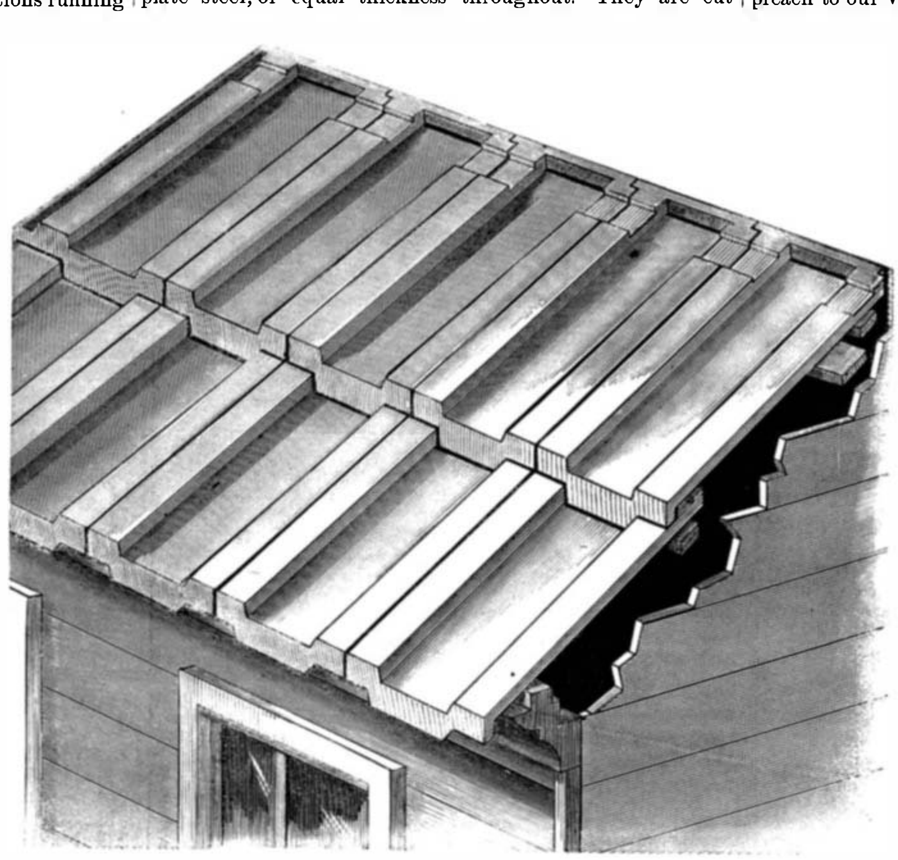
Improved Tile Roofing.

In some districts of this country, as well as in some other countries, wood is scarce and cannot be obtained readily, even for the purposes of roofing. Shingled roofs may be considered essentially American, not being much in use elsewhere. Slate stone is not universally found, and metal roofing corrodes readily in some climates. In such cases recourse must be had either to tiles or some more primitive material.

The annexed engraving shows a method of forming and laying tiles to make a convenient roofing. It is the invention of gentlemen living in Colorado, where wood, slate and metal for roofing purposes are scarce. The tiles are made in sections, so formed that each successive layer is a support to that next preceding. The tiles are made with projections running across the under sides to rest against the eaves or wall plate and against the cross rafters. The upper edges also have projections at the other ends of the tiles to lock into the downward projecting edges before mentioned. The whole is secured in place by a strip which near the ridge-pole fits into proper depressions, and the longitudinal recesses in the center of the tiles form in combination perfect gutters for rain. The arrangement can be easily understood by the engraving. It would seem to be admirably adapted for certain situations. Address Chas. Bamberg or Jos. Weiber, Box 443 Central City, Colorado, for state and county rights.



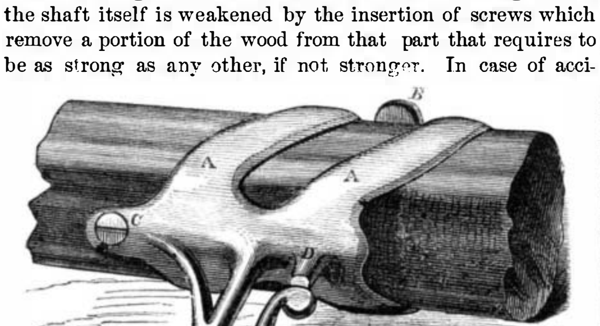
BAMBERG & WEIBER'S TILE ROOFING.

Absorption of Gases by Solids.

