vegetable yields ranging from 35 to 175 per cent are said to have been achieved recently by German agricultural experts through the use of



How the size of potatoes was increased by fertilizing them with carbonic-acid gas

carbonic-acid gas as a soil fertilizer. Since carbonic-acid gas is formed in combustion, waste gas from a mine and foundry near Essen, Germany, was used in the experiments. After being purified, this gas was led through pipes with perforations to hothouses and open fields. In both cases astonishingly favorable results were reported.

Much more rapid development and a 70 per cent increase in yield are claimed to have resulted from supplying the gas to cucumbers. Tomatoes were said to be increased 275 per cent.

MAGNETS SEPARATE SEEDS
 Seeds of valuable plants are separated from those of weeds by magnetism, in a process devised by a Hungarian inventor. To eliminate unwanted plantain seeds intermingled with clover seed, for example, the batch is dusted with a mixture of magnesium or calcium chloride, calcium oxide, and iron powder. The iron-bearing preparation adheres only to the plantain seeds, which may then be extracted with magnets.

Blaine scientist takes plant growth to new lengths

His process called key to beating hunger

By Cheryl Johnson
Staff Writer

Dan Carlson believes he has figured out how to make plants grow like weeds.

Carlson, a self-employed plant-breeding scientist from Blaine, uses high-frequency sounds and an organic spray of 55 trace minerals and amino acids in a process called Sonic Bloom. He says that it's being used in 30 states and seven countries, and that several universities are testing it.

Carlson says his process is a scientific breakthrough that could help solve the world hunger problem.

"As a scientist, I've invented indeterminate growth," he said. "That's a hell of a statement to make. The scientific community gets rather rocked when it hears that."

Carlson's first success was a house plant that grew into the Guinness Book of World Records. It was a Purple Passion, which normally grows about 18 inches. Treated with Sonic Bloom, Carlson's plant reached 600 feet.

The 17-year-old plant eventually grew to 1,300 feet, before horseplay by two of Carlson's children caused it to be pruned back by 1,280 feet when it got wrapped into the kitchen ceiling fan, he said.

In the meantime:

■ Save the Children, a nonprofit relief agency, has planted crops grown from seeds treated with the product.

■ C. Itoh America, a Japanese corporation with offices in Los Angeles, is negotiating a multimillion-dollar, five-year contract to use the process in Japan.

■ Farmers in 30 states and seven foreign countries testify that Sonic Bloom improves yields.

The process is being manufactured for house plants, vegetables, trees, flowers and farm crops by Dan Carlson Scientific Enterprises, Inc., at Carlson's home, 708 119th Lane NE.

Among the Minnesota farmers touting Sonic Bloom is Gerald Scheuerer of Nicollet, Minn., a farmer for 25 years. "We had one of our best crops ever last year," he said.

Scheuerer said that in order to cut costs, he didn't use the product this season. "We are down this year, so we felt it did help a lot," he said. "Next year we are going to use some; that's for sure."

The concentrate costs about \$50 an acre per season for farmers, plus a \$200 annual leasing fee for the oscillating high-frequency sound unit. The home kit, which includes a cassette tape, is \$30.

Patents are pending for the product and Carlson's process in the United States. But the product and process already have been patented in Japan, Canada, Spain, Jordan, Lebanon, Australia and New Zealand, according to one of Carlson's attorneys, Donna Johnson of St. Paul.

Carlson said he believes that his technique, which works on plants in poor soil, high temperatures and sparse rainfall, could eradicate world hunger.

An agricultural project in New Mexico has successfully used Sonic Bloom to treat ancient drought-resistant seeds, said Lynnwood Brown, community planner for the project.

"It's a good product and we think it has a lot of promise," said Brown. "In many crops — corn, amaranth, tomatoes, beets, carrots — there were substantial increases in yield."

The New Mexico project has supplied Save the Children with treated seeds for use in drought-stricken parts of East Africa.

Carlson said his interest in eliminating hunger stems from his service as an Army border guard in South Korea from 1961 through 1963. He said he is still haunted by the eyes of a Korean woman he caught placing her child under the wheels of an Army truck.

"I went over to strike the woman and realized . . . she was terrified; this was a necessary act. She did it out of starvation. She and her child were starving to death."

On the spot, Carlson said, "I dedicated my life to solving the problem of world hunger. I enrolled in the University of Minnesota as soon as I was discharged. It took me 13 years to get my degree. I wasn't a real good student."



Carlson's Purple Passion house plant grew into the Guinness Book of World Records after it was treated with his Sonic Bloom process. Carlson, a self-employed plant-breeding scientist from Blaine, says his process could help solve the world hunger problem.

He graduated in 1975 and earned a living as an auto mechanic while researching and experimenting with growth stimulants such as gibberellic acid. His breakthrough came in 1972 when he discovered that certain sound levels would stimulate plants to absorb more nutrients if they were sprayed on the foliage.

"I read a book that said when plants heard sound, a 3,000-cycle hum, they seemed to open their mouths, they breathed better and got healthier." To get the plants to do that, he developed a high-pitched blend of sounds from nature and music. The sound makes weeds absorb more, too. But after about a year of using Sonic Bloom, Carlson said, weeds die because the soil becomes more balanced.

The cassette tape for home use features lyres and sitars playing soothing background music for the uninterrupted tweeting and squeaking of the world's happiest birds and crickets. The sound box available to farmers excludes the lyres and sitars.

With a product and process in hand

in 1976, "I went all around the country, to the deserts in Arizona and California and the tropical rain forests in Hawaii and sprayed everything we could for nothing," Carlson said.

"I believe he has a breakthrough," said Takashi Fukuda, manager of the provisions department for C. Itoh America in Los Angeles. The trading corporation is negotiating to use Sonic Bloom in Japan, where a cantaloupe costs \$30.

Although Fukuda said he believes in Sonic Bloom, he added, "One problem is how to make others people believe it. It takes a long time to prove this. Years."

A grant from the Kellogg Foundation of Battle Creek, Mich., is being sought to give Sonic Bloom scientific credence. Thelma Carlisle, a former researcher for the U.S. Department of Agriculture, said she is working with Carlson to get the grant. "We know it works," Carlisle said from her home in Gainesville, Fla. "There is evidence some marvelous things are happening, but it is going to have to be approached scientifically."

PLANT
WATER ENERGIZING TUBE
"FOR THOSE WHO NEED
A GREEN THUMB"



The photograph shows the accelerated growth and productivity resulting from the use of Energized Water vs regular water on two tomato plants. Each plant was 8 inches high when planted. Sixty days later, the left plant watered with the Energized water grew over 5 feet tall and produced 65 tomatoes as compared to the plant on the right which produced 9 tomatoes and was a dwarf by comparison.

HOW IT WORKS

The Energy tube never dissolves, yet it has the fantastic ability to treat over 1000 gallons of water... one or two gallons of water every 24 hours for two years.

This is accomplished by a frequency or a vibration of energy that is transmitted from the Energy Tube to the water by merely dropping the tube into a 1 gallon container and leaving it for 12 hours. The water is then ready for use in watering plants, flowers and vegetables. The tube may remain indefinitely in the container (of any material). A 1 gallon plastic water jug works quite well.

Use the water after 12 hours, then refill the jug. Some people find it convenient to pour the 1 gallon of treated water into a second storage container, then refill if they require 2 gallons of treated water daily.

CUT FLOWERS

Cut flowers last two and sometimes three times longer when they are placed into Energized water.

SICK PLANTS

Dramatic results have been observed when sick and unhealthy plants are watered with the Energized water.

DIRECTIONS:

1. ~~Remove the Tap~~ - drop Energy Tube into a one gallon container.
2. After 12 hours, pour the water onto plants, flowers or vegetables.
3. Leave the Energy Tube in the container indefinitely and refill the container with water. Leave for 12 hours and use.

ENERGY INNOVATION PRODUCTS

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A SCIENTIFIC BREAKTHROUGH FOR AGRICULTURE

(To improve quality & quantity of growth)

Our research has developed a process for altering the atoms of various basic elements so that these elements are in tune, or in resonance, with energies of the universe that have been with us since the beginning of time. Our products function as "transceivers", receiving and transmitting this energy that appears to be the "life force" energy that sustains all growth and living cells.

To date, our research for application to agriculture has been very limited. The majority of our products for plant growth have been used in energizing water for home plants and vegetable gardens as well as nurseries. At least 100,000 individuals have our products and are using them in their homes now with great success.

The energized water and other products have been used on fruit trees, flower gardens, and vegetable gardens. For example, by pouring one gallon of energized water on a lemon tree every other day for three months, the tree produced giant lemons the size of baseballs where normally they were no larger than a golf ball. When the experiment was discontinued the lemons fell back to golf ball size. The quality of the large lemons was excellent.

A grape farmer in the Salton Sea area used 10% energized water mixed with 90% regular water in his irrigation system. The grape vines that received this energized water grew 18 inches taller than the others in a six-week period. The most interesting observation was that the grapes produced on these vines became ripe for picking two weeks later and were larger and sweeter than the normal production.

Application of our system can be done in several different ways. The water for irrigation can be energized with our products, or a handful of altered decomposed granite can be spread around the base of a fruit tree. This should have the same effect and will be permanent. The altered energized granite should last for many years (at least 3 to 4 years) - possibly longer. For use in growing cotton or vegetables small quantities of altered granite could be spread in the furrows at the time of seed planting and should be very beneficial to growth and quality. We do not recommend that normal fertilizers be eliminated.

It is our desire to make contact with fruit growers and farmers who would be interested in assisting in the research required to prove out these new methods on a large commercial scale. If you are interested, please contact us so that we can get under way on testing programs.

Ralph E. Bergstresser
President

Put a Lightning Rod Over Your Garden and Watch It Grow!

A thunder-and-lightning storm has an extremely fertilizing effect on your garden and lawn. Immediately after one of these supercharged storms your plants seem, literally, to turn green on the spot. Fact of the matter is, my friends, they do, as a result of electricity charging the oxygen which turns into 78 percent nitrogen.

You can create this same condition in your garden by practicing a special type of gardening called *electroculture*. Electroculture is gardening with the use of metal objects, such as copper wire, metal trellises, and tin cans to attract static electricity to the soil and the immediate atmosphere of your vegetable garden. This charges your garden, and the flow of elements will increase the size, health, and yield of your crops.

Grandma said that when Great-Grandpa Coolidge was a young man, electroculture was all the rage in the agricultural journals and periodicals of the day. This growing method was first discovered and practiced in Europe, but when it was brought to our shores it spread like wildfire among the faddist farmers. Then, like many good things that are overpraised and overpublicized, electroculture fell into disrepute. I believe that if you approach it gingerly, and use it sparingly, you will have some very good results raising vegetables with electroculture.

HOW-TO-DO-IT ELECTROCULTURE TIPS

Here's how to grow vegetables with electroculture. First, stretch a piece of fine copper wire over the top of your vegetables, and fasten it to wooden stakes at each end of the row. Place the wire high enough so that it does not touch the tree plants.

Another method is to place tin cans every twelve to eighteen inches apart in your row with the tops and bottoms removed. Bury the bottom two inches of the can in the ground to keep it from falling over.

Melon and other vine crops, including beans, can be

grown on metal fences, resulting in some of the most extraordinary results.

Whenever possible, use copper, which gives better results. For more information on the use of copper in gardening and farming you might write to Phelps Dodge Industries, 300 Park Avenue, New York, N.Y. 10022. Phelps Dodge is one of the largest copper companies in the world and is very promotion-minded and a strong proponent of gardening and growing to keep America beautiful.

Place a peony ring around your rose and see if you don't get a larger plant. Do the same for evergreens and shrubs to give them a better start.

To keep rabbits and other varmints away from your cabbage patch and charge the air at the same time, make a wire hut over your cabbage and other plants. This will keep your furry friends out and the electric energy in.

Tomatoes can be improved by training them to grow on metal poles rather than wooden stakes. Tie them with nylon strips made from discarded pantyhose.

Wedding

Grandma said that one of the surest signs that I had done a good job preparing the soil and helping to make it fertile was the army of hostile weeds that seemed to spring up overnight.

She said it was very important that I get them all up before they choke out the corn, peas, radish, and carrot seedlings. She also warned me how amazingly quickly weeds are able to go to seed.

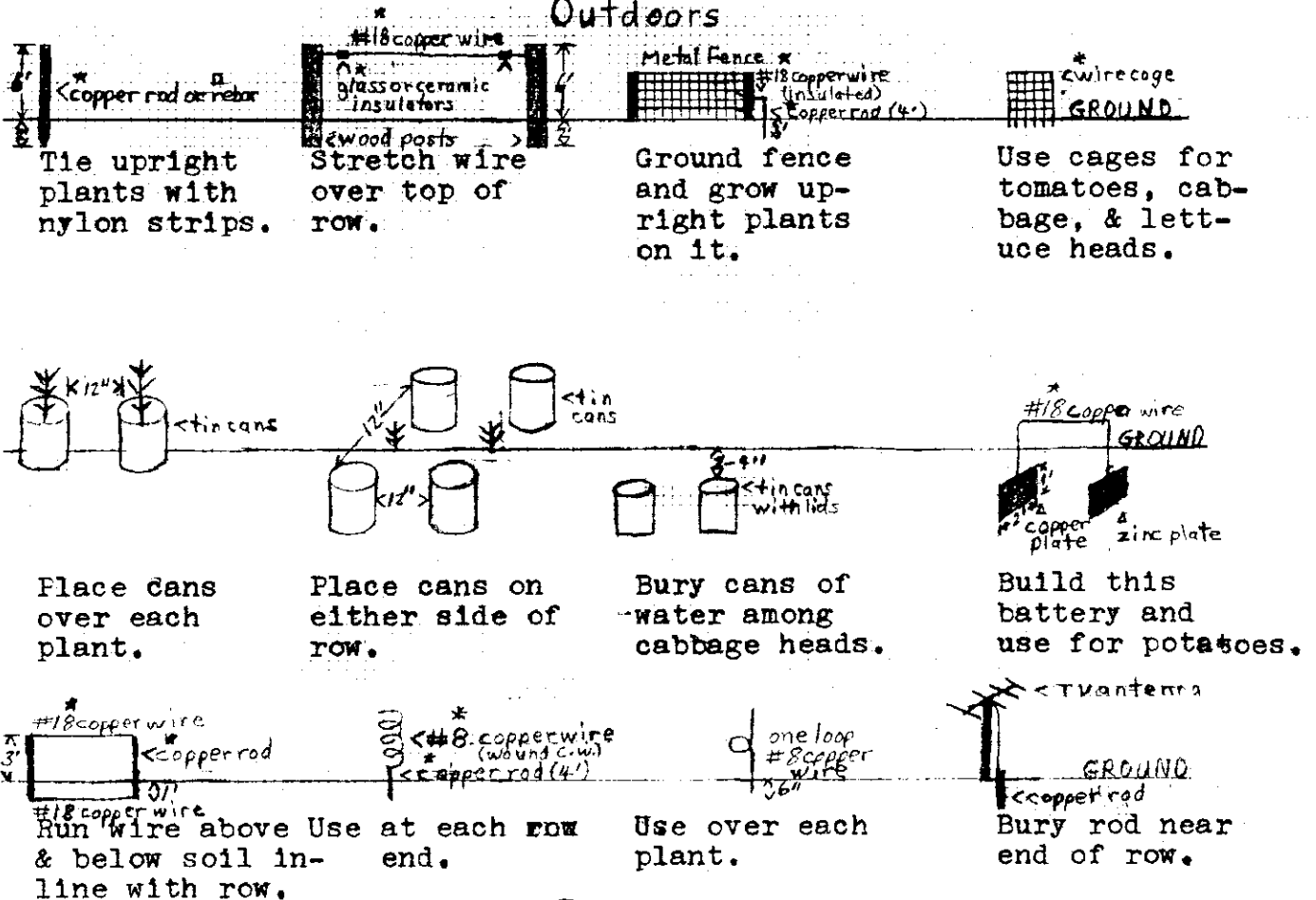
She told me that old-fashioned farmers had trained geese to pull weeds, but the best and surest way to get rid of them is to get down on your hunkers or hands and knees and pull them with two hands. Pull weeds cautiously as you get close to each side of a row of vegetables. Too many folks get in too much of a hurry and pull up half of their crops along with the weeds. Be careful to pull them away from the young beets without disturbing their root hairs.

*Talk to your Plants - 1973
Garry Baker Mack Publishing*

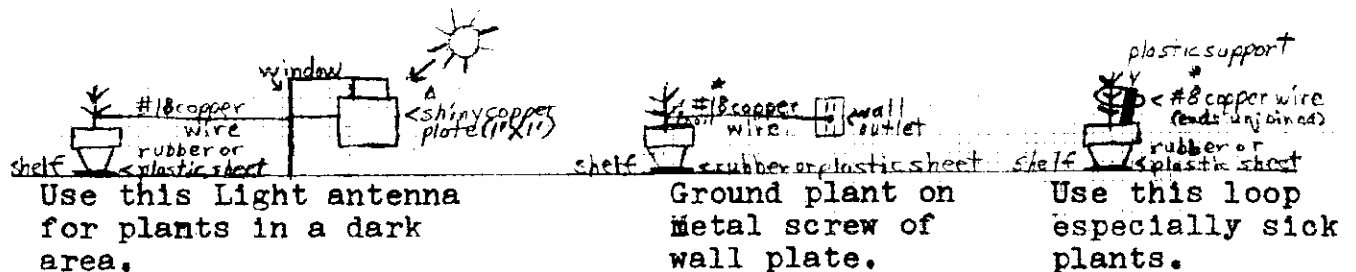
ELETA - GARDENING

PROJECTS

Outdoors



Indoors



* Electronics Store

* Hardware Store

Δ Metal Supply House

□ Building Supply Store

Note: Dimensions are not to scale and are for general reference only. They may be changed to suit your particular situation. Experiment!

