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Contents:

(Illustrated articles are marked with an asterisk.)

THE NEW COMMISSIONER OF PATENTS.

We are not surprised to learn that President Grant has appointed Samuel S. Fisher, Esq., of Cincinnati, to succeed Judge Foote as Commissioner of Patents.

The *Sun*, which "shines for all," referring to this appointment, says "it was made by the President on grounds of personal friendship," wherein the *Sun* is entirely mistaken.

Mr. Fisher was selected by Secretary Cox on the ground of peculiar fitness for the position; and we happen to know that he hesitated to yield a valuable and extensive law practice to assume charge of an office which could give him but $4,500 a year. Before entering upon his duties as Commissioner of Patents, Mr. Fisher will surrender his practice, and thus remove an objection which has been raised against his appointment. As a man of honor, he would not presume to occupy a position where his judgment could not operate entirely free from considerations of personal interest.

Mr. Fisher is well known in Ohio and in the United States Courts as an able, industrious lawyer, and especially skillful in patent law causes. But our inventors, whose interests are to be so largely in his hands, will naturally be anxious to learn something more respecting his character and fitness for the position.

Mr. Fisher is comparatively a young man, being but 37 years of age. He is a native of Michigan; studied law at Philadelphia, and afterward removed to Cincinnati, where, for fifteen years, he practiced his profession with that success which always follows ability, industry, and sterling integrity.

During the war, and when one-hundred-day regiments were called out, Mr. Fisher served as Colonel of the 138th Ohio, operating in front of Petersburg, Va. He now holds the responsible position of President of the Board of Education, of Cincinnati, and is highly esteemed in that city as a Christian citizen and an efficient co-worker in all public enterprises and reforms. Mr. Fisher was appointed entirely without solicitation on his own part. He is not indebted to any outside influence for the honor conferred upon him, and enters upon his duties entirely independent of political or patent cliques. From our knowledge of the character and antecedents of the new incumbent, we do not hesitate to say, that inventors may rely upon him as a true friend; and, furthermore, that the duties of the Commissionership will be administered by himself, and without the intrusive assistance of certain parties who seem to act as though the Patent Office was under their special guardianship, and the Commissioner a mere appendage to a lobby, which has cast a shadow over the good character of that Office. Commissioner Fisher is a hard worker, and, if the business of the Patent Office flags—if there are any drones in this hive of industry—he will be apt to inquire the reason why.

We commend this appointment as one of the very best that could have been made. It assures us that the administration of the Patent Office is about to return to what it was when Mason and Holt were Commissioners.

SCIENTIFIC AND MECHANICAL ASSOCIATIONS.

The utility of well organized and well managed associations for the advancement of science and the arts is unquestionable. There are many such societies, both in this country and in Europe, which are doing incalculable good. They are models of their kind.

We believe, however, that there is room for the organization of many more associations, connected more particularly with the mechanic arts, whose influence would be almost as great and beneficial as those of a higher scientific character. Our idea of such associations is to disconnect them entirely from all consideration of the regulation of wages, hours of labor, and other questions properly confined to the trades unions; their purpose and scope being solely to elevate the standard of skill and knowledge among mechanics everywhere, and to unite them by the strong tie of just and honorable emulation.

To this end, although such societies might be to a large extent local, they should be connected so as to form one large body, comprising the mechanical genius and skill of the entire country, and recording the valuable results of general observation and experience.

We scarcely ever converse with a practical mechanic without ascertaining some fact of general interest occurring in his experience. So far as such facts are available our readers get the benefit of them, but there are large numbers of mechanics throughout the country, who are in a position to make equally useful observations, but whose knowledge, for want of proper organization, is confined to only a few of their immediate neighbors and acquaintances, while they would greatly benefit the mass of mechanics by being promptly and universally diffused. The columns devoted to correspondence in our paper, are intended to supply this need in some measure among our readers, who may be said to be members of the Scientific American Association for the Advancement of Arts and Science, but we are certain that much that is valuable fails to reach the public through our columns, from considerations of modesty, and the want of a general interest which such associations as we allude to would excite.