Among the interesting observations of Mr. Graham, Master of the British Mint, (to some of which we have lately referred) upon the passage of liquids and gases through solids, is the fact that atmospheric air, by passing through india-rubber, becomes super-oxygenated, and will rekindle smoldering wood like pure oxygen. Any kind of light india-rubber receiver, in which a vacuum may be obtained, the size being sustained by mechanical means, will collect super-oxygenated air; the better if the india-rubber be thin and the temperature high. Mr. Graham makes the suggestion that the solid films pass gases through them by first condensing them to a liquid form within the substance, and then passing them off on the other side by evaporation. Hydrogen passes through redhot platinum, while oxygen and nitrogen do not, or not in appreciable quantities; hence their compounds with hydrogen are readily dialysed by this method. The passage of carbonic acid, chlorine, hydrochloric acid, vapor of water, ammonia, coal gas, and hydro-sulphuric acid, is also inappreciable, while the hydrogen, in compounds containing it, passes. One volume of redhot platinum absorbed 0·207 volume of hydrogen, retained it while cold, and gave it off on reheating. One volume of palladium absorbed 643 volumes of hydrogen, sensibly increasing its weight, and when heated afterward, gave off the most of it in a continuous stream. On the other hand, osmium-iridium does not absorb hydrogen, and copper absorbs it very slightly. Gold absorbs hydrogen and nitrogen slightly. Silver absorbs 0·289 of its volume of hydrogen, and then presents a beautifully frosted appearance. Oxygen is taken up in the proportion of 0·745. Redhot iron and steel pass hydrogen as readily as platinum does.

WILSON'S CLASP HOLD-BACK IRON.

In attaching the common hold-back irons to carriage shafts the shaft itself is weakened by the insertion of screws which remove a portion of the wood from that part that requires to be as strong as any other, if not stronger. In case of accidents by the stumble of the horse, the shaft is frequently broken, even if the animal does not fall upon it. The hold-back here represented is not open to these objections, as instead of weakening the thill it really strengthens it. It is made of malleable iron in one piece, embracing the shaft by two bands, A, which unite on the hook-front plate. On the opposite side the hold-fast is divided in a line with the shaft and the two parts are secured together by a single screw, head seen at B, which gripes the halves firmly around the shaft. By loosening this screw and drawing that at C the hold-fast can be removed to any portion of the shaft desired. The projection, D, on the inside of the hook makes it almost impossible for the breeching to slip out.



The contrivance has a very neat appearance and seems to be calculated for giving additional strength to the shaft. It was patented Nov. 6th, 1866. Information required by those interested, as to rights to make and use, can be obtained from Edward Wilson, Northbridge, Mass.

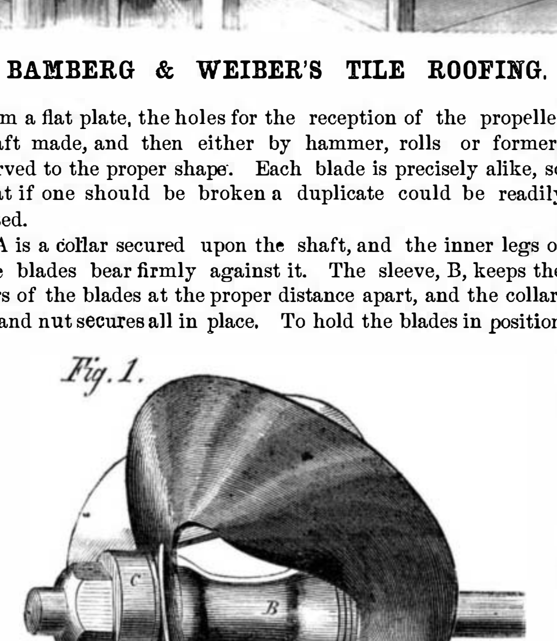
THE MODEL SCHOOLHOUSE.—The Legislature of Massachusetts has decided not to pay for the model schoolhouse which certain gentlemen have been getting up for the Paris Exposition. The point is, that Massachusetts and other American States excel not particularly in school *houses* but in school *laws*. Such a humble specimen of mere architecture, in the Exposition, will astonish the natives only as flies in amber do—how in the name of common sense, did they come to be *there*.

DAVIS'S IMPROVED PROPELLER SCREW.