Thomas L. Harrelson
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Columbus, Ohio 43206
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ELECTROCULTURE ENERGY FROM THE SKY

Electroculture has been labeled as a method for attracting electric fields to stimulate plant growth. This is not wall-plug electricity. The power is better identified with the same atmospheric phenomena that causes lightning and subsequent electrification of the atmosphere.

In recent tests, electrically charged plants showed 50% greater fruit yield than their non-charged counterparts. George deLaWarr says vital forces in soil — an aggregation of a series of electrostatic charges — “show life in progress.”

Forms seemingly help root systems oscillate in rhythmic patterns with both direct and alternating electrical currents. Electroculture has also been termed “Bio-electric Phenomena.” Some type(s) of self-generated electric fields continually operate throughout living plants. Form and external forces modify these energies.

Researchers claim forms of suspended wire substantially reduce frost damage in plants and trees and its magnetic action contributes to their protection and rejuvenation.

Weak electrical fields also increase the flow of sap in trees, according to researchers. Still, high humidity, heavy rains and intense sunlight may over-stimulate plant growth and negate the effects of electroculture, particularly when artificially induced.

Cement cylinders and wire-mesh tunnels serve well but metallic shields of fine mesh wire, while inviting growth activating energies, seem to screen out other fields.

Copper loops mounted so they halo above, or circumscribe, the plant produce vigorous plant specimens. A copper penny placed in a vase of flowers may brighten a bouquet.

Lakhovsky says, “A vast range of electromagnetic oscillations impregnate the earth’s atmosphere. Any oscillating circuit of ANY FORM or dimension is likely to find in the vast field of waves its own resonance with which it can vibrate harmoniously. He calls it “Magnetroptism,” (magnetic affinity).



Metallic forms of fine mesh, rabbit and chicken wire, castoff cans, wire trellises, lattices, screen cones, Christmas tree ornaments and even a handful of rusty nails cause vegetation to grow faster, greener, and resist attack by insects.

The metal forms apparently aid plants in drawing upon electrons in space. Electrons presumably combine with positive ions in the atmosphere’s oxides, developing subtle energies so necessary to vegetative growth.

THE MAGIC OF NEGATIVE IONS

Negative ions in our space, unlike the name they imply, have a positive effect on man and nature. European firms now market large quantities of negative ion producing machines.

Destined for auto, home, office and smoke-filled conference rooms, the ionizers (some selling for about sixty pounds sterling) seem to heighten one’s efficiency, induce better concentration and reduce fatigue. *Continued on page 4*

FIFTY FOOT HIGH GIZAH REPLICA

Dear Bill:

I have enclosed two photos which may be of some interest to you. The first is a shot of you standing near the 50-foot Gizah replica in Malibu. This was the first erection of the experimental pyramid which was jointly designed and fabricated by Dome West and students from SCI-Arch.

As you may remember, the framework for the structure was not entirely complete at that point in time — being about two-thirds of its full height. The pyramid was erected once again at “Design Village” at Cal Poly before going on to the A.L.A. (architect’s) convention in Washington, D.C., where it stood in the shadow of the Washington Monument.

Needless to say, the structure has evoked comment and interest wherever it has been erected. Many have been moved by its form and simplicity; many have been drawn into its interior for meditative or reflective experiences, and many have expressed an interest in running experimental studies of its “structure power.”

This leads me to the fact that Brian Burke (of SCI-Arch) and I are currently planning to erect the fifty-foot pyramid here in L.A. for experimental use. We are looking at sites in Topanga presently, and wish to open the structure for scheduled use to those who are seriously interested in studying any aspect of the properties of “pyramid power.”

If you — or anyone of your readers — would be interested in utilizing the fifty-foot Gizah model, please feel free to contact me at:

DOME WEST, Studio III
1618 Killarney Ave
L.A., California 90065
or give me a call at:

(213) 222-2629

George R. Madarasz



LAST PAGE ONLY

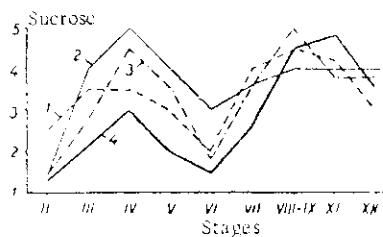


Fig. 1

Fig. 1. Content of sucrose (in points) during ontogenesis of barley following electrical treatment: 1) current density $8 \cdot 10^{-8}$ A/cm², exposure 5 min; 2) $15 \cdot 10^{-8}$ A/cm², 15 min; 3) $15 \cdot 10^{-7}$ A/cm², 5 min; 4) control.

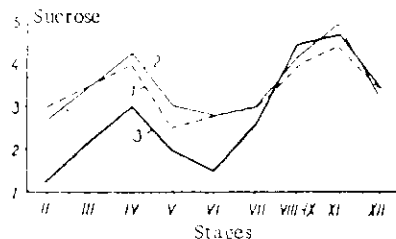


Fig. 2

Fig. 2. Sucrose content in ontogenesis of barley following electrical treatment: 1) current density $8 \cdot 10^{-7}$ A/cm², exposure 5 min; 2) $8 \cdot 10^{-7}$ A/cm², 15 min; 3) control.

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CONCLUSIONS

1. Presowing treatment by a direct current increases sugar formation in barley plants in the period of vegetation. Intensive sugar formation in the experimental series was dependent on the current density and exposure time. Optimal conditions for sugar formation in barley leaves were a current density of $8 \cdot 10^{-8}$ and $15 \cdot 10^{-7}$ A/cm² for an exposure of 5 min and $8 \cdot 10^{-7}$ A/cm² for an exposure of 15 min.

2. The electric current had the greatest effect on sucrose formation: this was the predominant sugar in barley plants, and each stage of organogenesis was characterized by its presence in a definite amount. Other forms of sugars showed smaller changes.

3. In the 4th stage of organogenesis maltose appeared, and its content increased after presowing electrical treatment.

4. The outflow of sugars into the seeds took place more intensively after electrical treatment. The greatest effect was observed with current densities of $8 \cdot 10^{-7}$ and $15 \cdot 10^{-7}$ A/cm².

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A typical example of damage to wheat by insects which can be exterminated by the method described

RADIO WAVES KILL INSECT PESTS

High-Power, Short-Wave Radiations Effectively Destroy Insect Pests but Do Not Damage the Infested Material

THE use of high-frequency current for medical purposes was first suggested by Tesla in 1891. Two years later d'Arsonval conducted some experiments on human and animal subjects with high-frequency waves using an indirect method and found these currents to act energetically on the vitality of tissue. In 1900 Hengstenberg found that high-frequency currents could be used for sterilizing substances of many kinds. Esau demonstrated in 1926 an ultra-short-wave therapy apparatus and Schliephake pointed out before the Berlin Medical Society that short radio waves furnish means of direct attack on pathologic foci which heretofore was possible only through the use of Roentgen rays.

IN September, 1926, Schereschewsky reported the results of his experiments on physiological effects on laboratory animals of currents of very high frequency. In December, 1927, the writer observed that the filament and gases in an incandescent lamp became luminous when held in close proximity to a high capacity antenna emitting six-meter waves. About this time it was observed that workmen testing radio equipment experienced an elevation of body temperature, and in 1928 Hosmer determined that this method could be used for producing in animals any degree of fever at will. A few hospitals are now using short waves for the production of artificial fever in patients undergoing treatment for certain diseases.

The writer was impressed by the observations and studies which he had made with the thought that short-wave energy, if of sufficient capacity and

By J. H. DAVIS

Chief Engineer, Electric Traction,
Baltimore and Ohio Railroad Company

concentrated in a narrow space, would constitute an effective agency for the extermination of insects in all stages of their development from eggs to adults. Radiated energy of this character will effectively penetrate dielectric materials without impairment and induce lethal temperatures in animal life which may exist therein. There is a real need for just such an agency as it is generally recognized that more effective means than those now available are necessary to reach and kill the eggs, larvae, and pupae which may be concealed within the host material.

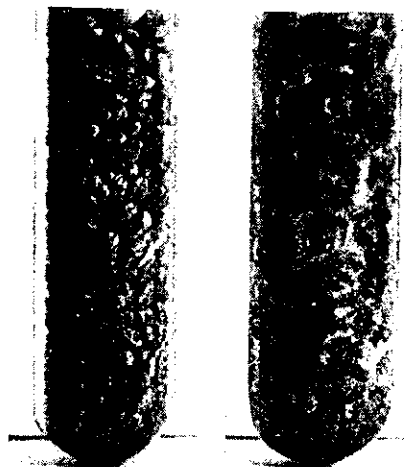
It has been estimated that the annual losses in value of grain and other mate-

rials in the United States, due to the depredation of insect pests, is about two billion dollars. To mitigate the depredation of insects in stored grain

it is customary to withdraw it from time to time for "airing and cooling." The development of the eggs and larval forms within the material is temporarily arrested by exposure to cold air but when the temperature of the stored material is again elevated, due to respiration or other causes, the eggs are hatched and a new generation of pests necessitates repeating the cooling and airing operation.

IF the infested material is given a "killing dose" of high-capacity high-frequency electrical oscillations and reinfestation is prevented by proper storage and aeration, the product can be kept for long periods of time. Recent developments in the field of short-wave treatment and proper aeration, including the maintenance of proper temperature and humidity conditions, appear to make this possible. Records are available showing that two million bushels of wheat in storage for a period of about two years were withdrawn for cooling and airing 13 times, resulting in a loss equivalent to about 130,000 bushels, or one half of one percent for each withdrawal.

Certain species of weevils drill holes in the grains in which their eggs are deposited and the holes are so cleverly sealed that ordinary inspection methods fail to reveal infested kernels. Within three or four weeks, under favorable temperature conditions, these eggs will hatch. The growing insect consumes the inside of the grain and thus destroys it for useful purposes. The United States



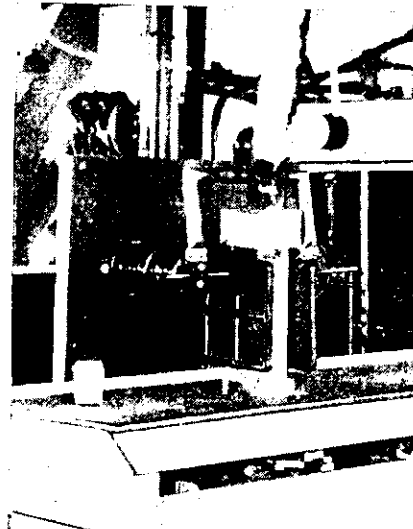
Left: Infested wheat in which insects were killed in six seconds.
Right: Untreated wheat destroyed

Department of Agriculture has estimated, assuming it takes four weeks for the weevil to mature, that the females and males are equal in number, that each female lays 200 eggs, and that all of these eggs hatch and live to maturity, that the possible increase of one pair of weevils in 24 weeks is two trillion weevils. It is not surprising, therefore, that grain and similar infested materials frequently lose their entire value by the depredations of these pests.

SEVERAL years ago the writer made some preliminary tests on small quantities of infested wheat with a view to determining if radio methods could be effectively used to exterminate the eggs and larval forms which may be concealed within the material, as well as the adult insects. Thirty and six meter waves were used, the former of low capacity and the latter of high capacity. The 30-meter low-capacity waves were effective in exterminating adult insects in small quantities of wheat within a period of about 90 seconds but the eggs later hatched out. With the 20 kilowatt, six-meter waves, an exposure of six seconds was sufficient to exterminate eggs, larvae, and adults. The writer received facilities from the Baltimore and Ohio Railroad Company to install a plant for the purpose of making a comprehensive series of tests on infested grain. This plant has been in operation for a year and many kinds of infested materials have been successfully treated including wheat, corn, flower and garden seeds, tobacco, spices, nuts, beans, peas, cocoa beans, packaged and bulk milled cereals, and so on.

The plant is equipped with a 20-kilowatt Westinghouse standing-wave oscillator operating at a fixed frequency of forty-two million cycles per second, seven meter waves, together with necessary accessories. Through suitable rectifying apparatus, the alternating current power supply is converted into uni-direction-

al current at from 6000 to 9000 volts and delivered to the plate circuit of the oscillator. Various forms of treaters have been designed and tested but further experience is required to determine the most efficient design. Most of the tests have been made using a rectangular glass chute type of treater placed between copper plates. Energy from the grid of the oscillator is supplied the treater through a transmission circuit. A thermal ammeter attached to



a "trombone" type of connection between the copper plates of the condenser is used to tune the treater and its contents so that maximum effectiveness of the oscillatory energy will be expended in the product undergoing treatment. Infested bulk material may move by gravity through the treater, the velocity of movement being accurately controlled to insure proper exposure for extermination of insect life.

Hundreds of tests have been made at this experimental plant using infested materials of various kinds and under various conditions of field strength at the treater, and various periods of exposure with material both in motion



Above and at left: Types of wheat treaters used by Mr. Davis. The glass box unit is shown at the left

and stationary. The following are examples of tests on wheat taken at random from the records:

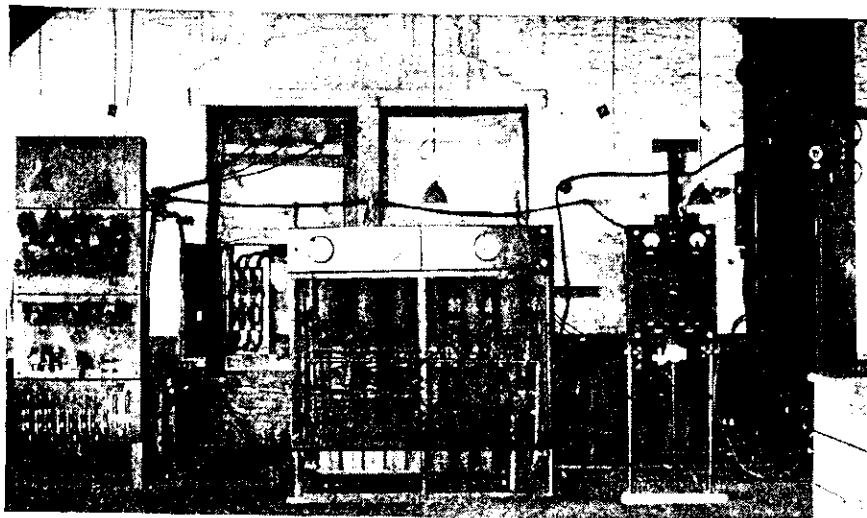
Time Exposure Sec-onds	Plate Amperes	Oscillator Plate Volts	Temperatures of Grain		Number of Weevils Used	Number Killed
			Before Treatment	After Treatment		
			Degrees F.	Degrees F.		
5	7	8400	88	120	13	13
5	5.5	7800	86	125	10	10
6	5.5	9100	86	131	6	6
3	5.5	7500	84	138	10	10
3	8	8000	87	130	9	9
2	5.4	7800	80	138	9	9
5	6	7800	86	142	142	142

Note 1—Untreated grain lightly infested with weevil. All live weevils killed by treatment. No indications of further weevil development to date, a period of 5½ months.

Note 2—Untreated grain highly infested with weevil. All live weevils killed by treatment. No indications of further weevil development to date, a period of 6 months.

THE equipment used in this experimental plant was that which was commercially available and not especially designed for the purpose to which it has been applied. Results of the writer's research work indicate definitely that weevils in all stages of their development, from eggs to adults can be exterminated without injury to the germinating properties of grain, or appreciably affecting the moisture content, and without adversely affecting the food value. There are indications that the germinating properties of wheat and other seeds treated may be enhanced. Worms, mites, and other infestations of cocoa beans, spices, tobacco, nuts, packaged cereals, and so on, can be exterminated without injury to the products treated. Where the equipment is properly installed there are no adverse effects upon persons working or stationed in the vicinity of the apparatus.

Aside from the fact that temperatures lethal to animal life can be obtained, under proper conditions, without necessity for elevating the host materials to such temperatures, there may be other factors contributing to the demise of animal life in the stored grain, such as the effect of invisible light or other rays.



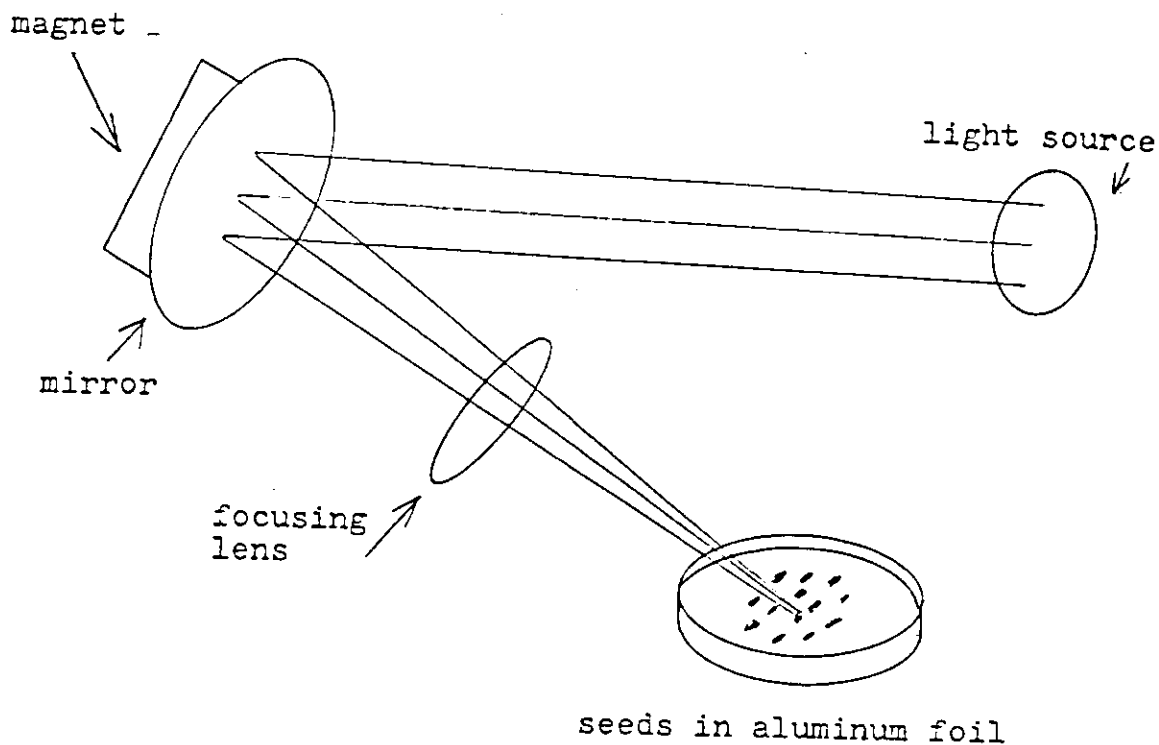
The original set-up for treating infested wheat by the high-frequency method described in the article. The 20,000 watt oscillator is shown at the right

7800-9100 Volts, 5.4-7 Amps, 3-9 seconds, 120°-142°F.

