

CULTIVATION VS. IRRIGATION.

At a recent meeting of the Southern California fruit growers Mr. James Mills read a most interesting paper showing the importance of cultivation in conserving soil moisture, and showing how it can be substituted for much of the irrigation now practiced. His suggestions were generally adopted in this state, so far as conditions permitted, the water now used in Utah could be made to double the duty it now performs in the irrigation of crops. Mr. Mills said:

"Let me say in opening that I believe from actual experience that there are many more orchards ruined by over-irrigation than by under-irrigation; that there are more men who ruin their property by irrigating water in and off their lands than there are who do it by irrigating their lands. As I understand irrigation, it is placing water in the soil for the development of the orchard, for the taking up in solution of the elements which the tree's roots can get in, or that nature puts in the soil, and feeding it through the root system to the tree, thus deoxygenating the laboratory of the tree the food stuffs that were taken up and carried through nature's avenues to their place of deposit. That is all I like to give. That if you pour water over your soil, you are damaging it, damaging your prospects and damaging your bank account. I will tell you what we have done and what we have accomplished, and what you have done, of having sandy and somewhat sterile which has not had but one irrigation each year for the last three years, and that irrigation given in order to plant the cover crop. When I took the office and am now occupying under W. J. Fraser, who is manager of that great property, this block of 50 acres I found took more water than

other orchard irrigated every 30 days, and within 10 days after every irrigation it is washed away. Why? The lands over which I preside we cultivate, and cultivate, and cultivate. We get that dust which holds down the water. The other man does not cultivate, he scratches the top of the soil—the way you scratch the top of the soil—so I have been over your lands all through the state. You scratch the top of the soil, what happens? Every capillary tube that you ought to have shattered and held down with your root blanket is in contact with the air, and it should have gone into your root system, up through your tree into your leaf, and, by transpiration, sent off into the atmosphere. Why put water into the soil if you don't want it to go into the atmosphere? I tell you, gentlemen, you have got to use your cultivator. It is water, it is fertilizer, it is fruit, it is success, and it is failure without it."

Explosive mixtures are formed by gases that produce flame, and the velocity of the explosion varies in time as well as in intensity, by the force of the gas molecules. The mixture seems to correspond with the motion of the gas molecules. It was calculated in one case to be 165 miles per minute, at a given high temperature, and the atoms of the air we breathe are supposed to move at the rate of 1,200,000 feet as fast as an express train. Under reduced pressure, the explosion does not always run the length of the tube, a spark sent in at one end of a tube 120 feet long failing to reach the other end when the pressure of gas was about one-tenth of that of the atmosphere.

The suggestion has been made by Prof. Ludwig Heitzen that in cerebrospinal meningitis a portion of the cerebrospinal fluid be withdrawn from the spinal canal, and pure carbon dioxide injected to be mixed in the place, giving an immediate phagoctytic effect. As tried on animals, the treatment is claimed to have effected many cures, which are believed to be permanent.

Man's greatest vanity is the placing of the human race at the head of creation. Prof. Oliver J. Lodge points out that the universe is large enough to hide vastly superior intelligences, and that our Imperial Caesar—or our American billionaires—but a creeping dust atom upon one of the dark junipers at the bottom of the ocean contains a hundred million great suns. In a recent illustration, Mr. T. E. Heath represented the distance traveled by light in a year by one mile. On this scale, the sun is a dot 100 of an inch in diameter, the earth to which human life is confined, a single particle one inch from it, and a table five-foot long suffices for the entire solar system, the nearest fixed star being nearly four and one-half miles away. Even on this scale, a circle thirty miles across would embrace only 27 of the nearest stars, the millions being far outside.

The gun camera of Dr. W. H. Howe, a Mexican angler, is especially intended for photographing leaping fishes. The idea was suggested by his desire to catch the large fish which jump six feet long, which he seeks each winter at Tamtoc. The new camera has shown the tarpon in various positions in the air, some of them quite unexpected and surprising. The apparatus consists of a gun-stock and a 4x5 Kodak, the shutter and opening are on a line with the sight, and the shutter is connected with the trigger by a wire, the gun being "fired" from the shoulder in the usual way. Great possibilities are opened in photographing also flying fishes and birds on the wing.

Aleohol is made unfit for drinking—or denatured—by dissolving in it a small proportion of acetylene and this new method increases heating power instead of unfavorably affecting as a fuel. The alcohol, when distilled in Holland for about 15 cents a gallon, when denatured with a small percentage of acetylene, is claimed to have a heating value much above petrol.

One of the most remarkable opals in existence is supposed to be a fossil fragment of the *cimoliosaurus*, which once lived in Australia, reaching a length of 40 feet. The specimen, lately brought to New York, weighs 1,150 carats.

In Planting Your Trees—For economy of water, I say to you, in planting your trees strike their roots deep, because it has got its roots down toward the center of the earth, and if you dig another root system three or four feet down, you can get it, and you can get it deep, for I have followed my roots six or seven feet down. And here is to be found fertilizer, humus and a vast reservoir of subsoil moisture that will keep your tree in the years to come in miniature and not just as all of the humus had been burned out or washed out or eaten out—it was gone. I saw that I must first place humus in the soil.