Many a hard-handed and hard-headed mechanic could and would impart information of general value, if he could wield the pen as deftly as he wields the implements of his trade. The diffidence he feels in appearing before the public as a writer, would not be felt in addressing an association of his fellow craftsmen, who would certainly be competent to judge whether his ideas were worthy of permanent record in their transactions. Printed copies of such transactions sent to one general central association, of which the smaller local societies should be the members, and in which they should be represented as delegates, would form the basis of a general record, the value of which could not be estimated.

Such a general annual report would be of as much practical utility to operative mechanics, as the transactions of learned associations are now to theoretical mechanics.

There seems no serious obstacle to the formation and successful operation of such associations, and their elevating effect upon their members would be immediate and salutary.

We have, in previous articles, discussed the subject of ways and means by which such organizations can supply themselves with books, lectures, and other means of individual improvement, and nothing would give us greater pleasure than to see those suggestions carried into general effect. The time is coming in the history of the world when men are to be estimated by what they can do. In that time the mechanic will find that his social position will depend not only upon his manual skill but his mental acquirements; but these will not be restricted by conventional limits. He may do or know what his natural genius best fits him for. Excellence will be the standard by which men will be estimated. Everything points to a new and better order of things in the future. It rests with mechanics themselves, whether, so far as they are concerned, the advent of the new era shall be hastened or retarded.

THE NEW EXAMINER-IN-CHIEF.

The President has appointed Rufus L. B. Clarke, Esq., of Mt. Pleasant, Iowa, to the position of Examiner-in-Chief of the Patent Office, to fill the vacancy existing in that Board. Mr. Clarke is a brother of "Grace Greenwood," and is a lawyer by profession, having been admitted to the bar by the Supreme Court of this State in 1845, and practiced his profession at Rochester, N. Y., until the fall of 1845 when he emigrated to Iowa. During his residence in Rochester he was one of the editors and proprietors of the *Evening Gazette*. At Mt. Pleasant, Iowa, Mr. Clarke, in company with George Doolittle, opened a law office and soon acquired a large practice; being offered the honorable position of law clerk in the Comptroller's office, at Washington, he removed to that city, where he has since remained in charge of special cases and questions arising in the settlement of war claims. He is said to be a gentleman of ability.

THE POSTAL TELEGRAPH BILL.

Since the assurance was first fully felt that the electric telegraph was, in fact, a means whereby messages could be cheaply, safely, and regularly transmitted with the speed of lightning itself to all parts of the civilized world, its ultimate use as an adjunct to the postal departments of this and other countries has been confidently predicted by far-sighted men.

The carrying of mails, as well as the coining of money, is a matter which all modern governments have kept under their own control. They are exceptions to the general order of business, wherein individual enterprise is allowed full scope. There are various and valid reasons why any commonwealth should retain the monopoly of these affairs, which we need not here discuss. The wisdom of such a policy has long been acknowledged by statesmen and political economists.

The analogies existing between the method of transmitting matter by the mail service, and the telegraphic system, are also obvious, and the influence is almost unavoidable, that if it be a wise policy for the governments to monopolize the one it would be wise for them to monopolize the other.

A bill for the establishment of a postal telegraph was introduced in the last Congress, and another is now under consideration, having been read twice and referred to the proper committee. While we are strongly in favor of the establishment of postal telegraphs connecting the principal cities in the United States, we are not altogether pleased with the bill under consideration.

This bill provides for the incorporation of a company to be called the "United States Postal Telegraph Company," with a capital of $400,000. This company is to build lines to connect within six months the cities of Washington and New York, Boston and Chicago, and within two years to connect St. Louis with New Orleans. It is further proposed to establish telegraphic communication with every city of five thousand inhabitants and upwards within three years from the completion of the contract.

The offices are to be located in every city at the postoffice, and also at the railroad stations. Messages are to be received at all the general and sub-offices and street letter-boxes. These messages are to be prepaid by stamps. Messages are to be delivered free, as letters are now delivered, within certain limits, and to be transmitted by mail from telegraph stations to towns too small to have a station of their own. The bill also provides for the sending of postal money orders by telegraph. The tariff is to be one cent per word for distances not exceeding five hundred miles, the smallest message to be twenty words, or if less than that number, to be paid for as twenty words.

While the increased facilities offered by this plan are very great, we are not disposed to view with favor the organization of a company to carry it out. The plan, if worthy of adoption at all, is worthy of being put in operation by the Government itself. Such a scheme might be initiated perhaps with the capital named ($400,000) but it could never be carried out without additional capital.

