SCIENCE NEWS

PLANT INJECTIONS

Science Service

HYPODERMIC injections are being used to feed and cure hungry and ailing fruit trees located at the University of California, at Berkeley, California.

Dr. C. B. Lipman wields a glorified hypodermic needle-like apparatus with which curative solutions and food are placed directly into the circulation of the growing plant. The natural method of providing the tree with its sustenance through the soil by means of fertilizers has in a large measure been superseded by direct feeding and medical treatment.

Primarily the new method is being used as a first aid to sick citrus trees. Orange and lemon orchards are sometimes attacked by a disease called chlorosis which causes the leaves to become yellow and the trees to cease bearing fruit. Professor Lipman and his associates attended some trees that had been in this nearly dormant condition for three years.

They bored holes into their trunks to about three-quarters the diameter. Then glass tubes were inserted and sealed tightly with a special wax. Reservoirs containing a solution of ferrous sulphate were attached and the trees were allowed to drink up the solution. In three weeks the yellow leaves had been replaced by green ones and the trees had taken a new lease on life. They now give signs of fruiting.

Citrus trees are heavy users of calcium in which some soils are deficient and the University of California scientists have found that injection of calcium nitrate or chloride into their trunks will cure and prevent a harmful mottling of the leaves due to lack of this salt.

"We believe that this ushers in a new era in feeding plants," Professor Lipman stated in commenting on the experiments that as yet have been reported only to the National Academy of Sciences "that we can ignore the soil completely and feed directly to the tree the nitrates, phosphates, calcium and magnesium salts necessary to its growth. Such direct injection of the nutrients allows us to avoid the troubles caused by the complexities of the various chemical reactions of the soil."

Although experiments have been performed on apricot, plum, lemon, orange and pear trees and on barley and wheat during the past two and a half years, no announcement of results has heretofore been made.

Trees can be stimulated as well as fed by the injections. Professor Lipman said that calcium and potassium salts have a stimulating effect when injected. Large quantities of solutions can be absorbed by the trees. One pear tree was persuaded to soak up over 60 quarts of chemicals in 24 hours.

The insect menace is to be combated by the new injection method. Professor Lipman next plans to experiment with solutions of chemicals that are known to be toxic to injurious insects but not harmful to the trees. The trees injected with the poisonous liquid will become poisoned bait to marauding scale insects or other harmful pests and thus will become self-protective.

UNIQUE BIRDS OF CHILE

Science Service

REMARKABLE birds of the Pacific coast of South America, including a wild duck that can not fly, a penguin that makes its nest in the midst of a jungle instead of on a rocky islet where one would expect to find penguins, and gulls that are a menace to sheep, were described before the American Ornithologists' Union meeting at Pittsburgh, by Dr. Frank M. Chapman, of the American Museum. Dr. Chapman has recently returned from a rapid study tour of the waters and coast lands of western South America.

The coast of Chile, he pointed out, is especially well adapted for the study of bird life and other natural history problems. In the first place, the climate ranges all the way from very wet in southern Chile to absolute rainlessness in the nitrate deserts of the north. Then, the sea penetrates deep into the Andes range, and indeed in the southern part actually pierces it in several places, so that products of southern Patagonia can be loaded on ships from the Pacific. These long fjords, as well as Magellan Strait itself, are simply flooded mountain valleys, and the offshore islands are simply isolated peaks and ranges.

In this region, where Darwin spent more than a year when he was on his famous voyage in the *Beagle*, a longer series of studies is planned for the near future.

Among the most interesting of the birds studied and photographed by Dr. Chapman was the loggerhead duck, also called the steamer duck, because of its peculiar method of half swimming and half flying. Its body is much too heavy for its short wings, often weighing ten or twelve pounds, and when it beats the air with its wings it rises partly out of the water, like a hydroplane, and thrashes up so much spray that it suggests the action of a sidewheel steamer, whence its name, "steamer duck."

The Chilean penguin is closely related to the penguins of the antarctic regions but instead of living on rocky islands in great rookeries near the shore, builds its nest in almost impenetrable jungles on forested islands. And though the forests are of a semi-temperate zone type, they harbor such birds as parrots and hummingbirds, most unlikely companions for penguins. It was like finding polar bears and elephants together, said Dr. Chapman.

The sheep ranchers of Patagonia are much disturbed over two birds, the speaker continued. One of these is the kelp goose, a large and very beautiful bird, and much devoted to his family. But the goose eats a great deal of grass—six geese as much as one sheep, the ranchers say—and hence is regarded as an enemy. The second bird that is "in bad" with the sheep men is the black-and-white Dominican gull. These birds have thriven marvelously on the offal of packing plants of the region and have become very numerous. But the sheep raisers claim that when their usual bounty of offal runs low the gulls attack and devour young lambs. So geese and gulls are both under the ban in Patagonia.