The inventor claims for the screw represented in the accompanying engravings several advantages over that in common use. As may be seen in the engravings, it is a combination screw, formed in parts and put together, instead of being a single casting. The blades are made of boiler plate, or of plate steel, of equal thickness throughout. They are cut from a flat plate, the holes for the reception of the propeller shaft made, and then either by hammer, rolls or formers curved to the proper shape. Each blade is precisely alike, so that if one should be broken a duplicate could be readily fitted.

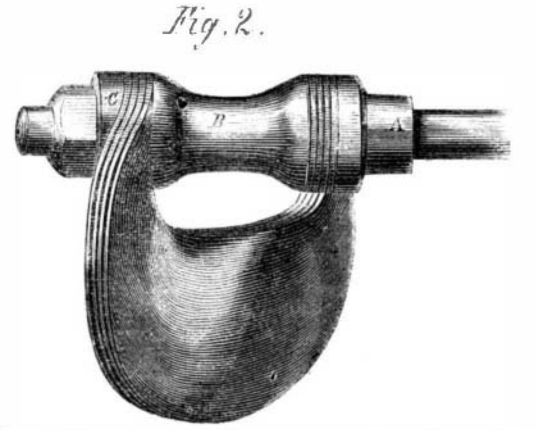
A is a collar secured upon the shaft, and the inner legs of the blades bear firmly against it. The sleeve, B, keeps the legs of the blades at the proper distance apart, and the collar, C, and nut secures all in place. To hold the blades in position

Fig. 1.



against the leverage of the water, bolts may be passed through the collars and blades longitudinally with the shaft, or the blades may be held by a feather on the shaft.

Fig. 2.



Among the advantages claimed for this screw over others is increased strength from the material used, less weight, greater efficiency from the uniform thickness of the blades, facility for repairs and also for transportation as shown in Fig. 2. When a blade is broken from a cast propeller the screw is ruined, and floating ice, timber, or fouling by a rope, are always threatening such an accident. With this screw, however, the breaking of a blade can be at once remedied by removing the remaining portion and replacing it with a duplicate blade. Letters patent for this device were granted through the Scientific American Patent Agency to William E. Davis, Aug. 7th, 1866. Mr. Davis will supply all further information if addressed at Jersey City Locomotive works Jersey City, N. Y.

Steam Plowing.

A steam missionary has been sent over from Englan to preach to our Western farmers. The economy of steam plowing, cultivating and harvesting in the Mississippi valley, is extraordinary, of course. The cost of the apparatus is the grand objection. In England, where $5,000 will buy a plowing equipment, it is found that few farmers feel able to furnish themselves, and still fewer, perhaps, could give enough employment to the capital in this form to render it remunerative. Hence association is resorted to, and a neighborhood of farmers sometimes organize a company for steam cultivation. Under our free laws of association this can be done with facility and advantage. Messrs. John Fowler & Co., of England, have taken the right way to extend their business, by sending out the agent above referred to, with their apparatus, (price $10,000) to exhibit its economy and induce the Western farmers to form associations for owning and operating it. An objection to doing this business by itinerant jobbing, is the cost of so much heavy transportation. The work of the steam plowing apparatus is estimated at an acre per hour, twelve inches deep.

Aerial Ferry.

We are rather surprised that our aëronautical friends have not seized the present favorable juncture for proposing an "air line" from New York to Brooklyn. It would seem that the first practical success in aerial navigation should be on short crossings like these, where some kind of guide or aerial suspension way can be established, along which to propel and steady in its course the unfledged flying ship. A sort of guy rope anchored to a pier in the middle of the channel, reaching to the shore, and there connected to the aerial boat, would guide it over in a parabola; yielding gracefully to any lateral deflection the wind might require in either direction. On approaching the shore, a gradual and easy descent would be secured by running out the guy rope off a drum checked by the tension of a strong spring or brake, thus rendering the centripetal pull sufficiently elastic. An experiment might perhaps be cheaply conducted by using one of the islands up the East River.

PAYMENT OF A PATENTEE.—Senator Van Winkle, from the Committee on Post Offices and Post Roads, reported a bill authorizing the Post Master General to pay $100,000 to the owner or owners of the letters patent granted to Marcus P. Norton, of Troy, N. Y., for invention for marking of letters, etc., and for the cancellation of postage stamps thereon, said sum to be compensation for the past and future use of the patent, and for which the transfer of the same is to be made to the United States.

Our readers will find an illustration of this invention on page 104, Vol. XI., SCIENTIFIC AMERICAN.