If Congress should see fit to sanction this scheme, it should not be done without the strongest guarantees that the spirit of the contract will be carried out, and should look to it, that, in granting such a franchise, it does not impose upon the country at large a system that places the public at the mercy of scheming capitalists.

THE TRANSITS OF VENUS IN 1874 AND 1882.

Doubtless many of our readers may think it prematurc to say anything about an event six years before it will transpire, but there are good reasons in this case for such an apparently ill-timed proceeding. The transits of Venus to take place in 1874 and 1882 are justly looked forward to by astronomers as the greatest astronomical events of the century in which they will occur. Why they are so considered, and the necessity for anticipating them by extensive preparations, it is the object of this article to show.

The phenomena called transits occur only with the inferior planets, that is, those whose paths of revolution around the sun lie wholly within that of the earth. A transit is nothing less than an eclipse of the sun by an inferior planet, that is, the passage of either Venus or Mercury directly between the earth and the sun, so that their disks partially obscure its face, and appear as round, dark spots upon it. Conventional usage has limited the term eclipse of the sun to the obscuration of its disk by the moon, and transit to the same effect produced by the passage of Venus and Mercury between the earth and the sun, although there is no essential difference in the nature of the phenomena.

The transits of Venus occur very seldom. The first one, we believe, of which there is any record, was observed in 1639, by the gifted young astronomer, Horrox, whose brilliant career was so suddenly terminated by death at an age when few have even begun to achieve immortality. The celebrated Dr. Halley communicated a paper to the Royal Society in 1691, with a view of calling attention to a proposed method for determining the parallax of the sun, and thereby its real distance from the earth. Since his time only two transits of Venus have occurred—viz., in 1761 and 1769. Dr. Halley expressed in his paper the belief that, in the way proposed, the sun's distance from the earth would be determined with great accuracy. The feasibility of the method at once attracted the attention of astronomers, and, upon the occurrence of the transits in 1761 and 1769, the sun's distance was computed to be 95,173,000 English miles.

The parallax of heavenly bodies is the difference in their apparent relative position, when viewed from different stations. It is usually expressed in degrees, minutes, and seconds, of angular measurement. This may be illustrated by the following simple method. Take a station at any point where a tree, or lamp-post, or stake can be brought into range with a corner of a house or any other fixed object, representing the sun. The intervening object may be considered to represent the planet Venus, and the station at which the two observed objects are in line, may represent a portion of the earth's surface. If, now, the observer take a station to the right or left of the first station, the objects will no longer appear superimposed, but separated to a distance, depending upon the distance between the two stations, the distance of the stations from the remotest object, and the distance of the stations from the intervening object. The angular difference between the apparent positions of the bodies observed, and the distance between the stations, are sufficient data for determining all the other distances, provided the angle formed by a line joining the two stations, and a line joining either station with the intervening object is also known. The problem is then reduced to the finding of one side of a triangle, another side

and two angles being given, a very simple operation in plane trigonometry. In astronomical observation there are always some determinate errors, arising from refraction and other causes, which may, however, be readily corrected, and do not affect the general principle of the method as above illustrated.

In calculating the distance of the sun from the earth, the stations, from which the observations are made, can be so placed that the semidiameter of the earth becomes one side of a triangle. The parallax of the sun was thus calculated from the transits of 1761 and 1769, and found to be 8·65 seconds angular measurement, and the distance of the sun was hence determined to be 95,173,000 English miles, as given above. Subsequent calculation by Encke made the parallax to be 8·5776 seconds.

It will be seen that the correctness of these results depends upon the accuracy of the observations upon which the mathematical calculations were based. That these were not accurate, seems probable from the fact that there is every reason to believe, from the sun's parallax, as more recently determined, that the distance as originally computed is wrong by at least 4,000,000 miles.

