

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEAOK.

TERMS—Three Dollars per annum—One Dollar in advance, for four months. Single copies of the paper are on sale at the office of publication, and all periodical stores in the United States and Canada. Sampson Low, Son & Co., the American Bookellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

See Prospectus on last page. No traveling agents employed.

VOL. IX, NO. 21... [NEW SERIES]... Nineteenth Year

NEW YORK, SATURDAY, NOVEMBER 21, 1863.

OPENING OF A NEW CAMPAIGN.

It appears quite evident to all who observe the signs of the times that Generals Grant and Meade are about to open a new campaign, which we trust will inaugurate glorious results. Not exactly following in the wake of these military chieftains, the Publishers of the SCIENTIFIC AMERICAN propose to begin, on the first of January next, a new and brilliant campaign in the fields of popular science, and they hope to give renewed assurance that this journal is fully up to the stirring events of the day. After a flattering success of eighteen years, the SCIENTIFIC AMERICAN will commence a new volume at the time mentioned, being the "Tenth" of the "New Series." The Publishers earnestly appeal to their friends and patrons, far and wide, to reinforce their subscription list by the formation of clubs.

They feel warranted in saying that no better expenditure of money can possibly be made than for a year's subscription to this journal, which is the only one of its class now published in the United States. The Publishers promise untiring devotion to the interests of their patrons. No department of the journal will be allowed to fall behind preceding years; while it will still be their aim to excel in every respect.

Friends and Patrons, we ask with confidence a continuation of your former patronage, and also your influence in promoting a wider circulation of this journal than it has hitherto enjoyed.

Our New Prospectus will appear next week.

PREVENTION OF DANGER FROM PETROLEUM.

Within the compass of history no trade has sprung into such magnitude in such a limited period as the petroleum business. From an export of five million gallons last year, it has advanced to more than twenty millions this year, and the home and foreign consumption combined will exceed forty million gallons. The rise of this immense trade seems almost like the creation of a mighty magician, rather than the consecutive efforts of men. Much useful information has already been presented in our columns respecting petroleum; but new facts relating to it are being continually developed which demand attention as they arise. For example, in the unrefined article there are several distinct products, which vaporize at different degrees of temperature. Now in carrying petroleum from one place to another, or when it is lying in stores or sheds, some of the liquid is liable to be exposed to such a temperature as will convert it into vapor, in which state it will escape through very minute openings or pores in the vessel containing it. A loss of the liquid is not only thus caused, but this vapor when it escapes and mingles with about eight times its volume of air, becomes as explosive as gunpowder, and if the light of a match or lamp is then brought into contact with it, a violent explosion will take place. Several sloops loaded with petroleum have been subjected to explo-

sions by the escape of petroleum vapor from the barrels in their holds, and an accident of a similar kind recently took place in the rear store of a large druggist's establishment in Albany, N. Y. Cases like these call for preventive agencies; such as vessels that will not leak, and special places for storage. As a measure of safety, neither ignited match, lamp, nor light of any kind should ever be used in the vicinity of a large vessel containing petroleum, and it should be stored in a building or apartment exclusively devoted to hold it; not in cellars or storehouses, as a promiscuous article. As to vessels for carrying it, the cars on railways, the sloops on rivers and steamers on the sea, should be built of iron and rendered as tight as possible. An English iron steamer, constructed expressly for carrying petroleum from the United States to Liverpool, has been very successful, and others may be built upon the same principle. Another important agent of safety is the use of small tight vessels containing it, such as barrels. Perhaps these are of most consequence, for if it be possible to make perfectly tight barrels, the use of these will secure immunity from leakage and the dangers we have set forth. A letter upon another page of the present number of the SCIENTIFIC AMERICAN enters very fully into the defects of common barrels for carrying such an article, and an improved method of constructing them to prevent leakage is pointed out. But it may be asked, why not use iron cylinders instead of wooden barrels for such a purpose? Large quantities of caustic soda are exported to our ports from Europe to be used in refining petroleum, and air-tight cylinders of wrought iron are employed to contain it. Such vessels would perhaps answer a better purpose than casks, but so far as we know they have not been tried. Then, again, there is the system for preventing leakage of petroleum barrels used by Young in Scotland for his coal oil, as described in the SCIENTIFIC AMERICAN of last week. This consists in coating the interior of each barrel with glue, a substance which is not affected and dissolved by the oil, like a varnish of resin. We have not heard that any of our merchants and dealers in petroleum have tried this simple method of preventing leakage in petroleum. It certainly deserves a fair trial.