RAILWAY DRY DOCK.—Two gentlemen of Portland, Me., have patented apparatus designed for connecting with a dry dock a system of tramways and trucks upon which a ship, after being docked by means of high tide and supplementary water raised by pumps, may be run out into a ship yard adjoining, making room for others to any required extent. Locks and reservoirs are also arranged in such a manner as to store at the required elevation, for further use, the water once raised for the purpose of docking a ship.

GEORGE PEABODY'S GIFT.—A million of dollars in cash, and a million and more of unrepudiated Mississippi bonds which can be fully resuscitated through a shrewd application of the terms of the gift, make up a virtual donation of probably two millions of dollars, given in trust to a number of our most patriotic and liberal public men, for the all-important object of the time—the education of the youth of the Southern States, without any other distinction than that of their needs.

OFFICERS OF THE AMERICAN INSTITUTE.—The election of officers of the American Institute took place on the 14th inst., when the following gentlemen were elected:—President, Horace Greeley; Vice Presidents, Dudley S. Gregory, Orlando B. Potter, William H. Vanderbilt; Recording Secretary, Salem H. Wales; Corresponding Secretary, Samuel D. Tillman; Treasurer, Sylvester R. Comstock.

PATENT EXTENSION.—Senator Willey, Chairman of the Committee on Patents, has made an adverse report on the application of Geo. B. Simpson for the extension of a patent of a telegraph cable insulation by gutta percha. The case was elaborately argued by several prominent lawyers.

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. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.

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VOL. XVI., No. 9....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, MARCH 2, 1867.

Contents:

(Illustrated articles are marked with an asterisk,)

We have a very large number of valuable communications from correspondents who have acted upon our suggestion to write upon practical subjects for our columns. We shall publish them as rapidly as possible. In this connection we wish again to thank our readers for the great interest which they have taken in promoting the circulation of our paper. The subscriptions are still coming in very rapidly and we are now printing 35,000 copies per week.

THE SOUTH AMERICAN MEDITERRANEAN.

Professor Agassiz, in his second lecture (Feb. 11) forgot or deferred the sequel of the interesting geological history of the continent, and devoted the evening to the history of his expedition and the present terraqueous topography of the valley; with both of which our readers are already somewhat acquainted. Certain points, however, struck us with a significance not brought out in former reports, and we shall therefore take occasion to review the ground in a few words.

The valley of the Amazon is no valley to the eye: its bounds are far too distant to be visible at any point in more than one direction if at all, and its slopes are altogether inappreciable by the senses. Even the current of its waters is imperceptible, and sometimes locally reversed; so that it presents to the voyager no other appearance than that of an inland sea with a long, low, distant shore. On either side, the tributaries have a similar appearance: they are themselves so enormous that the eye cannot span their breadth: for example, there are four rivers descending from the Guianas on the north, east of the Rio Negro, hardly noticed on our common maps by name, yet of a wonderful size, one of them being no less than thirty miles wide at the mouth. Not to speak of the "great" affluents, the Xingu presents at its junction with the main river a front of forty miles broad, and the Tocantins, of sixty; and of all of them, it must be remembered that you ascend from the junction from a hundred and fifty to hundreds of miles before any appearance of rising ground, rocks or minerals can be found. The front of the united rivers, with their nearly oceanic depth, at *one* of the final outlets, is 150 miles across, and its yellowish white hue (like coffee and milk) tinges the ocean far out of sight of land.

Nor is the Amazon, when you have imagined its to the eye shoreless breadth, to be conceived as a simple stream or belt of water. It is a water system, prevading the country with unnumbered channels and branches for hundreds of miles in breadth. Independently of the usual obstructions and partings of streams, this system has a structure peculiar to itself, resulting from remarkable causes. The swelling of the waters will amount to from thirty to fifty feet, every rainy season, and the remarkable fact is that this takes place from two opposite quarters, the north and the south, not at the same time, but alternately.

The snows of the Andes melt in August and September, and reach the Amazon by October or November. The rains also begin on the south side in September, and the swelling of the southern tributaries pours into the great bed about the last of November. Both inundations continue with increasing volume until March, when the entire sea rises sometimes at the rate of a foot in twenty-four hours. At the same time, the tributary rivers from the north are at their lowest stage; and bearing in mind the fact that the fall of their channels for a long distance hardly exceeds that of the Amazon, or ten feet in a hundred miles, it is evident that a rise of thirty to fifty feet in the main river must not only send a vast back water up the northern tributaries for hundreds of miles, but must follow the depressions of the ground in every direction, and create a network of innumerable water courses

At the hight of the southern freshet in March, the rains begin on the north. As the southern rivers subside, the northern rivers swell, and come down in full flood about June, to gorge in turn the channels of their southern rivals, and to press the swollen tide up the southern side of its basin in the summer, as it rose upon the northern side in winter. Thus the water system we are describing resembles an ocean not only in extent and evenness of surface, but also in its (semi-annual) tides.

