Scientific American.

NEW YORK, JUNE 5, 1858.

Vehicles of Paints.

Oil is the common vehicle employed for paints, and it is undoubtedly the best; it has, however, some defects requiring correctives. Thus drying linseed oil, which is made by boiling it with some metallic oxyd, &c., has such an affinity for oxygen as to promote chemical union with it and the coloring pigments, and thus ultimately destroy the beauty of their color. There are many delicate and beautiful colored pigments which cannot be employed with oil in paint, without suffering injury. This is the case with chrome yellow, verdigris, gamboge, and a number of the lakes. But there is a very useful corrective for this deteriorating quality of the oil, that is pure beeswax. It was the principle vehicle of the ancient painters before oil painting was invented, and some of the old paintings exhibit a freshness of color perfectly wonderful. Wax is a powerful antiseptic, has great preservative powers, and it would be well to apply it as the first coating for canvas designed for oil paintings. Wax added to painters' varnishes tends to prevent them cracking, the latter being an evil which has destroyed the beauty of many excellent works of art. It is said that the famous Titian painted on a red ground, and imbued his canvas at the back with beeswax dissolved in oil; this may account in a measure for the enduring brilliancy of his colors. It has also been asserted on the other hand that Sir Joshua Reynolds used a great deal of wax with his colors, and it is well known that their beauty has been very short lived, and his paintings have all become very faint. But it has also been denied that he used wax as a vehicle, because it is the most unalterable of unctuous bodies, and would have preserved his colors. Bleached wax is easily dissolved in hot oils, both volatile and fixed; it is not changed by exposure to the atmosphere, and is but very feebly acted upon by the strongest acids. Its appropriateness, therefore, as a vehicle for paints is self-evident.

Oils contain a considerable portion of glycerine, which is a hygroscopic fat, and prevents unprepared oils from drying. It has been found that some metallic oxyds possess the quality of combining with the glycerine in the oil, and rendering it susceptible of readily drying in the atmosphere. The oxyd of lead, sulphate of zinc, and the oxyd of manganese, boiled with oils, communicate to them great drying properties, and for this reason oils treated in this manner are called *drying oils*, and are in common use.

Some works written by incapable authors recommend the use of both sulphate of zinc and the acetate of lead mixed together for making drying oil. These two metallic salts when brought together produce two new compounds by double decomposition, namely, the acetate of zinc and the sulphate of lead, and the oil is restored to its original condition. The acetate of zinc should never be employed in paints, because it is a bad drier. Few painters, we suppose, are aware of the foregoing action.

Fixed oils, even those which are bleached, when exposed to the air become rancid, yellow, and acquire an acid reaction. They absorb oxygen from several pigments, but this, in a great measure, is prevented by the use of wax or a little resin, such as gum shellac. Many persons mix shellac varnish with common paint in order to render the latter less expensive, because a considerable quantity of water can be added to the varnish and combined with the paint owing to the alkaline agent employed to dissolve the gum. Thus, if we take three ounces of the bi-carbonate of soda, and place it in three pints of soft water, it will dissolve a pound of gum shellac by boiling, thus making a lac varnish. To this is usually added half a pint of alcohol and two quarts of soft water, and it is then mixed with common oil paint. For inside work in houses it will answer well, but it should never be applied to the outside of buildings, because it cannot resist atmospheric influences like paint which contains only boiled oil and a pigment. Gum shellac varnish made with the carbonate of soda does not stand the action of rain so well as shellac varnish for which alcohol has been employed as a solvent. It should, therefore, never be used for any work exposed to water or the weather.

San Francisco Mechanics' Institute.

The second Industrial Exhibition of the above Institute will be held on the first of September next, and will continue open for fifteen days. The State Horticultural Society will also hold its second annual exhibition in conjunction with the Institute, and thus the California mechanic and agriculturist—twin brothers in the useful arts—will stand, as they always should, on the same platform.

The San Francisco Mechanics' Institute is a spirited and flourishing association, and we think it will do a great and noble work for California, as the prosperity of any State depends chiefly on the character and number of its mechanics. They fabricate the engines, machines, and implements by which agriculture, commerce, and all the useful arts are conducted and carried on.

