their motion, you must know that they move in such slow measure, that they cannot weare, and the lesse, for that they are not forced by any poyse of waight. It is reported in the preface of *Euclydes Elements*, by John Dee, that he and Hieronimus Cardanus saw an instrument of perpetuall motion, which was solde for 20 talents of gold, and after presented to Charles the fift, Emperour: wherein was one wheele of such invisible motion, that in 70 yeeres onely his owne period should be finished. Such slow motion cannot weare the wheeles. And to the end rust may not cause decay, every Engine belonging to this instrument, is double guilded with fine gold, which preserveth from rust and corruption.

PHIL.—This wonderful demonstration of Artificiall motion, immitating the motion Celestiall, about the fixed earth, doth more prevaill with me to approve your reasons before aleadged, concerning the moving of the Heavens, and the stability of the Earth, then can Copernicus assertions, which concerne the motion of the Earth. I have heard and read of manie strange motions artificiall, as were the inventions of Boetius.

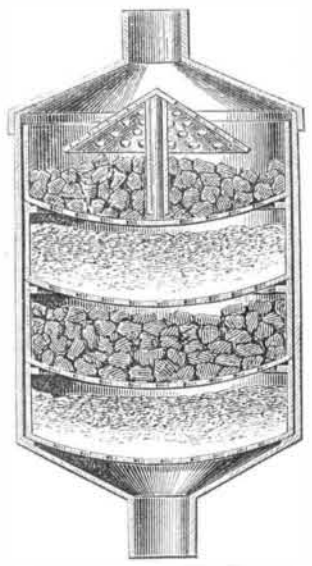
After enumerating these and others, Phil. concludes:

These were ingenious inventions, but none of them are comparable to this perpetuall motion here described, which time by triall in ages to come, will much commend.

THEO.—These great misteries were attained by spending more oyle than wine: by taking more paines than following pleasure.

IMPROVED CISTERN FILTER.

This filter is the invention of G. W. Lampson, of Waterloo,

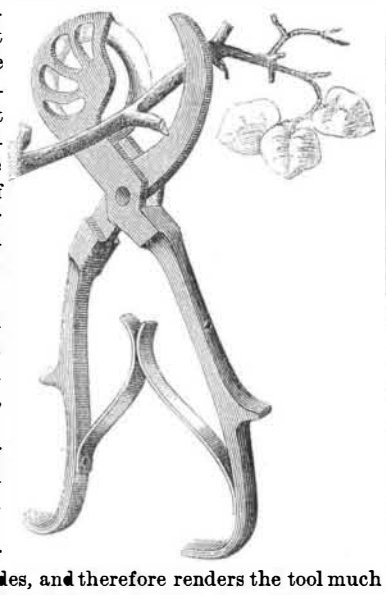


N. Y. It consists in a series of pans arranged one above the other, in the manner shown, in a suitable receptacle. Charcoal and gravel may be used as filtering material, or any other approved material found convenient may be substituted. The water entering the filter falls upon a perforated cone, which distributes it over the filtering material in the upper pan. It then passes through the substances placed in the lower pans, and is drawn off free from impurities at the bottom.

PRUNING SHEARS.

It is well known that a curved edge, or one which cuts obliquely across the grain of wood, is more effective than a straight edge, cutting square across the grain. This principle has long been recognized in the construction of turning tools, carving tools, axes, etc.; and even in the use of tools with straight edges, the apprentice soon learns unconsciously to give the edge a slight inclination, finding that in that position the cutting is accomplished with much greater ease.

In the use of tools constructed on the shears principle, where the blades are short, and the substance to be cut is thick, the latter is liable to be thrust out from between the blades, and thus defeat the attempt at cutting it. Especially has this been the case in the use of shears for pruning trees, vines, and hedges where the branches vary greatly in size. The invention shown in the annexed engraving shows a form of pruning shears, wherein the principle of inclined cutting edges is combined with a curved blade, which prevents the branch from slipipng from between the blades, and therefore renders the tool much more effective than those with straight blades. The branch is also liable to force its way between the blades and strain the pivot. In this device this is prevented by a blunt blade, which construction gives two points of support for the branch instead of one, as in the old form of shears.