We have thus briefly alluded to preventive measures and agencies for securing immunity from explosions, conflagrations and loss by the leakage of petroleum in transit and in store; and if the suggestions made and the information given are acted upon and applied good results will be secured. At present the petroleum business is not in a prosperous condition, and there are some signs of the supply failing. In Canada, the oil wells have nearly all given out, and many in Venango county, Pennsylvania, are in the same predicament; but if the petroleum wells should fail there will be a return to coal oil, and the foregoing remarks are also applicable to vessels for containing it.

STEAM ON CITY RAILROADS.

It is announced in one of our cotemporaries that six "dummy" engines are building for a street railway in Philadelphia, and but a short time ago we saw mention made of another enterprising corporation that had determined to adopt steam in lieu of horse power, and thereby save themselves and the public both time and money. It is almost useless to expect anything of our railroad authorities in this respect; notwithstanding all the examples set before them, the arguments in favor of the steam system, and the evidence of common sense, we still have to put up with horse power; and the only dummies in use or in existence on our street railroads seem to be those persons who direct and control the principal interests of them.

The gridiron railway, in spite of the outcry and opposition manifested toward it, is gradually extending its iron arms, and even now grasps by far the greater part of the city streets occupied by vehicles devoted to passenger traffic. We had hoped that the directors of these roads would have seen fit to try at least one of the steam cars (they are not "dummies"), and compare the cost of running it with that of horses in all essential points; thus to satisfy themselves by practical demonstration that steam is better than horse power for the purpose discussed. In this we have been disappointed, and horses rule

the road, to the exclusion of machinery, which is obviously cheaper than any other means of transportation.

It would be considered fatuitous and short-sighted to the last degree for any railroad company to discard all its engines, run a canal alongside the line, and put on a number of boats and horses to "accommodate freight;" yet this the street railways do, in effect, by employing horses to accomplish tasks that properly belong to machinery. Even in the absence of any positive data in black and white as regards the expense of the two systems for carrying passengers by steam or horse power, it is safe to assume that the former is the most preferable in all respects, on the general ground that the introduction of machinery inevitably enhances the profits of any trade or business, provided the same be properly carried on.

There is no occasion, however, to presuppose that railroad men are ignorant of the comparative economy of steam as opposed to horse power, and we must seek for some other motive for their non-adoption of the first. Certainly no unprejudiced person could hesitate to declare in favor of steam; the arguments published from time to time in the SCIENTIFIC AMERICAN, (which have never been refuted in the slightest particular) show conclusively that the advantage is in favor of steam. We can only await the slow dawning of intelligence and enterprise upon the minds and convictions of our railroad men; for the pressure of public opinion and the examples of the directors of street railways in other cities seem thus far to have had very little effect.

LAKE SUPERIOR COPPER WORKINGS.

A large and most interesting pamphlet by Charles Whittlesey, Esq., on Ancient Mining on the shores of Lake Superior, has been published as one of the Smithsonian contributions to knowledge. The author has devoted much attention to this subject, and maps of the country, with engravings of old mines and the relics found in them, are contained in this publication. We here learn that evidences of ancient mining operations were first brought to public notice in the winter of 1847-8. The Jesuit Fathers who first visited that region announced the presence of native copper in large masses; and boulders of copper had been found many years ago scattered among the drift gravel, from Lake Superior to Rocky river, in Ohio; but no ancient workings were known till the period mentioned above. In casting the eye over a map of Lake Superior, a remarkable projection, in the form of an immense horn, is observed jutting out from the south shore and curving eastward. This is Keweenaw Point, which is about eighty miles in length and forty in width. Through the whole of this extent of projection, a belt of metalliferous formation extends; and within this all the copper mining operations—ancient and modern—have been confined. The most remarkable feature of this metalliferous region is the character of its products, which occur, not as an ore of copper, but in masses, veins, and rounded nodules of the metal itself.

The first actual mining operations here were commenced in 1761 by Alexander Henry, but they proved abortive. In 1841, Dr. Douglas Houghton made a report to the Legislature of Michigan, conveying very definite information respecting the existence of native copper in Lake Superior, and shortly after this fresh mining operations were commenced, and speculators flocked in from all quarters. In 1848, Mr. S. O. Knapp, Agent of the Minnesota mine, made the first public announcement respecting the discovery of ancient mines and the relics of an ancient mining population. This created a sensation far and near, and subsequent explorations have led to the discovery of very many ancient pits. Most of the ancient diggings have been found in dense forests, and outwardly consist of irregular shallow hollows, which had been previously noticed without thought of their real character. There are three groups of ancient mines corresponding with the modern mines in this region. In these old pits, hard stone mauls and hammers have been discovered; also copper hammers, spear heads, gads, arrow heads, and knives; and wooden shovels, levers, and a ladder. During the past summer, several of these old mines were discovered in the Ontonagon district, and from one a bag of untanned leather in a perfect state of preservation was taken, and has been considered one of the