SYMBIOTIC ELECTROMAGNETIC ENERGIES

by
Dr. Edson Johnson

I'm researching what I call "Symbiotic Electromagnetic Energies" (S.E.E. for short), using the combined stimulation effects of electromagnetic spectrum energies (electricity, magnetism, light spectrum, ion effects, etc.). Symbiotic in biology means one organism being helpful to another, i.e. deriving mutual benefit from each other. In my research I have found the following: Take a strong light source (I use a car headlight), and shine that light on a mirror with a 500,000 gauss magnet placed behind it and then focus the reflected light through a 10 power or more lens onto seeds placed in an aluminum foil container. (The foil acts like a reflector of the focused light onto the seed scars, hilums as they are called botanically). Now, the seed scars (hilums) appear to open in this magnetic and light stimulation. It allows more water, carbon dioxide, oxygen and liquid fertilizer into the seeds, thus quickening the germination of the seeds and the result is accelerated plant growth!!! You can see this opening of the seed scars on radish seeds with a lens. I have given this method gratis to many agricultural organizations around the world and it is now public knowledge. This would be a good experiment for your BSRF Journal readers to try.



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GARBERVILLE

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Charged-up plants will grow better

By Mary Ann Edwards

Special Garden Reporter

The same force that produced Bee Franklin to fly a kite in a thunderstorm also can stimulate plant growth.

Lightning, natural radiation, static electricity and similar forces change nitrogen and other elements in the air into fertilizer, carried to the Earth by precipitation, said Thomas L. Harrelson, a self-employed electronics technician. But the electricity itself, picked up by the plants, also promotes growth and germination of seeds.

YOU CAN harness this energy to help make your garden grow, according to Harrelson, whose "electrogardening" lectures are appearing on Cable (Public Access) Channel 3.

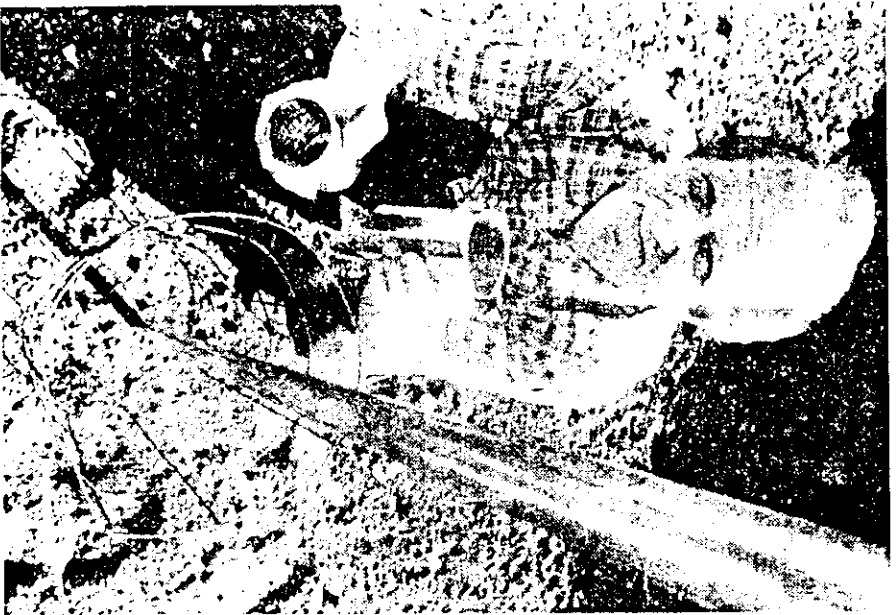
One of the simplest tools is a 6- to 8-foot-long copper rod used for grounding antennas, available at electronics hardware stores. Place it 2 feet into the ground and the tomatoes or pole beans to it with strips of old nylon stockings, he suggested. The rod should have a sharp point on top.

The rod picks up electrostatic energy in the air. Other kinds of metal rods also will work. Use nylon ties instead of cloth, since they pick up static. When cloth gets wet, it tends to short out some of the electricity, he explained.

Harrelson knows of two friends who grew tomatoes from the same kind of seeds in pots across a fence from each other. Neither used pesticides nor fertilizer, but one staked the plants with copper rods. He grew more and larger tomatoes than the other.

HERE ARE some of Harrelson's other tips:

- Grow tomatoes and other plants in wire cages. "Cages have been used for years, although they have not been promoted for their electrical advantages, probably because 'people would think it was hokey.'"
- Place open-ended tin cans individually over small plants.
- Grow vine crops on a metal fence or



Dispatch photo by Tom Sims

Thomas L. Harrelson displays tools of electrogardening

Thomas L. Harrelson's electrogardening lecture will air at 11:30 a.m. Monday, 7:30 a.m. Wednesday, 11:30 p.m. Thursday and 8 p.m. Friday on Cable (Public Access) Channel 3. The program is sponsored by Natural Food Associates, an organization of people interested in organic gardening, health and similar topics.

trellis that is grounded with wire to a metal rod, placed 1-foot deep in the ground.

Pest control is a fringe benefit. He said insects are repelled by the electricity, sensed by their antennae, the same way people avoid static electrical shocks.

AS EARLY as the 1700s, European scientists electrified seeds, bulbs and other plants and found their growth accelerated, he said.

In the 1800s, polar explorers noticed plants north of Lapland grew better than their counterparts farther south, Finnish

scientist Selim Lemstrom noted high concentrations of atmospheric electricity in the area — the same sparks that trigger the aurora borealis.

Harrelson first read of electrogardening about 10 years ago, when he saw the copper stake trick in Jerry Baker's book *Talk to Your Plants*. Electrogardening diagrams and hints are available to anyone who sends a stamped, self-addressed envelope and \$1 to Harrelson at 1214 S. High St., Columbus 43206.

MONEY, JOBS AND PEOPLE

Electric Gardener Reports Results

By JOHN H. LYST

(Second of Three Articles)

Washington, D.C. — It was Saturday morning and ordinarily Bob Beutlich, a Chicago businessman, might have been puttering in his own backyard.

But last Saturday was no ordinary one for Beutlich.

He was here at Washington that day, drawing diagrams on the blackboard of a basement lecture hall at American University and giving a talk on the unlikely subject of "electric gardening."

Last year Beutlich, whose company — Rebeco Industries Inc. — manufactures graphic arts equipment, began some simple experiments in a small 14-by-14-foot home garden at Chicago and in a larger plot at a summer cottage in Wisconsin.

HE PLACED OPEN-ended tin cans next to rows of beans. He strung a radio antenna over a row of radishes and a row of lettuce. He put some tomato plants inside a circle of metal lathing wire. And he wired up the perimeter of his Wisconsin garden with a strange "electric" fence for which he used no conventional power.

Beutlich found his beans seemed to grow faster than normal with the plain cans near them. Some other bean plants which were interspersed with cans having spiral copper wires in them, however, appeared to be retarded from normal growth.

The radishes with the antenna grew three to four inches higher than those without an antenna, he reported. But lettuce didn't seem to react to the antenna one way or the other.

TOMATOES INSIDE the lathing wire, said Beutlich, grew to a height 20 per cent above those without such enclosures.

As for the "electric" fence, it showed some startling results, according to Beutlich.



Lyst

Designed as an attempt to protect the garden from rabbits, its physical parts consisted of 2-by-2-inch short wooden posts at each of the garden's four corners. Each post was set at a 45-degree angle to the garden plot and mounted with a 4-by-7-inch aluminum plate facing the plot. Beutlich slotted the tops of the posts to hold the plates.

A wire was then strung from post to post around the perimeter and outfitted on one side with a metal cone about 4 inches in diameter at its base, made from a tin can.

A PLAIN TIN can also was strung on the wire and positioned a few feet "down range" from the cone in the direction to which the cone's nose points.

The wire could have been replaced with a string, said Beutlich, because it only serves to hold the cone, which collects "energy" beams, and the can, which guides those theoretical beams.

Strange?

Yes, Beutlich admits, it is all pretty strange, and as a home gardener he has no idea why such things work or don't work.

IN HIS TALK here before a three-day American Radionics Congress last weekend, Beutlich stressed that he was not a scientist, his experiments were not conducted in a scientific fashion and his equipment was not fancy. His cans were dog food cans.

"All I can tell you," said Beutlich, "is that something is going on, and I wish someone would find out what it is."

Indeed there is nothing among the currently accepted theories of the physical sciences which can explain such things although they seemingly have been going on for years.

There is a section describing such effects in "The Encyclopedia of Organic Gardening" published by the Rodale Press, an old standard text for organic home gardeners written long before such methods gained wide attention.

THE FOLKLORE of agriculture is replete with a bizarre assortment of ancient fertility rites and less suspect common practices best represented in any farmer's almanac. Planting by the phases of the moon is still regarded as a serious concern by some, although conventional modern agriculture now puts its faith in commercial fertilizer

instead.

But now there seems to be an awakening of scientific curiosity about such phenomena, previously ignored by classical research and left to the realm of such esoteric sciences as radionics, itself based on the theory that all matter radiates wave forms or vibrations.

Among the signs of such new interest was the participation in the American University conference by such men as Dr. Z. V. Harvalik, a physicist who recently completed a world fact-gathering mission on which he explored information about radionics and dowsing practiced in a half dozen countries, and Paul Sauvin, a New York electronics specialist who five years ago gave up his work perfecting aircraft guidance systems for defense contractors to pursue the intriguing idea that he could transmit messages between two living plants.

SAUVIN'S experiments, some carried over network television, were among the most unusual of those carried out in the wake of discoveries in 1966 by a New York polygraph detector expert, Cleve Backster, that plants may indeed have "feelings."

All that work is chronicled in the best-seller "The Secret Life of Plants" by Peter Tompkins and Christopher Bird, published in 1973 by Harper and Row and outlining some work done too in agriculture.

Among current work in commercial agriculture is that being undertaken by an Elkhart (Ind.) firm, International Trading and Engineering Company Inc. which is running experiments in which seeds for commercial grain crops are being electronically stimulated prior to planting.

OTHERS, particularly in the Southwest, also are doing similar things.

As for "electric" vegetable gardening, author Chris Bird suggested during the American University conference here that a major study should be made to measure accurately the effects of such devices as Bob Beutlich's cans and antennas.

Meanwhile Beutlich toils ahead. This season he has, among other things, hung Christmas tree ornaments on some of his tomato plants.

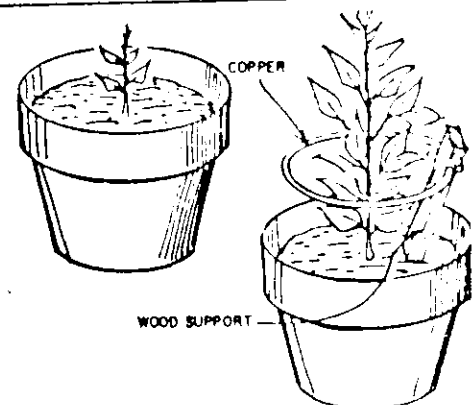


Fig. 2—A copper wire...

GROW GIANT PLANTS

There is a mysterious force permeating the earth that has the power to grow abnormally large plants from ordinary seed...and twice as fast! When we first came across this information last year, we immediately put the

described method to a test...with a great deal of success. Anything that can make plants grow as large as some of the illustrations shown here is well worth investigating. Especially since it involves no lengthy study of mystic symbols or deep meditation. Just tin cans! Or, should I say, tin cans and copper wire.

Where these ideas originated I don't know. I do know they've been around for years and slowly but surely more and more gets added to



... IN A TIN CAN !

them as people experiment for themselves.

One source for some of these ideas is a book called 'Encyclopedia of Organic Gardening' by Rodale Press put out several years ago. Additional info for this article was garnered from an article by Robert Beutlich of Chicago, Illinois appearing in Energy Unlimited back in 1979.

Whether we're talking about Odic Force, Orgone Energy or some other Etheric Force I'm not sure, but it matters little for I'm certain that all of these and more, are just names for a single unifying underlying energy matrix that permeates all of the known universe. Be that as it may, for the experiments we're going to describe we'll call it Etheric gardening.

The simplest experiment to start with is to string a piece of copper wire over the tops of your plant row. Do this by attaching the wire at each end of the row to a wooden stake. The wire can be insulated in which

case no insulator is needed. If bare wire is used, attach them to electric insulators. Place the wire high-enough so they don't interfere with plant growth...8 feet in the case of corn.

If you follow the instructions just given you will find that the corn under the wire will be about 2 feet higher than your normal corn plants! Simple, right? Yet no one knows exactly why or what causes this phenomenon.

Another method that will produce equally startling results is to remove the tops and the bottoms from ordinary tin cans and then stagger them on each side of a row of vegetable seedlings.

Back in 1979, Bob Beutlich was inquisitive enough to want to learn more, so he did a little investigating of his own and ultimately presented his findings to the United States Radionic Association.

cont. on p. 22



Bob says that in 1975 he began a series of experiments in which he used both the antennas and tin cans with spiral wires attached to both the inside and outside cans. He planted beans in early May in rows 3 feet apart in a North-South direction. When they were about 1" tall he placed a plain tin can over some of the plants and a spiral can over others. He left one row undisturbed to act as a control for the experiment. After 3 weeks the plain tin cans plants were still normal or perhaps a little larger, with approx. 5 leaves to the normal 3. The plants were about 4" tall. The spiral can plants however were very stunted. The primary leaves had fallen off and the secondary leaves were still in a very tightly curled position. In addition, the outside of the leaves had assumed a very wrinkled appearance and their tips drooped.

Bob removed the spiral cans at this time and moved them to other healthy plants nearby. The stunted plants recovered somewhat in the

"BY JUNE 20TH THE PLANTS HAD REACHED A HEIGHT OF 19 INCHES COMPARED TO THE NORMAL 9"

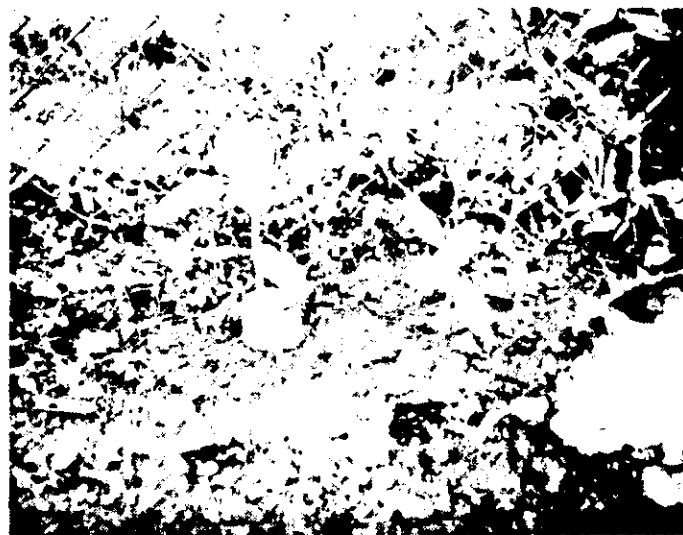
2 weeks, unfolding their leaves and growing new secondaries, but they remained about 2" shorter than the normal plants. Within another week it had caught up with the others and appeared normal. At harvest time both the spiral can 'stunted' plants and the current spiral canned plants produced normal sized beans and yields.

Meanwhile, on June 3rd, Bob placed some antenna wire over another row of bean plants that were about 4" high with 2-3 leaves. This antenna consisted of No. 20 gauge wire



Plant in spiral can was stunted

insulated with PVC. He used no insulators on the wire, which was strung on poles about 18" over the plants. By June 20th, Bob reports, the difference between plants was quite perceptible. The row with the antenna was 14-15" high while the normal plants were only about 10" high! Also, the individual leaves of these plants were double in size compared to the normal.



Tin can plant on left is almost twice as large.

Even more intrigued now, Bob cut the tops and bottoms from some ordinary tin cans and placed them on either side of a row of radishes, staggering them about a foot apart crisscrossing the row. He did the same with some nearby lettuce. The radishes were about 2" high at the beginning of the test but by June 12th the effects of the cans was quite pronounced says Bob. Their height was 12" compared to the normal nearby radishes which were only 5-7 inches! Another effect was now noticed by Bob, which could be termed 'end fire'. This effect was evidenced by the larger growth in descending order for the next two feet or so of row beyond the end of the tin can. The leaves of the effected plants were found to be much larger also, measuring about 3 3/4" x 7" compared to the normal nearby leaves of 2 3/4" x 5". The treated radishes had about doubled the leaves surface area!