This tool is the invention of George H. Clinton and D. H. Harris, of New Haven, Conn., and has been patented.

American Needles.

A new demand for articles of American industry has, says the *Bureau*, just come to light in the shape of an order from England, to the agent of one of the largest manufacturers in this country, for 50,000 American needles to be sent to Birmingham, England, which was for years the only city in the world in which the manufacture of needles and fish-hooks in a large scale was carried on. For something more than a year past the same concern has been shipping fish-hooks to England in considerable quantities. The reason for this order is that we are making good needles cheaper than they can be made in the Old World, on account of the improved machinery in use in our factories. This exchange of business seems very strange at first, but we will soon become accustomed to it and expect it. A large number of articles are now made here for shipment to England and the Continent, which a few years ago were not manufactured in this country at all; and many articles are now exported, which we have procured abroad for many years, and which are now made much cheaper in this country than any other.

The Broken Atlantic Cables.

The recent failure of the two British cables leaves both continents at the mercy of the single French submarine telegraph, and considering that damage to the latter may occur at any time, it is of the utmost importance to the commercial world that the repairs be made at once.

What the trouble is, with the two cables that have ceased working, is difficult to apprehend, but that some under-current has moved the cables upon the edge of a cliff or rocky point, till the coatings are abraded and insulation destroyed, is not improbable. The *Robert Lowe* (British steamer) is at St. John's, Newfoundland, on a grappling and repairing expedition, and it is to be hoped that we may soon hear that both cables are perfect and communication restored. The survey of the bed of the Atlantic ocean is now so complete, that, in any future cable there will be less difficulty in placing portions of wire rope, heavier and better protected, in such parts as the difficult places at the bottom of the sea may make necessary.

The damage is known to have occurred at about 65 miles from Heart's Content, Newfoundland. The grappling for the cables is simple enough, but the rough weather, usual at this time of year, off Cape Race, may delay the completion of the work until Spring.

Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

A Defect in the Patent Law of 1870.

MESSRS. EDITORS:—Allow me to call your attention, and that of your readers, to the closing paragraph of section 33 of the new patent law. The whole section reads as follows:

SEC. 33. *And be it further enacted*, That patents may be granted and issued or reissued to the assignee of the inventor or discoverer, the assignment thereof being first entered of record in the Patent Office; but in such case the application for the patent shall be made and the specification sworn to by the inventor or discoverer; and, also, if he be living, in case of an application for reissue.

This closing paragraph enacts that all applications for reissues shall be sworn to by the original inventor, if he be living.

This is not only a great hardship on assignees, but will probably prove disastrous to inventors, if it be not speedily abrogated. The hardship of it upon assignees is well illustrated by a case which has lately come up in my practice as an attorney. A manufacturing company paid some $30,000 to an inventor, for his patent of an improvement in the manufacture of an article which is one of their staples. He squandered the money, and then attempted to make precisely the thing he had before sold to the company, who, of course, resorted to legal proceedings and stopped him. This naturally left bad blood between them.

Now other parties, having discovered an oversight in this patent, have procured patents based thereon, and are proceeding to claim as their own that which plainly belongs to the company. To stop these pirates, it is first necessary to reissue the company's patent; but, under the present law, to do this, they must procure the oath of the original inventor, who would about as soon part with his right hand as thus oblige the company. It is useless to talk about bills in equity; he would soon put himself beyond the bailiwick of any officer, if this were attempted. Now, is this an isolated case? Probably four out of every ten assignees would at this moment find it very difficult to ascertain the whereabouts of their assignors, and equally difficult to procure their oaths when found, except upon payment of considerable, and oftentimes large, sums of money.

In just the degree that this provision is found a hardship on assignees, will it prove disastrous to the interests of inventors, as a rule. To a large majority of inventors their inventions are valueless if they cannot sell them, for very few inventors are, themselves, possessed of means to manufacture and introduce their inventions; and if purchasers are to be practically almost deprived of the right to reissue the patents they purchase, thus putting it out of their power to suppress ingenious evasions of their rights, they will be very slow to purchase even valuable inventions. Poor inventors find abundance of difficulty now in disposing of their patents, and they can ill afford to have this heavy load put upon their camel's back. They will surely revolt when they come to understand the practical working of this seemingly harmless little enactment.