The result is that all the roads in this wonderful country are ready made. They are water roads, or ship canals, on the grandest scale of nature, through which the united navies of the world might steam or sail in company, for 2,000 miles from east to west and 500 miles on each side, or 1,000 miles from north to south; freely penetrating every portion of the country through the profusion of cross courses by which the rivers, swollen on both sides as we have seen, twice a year, have overflowed and run into each other, and in short have divided up the whole land into islands. Taking this into view with the fact that nearly all the principal countries of South America—Brazil, Peru, Bolivia, Ecuador, New Granada, Venezuela—have their main drainage and the best portion of their domain either in this valley or in navigable connection with it; the importance and the justice of the late decree of the Emperor of Brazil, opening the Mediterranean of South America as a free highway for all nations, are seen at once in a conspicuous light. The Amazon by nature belongs to South America and mankind.

The treasures of commerce to be directly drawn from nature here, have already been brought in a general way to the notice of our readers. We may add to the 300 kinds of choice timber, remarkable for their density and beauty of grain, which cover the entire country with dense forest, an endless variety of strong and light textiles, a variety of fruits of the myrtle family, as numerous and as fine as that of the rose family that embraces all the choice kinds of our northern climate, another family akin to the magnolia, embracing also a great variety of luscious fruits, and still another family of which the character was not defined, quantities of indigenous cotton, probably the greatest on the globe, the material of chocolate, caoutchouc, Brazil nuts, etc., in inexhaustible profusion everywhere, and finally the grand staples, drugs and dyes of the richest character and variety. Settlers would have nothing to do but to gather these stores from gorged nature in a perpetual harvest, and commerce, nothing but to load cargoes of treasure almost directly from the ground on which it grows. The aquatic vegetation is so luxuriant that it is never apparent where the land ends and the water begins, and the latter is often concealed completely by a prairie of rank vegetation and gorgeous flowers.

But there are not now 250,000 people in all this new world; and the bad reputation of the climate, which the learned professor stoutly combats—declaring it, from ten months' trial, most delightful and salubrious—is imputed to the unanimous hue and cry of the officials exiled from time to time to those wild though luxuriant solitudes, whose natural discontent has attributed to them every deadly evil that imagination can conceive. Of the temperature and other interesting matters of this lecture, we need not repeat what we have heretofore republished.

THE GLACIAL THEORY AND THE TROPICAL GLACIERS.

Professor Agassiz' third lecture in New York was a careful elucidation of the Glacial Theory, which he enjoys the honor of having developed and established; proving that a period of a much lower mean temperature than at present must have once existed in the now temperate and torrid portions of the globe, when that peculiar "current" known as the glacial structure crept over the whole surface of the continents, and performed an important part in preparing them for the habitation of man.

The first question is, What is the glacier? We have styled it a current, and such it is, as much as any that exists in the liquid form of the same element, governed in part by the same laws, but performing offices for which water is not adapted. Its law is motion under the influence of heat, in the direction of increasing temperature. Its formation is from snow, at such elevation as under existing thermal conditions permits an average temperature as low as 32°; but the comparative warmth of a lower elevation or of a warmer latitude, usually assists. By this means the snow is alternately softened in part to suspended water, and conglomerated by the freezing of the suspended water, until it forms a granulated ice.

Its law of motion is in substance the simple fact that water expands in freezing. When formed on a mountain side at a proper elevation for the required temperature—and equally when formed on a level, at the right latitude—the glacier is constantly expanding by the expansive congelation of suspended water or rains; and finding little resistance at its lower limit (of altitude or latitude as the case may be) but being more powerfully resisted in the direction of greater cold and rigidity, its horizontal expansion of course pushes in the former direction. In other words, it moves onward, by a simple and constant law, in the direction of warmer temperature; and will continue thus moving as far as that temperature is not warm enough to melt and destroy it entirely.