By the 16th of June, Bob reports, the regular radishes were ready for harvest. The plants with tin cans around them were still growing in height but the bulbs were slender, long and immature. Bob then removed about 1/2 of the tin cans to see what would happen to the plants. By June 20th, the tin can plants had

cont pg 80

GARDENING WITH A MAGNET

(Continued From Page 3)

and the plants will grow more quickly. However, if the North Pole of a magnet is used for treating seeds they germinate slower and produce taller, thinner plants.

"To prove this to yourself you can treat some seeds of the same kind and type. (Davis uses radish seeds in his own experiments because of their very short growing and harvesting time.) You will see that the North Pole seeds take longer to come up and are in most cases thin and grow tall in comparison to the controls or untreated seeds. While the South Pole seeds come up sooner and are larger and stronger in appearance."

From this test, Davis concludes that "the South Pole acts to encourage life in the seed embryo while the North Pole acts to slow down life and the growing processes of seeds."

"Why should this be so?" This writer asked the scientist, Davis maintains that while textbooks continue to teach Michael Faraday's "outdated theory" that the two poles of a magnet are alike, the truth is that the North and South Poles of a magnet represent separate and different energies.

"The North Pole energies represent a negative form of energy while the South Pole provides a positive form of energy," he explained. The North Pole end or south-seeking end of the magnet acts to present a counter-clockwise electronic spin where as the South Pole end of a magnet or north-seeking pole presents a clockwise electronic spin effect."

Davis contends that seeds and other biological living systems, as well as chemicals, gases, metals, plastics, fire, air, water and other materials react when placed in such a magnetic field, whether the field is strong or weak.

In one of his scientific papers entitled "The Effects of Magnetic Fields on Man and Material Physics" Davis describes experiments which he says prove the effects of using the differing magnetic poles on seeds and other materials--effects which the hobbyist or the 4-H Club member may wish to duplicate. The experiment involves using different magnetic poles against glasses of water.

"The untreated glass of water or control has that water's normal surface tension," according to Davis. "However, if you use the South Pole against a glass of water it will result in a lower surface tension while North Pole water will show a higher surface tension."

From such experiments which are described in detail with diagrams in Davis's books and research papers, the scientist and his colleagues have developed what amounts to a "course" for would be magnetic home gardeners. Here are some principles which you may use any type of seed, but radish seeds, which take 30 days to harvest, are the fastest growing vegetables that Davis and his colleagues know about.

*Seeds may be grown in pots or boxes indoors or outdoors in a small section of earth.

*You may obtain from the Green Cove Laboratory magnets in 500,800 or 1,500 gauss models. (Davis and his colleagues

use magnets in the 5,000 gauss range for their own research).

*A horseshoe magnet may be used to treat a larger quantity of seeds but since the poles are located next to each other, the Green Cove scientists say that it is preferable to use a medium length bar or cylinder since the poles of the latter magnets are farther apart. (Having poles farther apart assures the gardener that he is getting the energies of a particular pole, whether North or South).

In researching the effects of these magnetic poles in gardening, Davis and his coworkers also use magnetically treated water for soaking and watering seeds on planting. They find that by using water treated with the South Pole of a magnet "we are able to achieve a very good improvement in plant growth."

To get the greatest effect, Davis recommends that distilled water be used as a medium and that water in a glass or plastic container should be exposed to either pole of a magnet for at least 5 minutes in order to maintain the polarization which results.

Davis has prepared a list of vegetables which best respond to the separate magnetic energies which may guide gardeners and hobbyists who wish to carry out their own tests.

For example, if you want to grow vegetables which produce their edible products above ground--such as lettuce, tomatoes and cabbage--Davis recommends treating those types of seeds, with the South Pole of a magnet (using the seed treater he has developed) or a 1,500 to 2,500 gauss South Pole magnet. He declares:

"We found after many years of

MEANS TO END
 And with Good health the opportunity to show appreciation for a bountiful and all wise Creator makes seeking good health not just an end in itself but a means to an end.
 --Editors Note

D Reliance on toxic rescue chemistry is amateurism...
I And in the super agency people continue to think that the muffed agony of people does not matter, we may be alone, but we will stand out ground.
D Charles Walters Jr., ACRES, ILL.
Y Economic smallness is more efficient, more productive, more innovative and generally more enriching to our lives than economic plantism...It seems almost heresy to say it, but there it is: Bigger is not better.
O Jim Hightower, EAT YOUR HEART OUT

research that treating above ground seeds with the South Pole of a magnet increases the germination, growth and also the leaves of these vegetables are larger."

On the other hand, Davis goes on to say, "If you plan to treat seeds that result in plants with their edible portion underground in the earth, such as beets, potatoes, carrots or turnips, then you will produce a better product by using the North Pole of the magnet."

However, there are exceptions to the rule which gardeners should know about, according to Davis. The scientist said that although many types of beans, peas and field corn show improvement when treated with a magnet's North Pole. English peas or sweet peas as well as yellow table corn have shown improvements by treating them with the South Pole.

In discussing the reasons for such results in the gardening experiments, Davis says the stimulating effects of the South Pole are partly due to the water being wetter and softer, in addition to the fact that it has taken on a positive electro-magnetic charge effect.

"The water magnetized by the South Pole of a magnet which has less surface tension, passes through the root fibers of the plant faster than the water treated by the North Pole of a magnet.

What is the future of magnetic

farming?

Magnetic energies offer many new and exciting possibilities in agriculture, energy development and nutrition, according to Davis.

For instance, Davis and his biomagnet researchers claim that when seeds are treated with the South Pole of a magnet that they germinate into vegetables which contain more sugars and vital nutrients. Magnetic energy can also act to change how a vegetable tastes by reducing acidity.

"In our tomato planting, we found that tomatoes are less acid when treated with the South Pole," Davis said.

For farmers interested in how magnetic energies might be applied in large-scale commercial farming, Davis has a number of inventions which may prove useful. For instance, he has developed a method and apparatus for closely controlling the exposure of seeds in a unipolar magnetic field. Such an apparatus also is designed to accommodate, without damage, all sizes and shapes of seeds while rolling and tumbling them in a unipolar magnetic field. (The U.S. Patent Office granted Davis a patent for this invention, No. 4,020,590, on May 3, 1977.)

These inventions in the field of biomagnetism may represent a scientific method which one day could revolutionize gardening as well as the agricultural food system.

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Albert Roy Davis looking over his patents at his laboratory at Green Cove Springs, Florida.

Gardening With A Magnet

Inventor Harnesses 'Natural Energy'

By EDITH KERMIT ROOSEVELT

GREEN COVE SPRINGS, FLA. -- Albert Roy Davis, a Florida physiologist and researcher on biomagnetism, has developed a new type of gardening, he gardens with a magnet.

"This method is ideal for home gardeners and has a potential for large-scale agriculture as well," he told this writer. "The magnetic energies we find in nature can be used to grow nutritious food more quickly at no cost to the environment."

Gardeners and scientists from all over the world visit Davis's laboratory here to watch him stimulating seeds with magnets as well as to study the many scientific papers and books he has written on the potential of biomagnetism in agriculture, gardening and nutrition.

Although the American government has yet to seriously investigate Davis's extraordinary theories and research results, the Department of Agriculture paid the scientist a tribute not long ago. In a letter dated April 26, 1977, M.D. Levin, administrator of USDA's Agricultural Research Service, said:

"We are indeed aware of the contributions by Dr. Albert R. Davis and his associates to the science of biomagnetics, research on which has been underway in this country and other countries of the world for many years."

As the economic, environmental and

social costs of traditional chemicalized farming become more apparent, it may well be that Davis's work could attract the funding that its adherents feel it deserves. Meanwhile, gardeners, 4-H Club members and hobbyists of all types are investigating for themselves the system developed by the Green Cove researchers. (Readers desiring to know more about magnetic farming can send for a "Magnetic Treater" for treating seeds and water available for \$10.95 plus \$1.35 postage and handling from the Albert Roy Davis Research Laboratory, P.O. Box 655, Green Cove Springs, Fla. 32043. For an additional \$6.95 plus \$1.35 postage and handling, the reader can send for Davis's explanatory textbook "Gardening with a Magnet. A check for \$20 would cover all costs involved for sending both these items. A publications list with prices is also available.)

What are the precise effects of a magnet on seeds?

"We've found that seeds are like people," the scientist explains. "They may look alike but they act differently. Each type of seed seems to have desire for one pole or the other to produce the best improved product. This is what makes this research so interesting."

According to Davis, if the gardener uses the South Pole of a magnet it will encourage seeds to germinate faster

(See GARDENING, Page 6)

Ask The Doctor

Dr. Friedman (2)

going to have a baby," Dan said. "Copy me! I am going to be a grandpa! Don't worry about anything, Dan. We can sell some more herd bulls!"

About 3:30 a.m., I woke up and heard, as painful as anything I have ever heard in my life, I heard my unborn grandchild cry out and say, "Please Dr. Joe, get up and do something." I heard my unborn grandchild cry out and say, "I don't want to be born with a birth defect. I don't want to be born with a hole in my back. I don't want to be born with a cancer. Please Dr. Joe. Do something." I heard him say, "I don't want to be born prematurely and never see outside a hospital. Please Dr. Joe. Do something."

That is how we got the title to our book. Nobody can ever change that title.

The book is dedicated to him and thousands of others like him.

I am going to my best to practice what I preach and teach him to eat right so he can give me some great grandchildren without birth defects.

Next month we will write about the treatment of mental depression and schizophrenia. Is there a better way than shock treatment and tranquilizers?



Albert Roy Davis proudly surveys 'magnetically-grown' corn at his Green Cove Springs laboratory.

Plants reached a height of 19" compared to the normal of 9"! However, they had started to flower and go to seed without ever producing an edible sized bulb. The portion of row from which he had removed the tin cans 4 days earlier only grew another inch, from 12" to 13"...while the tin can section had continued growing taller.

Bob's ultimate findings were that while the tin cans did enhance top growth tremendously, and hastened seeding, it did no good for the ultimate crop which was the bulb. Also, the lettuce in the treated rows showed absolutely no sign of any effects! Thus not all plants are affected by these devices placed after germination.

The next tin can experiments Bob did involved sunflowers. When they were about 3" tall, he placed a plain tin can with top and bottom removed over the middle plant of a group of three. He did the same thing in another group using spiral tin cans. Within 3 weeks results started to show. Again the spiral can produced a stunted plant. The normal plant though was about 1/2 the size of the plant surrounded by the tin can!

Within the next 4 weeks it was obvious that the tin can plant had larger leaves than any of the other plants. All the plants headed out at about 7" and flowers formed. What was immediately obvious was the larger size of the flower head on the treated plant. It reached full seed size and ripeness about 7-10 days ahead of the others. The head measured 14" across while the others only reached 7-8" in diameter! In addition, the leaf area was almost double of any other plant!

In his last experiment Bob worked with tomato plants that were about 6" tall. Over one such plant he placed an antenna and over another he put an eight inch spool or cage expanded metal lath material. It's sort of like fencing material. Within a week, a difference was again noticeable. The plant inside the lathing was 12" tall while that under the antenna was (9"). This differential continued for the next 5 weeks with the material lath plant being about 20% bigger in both height and leaf size. Ultimately however, when harvest came there was no tremendous difference in the yield or size of the plants. The conclusion would seem to be that not all plants are affected equally by use of such devices and except for the corn and sunflowers, the harvestable crop yield was



The head measured 14" across and the leaves had doubled in size!

not affected. However, this may not be the failure many would attribute it to be, in that if the crop were flowers for example what would the harvest have been? Why it worked on ears of corn and not to the tomatoes is still a mystery but what of other such crops? How about melons, squash, cukes or even other fruit plants such as apples, etc? It appears that the novelty of this and similar methods will remain just that until someone decides to take the time and patience necessary to expand these experiments to encompass all of the popular plants, and of course, do it in a reproducible manner.

Far from answering questions, these findings only create many more. What effect would an orgone type container have on the plants growth? In tests using a cloudbuster on plants the results were startling. Would a container without ends do as well? Years ago, there were a lot of experiments using pyramids and cones over plants that showed equally amazing results, but they too faded away and to my knowledge, no one today is doing any serious experiments in this field.

With the world food situation being what it is, not to mention the price of today's groceries, you'd think somebody would want to grow bigger and better plants for the price of a tin can!

Ed. Note:

In the early part of last summer we hurriedly tried to initiate this experiment ourselves.

prior patents and discloses and claims an invention in approximately the same manner in which such prior patents have disclosed and claimed various inventions there are seldom any serious problems in connection with the manner in which an application is written which cannot be alleviated by appropriate amendment and argument.

The situation is entirely different in connection with an apparently understandable application which an examiner cannot understand or in connection with an application which an examiner believes to contain inaccurate, erroneous, or misleading statements. This is especially true in connection with applications pertaining to truly "far out" subtle energy technology. It does not apply to the vast majority of patent applications pertaining to extensions of normally accepted forms and uses of subtle energies.

These statements can be illustrated with reference to applications pertaining to the subtle energy of magnets as used for various purposes. Many patents have issued pertaining to the use of apparently "subtle" magnetic energy to treat fuels so as to obtain increased power from the use of these fuels. Further, a number of patents have issued relative to the treatment of fluids with what is apparently "subtle magnetic energy" so as to control mineral deposits in water lines. Other patents have issued pertaining to the use of subtle amounts of magnetic energy for other purposes.

A patent of the latter category is the Davis US patent 4,020,590 issued May 3, 1977. It discloses a method and apparatus for using the energy associated with a unipolar magnetic field to benefit the germination and growth of seeds. The nature of the machine contemplated by this patent is indicated by the accompanying reproduction of Fig. 1 of the patent. From the fact that this patent was issued on May 3, 1977, on an application filed Dec. 15, 1975, it is apparent that it practically zoomed through the PTO with little or no prosecution — i.e., no significant problems. Probably all of the major reasons for this short prosecution are apparent from the patent document.

Both the specification and claims of the Davis patent read more or less like the vast majority of other patents. Clearly the examiner handling the case had no difficulty in understanding the content of the Davis application even if he did not understand the manner in which the treatment described was effective in promoting plant growth. The extensive citation of prior art relative to the use of magnetism in treating seeds assured the examiner that the subject matter of the application was of a type having a recognized status in the field of seed treatment. This assurance was apparently enough to overcome any misgivings the examiner may have had relative to the statement about a unipolar field altering the character of water, and other more or less "far out" averments in the Davis specification.

None of these factors relate to questions relative to whether the Davis

application claimed "new, useful, and unobvious" subject matter as required for an application to be patentable. From the short duration of the Davis prosecution it is clear that the examiner handling the application considered that the claims issuing in the patent met all of these statutory criteria. In determining that this was the case the examiner undoubtedly was influenced by the extensive citation and discussion of prior art in the Davis specification. There is a good chance that the examiner considered that he need not make an extensive search for prior art after considering the prior art cited by the applicant.

The differences between the facts in connection with the Davis patent, and those in connection with an abandoned Fregeau application SN 906,790 filed on May 17, 1978, indicate the usual borderline between when an application pertaining to subtle energy is or is not apt to get through the PTO. Although normally all information relative to abandoned applications and their prosecution is held in secret by the PTO, the public has knowledge of this Fregeau application because it was the subject matter of a court action against the head of the PTO seeking to overcome the PTO refusing to issue a patent on the application. This court decision is *Fregeau v. Mossinghoff*, DC. for DC., 224 USPQ 238, (1984).

Because of unexpected complications in obtaining a copy of the Fregeau application all statements relative to it in this discussion are based upon the content of the *Fregeau v. Mossinghoff* decision. The Fregeau application appears to have disclosed and claimed a method for treating variously commonly consumed liquids — including ethanolic beverages — with a magnetic field so as to "increase the specific gravity of the liquid" and to beverages produced by this type of process. The treatment specified was disclosed as enhancing the flavor of whatever fluid was treated. From the decision there is no indication that Fregeau knew of or cited any prior art references suggesting that on the basis of what

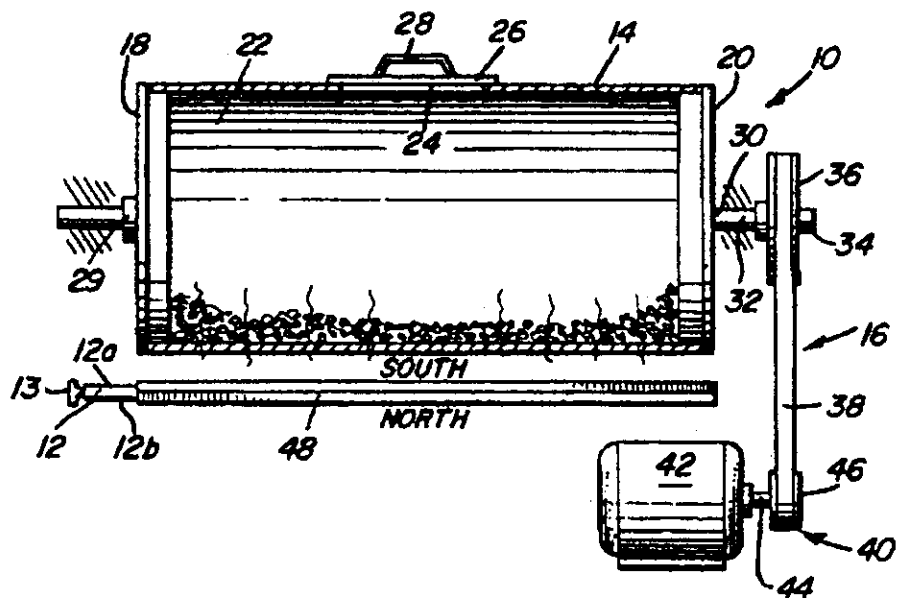


Fig. 1.