——"By hammer and hand
All trades do stand."

Prosperity always attends a nation in which the mechanic arts flourish. Wherever the mechanics are in a low condition, the mass of the people sink to the same level; a general poverty, at least, is always the consequence. Turn our eyes to whatever quarter of the world we may, and these assertions will be fully borne out by the condition of the various peoples inhabiting our globe. Those, therefore, who are engaged in the mechanics' institutes and other kindred societies, are doing a noble work for their country and fellow men in their endeavors to raise the dignity of their callings, and to render the mechanic arts respectable and flourishing.

At the exhibition of the above institution held last year, the secretary, Mr. H. F. Williams, delivered an able address, from which we glean some instructive statistics in reference to the progress of California, a few of which we shall present :—

In 1850, the entire area of land under cultivation in California was only 5,000 acres; in 1856 it had increased to 500,000; 17,000 bushels of wheat were raised in 1850—in 1856, 4,000,000. In the latter year 2,000,000 gallons of native wines were made, and other agricultural products were raised in equal proportions. California is fast becoming a great agricultural State, and now exports wheat.

In 1850, there were only 25 mills in the Golden State; in 1856 there were 500, exclusive of the quartz mills. There are now over 130 grist and 370 saw mills. The flour mills can turn out 2,000,000 barrels annually, and the saw mills 500,000,000 feet of lumber in the same time. Both flour and lumber were exported last year to the value of $1,000,000. There are 14 foundries, and a large number of machine shops in San Francisco in successful operation; and engines, boilers, quartz machines, and almost all other kinds of machinery are now manufactured extensively. A considerable quantity of furniture is also made from the native woods, some of which are very beautiful, and eminently adapted for cabinet work. A sugar refinery and soap factory have been erected; but although $4,000,000 worth of hides are annually exported from thence, no tannery has yet been put in operation; and yet $20,000,000 are yearly paid for imported boots and shoes.

The early history of California is filled with scenes of debauchery and crime. The majority of the early adventurers went there solely to make money in any way, not to make that land their home. Some of the noble spirits who then went out, and who, in the exhibition of high moral principles, refused to gamble and carouse, and were scouted and sneered at, are now all the more highly honored because of their moral steadfastness amid so many temptations. Of late years, a very respectable class of yeomen and mechanics' families have gone thither, to make it their future abode. The valleys of the golden land are now beginning to smile with peace and plenty; the church and the school-house —those necessary adjuncts of morality and civilization—are to be seen in every village. California is, perhaps, yet destined to be the greatest State of the Republic.

The Great Astronomical Experiment.

A few years ago, some members of the Royal Institution of Great Britain, after regretting the limited sphere of man's vision, and only feeling, from the telescope's revelations, an intense desire to know more of the universe, and a wish to dive deeper into the realms of space, suggested that could a telescope be placed at a great elevation, say 10,000 feet above the level of the sea, the observer would be able to scan a greater distance than had ever been seen before. In accordance with this suggestion, Professor C. Piazzi Smyth, Astronomer Royal for Scotland, amply provided with instruments, went to the Peak of Teneriffe, and the history of his observations he has just made known. R. Stephenson, Esq., kindly lent the Professor his yacht *Titania*; and under the auspices of the Lords of the Admiralty, and with the advice of Mr. Airy, and the good wishes of all, the little expedition left Cowes, June 22, 1856, and arrived at Teneriffe July 8th. Professor Smyth was accompanied by his wife, and a better assistant no astronomer ever had. They bivouacked on the top of Mount Guajara, 8,900 feet high, where the air was always calm, the temperature averaging 65°, far above all clouds, and under a sky gloriously resplendent with stars.

"A great plain of vapor," we use the Professor's own words, "floated in mid-air, at a hight of 4,000 feet, and separated many things from our vision. Beneath were a moist atmosphere, fruits, and gardens, and the abodes of man; above, an air inconceivably dry, in which the bare bones of the great mountain lay, oxydizing in all the variety of brilliant colors in the light of the sun by day and stars innumerable at night."

The air was so clear that a star which only appeared of the 10th magnitude on the sea level, was one of the 14th from that height of observation.