It is evident that the loose angular rocks constantly crumbled off in the path of the glacier must be carried or rolled along under it, and often embraced and frozen into it, in great numbers. Again, the great transparency of ice to heat, permits the sun's rays to pass through to the rocks beneath and within and comparatively to warm them. Thus the rocks rolled along under and those carried within the glacier cooperate in thinning by their comparative warmth the ice that separates them, while the grinding movement of the glacier also tends to break it, and thus the rocks practically attract each other, accumulate, and are passed onward until some obstruction arrests them or some cavity receives them. Not to particularize and explain here the very distinct and characteristic arrangement of these accumulations in the Alps, where the active process may be now observed, it will be evident to the reader that some of their peculiarities must be recognizable wherever the glacial drift has passed along, in the disposition of the fragments and in the effect of their tremendous attrition upon themselves and upon the surface of the underlying rock.

The first suggestion of the glacial theory was due to the discovery from the kind of traces above referred to, that the glaciers of the Alps had once pushed out not less than twenty-five miles from their present habitat and extended their flow across the plain of Switzerland until they abutted upon the Jura. The same traces also gave proof that (as might indeed be presumed) they were then some 5,000 feet thicker than now. The inference was imperative, that a glacial temperature then prevailed at the moderate elevation of the plain of Switzerland, and hence must have prevailed in other parts of the world similarly conditioned. This led to examinations everywhere for traces of the glacial drift, and it needs only to be added that they have everywhere been found abundant. In the British Islands, in all parts of North America, and more lately in South America, near the equator,—here commencing on the Andes and moving across the continent eastward, far into the present domain of the ocean—the polished, scratched and furrowed surface of the rock, its grooves always running north and south, (except where the declivity of mountains had changed the direction) and the "drift" of rugged but tamed and abraded fragments, show the unmistakable action of those "mills fo God" once built to grind the face of the earth smooth and pulverize materials for the plastic hand of Nature—now dissolved long since by the breath that built them, having served their end.

LETTER TO MECHANICS AND INVENTORS.

We notice in one of our Michigan exchanges that a stock association is about organizing in Detroit with a capital of $20,000, which is to be employed in defraying expenses of getting up models, obtaining patents, and for establishing agencies for the sale of patents throughout the country. The par value of the stock is fixed at $25, and persons becoming members are required to pay one dollar initiation fee, and a further fee of fifty cents per month, making a total tax of seven dollars which entitles him to a share of stock.

We presume that the parties to this organization are all respectable gentlemen, but it is evident that they are engaged in a business which they do not understand. Efforts have been repeatedly made in this country to organize similar associations and every time the attempt has been made it has failed. Protective or joint stock societies of this kind have also frequently started up in England and though backed by big names, failure has always been the result.

Inventors very naturally and very properly distrust an association that undertakes the double business of procuring and selling patents. The two operations cannot be successfully conducted jointly without causing suspicion. Some inventions will inevitably receive much more attention than others, and it is wholly impracticable to keep a stock of patents on hand for sale like merchandise. The very idea will suggest an absurdity to any practical mind. If the association should chance to get hold of one good invention which promised success they would be quite likely to employ their whole force of salesmen to push it forward in every direction, and thus less important and less easily-managed inventions would have to be suspended.

A member paying seven dollars for his certificate may never have occasion to employ the services of the association. But suppose he does seek their services, what pecuniary advantage does he gain? Nothing more than the facilities possessed by the association and for which of course he must pay extra charges.

We do not object to this scheme as a speculative enterprise, but we do not perceive that it possesses the merit of novelty or is likely to afford any advantage to either mechanic or inventor.

WHEN AND WHERE DOES THE DAY BEGIN?

As we travel eastward the day begins earlier: near the equator starlight appears an hour earlier for each thousand miles going east. When it is sunrise in New York, the people of Europe have had sunlight for many huors, and the Californians are still in their beds dreaming. Evidently the day has a first begining, and at the eastward. But how far and where? What are the people who first see the light of Monday morning?

It is the sun which brings the day; where does he first bring Monday? If we could travel with him we might find out. Let us suppose the case. We will take an early start: at sunrise on Sunday morning, with the sun just at the point of peeping over the horizon behind us, we travel westward. As we go, the people give us a Sunday greeting; we bring Sunday with us to Pittsburgh, St. Louis, Salt Lake, San Francisco. At San Francisco, our faithful chronometer informs us that we have been on the tramp about five hours. But we started on Sunday morning and it is Sunday morning still We go on, still on Sunday morning. Will this Sunday morning ever end? The quiet Pacific knows very little of Sunday or any other day, and our question scarcely receives an echo for reply. When we get to Yokohama in Japan, or Shanghai in China, we search for some Yankee, wide awake in the early morning, and we are told for the first time that Monday