Patent# 4,020,590, May 3, 1977, Albert Roy Davis. Apparatus and Method for Exposing Seeds to a Magnetic Field.

HIGH FREQUENCY APPARATUS
TH. S. CURTIS (1920)

CHAPTER XVI.
PLANT CULTURE WITH HIGH TENSION
CURRENT.

There appears to be a decided scarcity of data covering the process of plant culture through the agency of electricity. The contributions on the subject have been anything but specific in nature and this is due, in part, to the fact that most of the experimentation has been carried on by private investigators who, for various reasons, do not seem disposed to make public the results of their research. In this country, the greatest progress has probably been made by the agricultural departments of several schools and colleges, and it is to the excellent bulletins from this source that the author is indebted for much of the data that led to some private experimentation. While the present discussion is based upon this experimental work, the author does not wish to pose as an authority on the subject and the remarks herewith are offered in the hope that they may lead to some private research on the part of the readers. An interchange of ideas and experiences is invited and it is felt that such a policy will be conducive to a broader presentation of the subject in later editions of this book.

While the art of electroculture is almost wholly in the experimental stage, still it may be said that the experiments are productive of really practical results and the apparatus necessary for their performance is not expensive, providing the investigator is content to begin on a small scale.

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There are several methods by which plant life may be stimulated with the electric current and, in treating of the subject, the author will outline these methods briefly in order that the detailed descriptions of the equipment necessary in each particular case may be made clear. The construction of the apparatus involved will then be covered and it will be optional with the experimenter whether he constructs his apparatus or buys certain parts of it ready-made from manufacturers. The latter course is desirable in many instances as many instruments are rather difficult of construction and can be purchased ready for use almost as cheaply as they can be made in the home workshop.

Electroculture Methods.—The methods by means of which plant life may be stimulated with the electric current may be divided broadly under two headings: one, in which the rays from an electric lamp are permitted to fall upon the area under cultivation, and the other, that in which a high potential current is sent through a network of wires stretched over the plot of ground. This latter method may be further subdivided into two basic headings: One in which a high tension direct or low frequency alternating current is sent through the wires and, the other, that which employs a high potential, high frequency current. The former is simpler and productive of very good results; the latter is the more effective and, in some cases its results have been spectacular.

Merely because the high tension discharge method was productive of the most encouraging results in the personal experience of the author this method will be discussed first of all. It is not claimed that this is the right or even the logical method; it simply "worked" where others failed in the case of one individual investigator who is naturally prejudiced thereby.

The subject under investigation was a bed of lettuce,

Reprinted 1984 by Tesla Coil Builders Assoc.

10 feet wide by 20 feet long. This was situated across a yard and 50 feet from the companion bed used for purposes of comparison. The two beds were boxed in with lumber and topsoil was taken from the same load for each; in fact, the conditions were as nearly identical as it was possible to make them. Four posts were set up at the electrical bed, in the corners of the plot as shown in Fig. 86. At a distance of 5 feet from the ground, ten wires were spanned from cross-arms attached to the poles. The wires were

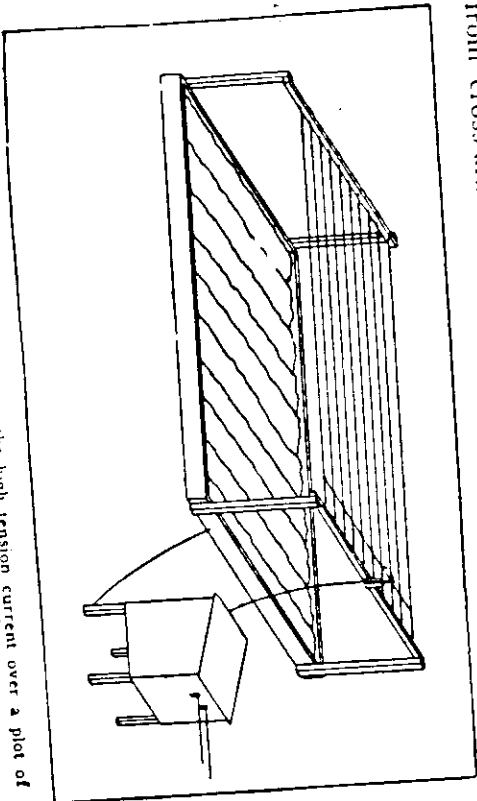


Fig. 86.—Showing span of wires to carry the high tension current over a plot of ground in which plants are to be cultivated

carefully insulated with two porcelain cleats in series at the end of each wire and a common lead connected the span of wires at one end as shown in the illustration. A ground connection is made by means of strips of galvanized iron "chicken wire" buried in the earth beneath the bed. The aerial conductor is brought to a small shed or other shelter arranged near the bed under cultivation and in this shed the high-tension transformer is placed. The power wires from the electric lighting circuit are carried to the trans-

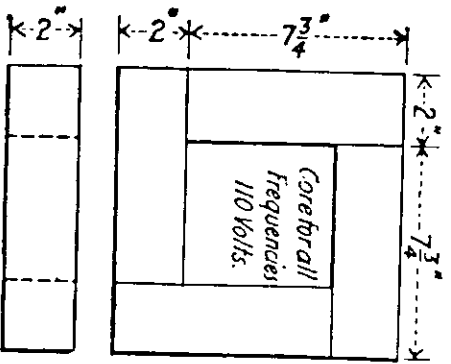
former shed and a switch is conveniently placed both at the shed and at the point where the wires leave the house or pole.

Caution Must Be Observed.—The utmost care must be used to prevent the possibility of persons coming in contact with the span of wire over the bed, or, indeed with either wire leaving the transformer secondary, as the voltage delivered at this point would produce a dangerous shock. To afford a safeguard in this particular, a fence should surround the plot and a contact be arranged at the gate in such manner that when the gate is opened a bell will be caused to ring and this will remind one to turn the current off from the transformer before entering the gate. This device is not difficult to design and in fact it may consist of one of the familiar release pushes such as are used on door jambs.

The transformer used by the author delivered a potential of 10,000 volts and was rated at $\frac{1}{2}$ k.w. The construction was of the closed core variety and the instrument was immersed in oil to assist in cooling as the runs were from 8 to 12 hours daily. Such an instrument can be purchased for a small sum from manufacturers of wireless telegraph apparatus and the experimenter is advised to buy one outright. The necessary details are given, however, so that the ambitious worker may try his hand at the job if his courage is good.

Construction of the Apparatus.—The transformer to be described is generously proportioned in order to provide ample insulation and radiation surface. The constructional details for a transformer to operate on the usual 60-cycle, 110-volt supply are given herewith and in the full-page plate the worker will note that data for 25-cycle and 125-cycle instruments are given also. The windings for 70, 110 and 220 volts are appended as well.

TRANSFORMER DATA

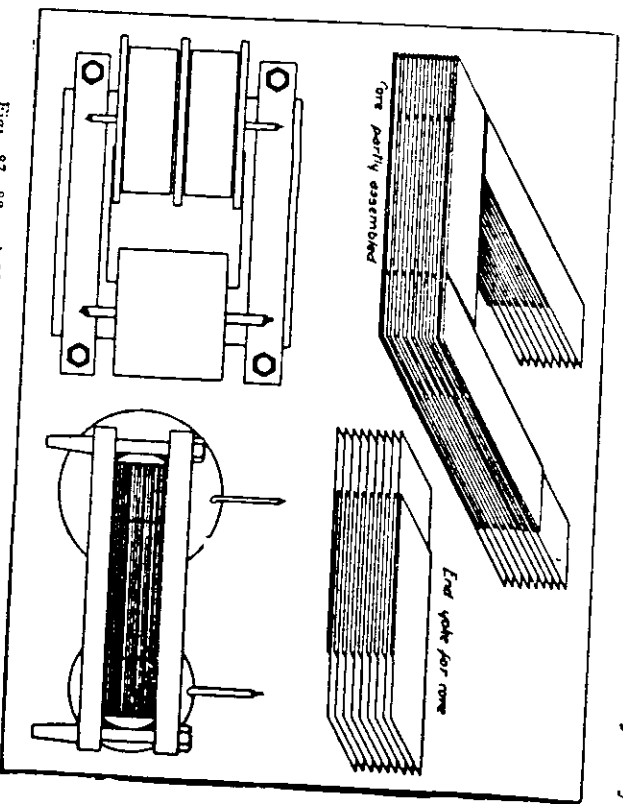


PIECES	PRIMARY	SECONDARY
25	700 Turns No. 14 D.C.C.	64,000 Turns No. 36 Enam.
60	350 Turns No. 12 D.C.C.	32,000 Turns No. 34 Enam.
125	175 Turns No. 12 D.C.C.	16,000 Turns No. 34 Enam.

From the working drawing, the core is seen to be built up from pieces of sheet iron or silicon steel .014 in. thick and 7 3/4 in. long by 2 in. wide. This is for the 60-cycle transformer. The same general directions apply in the case of the other frequencies, therefore the description will be confined to the one only. In all, 460 pieces will be required. If silicon steel can be obtained from some transformer manufacturer it should by all means be used as it is not expensive and its permeability is very much higher than that of ordinary sheet iron. The core irons are laid

up alternately in piles until each has assumed a thickness of 2 inches, after which end pieces are fitted in the spaces left in the ends of the piles as shown in Fig. 87. Friction tape should be wrapped around the pieces of iron to hold them in place.

The primary coil consists of 350 turns of No. 12 D.C.C. magnet wire wound upon a form which will give the opening in the coil a diameter of 3 inches. The primary may



Figs. 87, 88 and 89.—Details of the high potential transformer

be wound to a length of 4 1/2 inches and after it has been removed from the form it should be carefully taped. The secondary is wound in 2 sections, each containing 16,000 turns of No. 34 enameled wire. These sections also have an opening 3 inches in diameter to permit their being placed over one leg of the core. The winding is in 80

layers and has 200 turns to each layer. A strip of oiled paper 2 inches wide separates each layer of wire from its neighbor and as the 200 turns will occupy a space of approximately $1\frac{1}{2}$ inches, it is obvious that a space of $\frac{1}{4}$ inch will be left as a margin on each side of the paper.

The starting end of the winding of each section is soldered to a strip of thin copper ribbon which extends beyond the edge of the coil. The finishing end is likewise connected to a piece of ribbon which should come out on the opposite side to that of the starting end. The final layer of wire is covered with several thicknesses of the oiled paper to afford mechanical protection. The two sections of the secondary are to be wound in such manner as to permit the current to flow in the same direction around the core when the two starting ends are joined together.

The primary and secondary are to be assembled upon the core as shown in the drawing and the secondary sections are insulated from each other and the core by discs of heavy fibre. The remaining core irons may then be placed in position and the core clamped between wooden pieces as the drawing indicates. Pieces of flexible wire are joined to the secondary leads and the entire transformer is then placed in position in a sheet iron container made oil tight. Wires leading from the secondary and from the primary are brought to suitable terminals in the top of the transformer case. The case is then filled with transformer oil until the transformer is well covered. It is believed that the drawings will make the details clear and that further description is unnecessary.

It is, of course, understood that the line wires supplying the alternating current of sixty cycles at 110 volts are connected with the primary terminals while the secondary terminals deliver a current at approximately 10,000 volts to

the span of wires over the plants to be cultivated; that is to say, one secondary wire leads to the overhead wires while the other secondary terminal is connected with the ground.

Actual Results Obtained.—A most interesting report on electroculture experiments was made recently by Mr. T. C. Martin at a convention of electrical men and from this report it may be deduced that, of all the processes by means of which plant life may be stimulated, the one employing the high frequency current as it fundamental principle is the most successful by far.

The experiments mentioned by Mr. Martin were carried out at the Moraine Farm, a few miles south of Dayton, Ohio, and located in the celebrated Miami River Valley. The experiments were promoted by F. M. Tait, formerly president of the National Electric Lamp Association, and were in the immediate charge of Dr. Herbert G. Dorsey, whose work in this line has long been worthy of note.

"In preliminary tests, according to Mr. Martin's report," says the *Philadelphia Inquirer*, "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." To quote further:

"In the soil of Plot No. 1 was buried a wire screen. Over the plot was a network of wire, stretched about 15 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 tin-foil and glass plates, which dis-

charged through a primary of the coil. About 130 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.

"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 sub-divided 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."

The comparative results obtained with the various processes may be noted in the table which follows, and it is interesting to observe that the high frequency current from the Tesla coil takes the lead from the standpoint of weight

of the edible portion of both radishes and lettuce grown under its influence:

	Plot 1 Tesla Coil	Plot 2 Ruby Light	Plot 3 Mercury Vapor	Plot 4 Nor- mal	Plot 5 Elec. Spk.
Radishes (ten plants selected at random):					
Total plant weight, grams.....	265.70	137.80	109.50	190.00	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	2.48	3.12	4.85
Lettuce (ten plants selected at random):					
Edible portion, grams.....	67.00	52.60	56.60	46.10	31.30
Edible portion, per cent.....	60.70	57.30	50.20	41.80	28.20
Roots, grams.....	90.59	89.92	88.85	90.67	92.10
Roots, per cent.....	6.30	5.30	6.30	4.30	3.10
	9.41	10.08	11.15	9.33	7.99

HIGH FREQUENCY PLANT CULTURE.

High Frequency Cultivation.—The successful generation of an electric current at high potential and high frequency offers a problem not easy of solution, particularly if this current is to be put to practical use for long-continued periods of time. While there are several methods of producing the current, only one will be considered here as the others are deemed impractical for amateur use.

The generator to be described is designed for hard duty. The complete apparatus comprises a transformer, condenser, spark gap and an oscillation transformer. In the construction of the apparatus, a fairly complete electrical knowledge is essential. The high-voltage transformer must be carefully made and properly insulated, while the accessory apparatus requires not a little mechanical skill for its successful completion. Once constructed, however, the operation of the outfit is a simple matter and quite within reach of the average fruit or vegetable grower.

In order to simplify the explanation, the description of the transformer will be divided into sections, each bearing the appropriate heading.

In accordance with the inevitable policy of this book, the data for transformers of various frequencies are given in the full-page plate appended. The description is for the 60-cycle instrument, and, as the construction of the others is the same, a repetition would be superfluous.

Construction of the Core.—The core is composed of thin sheet iron or preferably silicon steel which may be

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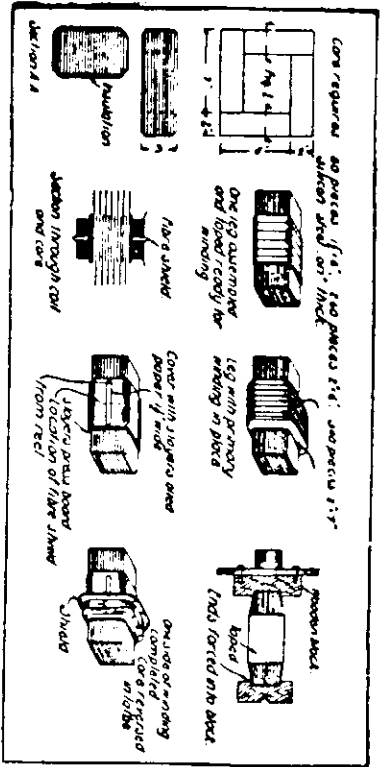
obtained from transformer manufacturers. The sheet metal is to be cut into strips according to the specifications given in Fig. 90. The 2 by 6 inch strips are divided into two piles of 130 pieces each and these strips are assembled alternately with the ends overlapping two inches. The 1½ by 6 inch strips are next divided into four piles of twenty each and these are assembled alternately also. These packs are then to be placed above and below the assembled piles as shown in Fig. 92 to break the sharp corners. The piles are then wound tightly with tape and finally covered with several layers of press-board, preparatory to winding the primary and secondary.

Winding the Primary and Secondary.—The primary is wound on one leg of the core and the secondary on the other. The two cores are then joined in a complete magnetic circuit by the end yokes as shown in Fig. 1. The primary winding consists of 125 turns of No. 10 D.C.C. copper magnet wire wound 25 turns per layer and five layers deep. Between each two layers of wire, a turn of press-board should be taken. The first and last turns of wire are held in place with loops of strong tape placed under the winding and drawn tight after the turns are in place. No shellac or other paint is used on the winding as the coils are to be immersed in oil when the transformer is completed.

The secondary winding is in two sections, each containing 4200 turns of No. 28 enameled magnet wire, making 8400 turns in all. The wire is wound in layers about an inch wide and separated by a double thickness of oiled paper between each two layers of wire. The paper should be 1½ inches wide. In Fig. 95 is shown the method of clamping the core leg in the lathe for winding.

Before starting the winding, a strip of thin copper ribbon is cemented to the insulation as shown in Fig. 96 to

Provide the connection between the two halves of the secondary. A strip of paper is placed over the ribbon and the winding started after the end of the wire has been soldered to the ribbon. When the first section of the secondary has been completed, the finishing end of the wire is soldered to a piece of ribbon, a few turns of paper taken over the final layer of wire, and the core leg removed from the lathe. The fibre shield which separates the two secondary sections is then slipped in place and the core replaced in together by means of the copper strip.