One thing has been clearly proved by this gentleman's observations, namely, that the most accurate observations can be made at a great hight, and that the penetrative power of the telescope is increased in the higher and dryer regions of the atmosphere. Sir Isaac Newton prophesied this fact, but it remained for the astronomers of the present day to test and prove the truth of the hypothesis, and as a result, we have no doubt but that an observatory will be established on Teneriffe by some people or nation. We should like such a place to be cosmopolitan—open to the astronomers of the world; for the stars shine alike on all men, and know no distinctions of flags or nationalities. They teach their lessons to all who will learn, and fill the immensity of space through which all nations roll.

How to Run a Boundary.

In the Senate at Washington, on the 18th ult., some discussion took place upon this subject, and an amendment was proposed, which provided that no persons but those who were actually necessary to the taking and registering of measurements, &c., should accompany the expedition. Mr. Houston, in a humorous speech, expressed his sentiments upon the subject of scientific men accompanying such expeditions. He said: "The catching of a single bug of rare quality immortalizes a scientific gentleman, and a lizard or a horned frog confers double immortality"—from which he deduced that these gentlemen have their own aggrandizement more at heart than the purposes of the expedition. This may be very true; but when a new country is explored, it is necessary that astronomers should visit it, that the world may be informed of the astral peculiarities; its geology and natural history should be described; and more than all, its physical geography is important. To discover these facts, and to arrange them intelligently, scientific men must visit the place; and it is a very false economy on the part of any government not to give them all the aid they require. In many climates insects eat up a crop before its maturity, and so cause a famine; and if by a scientific man this insect can be discovered and killed, "the catching of a single bug" may not only immortalize the catcher, but also benefit a whole community. We say, support scientific explorations, for there are people in the world who see more than pictures in the books published by Uncle Sam, and who regard them with more interest than giving them to amuse children.

Ericsson on the Atlantic Cable Machinery.

Capt. Ericsson has addressed a letter to the Editor of the New York Daily *Times*, on the above subject, and it has attracted some public attention. He labors under misinformation regarding the machinery which has been adopted for paying out the cable. He asserts that it does not embrace devices or arrangements to prevent jerks and strains upon the cable while the vessel rises and sinks in a heavy sea. Were this the case the machinery would be defective indeed.

He proposes an arrangement to meet the difficulty mentioned, by passing the cable over a traveling sheave, which is to run back and forth, to pay out the increased slack of cable required, when the stern of the vessel rises, and vice versa. The Atlantic telegraph company have adopted this very feature in their machinery for paying out the cable, but it is not the invention of their engineers. It was patented by H. Berdan of this city, as stated by us on page 293, and his model with such an arrangement was exhibited in our office, as far back as November, 1857, and in the Merchants' Exchange, this city, in February last, in which month it was sent to England.

It was not, until a considerable period subsequent to the exhibition of this model, that we heard of any other person proposing such a necessary compensating arrangement for paying out the Atlantic cable. The only mechanical difference between the arrangement proposed by Capt. Ericsson, and that embraced in Mr. Berdan's model, is that the latter has a traveling carriage, instead of a single traveling sheave, and he employs a tension weight, instead of steam, or compressed air, which Capt. Ericsson proposes for the same purpose, but the principle of the invention is the same. The machinery to be employed by the Telegraph company, is Berdan's turned upside down, which embraces about as much difference in principle, as making the hammer of a gun strike upwards, instead of downwards, and which the infringer of Forsyth's patent, had the audacity to represent before a Court, as a different invention from the percussion lock, because the latter was represented in the patent with its hammer downward. "Honor to whom honor is due."

Just as we were going to press we received a letter from Capt. Ericsson, in which he states that a friend had directed his attention to an article on page 293 of the present volume of the SCIENTIFIC AMERICAN, subsequent to the publication of his letter above referred to. Of course, had he seen our article, he would not have written the letter to the *Times*.

Death of a Spanish Savant.

M. Adrien Paillette, who has been for many years civil engineer to the Queen of Spain, died recently at the age of forty-nine. He was a first-rate metallurgist, and has constructed some immense works calculated to develop the mineral resources of the country. Numbers of decorations were conferred upon him by the Courts of Europe for his acquirements and learning.