

gan at Naples. To place the water organ side by side with our magnificent modern instruments would be as unfair as it would be absurd. More than two thousand years divide them, but that the hydraulus can still afford pleasure was conclusively shown at a demonstration given lately in London, when the ancient Greek music in use at the time the pottery model was made (such as the Ode to Chronos and the Hymns to Nemesis and Kalliope) was rendered in the original language with hydraulus and kithara accompaniment to the enthusiastic appreciation of a large audience.

In classical times the water organ was the admired adjunct of the public games and the luxurious theaters. Its association with the orgies of pagan Rome and the contests of the gladiators did not recommend it to the Christians. With dying Rome, it died; and those ingenious devices of keys, stops, and other details were lost until at the close of the eleventh century musicians astonished the men of their day and generation with a newly-found keyboard—a rough and rude contrivance indeed when compared with the "light touch" and "varied strains" of the old hydraulus.

The Inevitable Ether.

In an article which Miss Agnes Clerke writes in Knowledge on "The Inevitable Ether," and which is remarkable no less for its brilliant summary of the modern theories of the "ether" than for the literary fastidiousness with which it is written, the steps by which the conclusion that mass and energy may be interchangeable are traced. "The glory of the heavens is transitory," writes Miss Clerke, "but to the very brink of that mysterious ocean the science of the twentieth century has brought us; and it is with a thrill of wondering awe that we stand at its verge and survey its illimitable expanse. The glory of the heavens is transitory, but the impalpable, invisible ether inconceivably remains. Such as it is to-day, it already was when the *Primum Mobile* was spoken; its beginning must have been coeval with that of time. Nothing or everything according to the manner in which it is accounted of, it is evasive of common notice, while obtrusive to delicate scrutiny. Its negative qualities are numerous and baffling. It has no effect in impeding motion; it does not perceptibly arrest, absorb, or scatter light; it pervades, yet has (apparently) no share in the displacements of gross matter. Looking, however, below the surface of things, we find the semi-fabulous quintessence to be unobtrusively doing all the world's work. It embodies the energies of motion; is, perhaps, in a very real sense, the true *primum mobile*; the potencies of matter are rooted in it; the substance of matter is latent in it; universal intercourse is maintained by means of the ether; cosmic influences can be exerted only through its aid; unfelt, it is the source of solidity; unseen, it is the vehicle of light; itself non-phenomenal, it is the indispensable originator of phenomena. A contradiction in terms, it points the perennial moral that what eludes the senses is likely to be more permanently and intensely actual than what strikes them."

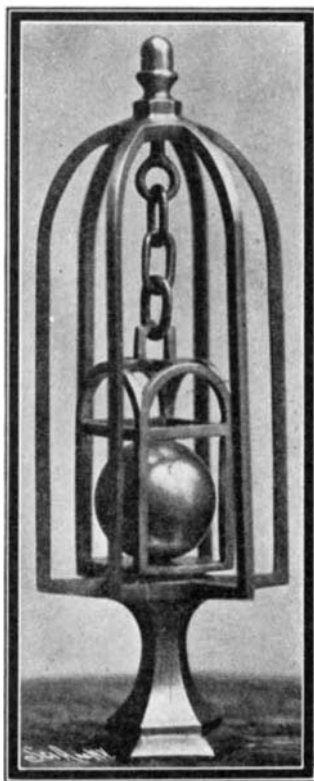
TOMATO VINES THIRTY FEET LONG.

BY H. L. JONES.

Throughout the winter months, when easterners were crouching about their fires and shivering, and nature growths were either asleep or frozen stiff with the cold, Mr. F. J. Bates, of Pasadena, Cal., was in his garden climbing an 18-foot ladder to gather his various crops of tomatoes. He has three plants which have reached a length of 30 feet. They are of the species "Ponderosa," but these particular plants have surpassed in growth anything previously attempted by their kind. The seeds were planted in May, and three months from that time they had climbed to the top of a 20-foot trellis. When they reached this remarkable height they waved their flower-tasseled heads wonderingly, then turned around and grew backward until they have attained a length of 30 feet. As the vines are still sprinting, Jack's beanstalk must sink into obscurity and transfer its fame to these irrepressible tomato plants. They have had no especial care or cultivation, and have had no protection from the weather, yet in spite of every disadvantage they have kept on growing and fruiting in the most astonishing fashion. The trunks of these vines are 1½ inches in diameter. The foliage is thick and luxuriant, and at all times blossoms, green fruit, and ripe fruit can be seen on the vines. Enormous quantities of tomatoes have been picked from these three plants. The fruit is of unusual size and has an extraordinarily fine flavor.