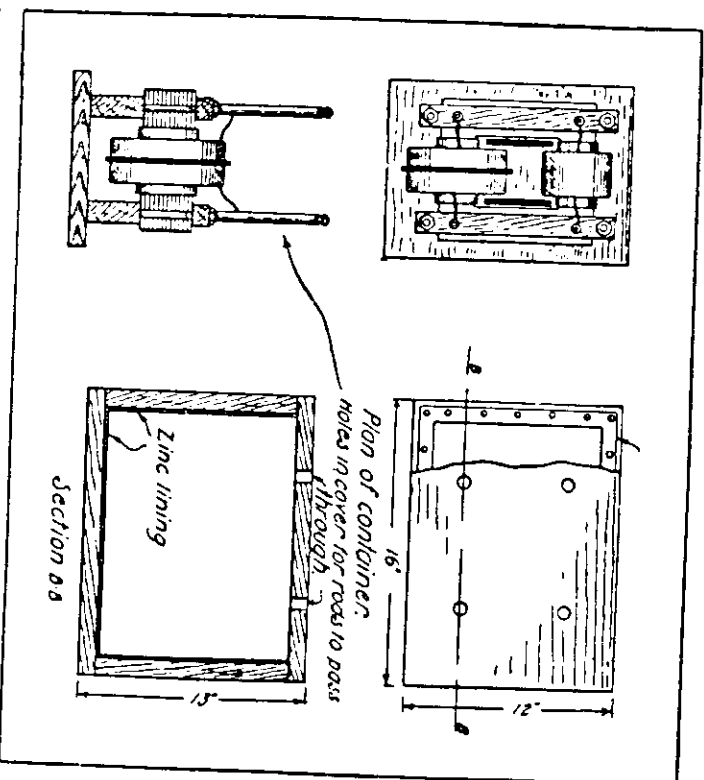


Figs. 90 to 98 inclusive—Details of the magnetic leakage transformer

the reverse direction; that is, the core is turned end-for-end in replacing it to make the blank portion of the core take the place of the wound section. The second half of the winding is then started by soldering the wire to the copper strip as before. Assuming that the lathe is turned always in the same direction, the act of reversing the core insures that the direction of the winding shall be continuous in both sections, with their starting ends connected to—
Assembling and Mounting.—The secondary finished, the two legs containing the windings may be stood on end

and the remaining core strips inter-leaved in place to complete the magnetic circuit.

The reader is referred to Figs. 99 and 100, for the method of mounting the transformer. The core is gripped between clamping strips of hard wood and bolted to a base of the same material. The primary and secondary leads are conducted to upright pillars of hard rubber having a brass rod running through the centre.



Figs. 99 to 102 inclusive.—The transformer assembled and details of its container

The transformer is placed in a container of wood, lined with zinc as shown in Figs. 101 and 102, which give the

proper dimensions. In the cover of the container are bored four holes to pass the terminal rods.

When the transformer has been placed in the case, the latter is filled with transformer oil to within an inch of the top and the cover fastened down with screws. The addition of substantial handles at the ends of the container completes the work on this portion of the apparatus.

Construction of the Condenser.—In the design of the condenser for our purposes, one or two primary requisites have constantly been borne in mind. The condenser is

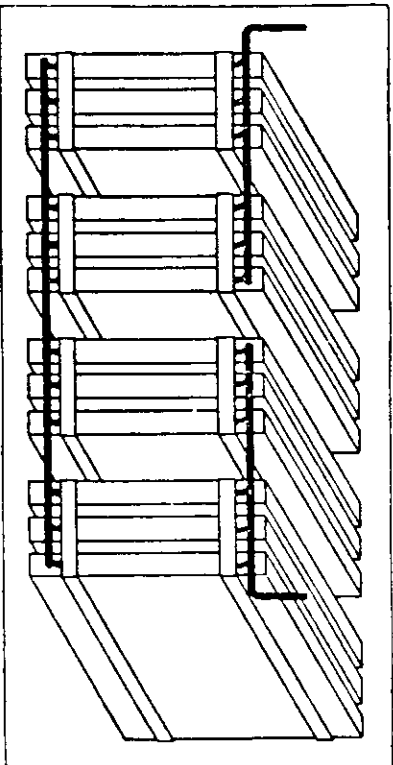


Fig. 103.—The condenser complete showing method of connection

subjected to practically continuous use for several hours at a time and it is obviously essential that ample radiation surface be provided in order that the plates may remain cool. Coupled with this highly important point may be mentioned the importance of eliminating all corona or brush leakage around the edges of the tinfoil plates. These requirements are ordinarily met with in an oil immersed condenser, but the latter, to be efficient, should employ only oil as its dielectric and such a condenser presents

constructional difficulties not easily conquered by the amateur workman. As the next best solution of the problem, the design for a glass plate condenser of large heat-radiating surface and of substantial construction is offered in this chapter.

For its construction the condenser will require 120 plates of glass 8 by 10 inches of the kind used for photographic negatives. Old plates of the latter sort may be purchased cheaply from nearly any photographer and they serve the purpose admirably. The first step is to remove the emulsion coating on each plate by soaking it in hot water and scraping with a putty knife. The plates are then to be dried thoroughly and divided into four piles of 30 plates each. The complete condenser consists of four units, of 30 plates each, connected in series multiple as shown in Fig. 103, and in order to make the description clearer the steps in the construction will be given for but one of the four units, which are alike in every particular.

A good grade of varnish gold size is procured and placed on the work-table with a good soft brush about an inch in width. Tinfoil of the grade used by florists may be procured in pound packages containing four or five strips of foil six inches wide and perhaps 48 inches long. The foil is to be cut up into pieces 6 by 8 inches in size, neatly flattened and separated ready to be applied to the glass plates, which should be arranged in a pile on the table. A plate is removed from the pile and given a quick, thin coating of the varnish (which dries in twenty minutes in the open air) and a sheet of foil immediately laid upon it, care being taken to see that the foil is accurately centered on the plate. The foil may be forced into smooth and close contact with the glass with the aid of a wad of cotton placed within a piece of soft cloth to make a sort of pounce or dabber. Starting at the center of the foil sheet and

carrying the rubbing process toward the edges with a circular motion, the workman will be able to force the foil into what is practically absolute contact with the glass, and at the same time cause the surplus of varnish to exude from the edges.

The plate is then turned and coated on the other side in exactly the same manner; the process is repeated with each of the thirty plates in each of the four units until the 120 plates have been coated. The lot may then be laid aside to dry in a warm room for several days. When this has been accomplished, each plate is to have its edges

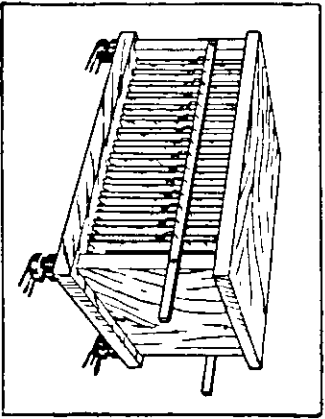


Fig. 104.—One section of condenser mounted in its case

dipped into melted beeswax to a depth of $1\frac{1}{2}$ inches in order that the edge of the tinfoil on both sides may be thoroughly coated with the wax. This will quite prevent the corona or brush losses so frequently noted with glass plate condensers.

The rack in which the plates are to be mounted may next claim our attention. Its construction may be noted in Fig. 104, which gives a perspective view of the complete unit. The reader will see that the support comprises a baseboard and cover of wood separated by two end pieces. The plates slide in grooves formed by $\frac{1}{2}$ -inch square strips

of wood nailed to the base and cover. A bar of $\frac{1}{8}$ -inch by 1 inch copper runs across from one end piece to the other on either side and affords a means of connecting the many plates in multiple. This connection is accomplished by means of the special contact leads shown in Fig. 105. These leads are merely pieces of lamp cord tipped at one end with a lug and at the other with a contact made from a piece of spring brass ribbon bent into the shape shown in the drawing. The object of the contact is to establish

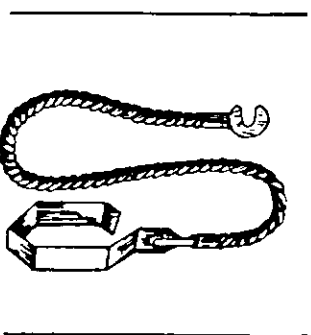


Fig. 105.—Spring connector and cord for condenser

connection between both plates of tinfoil when the spring is inserted.

In making the connections to the bars on either side, the contacts are alternated in order that the plates may all be in multiple. That is, referring to Fig. 104, in starting to insert the contacts, on the one side the first contact spring is inserted between the first and second plate; on the other side the contact would be between the second and third; returning to the nearer side, the second contact is inserted between the third and fourth plates, and so on until all have been put in place. The contact with the first and last coatings are of course made by inserting the clip between the tinfoil and the wooden end piece, placing a small sheet

of glass between the spring and the wood to prevent the metal coming into contact with the wood.

When the four units have been made as described, they are to be connected up as shown in Fig. 103, the connecting leads being strips of copper ribbon. The setting up will receive due attention when the rest of the apparatus has been described.

Construction of the Spark Gap.—Perhaps no one portion of the high frequency apparatus is more likely to give trouble and to require frequent attention than is the spark

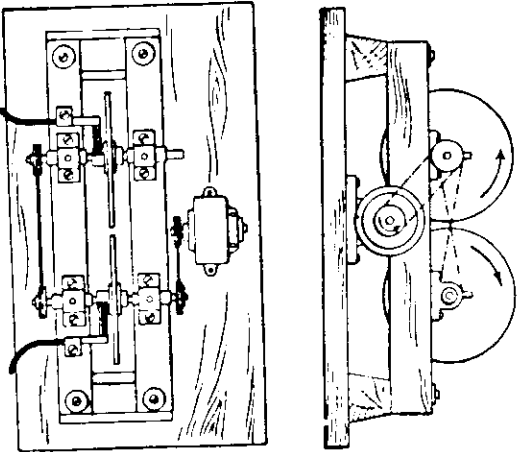


Fig. 106.—Self-cooling spark gap

gap across which the condenser discharges. The discharge is accompanied by heating effects which are in themselves troublesome, and while the ordinary stationary form of Gap may give satisfactory service for a time at least, still its successful operation is hindered as the sparking surfaces become heated and pitted. The gap to be described has

proved its value in actual practice and, while it may appear to be unnecessarily complex in design, still the many points of advantage are only brought out through the construction of a substantial and more or less massive affair.

With reference to the side elevation and plan views

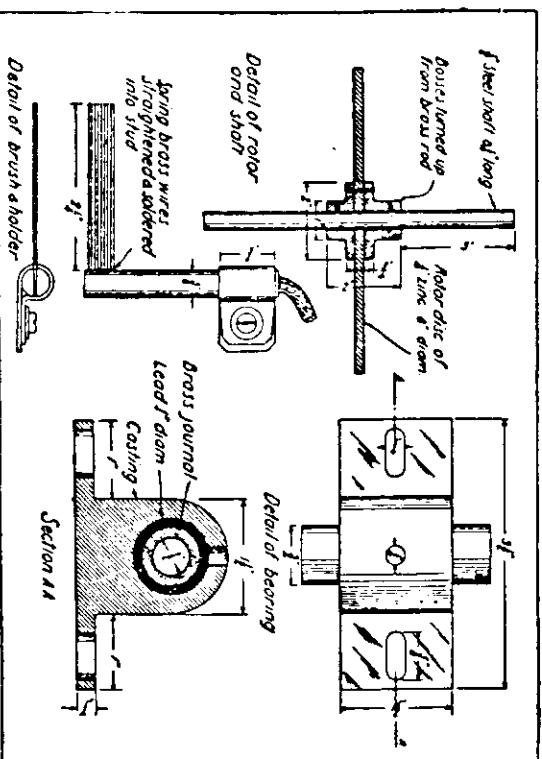


Fig. 107.—Details of the spark gap

arranged to rotate in opposite directions at a fairly rapid rate of speed. The rotation serves the double purpose of always presenting a fresh sparking surface, and therefore a cool one, to the point of discharge, and in establishing a strong current of air directly upward and between the sparking surfaces, due to the surface friction of the periphery of the discs. The effect of this current of air is to assist in the wiping out of any arc which may form during the discharge.

The discs are mounted upon a substantial framework

and base of dry wood which has been painted with or preferably boiled in paraffin wax. The discs are mounted upon shafts of $\frac{1}{2}$ -inch steel and secured to the latter by means of brass bosses turned up and drilled to a snug fit on the shaft. When the final assembling has been done the bosses are pinned to the shaft and to the disc, thus insuring the permanency of the construction. The final operation is to take a finishing cut off the periphery of each disc with the shaft held between centers in the lathe.

The details of the bearings are given in the enlarged drawings, Fig. 107. The reader will note that the bearing proper is a journal of brass tubing reamed to fit the shaft nicely. The bearing support is a casting with a hole cored through it to take the journal. Slots in the feet of the bearings permit the distance between the discs to be varied.

When the various parts have been finished, the bearings are located on the framework as shown in the plan drawing and the journals slipped over the shafts. A piece of cardboard is then forced over each end of each journal after the latter has been propped up inside the bearing with bits of wood. Melted lead is then poured into the opening at the top of the bearing and when cold it will hold the journals in perfect alignment with the shaft. The bearings may then be removed and a small hole drilled down through the lead and brass to afford a passage for oil to the shaft. The addition of an oil cup stuffed with a wick completes the bearings, which may be replaced on the frame.

The shafts are belted together with rubber belting crossed to make the discs turn in opposite directions. The driving is accomplished by means of an electric motor belted to a pulley on one shaft.

The current is conducted to the discs through wire or Gauze brushes bearing upon the smooth bosses, as shown

in the plan view in Fig. 106. The details of the brush holder are to be seen in Fig. 107.

The discs should rotate freely and quietly when the motor is started. If the oil cups are properly fitted, the gap should be capable of an all-day run without trouble developing. The adjustment of the gap will be considered in due time, when the instructions are given for the operation of the completed apparatus.

The Oscillation Transformer.—The reader has been told of the construction of the transformer which steps the commercial lighting current up to a potential of several thousand volts, the condenser which stores up this high voltage, and the spark gap or discharger across which leaps the stored-up current in the condenser. The discharge of the condenser across the gap sets up electric oscillations or, as it is termed, a high frequency current. In order that this current may be rendered suitable for the purposes of electro-culture, however, its potential must be raised to a very much higher degree and the object will be to explain the construction of the special type of transformer or coil employed in the process of stepping up the already high potential, high frequency current.

The high frequency transformer differs from the type used for the conversion of low frequency or commercial currents in that it has no core of iron and the turns in its primary and secondary are numbered in tens and hundreds, respectively, instead of in hundreds and thousands, as is the case with the transformer used for lighting and power work. Furthermore, on account of the extremely high potentials induced in the oscillation transformer, the insulation problem must be treated in a somewhat radical manner. This problem is not, however, so difficult of solution as it might seem. The coil may be of generous propor-

terminal are given in Fig. 109 but the stud has been omitted, since its construction is obvious. The next operation is to treat the cardboard cylinder to three coats of shellac, making certain that each coat is bone-dry before applying the next and baking the cylinder after each coat in a moderately warm oven.

With the third coat of shellac quite dry, the cylinder may be mounted in the lathe between centers, a slender screw driven into the wooden head and catching a slot in the faceplate to afford a means of driving. The lathe should then be speeded up and the surface of the cylinder carefully gone over with the finest sandpaper to remove the inevitable irregularities caused by particles of dust and dirt. On no account must emery paper or cloth be used and the lathe bed must be scrupulously clean while the cylinder is being handled, as the least trace of metal chip or dust under the winding would be fatal to good results.

The surface of the cylinder having been carefully smoothed over, the lathe may be prepared for the winding. The gears are set to cut 24 threads per inch and the winding of No. 30 D.C.C. wire is started one-fourth inch from the end. In starting, the wire should be passed through a small hole in the cylinder and the hole immediately plugged with a bit of wood covered with wet shellac. This will prevent the winding from coming loose during subsequent handling. The lathe should be turned slowly and backward, and the wire fed through a guide held in the tool post. When the finishing turn, the 300th, is in place, the final end of wire may be passed through the cylinder and secured as was the starting end.

While the coil is still in the lathe, the winding should be coated with shellac applied in a thick solution and with a soft brush, the greatest of care being taken to see that the fluid soaks well into the turns and between them and

also that no air bubbles or particles of dirt are permitted to remain. When the first coat has dried for an hour or more, the cylinder may be carefully removed and placed in the oven, wherein the temperature should not be over 150 degrees F. The baking may continue for a few hours and the second coat applied after the coil has been put back in the lathe. The builder is strongly advised to do all of the painting in the lathe, as the examination and turning of the cylinder is greatly facilitated thereby. The third coat may be the final one and it should be dried as thoroughly as the first and second.

The secondary finished, the wooden heads may be removed and connection made with the terminal and base studs. This is easily accomplished if the ends of the wire are left long and passed through the holes in the heads with the studs fitting loosely. When the heads are replaced, the wires may be drawn taut and the nuts of the studs turned up to grip the bare wire. The heads may then be secured in place by plugging with wood dipped in shellac, the small holes drilled around both top and bottom of the cylinder.

The base of the instrument is simple in construction, as is readily seen in the drawing. The method of supporting the primary strip, as well as the nature of the support, will, however, bear some explanation. The copper strip is $\frac{1}{2}$ -inch wide and $\frac{1}{8}$ -inch thick and is wound edgewise into a helix having an internal diameter of $10\frac{3}{4}$ inches. This helix material is also to be obtained in the size given and it can be purchased far more cheaply than it can be formed up by the amateur workman unless he has the necessary equipment for the bending operation. As this device is quite complicated, the space necessary for its description will not be taken here. The problem is to bend the thin strip edgewise and prevent it from buckling.

Assuming that the builder has procured the helix material, eight complete turns of which are required, the attention may be directed to the posts which support the helix on the base and at the lower end of the secondary cylinder. From the detailed drawing in Fig. 109 the reader will note that four posts of black fibre rod, $\frac{3}{4}$ inches high and one inch in diameter, are given a series of saw cuts to a depth of three-eighth inch. Eight cuts will be required in each post to take the eight turns of primary strip. The cuts may be made with two blades of a hacksaw placed side by side to give the required thickness or, what is by far the better method, the cuts may be taken in a milling machine if one is available. The posts are located on the baseboard and secured with short machine screws tapped into the fibre. Care should be taken to see that the screws do not pass into the posts beyond the bottom turn of the primary.