The new patent law was, probably, drafted by the late Commissioner of Patents; and this provision must have taken its rise in a curious hostility that he seems to have had against reissues, a hostility that he carried so far as to push him into—as the writer believes—an unprecedented overslaughing of the acts and decisions of his predecessors—a charge which, when made, it is perhaps well to illustrate.

The writer had, during the late Commissioner's term of office, occasion to prosecute an extension case on a reissued patent, before the Office; it was favorably reported upon by the examiner who had it in charge, and on the last day before the expiration of the patent it came before the Commissioner in person for his final approval. He made no objection to the findings and decision of the examiner below, but refused the extension on the ground that the reissue contained new matter not in the original patent.

Now, as this very question had been expressly decided upon when the patent was reissued by one of his predecessors, every way competent and fit for his office; and as a Commissioner is not, in law, a court of appeal to overturn the decisions of his predecessors; and as the late Commissioner, being a trained lawer, cannot be ignorant of the true doctrine of *stare decisis*, it is fair to put this act down as most arbitrary, and, with his approval of the enactment spoken of above, as indicating a strong hostility to reissue.

Inventors and owners of patents should lose no time in pressing upon their Representatives and Senators in Congress, to have this enactment repealed, and that right speedily.

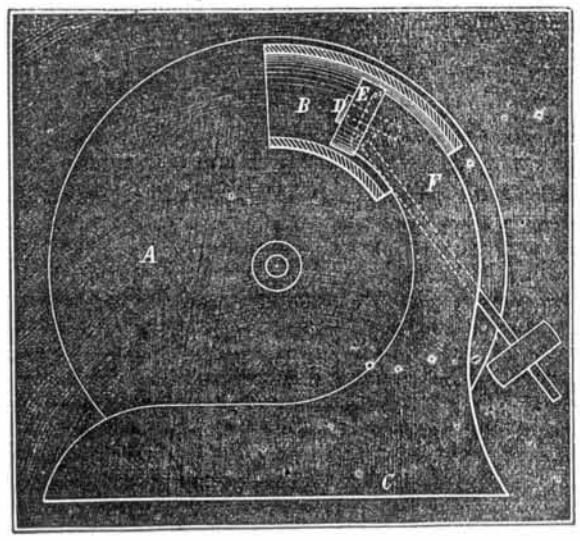
W. E. SIMONDS.

Hartford, Conn.

Boring out Curved Cylinders.

MESSRS. EDITORS:—Permit me to give you a solution of L. Q.'s problem in your issue of Nov. 20th.

A, in the accompanying sketch, is the face plate of a lathe



on which B, the piece to be bored, is fastened (by blocking and straps, not shown) at the right distance from the center to give the desired curve to the hole. A cast-iron piece, C, is to be bolted to the lathe bed, while the part, F, (which is cast at about the same curve that it is desired to give to the hole) is set so that, when the face plate is turned backward, it will enter B centrally. D is a pin passing through E, and driven or screwed into E is a revolving head, which carries one or more cutters, and is made to turn on the pin, D, by means of internal bevel teeth, which engage with the pinion shown in dotted lines. A strip of tin soldered to the revolving head, and projecting back a little over B, will keep the chips out of the gears.

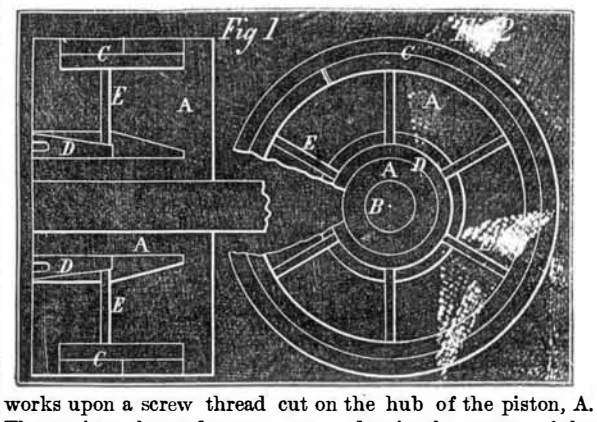
S. G. STODDARD.