Many hypotheses have been made as to the origin of such a grave mistake—some attributing the error to confounding a part of the planet with its penumbra, and others to mistakes in the computation, but these are of little importance. The time is approaching when the problem can be reworked, and, with the improved apparatus now possessed by astronomers, and the wonderful advances made in methods of observation, it may well be hoped that this time a reliable result will be obtained. The *Standard* (London) says of the extensive preparations now initiating for the observation of the coming transits, that "the Astronomer Royal is doing good service in preparing betimes for the great event. Though it may seem a long time to look forward to, to those who are unacquainted with the amount of preparation required for such observations, those who know the difficulty of procuring a large number of first-rate instruments, unless plenty of time is allowed, will know that there is really no time to be lost, especially if, as we should hope would be the case, all the expeditions sent out are provided with precisely similar instruments and apparatus. It is imperative upon the government to put no obstacle in the way of carrying out these observations in the most perfect manner. England must not be behind the Continent, at any rate. If any amount of failure takes place, it will not be from want of preparation on Mr. Airy's part. At the late meeting of the Royal Astronomical Society he showed that there was nothing indefinite about his ideas; he had already prepared careful maps both for observing the ingress and egress of the planet. He showed the importance of sending expeditions to several places, because, among other considerations, a thousand obstacles might interfere with the observations in any particular place. There are places which, if weather, etc., are favorable, will be admirable for all purposes, but, as in the case of Kerguelin Island, the chances are very much against a clear atmosphere. Captain Toynbee said that this island is seldom to be found on account of the fog. If practicable, no expedition will be of the importance of one sent to the South Pole, that is, as near to it as possible. At the South Pole the effect of parallax will be the greatest—that is to say, the position of Venus will vary to the greatest extent on the sun's disk. The Astronomer Royal in his maps suggests two points, one in Enderby's Land, but here the sun would be too low for it to be a certainly advantageous position—he greatly preferred a point in the Antarctic Continent, where Sir James Ross landed. As a place for observation nothing could be better. The only point is, Will the severity of the climate admit of the expedition? Captain Richards, the hydrographer to the Admiralty, spoke well upon it. He showed that if properly fitted out and provided with good huts, clothing, and food, there would be no further objection to the place than must stand in the way of any Arctic expedition. Those, however, who joined in it would have to make up their minds to one thing, namely, that they would have to spend a year upon the spot; for that it was unapproachable at anything near the time when the transit will take place. To show, however, that he did not consider this in any way fatal to the position as a station for observation, he said that he should much like to be one of the party himself. In this he was fully borne out by Captain Davis, who landed there with Sir James Ross. So that we may hope that this, at least, will be one station, and that the government will not postpone till too late the preparations to make it as favorable for the comfort of the spirited observers who will join in the expedition as for the objects of the enterprise. It may possibly be advisable to send out an exploring party previously, though Captain Davis did not seem to think that it would be necessary. The first great difficulty in all places will be to get the absolute longitude. No ordinary nautical longitude will be of the slightest value. Observations necessary can be made at many places easily accessible, as far as England is concerned, as at Alexandria, where the telegraph will be of great use; at many places, too, in the United States, where we can safely leave the work to Americans. We may especially do the same in the case of the Russians, where the exact longitude of Orsk, the extremity of the great arc of longitude extending from that place to Valencia, is known to a millionth part of a second, or in other words, to absolute certainty. The other places which are recommended to the English government are—Mauritius for one reason, and Madagascar for another. If, however, it should be thought unnecessary to fix both of these spots, then an intermediate station—viz., on the Island of Bourbon, would be preferable. If the Astronomer Royal can show that the two stations would be of considerable advantage, we hope that no financial reasons will prevent his wishes being carried out. Above all things we would urge upon the authorities the importance of making up their minds as to the instruments to be used, and in losing no time in having them put in hand. There is one more point worth noticing. How far photography can be depended on as to accuracy in helping to discover the sun's distance is not easy to answer off-hand; but certainly it is not to be doubted that much useful and interesting information may be secured by its means; and it is highly desirable that at none of the stations its use should be neglected. This part of the question is not, however, of the same pressing importance as the fixing of the stations suitable for observing the ingress and egress of the planet, and of the preparation in good time of the instruments and apparatus required."

Our readers will now be prepared to appreciate the importance of this subject, and to understand why its discussion is likely to occupy, to a large extent, the attention of the scientific press for a considerable time to come.

GALVANIZED IRON WATER PIPES.

In the opinion of some, the use of galvanized iron for water pipes, conveying water for drinking and culinary purposes, is injurious. Others take opposite ground in regard to this matter, and express themselves strongly in favor of such pipes. Our opinion upon the question has been asked by parties interested.