The assembly of the parts is clearly shown in Fig. 110 and it is believed that no further comment is necessary other than to say that the bottom turn of the primary is connected with the ground stud, as shown in the diagram of connections.

Installation of the Apparatus.—We have seen how the various instruments comprising the high frequency current generator are built in order that we may have available a steady supply of high potential current, oscillating at a frequency of approximately 100,000 cycles per second. It is this high potential, high frequency current that we shall employ in the electrification of our plot of ground, and the object of the present article is to point out how the various instruments of the outfit are connected and combined to produce the current.

The entire outfit should be housed in a perfectly weather-tight shed. The construction of the building may

be comparatively crude, if the precaution is taken to carefully seal all cracks and crevices, not only in the walls, but around the door as well. In rainy weather, or even when the humidity of the air is high, the inside of the shed should be kept dry and warm by means of a small oil stove. Dampness is positively fatal to the successful operation of the apparatus if it is permitted to strike in for any length of time.

The shed should contain a substantial wooden table along the rear wall facing the door, and upon this table the apparatus is arranged in the order shown in Fig. 110.

The floor of the shed should be at least one foot above ground and an open air space should be left beneath in order to frustrate dampness so far as is possible. A simple and good construction is to build the shed around four substantial corner posts, starting the walls a foot above the ground. The roof should have a generous slant to shed the rain.

With reference to the first drawing, the apparatus is arranged in the following order, left to right: Transformer, spark gap, condenser and oscillation transformer. Upon the wall to the left is secured the main switch, which should incorporate a cut-out fitted with 15 ampere plug fuses. To this switch from the outside of the shed, lead the line wires, which are to be supplied with a 110-volt, 60-cycle alternating current, preferably from the local central station.

Beside the main switch, the switch for the spark gap motor should be located. The primary terminals of the transformer are to be connected with the main switch, as shown in the wiring diagram below, which also shows the connections for the remainder of the apparatus. From the secondary terminals of the transformer pieces of No. 14 rubber-covered wire lead to the terminals of the spark gap.

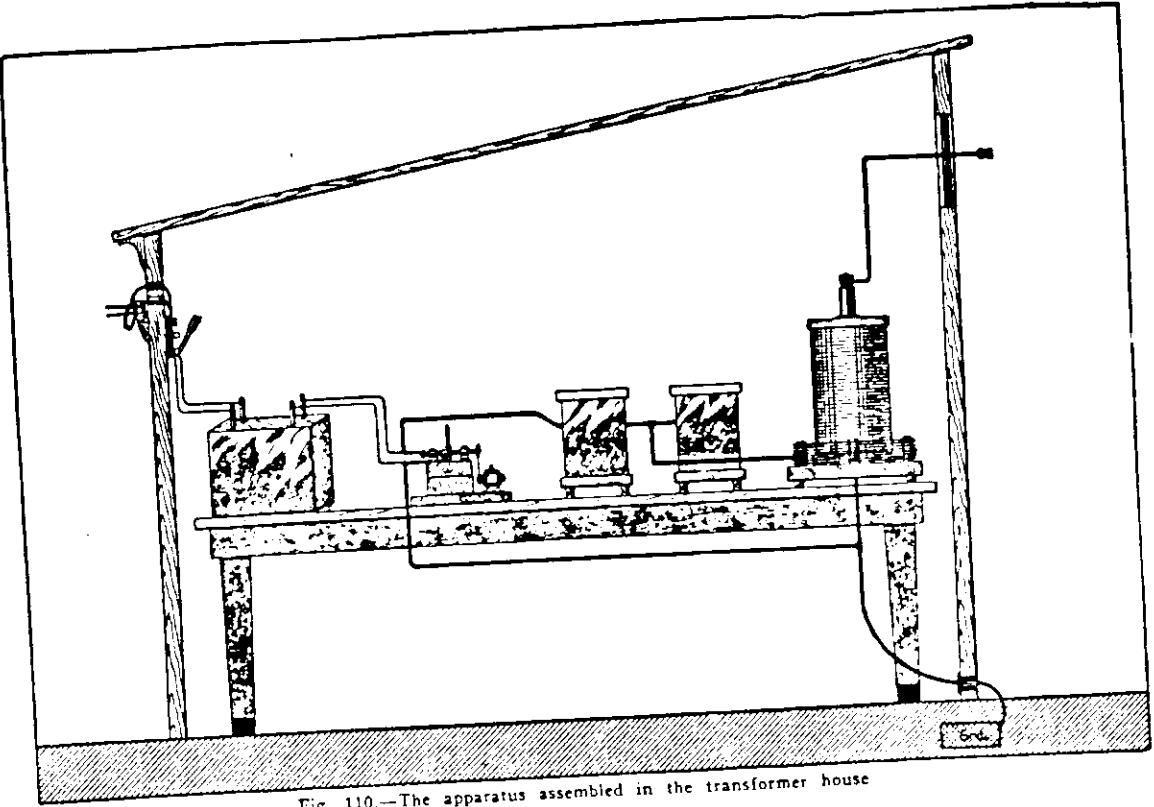


Fig. 110.—The apparatus assembled in the transformer house

From one terminal of the spark gap a piece of stranded cable, composed of 100 strands of about No. 24 insulated magnet wire, runs to one terminal of the condenser. From the other terminal of the condenser, a piece of the stranded cable leads to the movable clip on the primary of the oscillation transformer. The second terminal of the spark

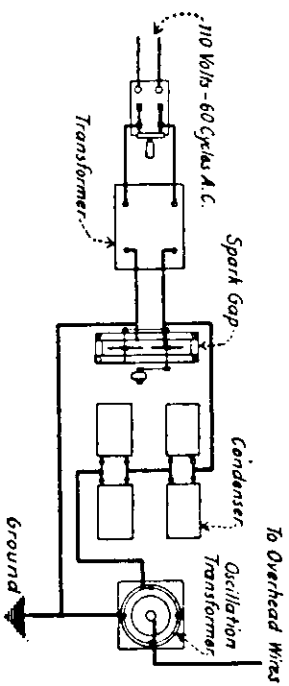


Fig. 111.—Diagram of connections for the apparatus

gap is connected by cable to the ground connection of the oscillation transformer and this in turn to a series of wires buried in the ground beneath the plot to be cultivated.

The high-potential, high-frequency terminal of the oscillation transformer connects with a piece of light copper rod, which extends upward and out of the side of the building, through a hole cut in the center of a pane of glass. This glass window should be at least 18 inches square and shaded on the outside of the building with a contrivance resembling an awning, in order that the surface of the glass may be kept as nearly as possible in wet weather. The copper rod passing through the glass is tipped with a connector to which the overhead wires of the plot are secured.

Wiring the Plot.—The high frequency current produced by the apparatus described is administered to the plot ground under cultivation through the agency of an over-

head network of copper wires and a ground connection consisting of strands of wire buried in the earth of the plot. The transformer house is preferably located at one end of the plot in order that the high frequency current may be carried to the area under cultivation by the shortest possible route. This is highly desirable, as an appreciable loss would be sustained in a long transmission line.

The equipment recently described is of sufficient power to cultivate a plot of ground embracing 5,000 square feet, and, in the case under the writer's observation, the plot measured 50 feet in width by 100 feet in length. The

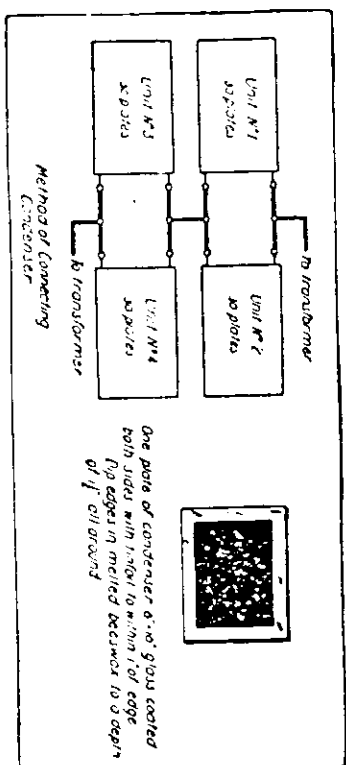


Fig. 112.—Showing how four units of condensers are connected

Ground wires, three in number, were run the entire length of the plot and spaced ten feet apart. Crossing these wires at ten-foot intervals were ten bridging wires arranged as shown in the illustration and soldered at each joint. In all cases the wire was of No. 16 bare copper. At the end of the plot nearest the transformer house, the ground wires were brought together in a rat-tail and connected with the ground lead of the apparatus.

The overhead network presents a more difficult problem. In the experimental plot ten wires spaced five feet apart ran the entire length of the plot and were sup-

ported at either end upon high-tension insulators held by posts which were of such a height that they suspended the wires seven feet above ground. At twenty-foot intervals on either side of the plot, additional posts were located and cross wires between each two of these posts completed the network and at the same time relieved the strain upon the slender wires running the length of the plot. As in the case of the ground network, all joints were soldered. The overhead connection is in the nature of a continuation of each of the long wires to form a rat-tail, grouping all of the wires where they are connected with the high-tension lead passing through the glass window of the transformer house.

The insulators on the posts may be of the conventional glass high-tension type or they may be cobbled up by grouping a series of porcelain cleats as suggested in the appended illustration. The best of insulation is none too good, particularly in damp weather, as the high-tension current leaks badly in its effort to find its way to the ground.

The actual time of treatment will naturally rest with the individual investigator. From one to four hours, both night and morning, is a fair dosage, and noteworthy results have been obtained with this average treatment. The plants or vegetables under cultivation should be planted in duplicate in a neighboring bed in order that comparisons may be made at frequent intervals. In order to put the experiments on a practical footing, the notes taken during treatment and subsequently should include data on the weight, amount of foliage, percentage of edible portion, quality of the latter, time required to bring plants to maturity, etc. These notes will be useful not only to the individual investigator, but to the world at large.

produced by means of a hand plow or cultivator of the kind sold in nearly every country hardware store. The ground wires, nine in number, were bridged at either end

CHAPTER XVIII.

FURTHER NOTES ON PLANT CULTURE.

Every radio telegraphic transmitter, large or small, amateur or professional, is a potential cultivator of plant life. Through a simple conversion of the oscillation transformer, the apparatus to be found in the possession of every licensed radio amateur can be made to perform this practical service in connection with the so-called "Kitchen gardens" springing up all over the country.

Following this line of reasoning, Mr. F. F. Pickslay, an ardent experimentalist of Mamaroneck, N. Y., called at the offices of the author and made known his plans, which were formulated largely as a natural result of the order to dismantle all radio stations in 1917.

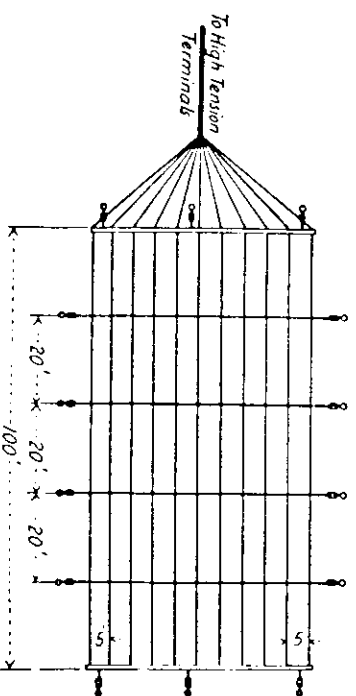
The entire stretch of ground planted measured 38 feet front by 110 feet deep. This plot was divided into two parts, one of which was electrified, and the other was without current, for purposes of checking results obtained.

The Distributing System

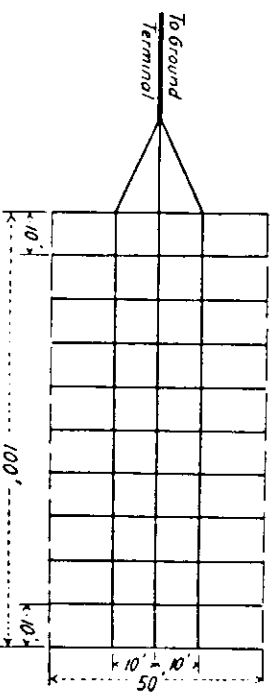
The system for distribution of the high-tension, high frequency current was simple. It comprised essentially a net-work of copper wire suspended above the garden at a distance of some 8 ft. from the ground, and a series of copper wires placed in shallow trenches beneath the ground.

In the case of our garden, the placing of the ground wires was a simple matter. The plot was first plowed, then raked, and finally the ground wires were placed in furrows

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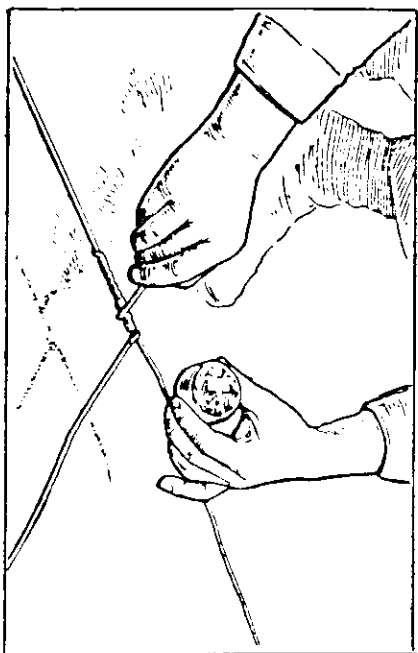
Side Elevation and Plan of Overhead Wire.



Plan of Ground Wires.

Fig. 113.—Plan of overhead and ground wire system with a piece of heavy stranded copper wire. All joints were soldered before the wires were buried. The ground lead was a piece of No. 4 stranded copper wire leading

down a side of the house from the transformer apparatus and making connection with the nearer bridging wire beneath the ground.



Soldering the burred wires

To Right Method of Overcoming
the Weight of our Aerial Network

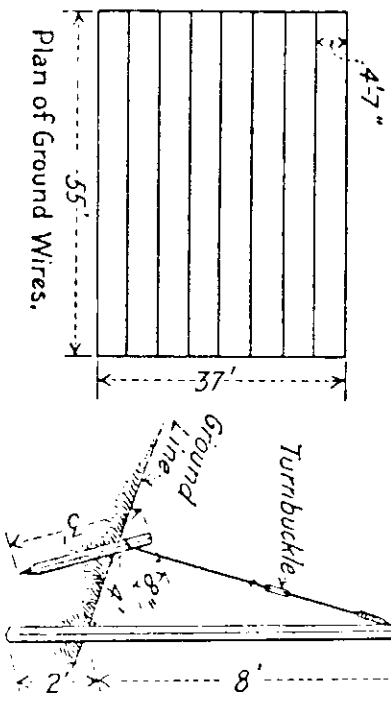


Fig. 114.—Plan of ground wires and method of putting in posts

The aerial network was formed by stretching four stranded copper wires between insulators secured to the supporting posts in the four corners of the electrified plot. Guy wires and turnbuckles stiffen the structure and enabled us to make the network taut. Smaller copper wires were stretched between the stranded conductors, forming the closed loop as shown in the drawing. All joints in this network were carefully soldered with the aid of a blow torch. A rat-tail, composed of wires leading from each of

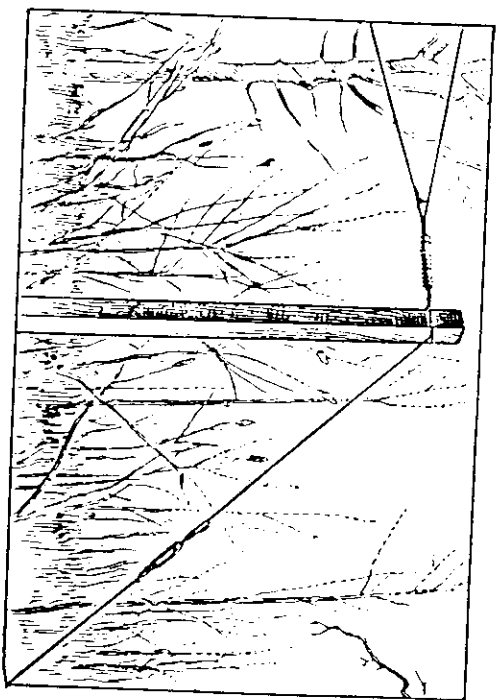


Fig. 115.—Method of holding overhead wires to posts

the longitudinal stranas, leads directly to the switch outside the house which formerly served the purpose of a lighting switch when the wireless outfit was in commission. Indeed, the scheme of connection is exactly the same as that employed for wireless, the switch being so arranged that when current is not being sent through the network the switch connects the aerial network with the ground wires.

Construction Difficulties

A shelf of rock runs beneath the entire plot under cultivation. The depth of the soil varies from less than a foot to over four feet at different points. While this forms an ideal condition from the standpoint of vegetable raising, in view of the fact that it maintains practically a constant state of moisture in the earth, the rock caused no little difficulty when we undertook to erect the supporting poles for the aerial network. As the strain on the poles is considerable, we found it necessary thoroughly to guy the poles,

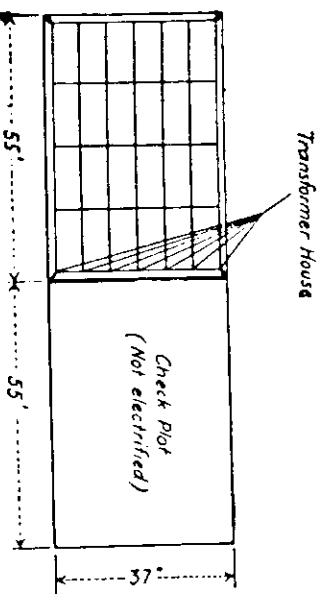


Fig. 116.—Connections of ground wires

and in this connection were forced to resort to various expedients such as the use of convenient trees upon which to fasten the guy wires. Where this was found necessary, we protected the bark by placing strips of wood under the loop of wire where it passed around the tree. In other cases, we were forced to rely upon stakes driven into the ground. We are not certain that the latter will stand the strain, and we may find it necessary to use "dead-men" at the ends of the guy wires. Be it understood a "dead-man" in this case is an anchor-like contrivance buried in the earth.