Bridgeport, Conn.

A New Piston.

MESSRS. EDITORS:—The annexed diagram is illustrative of a new steam engine piston, which is so constructed that its rings may be set out or adjusted without removing either of the heads of the cylinder. I know that this feature in a piston is not new, but I am sure that I have never seen one of so easy mechanical construction and so simple and perfect in adjustment as this one.

The body, A, of the piston has several radial holes for the reception of the spindles, E. These spindles fit easily in the holes, and are of course exactly of the same length. Their outer ends are in contact with the inner packing ring, and the inner ends rest upon the conical ring, D. This ring



works upon a screw thread cut on the hub of the piston, A. The engineer has only to remove a plug in the center of the cylinder head, and apply a forked wrench to the ring, D, when any adjustment of the rings, C, is necessary.

When cast-iron packing rings are used, a stiff spiral spring should be applied in each spindle hole to prevent chafing the cylinder.

F. G. W.

Preservation of Honey. Invention Wanted.

MESSRS. EDITORS:—Whenever we desire light upon subjects of general interest, or wish to call out new inventions, we are wont to turn to the SCIENTIFIC AMERICAN, and seldom fail to awaken attention, and elicit a satisfactory reply from some of your many readers.

Every one who is at all acquainted with the nature of honey knows that in a short time the transparent, viscid liquid changes to a thick candied substance. On placing a

jar of this candied honey in warm water, it will soon return to its former transparency. But dealers who have tuns of it on hand cannot profitably, with the present appliances, do this; consequently it depreciates very much in value, though the nature of honey, and the remedy for the evil, be explained to the purchaser.

The honey now shipped in such quantities to the cities is produced directly from the comb with the honey emptying machine, and this machine is destined to revolutionize the culture of the honey bee. Apiaries that formerly afforded but little profit now produce a hundred fold, and as a consequence, a widespread interest in the management of this industrious little insect is manifesting itself throughout the country. But just as the interest is becoming one of national importance, one of our largest honey merchants in New York city says: "Mel-extracted honey sold lavishly for a time, but it has candied now, and looks like lard, and is of very dull sale. There must be some means devised to use it, or mel-extracted honey will prove a failure." Many other experienced dealers and apiarists express the same opinion.

Now, I have faith in the modern idea that "whenever an article or process becomes absolutely necessary, there is some one created for the purpose of inventing it."

I wish the army of inventors who read the SCIENTIFIC AMERICAN would devise some simple method to prevent pure, transparent honey from taking the appearance of lard. Could not the covers to the glass jars, in which the honey is sent to market, be so constructed that several hundred jars could be connected with a battery, and a strong current of electricity sent through the honey, creating heat enough to prevent candying?

Can honey or any of its elements be used extensively for manufacturing purposes?

Will some one versed in the mysteries of chemistry give the entire chemical composition of honey? I doubt not that, with proper attention from persons skilled in chemical manipulation, much benefit would arise from the study of honey.

Chemists have brought forth the beautiful aniline colors from the dirty refuse of the gas house. Why not endeavor to produce something equally useful from one of the most abundant of nature's sweets? J. H. M.

Hartford, N. Y.

Roman and Egyptian Artificial Stone Reproduced. Paving Blocks, etc.

MESSRS. EDITORS:—In No. 2, current volume, page 23, I notice an article on Pavements, with 10 or 11 requisites. Such a pavement will be hard to meet with, unless you resort to the old Roman, Pompeian, or Egyptian stone pavement. This stone is artificial. Of the Egyptian stone, (paving stone) I have had some specimens. I have analyzed it, tested it, and have made similar stone, quite equal in quality, from material found in the mountains of Virginia. I have also had a piece of a sanitary tube with which Pompeii is sewered, and have seen oval-shaped sanitary tubes 9×6, two feet long, commonly called egg shape, coated inside and outside with glass, as the American term the glaze on the Scotch sanitary tube, but which is in reality produced by the volatilization of salt, burned on at a high degree of heat, and best known as "salt glaze." The ancients, more especially the Egyptians, certainly did understand building, paving, and sewering, better than we know-alls of the present day.