The use of zinc as a coating for the surface of iron pipes is not merely mechanical. Being more readily oxidizable than iron it produces an electric state in the latter metal which protects parts not covered perfectly as well as other portions of the pipe. The oxide which forms upon zinc is insoluble in pure water. Acids dissolve it readily, and when hydrated, as is the case in water pipes, solutions of the caustic fixed alkalies and solutions of ammonia will dissolve it.

Whether the oxide which forms upon the surface of galvanized iron pipes will be dissolved, depends therefore entirely on the character of the water, flowing through them. Rain water contains more or less ammonia when first precipitated. The oxide upon a galvanized iron roof would of course be dissolved to a certain extent, during a rain storm, a fact that has been noticed in connection not only with this material but with roofs of sheet zinc.

It is probably rare that water does not contain traces of free ammonia, or salts, the acid of which has a greater affinity for the oxide of zinc than the base with which it is combined. In such cases we should expect to detect traces of the zinc in water which has remained for any length of time in the pipes.

There are waters, doubtless, which could be passed through such pipes without the slightest danger of becoming charged with the poisonous oxide, and before their adoption an examination and analysis of the water should be made.

But while we have no doubt that in many cases, it would not be proper to employ galvanized iron pipes, we do not think that in a large majority of cases, the possible evils which attend their use, would be likely to prove serious. A great deal of exaggeration is to be expected upon the part of those who deal in pipes of other materials, and whose interest it is, to excite the fears of the public in regard to any wares that damage their particular trade. People are too apt to become excited by newspaper statements upon such subjects as these, and alarm themselves needlessly. If the fact exists that water flowing through galvanized iron pipes is impregnated with zinc, a simple chemical test by a competent person will readily determine it.

All metallic pipes in use are open to some objections. A great deal has been said upon the danger of using lead pipes, but the injury that has resulted from their use has undoubtedly been over-estimated. Lead poisoning is by far more subtle than zinc poisoning, and as its effects may follow without premonitory symptoms of sufficient extent to excite suspicion, we think them fully as dangerous as galvanized iron pipes under most circumstances.

A material for water pipes, cheap, durable, and capable of resisting the chemical action of all waters fit for household use is a long sought for desideratum. Until it is found we must do the best we can with such materials as we possess. Glass has been proposed and used to a considerable extent, but there are practical difficulties, which will probably prevent its ever being generally adopted.

The matter may be summed up by saying that the circumstances of any particular case can only determine whether galvanized iron pipes, are safe or otherwise. For most cases we think their use admissible.

VELOCIPEDE NOTES.

The Paris correspondent of the London *Orchestra* writes:

"I see a playful statement made by one of the Paris correspondents of the daily press—in an ultra-waggish mood, I presume—to the effect that the Customs returns here show £40,000, or a million francs, as the value of velocipedes exported to the United Kingdom in the course of a year. During some weeks past I have made bicycle statistics a particular study, and I have learned enough to convince me that the above figure must cover (with plenty to spare) the value of the total manufactures. Nine-tenths of these, to speak with moderation, are for home use; and of the exports, by far the greater number go to the United States. Every manufacturer—and manufacturers have sprung up like mushrooms—has his hands full. Any man whose productions are trustworthy, has to enter his orders, and demand a month or six weeks' delay—an elastic convention stretching indefinitely.

"Velocipedes have become a rage. Everybody talks of them. Athletes and gymnasts led the way, and now you see them in the hands of old, young, serious, and gay. *Employés de commerce* ride down to business on them in the morning, and home at night. They stable them during the day in obscure nooks of warehouses, in yards, or cupboards. They fly over the ground at race-horse speed, and their hobby horse takes no more expensive feed than the occasional *goutte* in the patent greaser. Thus they economize time and omnibus fares. The faculty have pronounced it a sanitary exercise, and lo! the obese are seen in shoals on iron horses bringing down the superfluous pound or so at eight miles an hour—and they for the most part, like their patent wheels, provide their own grease—an increasing supply that gathers in globules on their brows and streams down their glowing faces. Ergo, the bicycle supersedes Banting, for of a surety it is more congenial to the *fat* to do deeds of daring in the pigskin than to go off their sugar.

"The house of Michaux et Cie., of the Champs Elysees, have already one hundred and fifty workmen going as hard as they can. Now Michaux, the king of the trade, can barely produce five a day. 'What!' cries the critical reader, 'one hundred and fifty workmen to make five velocipedes in a day; a very queer speculation for Michaux' Not at all. His velocipedes sell for three hundred and fifty francs in the plainest form, to five hundred francs in polished iron, with the patent improvements. They are really models of perfection, but they cost as much as a horse.