We used one 10-in. strain insulator of the high-tension variety at each pole.

In erecting the network, the posts were placed about two feet in the ground. In this comparatively small plot only four posts were used. The guy wires were placed next without any attempt being made to tighten them. Finally the stranded wires forming the closed loop were stretched tightly between the insulators on the posts and the joints soldered to insure non-loosening and good con-

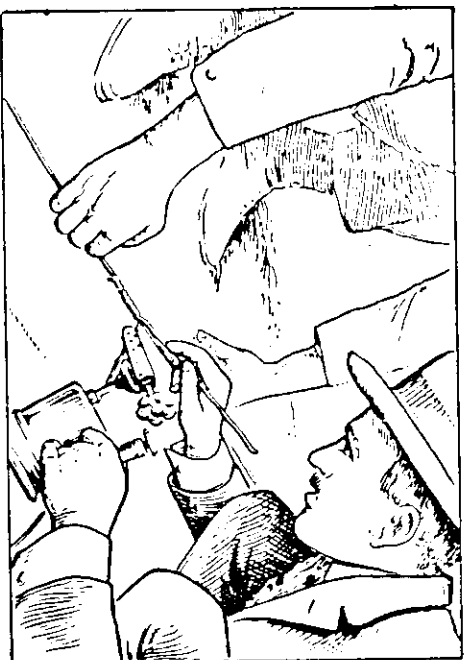
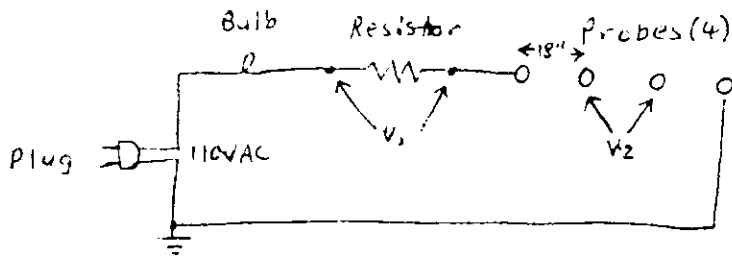


Fig. 117.—Soldering ground wires with torch.

ductivity. The turnbuckles were next brought up to stretch the loop tightly. The longitudinal wires, five in number, were next stretched tightly between the two end wires of the loop. These points were soldered. Then the three transverse wires were stretched between the side wires of the loop and the joints soldered. This gave us a perfectly taut network of ample height to permit freedom of movement underneath it in cultivating the garden.

Earth Conductivity Measuring Device



Bulb - 100w.

Resistor - 14.6 Ω 5w.

Probes - $\frac{5}{8}$ " dia. (copper or iron) 18" spacing, 12" depth

Plug - Polarized 110v. Type
(wide to neutral-grd.)

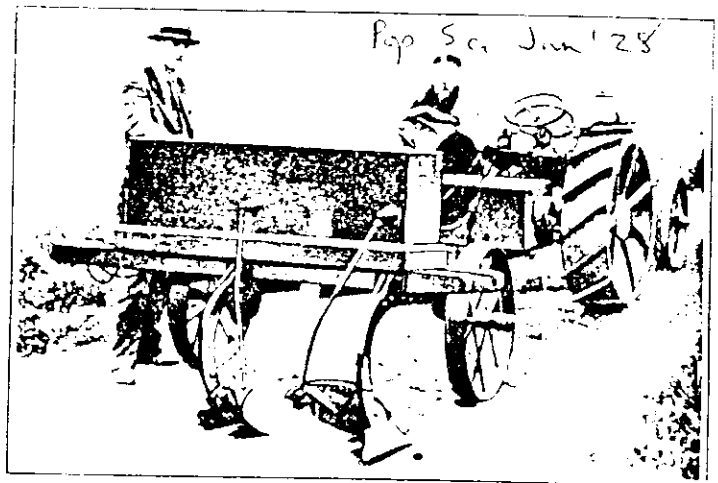
Conductivity Formula

$$\text{Millimhos/meter (conductivity)} = 21 \times \frac{V_1}{V_2}$$

1-5	millimhos	- poor soil
10-15	"	- average "
100	"	- very good "
15	"	- freshwater
5000	"	- salt "

ARTIFICIAL FOG SAVES ⁹⁴⁷ GARDENS FROM FROST ¹³²

FIGHTING frosts with artificial fog will be tried in Germany this fall, in the vicinity of Hamburg. It is expected vegetables will be protected by clouds of chemically-produced mist. Into drums of unslaked lime, dissolved sulphur trioxide will be allowed to drip when the farmer receives frost warnings from weather bureau headquarters. The reaction will produce the protecting cloud of vapor.



How Electric Plow Wars Against Crop Pests

The wires of this plow, invented by H. L. Roe, of Pittsburgh, described in the November Paper on Science Monthly, flash 103,000 volts of current between the plow shares to kill all pests in the soil.

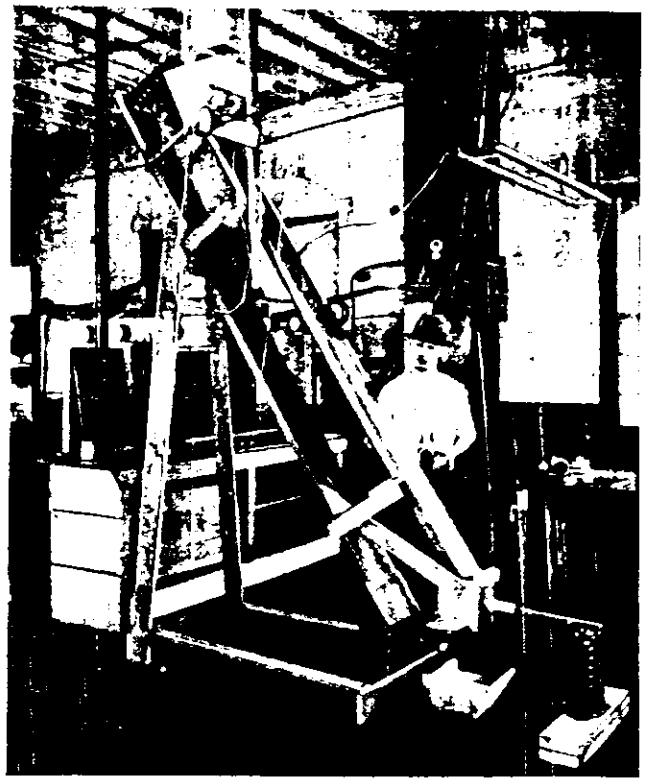
ELECTRICITY TESTED TO KILL PESTS IN STORED GRAIN

KILLING insect pests by high-frequency electricity is a process now being applied experimentally by the Baltimore & Ohio Railroad at Baltimore, Md. Grain awaiting shipment is protected against weevils and other parasites by running it, before storage, between metal electrodes that subject it to a high-frequency electrical field. The waves of electricity are reported to destroy both the weevils and their eggs, and the grain may then be stored without danger of deterioration. The method, and designs of treating apparatus used, were developed by J. H. Davis, chief engineer of electric traction.

Below, typical specimen of wheat damaged by insect pests. At right, wheat samples one of which, left, has been treated with electricity to kill pests. The other shows parasite ravages



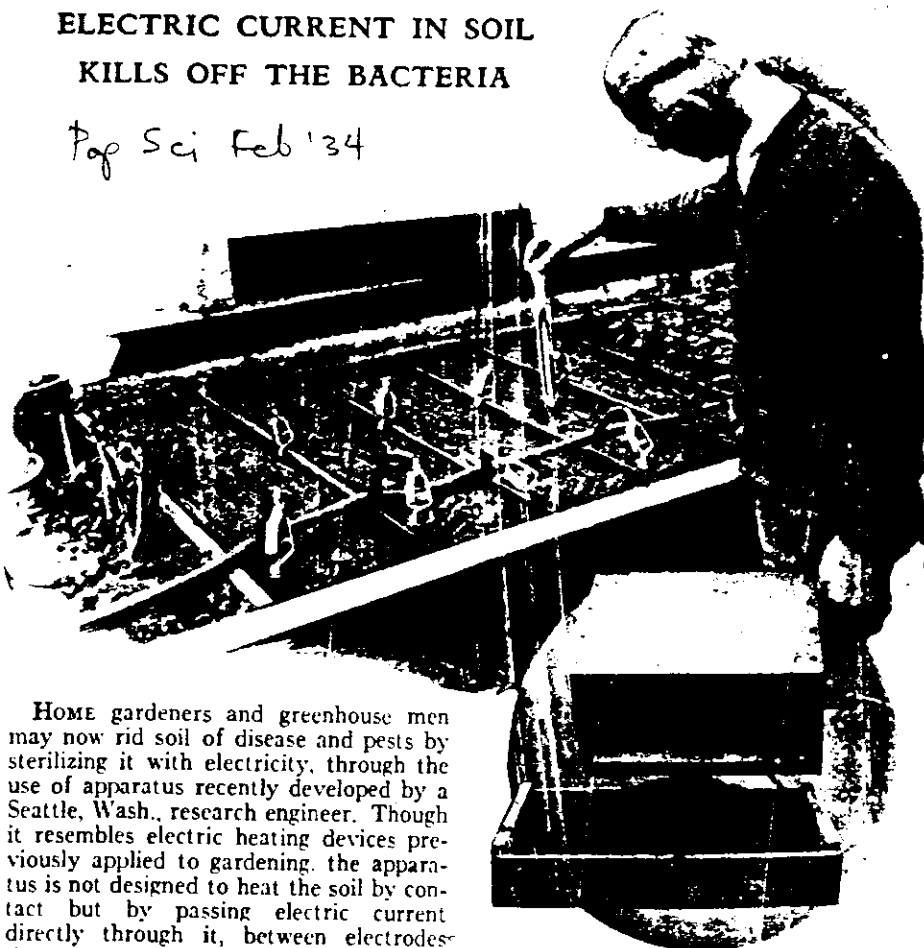
Pop Sci
Feb
1934



With this apparatus, high-frequency electricity is passed through grain before storage to prevent the destructive work of insects

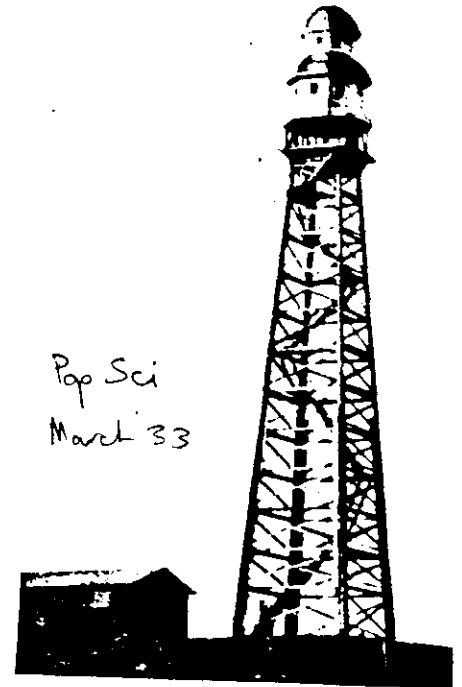
ELECTRIC CURRENT IN SOIL KILLS OFF THE BACTERIA

Pop Sci Feb '34



HOME gardeners and greenhouse men may now rid soil of disease and pests by sterilizing it with electricity, through the use of apparatus recently developed by a Seattle, Wash., research engineer. Though it resembles electric heating devices previously applied to gardening, the apparatus is not designed to heat the soil by contact but by passing electric current directly through it, between electrodes that are buried in the earth. The mild heating is said to kill all parasites.

At top, electric soil sterilizer in use. Above, close-up of insulating material and plates



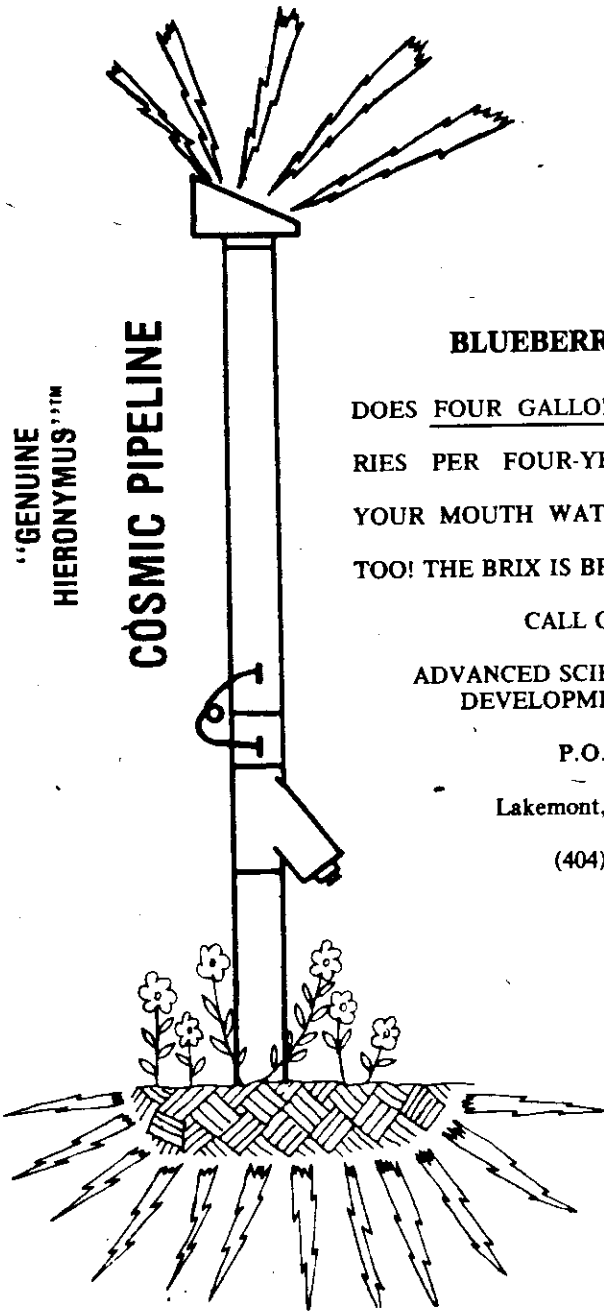
Pop Sci
March '33

CLOUD-MAKING TOWER MAY SAVE ORCHARDS

FANTASTIC ideas of capturing electricity from the atmosphere have led to small practical results thus far, but a curious tower just erected atop a canyon ridge near Whittier, Calif., proves that such a dream is hard to down. The Los Angeles inventor and builder of the tower says he will use it in an attempt to release electrical charges from moisture-laden air. Thus he seeks to form a blanket of clouds at will, and achieve thereby a means of protecting orchards against frost.

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TOO! THE BRIX IS BETWEEN 15° AND 19°.

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ACHIEVEMENTS of MR. MARK MOELLER
using the COSMIC PIPELINE

Mr. Moeller has owned his land in Pea Ridge, Arkansas, since 1978, at which time he conducted numerous conventional soil audits via the University of Arkansas, A & L Laboratories, and Dr. Cary Reems. Mark performed all of the recommendations of each of these advisors. Beginning in 1982, thinking that he had his soils "balanced" for growing blueberries, he has applied no more fertilizer.

The Brix sugar readings of his fruit indicated that his soil treatment was moving in the right direction. His Brix reading increased again after he installed the Cosmic Pipeline May 14, 1984.

Other indications of an improved crop response after installing the Cosmic Pipe, include being able to begin harvest two weeks earlier than his neighbors; he received \$15 per flat as opposed to \$10 per flat paid to his neighbors from the same Co-Op. His production per acre was the same as for established fields of blueberries, however, his blueberry bushes are only half-grown plants. Assuming a straight line increase of production to maturity, his production is double the normal yield already. His 1985 crop forecast looks very promising because he now has five times the fruiting buds on his plants as neighboring blueberry fields.

Mark achieved these dramatic results after only three months of energy "boosting" by the Cosmic Pipe. As the graph shows, his energy levels have continued to climb, as well as to "balance" out.

What about insects? The indication, to date, is that "harmful" insects will be controlled without the use of pesticides and without attacking them directly. Apparently, simply by raising the energy levels and vitality of the blueberries, and balancing the nutrient levels, the insect problems will take care of themselves. In December, Mark selected a random sampling of Bagworms, only to find that none of them were alive. The General Vitality of the blueberries had improved to the point that it no longer suited their needs. (Previous use of insecticides had proven ineffective.)

In December 1984, the Doctors Hieronymus developed a ReAgent, for use in the Cosmic Pipe, which has had a positive impact on the freeze tolerance of plants. Mark was sent one of these ReAgents, F-58, and installed it in his Cosmic Pipe. Since that time, he has documented a minus 20 degree freeze with no apparent freeze damage to lush growth and swollen buds, then on April 9, 1985, he received the 20° nights after the blooms had opened with virtually no damage.

Mark has also documented his hay crop very well. On seven acres of 30% slope, rocky, Northwest Arkansas soil, he averaged 96-45 lb. bales of native grass hay from 1981 thru 1983. He produced 196-90+lb. bales during the 1984 season after the Cosmic Pipe was installed. No nutritional information was kept, however, due to his use of the hay as a mulch for his blueberries.

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