For paving blocks this stone certainly does possess all the requirements you name; besides, it can be made of three or four different colors—red, blue, white, and cream—not artificially, but naturally; and it forms a very beautiful carpet-like footpath up each side of the street. I do not mean the encaustic tile of Staffordshire, England, but the old Roman stone or flint (rough to walk on) paving blocks 12×8×6; that is 12 inches long, 8 inches broad, and 6 inches thick. One thousand of these blocks will cover 74 square yards, and could be made for about $100 per 1,000.

Perhaps a prettier pavement is made of blocks 12 × 12×9, with tongue and groove, or dove-tailed, so that the blocks will fit tight in each other and cannot be moved; requiring neither cement nor mortar, but only to be bedded in sand.

With regard to horse or wagon roads, color is not of so great importance as utility. The thing required is a hard, rough, even, and sure-footed pavement. These blocks can be made so as to fit into each other with as little labor as ordinary paving blocks, and can be taken up with the least trouble by loosening one of them. They could be made for $150 per 1,000, which number will pave about 111 square yards.

My errand into this country from the Staffordshire tileries, in England, is to search for material of which to make the real Roman and Egyptian stone. I have spent more than two years exploring some parts of the great Blue Ridge and Alleghany mountains, and have found more than I ever expected to. I have now specimens of these blocks, Roman stone, sanitary tubes, or flint tubes, salt glazed inside and outside, or coated with glass, and imperishable in water. Unlike iron, they are incorrodible.

I have bricks imperishable in water, coated on two sides with glass for culvert purposes; also red, white and blue Egyptian flint bricks, imperishable in atmosphere, for building purposes, and almost proof against the ravages of time, made from what is termed by practical claymen, Egyptian clay. I have a brick or block imperishable in fire; the Egyptian swimming brick, which is almost a non-conductor of heat, proof against fire, weighs only about 17 ounces, and is 9×4½ ×2, suitable for ships' cooking apparatus and powder magazines; paving blocks for stables and other uses, as known best to the Egyptians.

If any of your scientific readers would like to see specimens in miniature of the above materials, I should feel great pleasure in sending the same to them before I return home.

Before I go back, I purpose giving you some account of the *scientific principles* of burning the above-mentioned articles, as adopted by the ancients, so much superior to anything of the present day; especially of burning bricks for building purposes.

I wish most heartily all success to the SCIENTIFIC AMERICAN. "Go on and prosper."

Lynchburg, Va. JOHN DIMELOW.

Patents, or No Patents.

MESSRS. EDITORS:—I read in the Cincinnati *Gazette* for 1871, that the editors of that journal will oppose the present system of patents, and will favor the giving, to inventors of improvements deemed valuable, a suitable reward down, and then give the invention to the public. It seems to me, that to a poor fellow without means, or friends to introduce his discovery to public notice, this scheme is very favorable if it can be properly carried out.

In order to do this, it would be necessary to have a committee or board perfectly competent to judge of the merits of every device submitted to them. They must know whether it be practicable or not, so as not to pay for a worthless invention. They must be able to judge of the extent of its usefulness, so as to reward according to merit, and not give to one a large sum for a small improvement, and to another a small sum for a great improvement. They must be thoroughly informed on all matters on which they have to act, so that they may not be imposed on by any one palming off another's discovery for his own. They must be men of impregnable integrity, who will not favor one more than another, nor take a bribe, nor be partial.

It will need a large appropriation of money to pay for all the good inventions that will yet be brought out. To supply this, a tax proportionate to the amount required will be necessary. And as it cannot be known which branch of industry will be benefited most, all must be taxed alike. The farmer must help to pay for improvements in manufactures. The artisan must help to pay for improvements in navigation. Users of steam engines must help to pay for improvements in windmills, and *vice versâ*. If otherwise, the inventors must wait till their improvements are adopted, and the users of them taxed to pay for them. In which case, perhaps while the grass was growing, the horse might starve to death. Or, to anticipate the time, he might sell his claim; and thus bring about the state of affairs complained of under the present system—the inventor getting little, and the speculator getting all.