"They very politely told me '*Nous donnons delecons gratuites à tout acquereur*,' and if I purchased an instrument of their London agent, I was welcome to my free lessons in their *manége*. They led me into a spacious riding school, I should say three or four hundred feet long by a hundred wide. It was a dazzling sight. You are in an ordinary warehouse, a door is opened, and a field of thirty hunters bursts on your view, all dashing madly to cover! There are riders of every kind—more tyros than proficients of course. One young man of twenty, or under, at once fixed my attention; a fearless fellow this that can perform more daring tricks than a Prussian rough rider. He starts it on at a desperate pace and leaps into the saddle as it flies—out again—a run and he's up again *en amazone*, working one pedal only—off again—a run and he jumps back—on to his knees—and then he's standing bolt upright, like a circus rider; and all the while his velocipede is dashing away at the rate of a London Hansom. He slackens his space to breathe awhile, and then 'again he urges on his wild career.' He dashes full at the fence, and you shrink in your boots for a brief second, thinking he has lost command of his velocipede, but he turns off at a right angle when within an inch or less of the paling. I asked the gatekeeper of the *manége* who this was. 'It is the fils Michaux,' was the reply, 'and if he would only go to the Palais de Crystal, to run in the race on Easter Monday, your compatriots wouldn't stand a chance." Thus I had to learn the doings of Sydenham from the Champ Elysees. I learned too that Michaux meant to send over a first-rate man—he was shown me—and one second only to the daring son of the house, to uphold the honor of France in the contest at the Crystal Palace. It is a plucky thing to do, and (patriotism apart) I wish them every success.

"'You see that young fellow in the gray suit,' said the gatekeeper to me in a whisper, pointing out a tall, English-looking youth of fourteen; 'that's the cousin of the Prince Imperial. The Prince has given him a velocipede fit for a gamin of eight years, and he has come to get it changed. That tall gentleman *decoré*, no beard, is Monsieur ——;' then *sotto voce* the name of a public character that rather astonished me; 'that little disdainful-looking boy is a Spaniard, the Marquis de'—(I forget what—suppose we say Carrabbas). In fact, nobles, notables, and princes were plentiful in Michaux' *manége*, and there was proof positive that the highest in the land incline to the bicycle."

One of the peculiarities of velocipedestrianism in this country is the large inventive talent displayed in framing names for it. Velocipedestrianism, velocipedestrian, velocipedist, velocipeder, velocipedism, velocipedian, velocipeddler, velocipediana, are some of the names applied to riding, riders, and items on the velocipede.

People who want to establish a velocipede rink can call it by any of the following names: Amphicyclotheatron, gymnacyclidium, velocipedrome, or bicyclocurriculum. Monocycle, bicycle, tricycle, quadricycle, are terms used to indicate the number of wheels. But we have seen one name, that in classical beauty and richness of conception, seems to us to eclipse all competitors. The machine which rejoices in this appellation is a water velocipede, and it is called "Tachypodoscaph." Greek scholars will understand this to mean "a swift foot-boat," or, as Artemus Ward would have said, "words to that effect." In view of this amazing fertility of language would it not be well for some enterprising publisher to print a velocipedictionary?

Pickering's Velocipedist says: "We have had so many inquiries in regard to the monocycle, or one-wheel velocipede, that we have determined to get up one, which shall be clear of many of the objections which are urged against those we have so far seen. We shall have it completed in time to give an engraving of it in our next number. We think that we can dispense entirely with the use of not only the steering arms, but even the cranks, although it is worked by the feet; and we consider that the same machine will be adapted for either boys or men, short or tall persons—and even ladies. It may be easily mastered (we think), and in case the rider falls, the machine will not fall on him; in fact, it will not be capable of falling on its side; and further, it will not infringe any known patent. Still further, it is not a wheelbarrow."

Mr. Benton, master mechanic of the Terre Haute & St. Louis Railroad, has invented a railroad velocipede, and has made passenger train time on the same, making about twenty miles an hour between Litchfield and St. Louis, a distance of fifty-five miles. An Ohio inventor also proposes to make a veloci-