I took animal fertilizers to start with, and on top of this I put my cover crop of rye, and when the rye was up, I sowed my crop. In the Canadian field—*the common field peas*, I turned them under in the winter. I caught and held the rains and I pledge you my word that I hadn't irrigate that piece of land until the first of October, I carefully examining the soil every month. I dug a hole 10 feet deep, six feet long and 18 inches wide, that I might get in there and examine the soil as to the amount of moisture in it, and to see the condition of the soil, and the office examined them. I took the trees—there is the index, the tree, the tree will tell you when it needs water, and there is no necessity to give it before then, because you will damage its prospect if you do. I sowed the seeds every month and I applied the irrigation from putting the water on until the first of October. It was a rebuffed orchard that had been sown and was hidden over to ravage. The buds were three years old. We took the loose bodies of that orchard, and didn't need the irrigation at that time, but the pests did, because I wanted to put another cover crop in the ground.

The next year we irrigated it in July again, another cover crop, and we took 10,000 bushels of fruit out, and I give you this as an illustration that the pouring of water on that piece of ground every 30 days would not have been a good idea, it would have been a dead loss, and to you, for the sake of economy in getting the water to your tree until you know it soil. Water should not leave your soil. You can irrigate your soil without wasting water. There are thousands who will tell you that you can, if you have the right kind of irrigation.

We irrigate our orchard, but not oftener than eight weeks—very seldom within nine and 10 weeks. In the hottest time of the year, Right alongside of it and right across the line, within 10 feet of that orchard, there is an

OPPOSES CAPITAL PUNISHMENT.

Rev. Emil A. Meury, pastor of the Reform church of Jersey City, N. J., is making a fight to do away with capital punishment. He claims that he has made a lone study of hanging and has witnessed a number of executions. Mr. Meury's opposition to the death penalty is based on an astonishing experience which proved conclusively to the minister that the loss of consciousness is not an inevitable concomitant of the drop from the gallows, and the victim may suffer agonies while slowly dying from strangulation. Rev. Mr. Meury says that he intends to prove this so, and fight against capital punishment.

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SCIENTIFIC MISCELLANY.

To explain terrestrial magnetism three hypotheses have been offered, viz.: 1. The crust of the earth—probably soon after solidification—has become a permanent magnet through the circulation of electric currents, the latter possibly generated by heat. 2. The earth, acting like a self-exciting dynamo, has by its rotation gradually accumulated a magnetic field. This is a great electrical generator for the whole solar system, and each of the planets is a distributing station for the energy produced.

The new oscillation valve of Prof. J.

A. Fleming, F. R. S., makes ordinary electric oscillations measurable on a galvanometer by separating out the two opposite currents. It consists of a bulb enclosing a carbon filament, as in an incandescent lamp, the filament being wound on a cylindrical cyrind and the bulb highly exhausted. Negative electricity passes through the vacuum from the hot filament to the cylinder but not in the reverse direction. With a dead-beat galvanometer, the valve acts as a rectifier of the coherent receiver in wireless telegraphy, the signals giving long and short deflections of the galvanometer.

Horse-owners and breeders are invited to add the South Kensington museum in collecting a series of skulls and

limbs—bones of pedigree horses of all sorts of breeds. It is hoped that in time the specimens will show the origin and relations of the various breeds of domestic horses with scientific accuracy, and give facts of great value to naturalists and horsemen.

A clinical thermometer that can be boiled has a bulb at the top into which the mercury can expand without doing injury. As all germs can be destroyed, instruments has been highly sterilized to the Paris Academy of Medicine.

In the development of the Moore electric light which has been taken with an appearance of glowing white smoke, many experiments have been made with various metallic and non-metallic vapors under the influence of the electric current. The secret gas now used is non-metallic. The light completed is more than 150 feet long. From this new method of lighting has sprung the new art of glass plumbing. The room or building is piped with 1½-inch glass tubing, put up in lengths of about 8½ feet and hermetically sealed in position. The glass is cut with a special set of glass-blowers' instruments, including hand torches, glass-cutting tools, portable pressure-blowers, etc. Joints at first declared by experts to be impossible, and taking half an hour when first accomplished, can now be made in less than a minute.

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PROF. FEDOR I. TSIGALOV.

FAMOUS JURIST WITH RUSSIAN ENVOY.

Prof. F. de Martens, who is a member of M. Witte's suite, and who read the Russian envoy's greeting to the American people on the Kaiser Wilhelm on Wednesday, is one of the most unassuming of men, but is one of Russia's most distinguished jurists and men of learning. He was for many years a professor of international law in the University of St. Petersburg and was president of the Venezuela Arbitration commission which met in Paris. He was also one of the arbitrators at The Hague in the hearing of the claim of the United States against Mexico, growing out of the Pinos Fund of California. At present he is a member of the Privy council of the foreign office at St. Petersburg.



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English logician. In the "title notation" of logicians, all premises have separate symbols, and conclusions are produced by a combination of these symbols and on pressing the keys of the new machine—something like an adding machine—manipulations of circles and electric lights thrown into relief all formulas that are possible answers to logical questions. The prover keys have no chance of error.

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