On the whole, the cure seems worse than the disease. I think the present plan the best. Let the fees be reduced as low as possible, that all may be able to secure a patent. Then it rests on its merit. If good, the inventor may reap his reward. If worthless, the people are not taxed for it. Those who use inventions are taxed for the benefit of the inventor. Those who do not like to pay this tax have only to refrain from using the article. If the sewing machine that is sold for sixty dollars does only cost twenty, and you find it to your advantage to buy one at that price, who loses by it? But somebody makes an enormous profit off it. And somebody ought to make an enormous profit off so useful an invention. Of course the inventor ought to have the lion's share. If he does not, more's the pity. I would hail any plan that would give it to him. But I feel sure, that that of the *Gazette* would not produce a result so desirable.

Charleston, W. Va. THOMAS SWINBURN.

The Tides in New York Harbor.

A lecture by Professor J. E. Hilgard, before the American Institute, was illustrated by twenty diagrams shown upon a screen, on a very enlarged scale, by means of the magic lantern. New York Harbor has two entrances—one from Long Island Sound, the other by way of Sandy Hook. The former is a natural depression, or arm of the sea, which is not changed by the forces now in operation. The tidal currents which flow through it do not change the channel, but are obliged to follow it in its tortuous course. The Sandy Hook entrance, on the contrary, is characterized by a cordon of sands, extending from Sandy Hook to Coney Island, intersected by channels, which are maintained against the action of the sea, that tends to fill them up by the scour of the ebb tide from the tidal basin of New York Harbor.

The depth of twenty-four feet at low water which the harbor now possesses in a direct channel, may be considered as depending upon the following elements: 1. The large basin between Sandy Hook and Staten Island, including Raritan Bay, which furnishes more than one half of the ebb scour, 2. What is called the Upper Bay, including the Jersey Flats and Newark Bay. 3. The North river, as far as Dobbs' Ferry, maintaining the head of the ebb tide, although not directly taking part in the outflow. 4. A portion of the Sound tide which flows in through Hell Gate. The two tides, from the Sound and from Sandy Hook, meet and overlap each other at Hell Gate; and since they differ from each other in times and hights, they cause differences of elevation between the Sound and Harbor, which produce the violent currents which traverse the East River.

The conditions of the tidal circulation through Hell Gate are such that if there were a partition across it, the water would at times stand nearly five feet higher on one side than the other, and again five feet lower on the same side. The westerly current, usually called the ebb stream, taking place when the Sound tide is highest, starts from a level 3½ feet higher than the easterly current, and thus a much larger amount of water flows out through the Sandy Hook channels than through Throgg's Neck. It is apparent, then, that this portion of the ebb stream, reinforcing, as it does, the ebb stream of the harbor proper, at the most unfavorable times, performs a most important part in maintaining the channels through the Sandy Hook bar. It may be estimated that the closing of Hell Gate would cause a loss of certainly not less than four feet in the depth of those channels. In order to procure the depth which we now have, it is important that the area of the tidal basin should not be encroached upon. In proportion as that is diminished, the depth of the channels will decrease. The flats, just bare at low water, but covered at high tide, perform as important a part as any other portion, for it is obvious that it is only the tidal pressure that does any work in scouring the channels. The water on the flats is especially useful by retarding outflow, thus allowing a greater difference of level to be reached between the basin and the ocean.

When we yield to the demands of commerce any portion of the tidal territory, we must do so with full cognizance of the sacrifice we are about to make in the depth of water in the channel. From what has been said with regard to the meetings of the tides in Hell Gate, it will be seen that the violent currents experienced in that locality are due to causes beyond our control. The dangers to navigation arising from these currents, however, by their settling vessels upon the rocks and reefs, may, in a great measure, be done away with by the removal of the obstructions, in which work considerable progress has been made. The removal of reefs at Hallett's Point, which is now looked for, will doubtless, in a great degree, do away with the eddies and currents produced by the sharp turn which the channel now takes at that point. It is not improbable that the Sound entrance may yet become the entrance of New York Harbor.