A CURIOUS PIECE OF CASTING.

We have already presented to our readers pictures of Mr. D. Galvin's interesting castings. Perhaps the accompanying illustration shows the most curious piece that Mr. Galvin has thus far succeeded in producing. The casting, we are assured, was made from wooden patterns and sand. Nothing else was used.



A CURIOUS PIECE OF CASTING.

The height of the casting pictured, from the top to the base, is 12 inches, its width 4 inches. The ball is 1½ inches in diameter, and the frame around the ball has an exterior measurement of 1¾ inches. The thickness of the metal of the frame, outside of the base, is 1-16 of an inch. Three of these castings will be exhibited in the Division of Mines and Metallurgy at the St. Louis Exposition.

Irrigation Profitable in the Humid Parts of the United States.

The advantages of irrigation in the humid climates, merely as a supplement to rainfall in ordinary or extra dry seasons, are forcibly presented in Bulletin No. 148 of the Office of Experiment Stations recently issued by the United States Department of Agriculture. The reports of a number of irrigation plants in the vicinities of eastern cities go far to show that as

population increases and land becomes more valuable the zone in which irrigation can be profitably employed will be extended, as it has been in Europe, where the farmers have found that there are few sections where irrigation will not pay simply as an insurance against drought.

The bulletin states that a grower of berries in the vicinity of Poughkeepsie, N. Y., has found that artificial watering guarantees a perfect stand and rapid growth of newly-set plants, the highest quality of product, and maximum crops. Owing to dry weather and high temperature during the season of 1903 his berries had colored and hardened but did not sweeten. The application of 10,000 gallons of water in a fine spray and 25,000 gallons between the rows put the berries in fine condition for picking. He also found that to irrigate after applying chemical fertilizers dissolves and distributes the plant food and lessens the danger of injury to plants.

To water market gardens near New York city, on Long Island, and in New Jersey, small plants consisting of pumps, storage tanks, and piping are used with such success that their owners claim large returns on the money invested. One man stated that he would not attempt to garden for profit without such an assurance of plenty of water when needed. Some gardeners buy water from city supplies and find it more satisfactory than to install their own pumping plants.

Descriptions of pumping plants of various sizes and styles with their storage basins and distributing pipes are given in this bulletin so that those intending to try artificial watering may profit by the experience of several successful irrigators.

Striking testimony in favor of irrigation is furnished by the careful comparison of crops from irrigated and unirrigated plats of strawberries, asparagus, nursery stock, and onions at the Missouri Agricultural Experiment Station. Not only were yields larger, but in the case of asparagus unirrigated rows were affected with rust while the irrigated plants were entirely free from the disease.

A portion of South Dakota which is noticeably benefited by a supplementary water supply lies in the James River Valley. In the first attempts to utilize this supply of underground water, wells were made so large that the excessive cost resulted in financial loss. Within the last year or two the plan of sinking 1½ to 2-inch wells has been tried and its success is leading to their extended use. A good 2-inch well will furnish water for half a section of land. An oversupply of water in the first experiments produced conditions that prejudiced many farmers against the practice, but later tests show that no injury need be feared where water is properly used. All cases of deterioration are directly traceable to an oversupply of water. An excessive amount of water in the soil will smother the rootlets and on evaporation will leave a deposit of salt, so that care must be taken that the soil does not become too wet. The bulletin as a whole shows the great advantage of irrigation as a means of increasing production and as an insurance against drought, even where the expense of securing a water supply is great.

What is said to be the first harbor for airships was that erected for the aerial contest at St. Louis. The ground made use of for this purpose covers about fourteen acres, inclosed by a wall for the protection of the vessels making ascent and descent, which operations will be greatly facilitated by a substantial shield of this character. At the southeast corner of this structure are two stalls for airships, each one 180 feet long and 40 feet wide and 30 feet high. There is also a shed 180 feet long and 20 feet wide where are all the facilities for making airship repairs and accommodations for the storage of ballast and other impedimenta. The wall inclosing the harbor is 30 feet high. The lower part of this structure is proof against the passage of wind, being absolutely tight to a point twelve feet above the ground. The upper part of the barrier is of lattice-work, which has the effect of tempering the breezes to a considerable extent. One of the practical results of the interest aroused in aerial matters by the contests arranged for at St. Louis is the investigation of the upper air of this country by the means of balloons containing automatically-recording instruments, and by this means it is expected to secure some very valuable data. The work is under the supervision of A. Lawrence Rotch, of the Blue Hill Meteorological Observatory.

Owing to the success of the cross-Channel turbine steamer "Queen," running between Dover and Calais, the South-Eastern and Chatham Company has ordered two more to be ready by next May or June.



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