GRAVITY BALANCE AS A DIVINING ROD FOR OIL

Science Service

OIL, liquid wealth, located beneath the ground without the risk and cost of drilling! This has been the promise of a long list of fakirs who have victimized oil men who have been credulous in their eagerness to realize on the rosy promises to locate oil pools with absolute certainty, tell the depth to the oil, whether the wells would be pumpers or gushers and the amount of oil they would produce. "Doodlebugs" is the contemptuous name that has been won by the mysterious contraptions used by these fakirs.

Yet now comes a scientific instrument that promises to be a sort of divining rod for oil. It is the Eotvos Torsion Balance, now being tested by certain progressive oil companies in California as an aid in locating new oil fields.

This instrument was developed over thirty years ago by the great Hungarian physicist Eotvos who found he needed some super-sensitive means of measuring the force of gravity so as to detect its minute variations from place to place. However, it was a great many years later that the first suggestion was made that the balance could be put to practical use and it is only within the past few months that oil companies have become interested in its possibilities.

Essentially the mechanism consists of a light aluminum bar suspended from a fixed point by a fine platinum wire about a yard long. On one end of the bar is fastened a little platinum weight while an equal weight attached to the opposite end hangs down two or three feet below the bar. The weighted bar tends to rotate under the influence of the force of gravity until it comes to a certain position of equilibrium. This position of rest is either read off on the scale provided or in the case of newer models registered photographically. The whole instrument is then turned in another direction, the new position of rest recorded and the process repeated until enough data have been secured to calculate the exact value of the force of gravity at that station. Similar observations are made at other stations judiciously spaced over the area being investigated.

The torsion balance gives no direct indications of the presence of oil-bearing rocks underground. It gives only an accurate picture of the variations of the force of gravity in the locality. It is then up to the oil geologist to use this gravity data to help in working out the location of structures in the underlying rocks which are favorable for oil accumulation. Most of the important oil fields have been found to occur where the underlying strata have been arched upward. Where such conditions exist the older and generally heavier rocks approach nearer the surface and bring about a slight local increase in the force of gravity. It is in this roundabout manner that gravity measurements aid in the search for oil.

In actual practice a lot of troublesome corrections have to be made for the force of gravity is influenced by distance from the equator, elevations above sea level and especially by the proximity of hills and mountains. The Torsion Balance is so sensitive that even the presence of the observer is registered by a deflection of the beam. It bears much the same relation in sensitivity to the delicate balance used in chemical analysis as that instrument does to the railroad scales used for weighing freight cars. Extraordinary precautions have to be taken to prevent disturbances other than those due to gravity. The swinging parts, consisting of wire, beam and weights, are enclosed in a double-walled metal case. Even then, the sun's rays might set up tiny air currents inside which would cause temporary deflections of the beam and so the observations are customarily made at night with the instrument housed in a tent with insulating walls.

Experiments are still in progress and commercial considerations make the oil companies reticent in disclosing the successes and failures of the new method for predicting oil.

ITEMS

Science Service

Six of the new type of electric locomotives have been built by the General Electric Company for this railroad, and are being given a thorough test under working conditions. Four of them are used in regular train service, and two in yard service for switching purposes.

THE plumber, electrician, jeweler and builder can now use X-rays to aid them in their work. Dr. W. D. Coolidge, inventor of the Coolidge X-ray tube, has now devised in the research laboratories of the General Electric Company a new portable X-ray machine that weighs only 30 pounds, and that can be plugged into an ordinary electric light socket. Dr. Coolidge made first practical use of his new invention when he used it to locate pipes in his bathroom floor. Crystals produce characteristic diffraction patterns when a small beam of X-rays is shot through the stone and observed in a fluoroscope, allowing the new apparatus to be used in testing the genuineness of diamonds and other precious stones.

THE flagstone sidewalks of Denver and other Colorado cities were once walked by animals that throve on earth long before man, before the wooly rhinoceros and the saber-toothed tiger, and ages before even the dinosaurs appeared. This is the explanation given by Professor Junius Henderson, of the University of Colorado geology department, for the peculiar track-markings in the sandstone that was quarried and made into the older walls of the city. These animals, he says, were not large, only about the size of a Gila monster, though they were not lizards, but amphibians like the modern salamanders and newts. They walked high on their toes, for there is no sign that their bodies trailed in the soft sand that later was hardened into stone. If they had any tails they carried them high also, for there are no marks of dragging tails. And they were a sober, well-behaved race, for the tracks do not zig-zag, but proceed in orderly straight lines.