The Ninth Census Complete.

The following table, prepared by the Census Bureau at Washington, gives the total population of all the States and territories of the Union, by the enumeration of 1870, as compared with that of 1860. Several statements, purporting to give the result of the last census, have been floating through the newspapers, but this is the first that has appeared with the official sanction. It will be seen that the total population of the United States in 1870 was 38,538,180, an increase in ten years of 7,094,859. The greatest percentage of increase is in Nevada, and after it, Nebraska. Two States only exhibit a decrease, Maine and New Hampshire. All the Western States show heavy percentages of increase, the Southern and Middle States, a small increase, while New England is almost at a standstill. The table is interesting and instructive.

STATES.	1870.	1860.	Gain, p. c.
Alabama	996,988	964,201	3·5
Arkansas	483,179	435,450	11·0
California	560,285	379,994	47·5
Connecticut	537,418	460,147	16·8
Delaware	125,015	112,416	11·5
Florida	187,756	140,424	33·3
Georgia	1,200,609	1,057,286	13·6
Illinois	2,539,688	1,711,951	48·4
Indiana	1,678,046	1,350,428	23·9
Iowa	1,191,802	674,913	76·6
Kansas	362,872	107,206	238·5
Kentucky	1,321,001	1,155,684	14·4
Louisiana	732,781	708,002	3·5
Maine	626,463	628,279	* 29
Maryland	780,806	687,049	13·7
Massachusetts	1,457,351	1,231,066	18·4
Michigan	1,184,296	749,113	58·1
Minnesota	485,511	172,023	153·2
Mississippi	834,170	791,305	5·5
Missouri	1,715,000	1,182,012	45·1
Nebraska	123,000	28,841	326·5
Nevada	42,491	6,857	519·7
New Hampshire	318,300	326,073	*2·4
New Jersey	905,794	672,035	34·8
New York	4,364,411	3,880,735	12·5
North Carolina	1,069,614	992,622	7·8
Ohio	2,662,214	2,339,511	13·8
Oregon	90,922	52,465	73·4
Pennsylvania	3,515,993	2,906,215	21·0
Rhode Island	217,356	174,620	24·5
South Carolina	728,000	703,708	3·5
Tennessee	1,255,988	1,109,801	13·4
Texas	797,500	604,215	32·0
Vermont	330,552	315,098	5·0
Virginia	1,224,330	1,219,030	·43
West Virginia	445,616	376,688	18·3
Wisconsin	1,055,167	775,881	36·0
Total	38,095,680	31,183,744	21·1
District of Columbia	131,706	75,089	75·5
TERRITORIES.			
Arizona	9,658	.....	.....
Colorado	39,706	34,277	15·9
Dakota	14,181	4,837	193·2
Idaho	14,998	.....	....
Montana	20,594	.....	.....
New Mexico	91,852	93,516	*1·8
Utah	90,756	40,273	115·6
Washington	23,901	11,594	106·2
Wyoming	9,118	.....	....
Total District and Territories	442,500	259,577	
Total of States	38,095,680	31,183,744	21·1
Total United States	38,538,180	31,443,321	22·6

* Loss.

BALLOONS AS A MEANS FOR ARCTIC RESEARCH—The long voyages, made with entire safety, from the city of Paris, have concentrated much attention on the subject of ballooning. A correspondent, J. M., of Baltimore, suggests that any future expedition to the Arctic Ocean be furnished with balloons, properly fitted to secure the voyagers from the cold air, by which the eternal ice could be passed over, and the open polar sea reached. When the North Pole was once gained, the return voyage could be made easily, as whatever might be the direction of the wind, the balloon would be carried out of the circle into one hemisphere or the other.

A RESIDENT of Taunton, Mass., has obtained his ice for summer use for several winters past, in the following manner: Procuring about fifty empty flour barrels, at a cost of twenty cents each, he gradually pours in water, until each contains a solid mass of ice. The barrels are then put away in his cellar, and entirely covered with sawdust. As ice is required, a barrel is tapped.