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Contents.

(Illustrated articles are marked with an asterisk.)

American Association, next meeting	355	Incandescent lighting, spirit for	364
Ampere's induction experiment	353	Inventions recently patented	364
Anthrax in human beings	353	Iron notes	356
Archæological discoveries in Greece	360	Iron trade situation, the	356
Beet sugar possibilities	354	Metal mixers	356
Bicycle, ambulance, the	362	Nitro glycerine, explosion, a	361
Bicycle, a nautical	363	Noted queries	353
Bicycle, present status of the	354	Oregon, U. S. battleship	353
Bleaching cotton	359	Paper sails	356
Books and publications, new	364	Patents granted, weekly record	365
Bordeaux mulberry, the	358	Petroleum, American and Russian	364
Box, the, as a shrub	353	Petroleum, cycle, the	360
Centering device, Kolb's	356	Photographic hints	355
Chimney, a slant	355	Pipe line friction (6545)	365
Diarrhea and earth temp.	360	Pottery tree, the	362
Diseases, incubation period of	359	Progress, American	363
Egyptological	363	Propeller, Puig's	356
Electricity in bleaching	362	Quicksilver mines, the Almaden	363
Exhibition, Paris, of 1900	359	Rhododendrons	358
Exploration problems	359	Rifle, new navy	360
Fiber machine, Green's	356	Soap, soft, potash	358
Garbage carbonizer, a	358	Spider's web, the	363
Glass bricks	361	Star figure in Germany	355
Guns, machine, wanted	358	St. Louis, the	360
Hematite mining in Greece	364	Typewriter, Daugherty visible	357
Horseshoes, aluminum	353	Victoria Regia, the	361
		Whistles, passenger engine	362

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 1014.

For the Week Ending June 8, 1895.

Price 10 cents. For sale by all newsdealers.

I. AGRICULTURE.—The Russian Thistle.—Correspondence on the subject of the Russian thistle and its extirpation	16208
II. ARCHÆOLOGY.—An Archæological Discovery in Colombia.—Masterpieces of art recently discovered in a grotto in the Sierra Nevada	16211
III. ASTRONOMY.—The Declination of the Sun.—On the principle of the sun dial giving accurate results in time.—3 illustrations	16210
IV. BIOGRAPHY.—General Martinez de Campos.—An eminent Spanish commander, his life with portrait.—1 illustration	16199
Torquato Tasso.—The life of the great Italian poet, with portrait	16200
Eckley Brinton (cox)	16199
V. BIOLOGY.—Microbes and Metals.—An examination of the influence of metals on bacteria cultures	16211
Some Strange Nursing Habits.—By R. LYDEKKER.—Some very curious and interesting features in the life history of different animals.—3 illustrations	16212
What is Death?—A curious examination of the great problem	16211
VI. BOTANY.—Fragrance.—A graphic article on the subject of the perfume of plants and flowers.—2 illustrations	16208
Origin of the Potato.—Interesting historical notes on the great tuber	16210
Root Nodules of Leguminous Plants.—By RUDOLF BEER	16210
Plant physiology and the absorption of food material by the roots.—4 illustrations	16209
VII. CHEMISTRY.—Recent Advances in Electro-Chemistry.—Advance in the duplex science, with valuable notes on its present aspect.—Technical achievements.—A most exhaustive and laborious paper	16206
VIII. ELECTRICITY.—Another Product of Escaped Electricity.—Escaped electricity in England, with possible results of the occurrence	16205
IX. GEOLOGY.—Forests Turned to Stone.—Silicified wood of the Northwest	16212
Induced Magnetism in Volcanic Rocks.—A curious experiment in physical geology	16205
The White Cliffs Opal Fields, New South Wales.—By F. G. DE V. GIPPS.—An interesting description of a region where opals are found	16211
X. MINING ENGINEERING.—The Industry of Bolivia.—The ore deposits of the South American republic and the methods of exploitation	16201
XI. MISCELLANEOUS.—The Evolution of Shorthand.—A very excellent article on modern shorthand writing and on the difficulties in acquiring the art	16200
XII. NATURAL HISTORY.—A Cat Show in New York	16214
XIII. PHOTOGRAPHY.—Influence of Temperature on the Sensibility of the Photographic Plates.—One of the most important researches in photography, with results obtained	16205
XIV. RAILROAD ENGINEERING.—A Portable Single Rail Surface Railway.—A very simple construction of railroad and its adaptation to agricultural purposes.—19 illustrations	16202
XV. TECHNOLOGY.—Acetylene and the Gas Industry.—By NORTON H. HUMPHREYS.—A very valuable and interesting examination into the chemistry of the new illuminant	16204
Cotton from Wood Pulp.—The manufacture of textile products from wood pulp and prospects of the peculiar industry.—1 illustration	16206
Notes on Gas Enrichment.—By Col. SADLER.—Acetylene viewed from the standpoint of the practical gas engineer.—Benzol enrichment and its advantages	16203
The Production and Uses of Cottonseed Oil.—By P. L. SIMMONDS.—A great American industry, with statistics.—Details of the treatment of the seeds	16206
XVI. TRAVEL AND EXPLORATION.—Baron Von Toll's Expedition to the New Siberian Islands.—By CARL SIEWERS.—A description of a recent exploring expedition to the north of Russia	16210

THE PRESENT STATUS OF THE BICYCLE.

The development of the use of the bicycle, which has been often spoken of in these columns, has attained now a wonderful extension. Wherever one travels in the country, whether near or far from the center of population, the omnipresent bicycle is found. On country roads the woman school teacher is met riding home from the district school; in manufacturing places the artisan is seen, perhaps dressed in his overalls and carrying his dinner can, going on his wheel on his way to and from his work. In road houses and in some stores special provision is made for the care of bicycles. Men go to their business on them, and it is at last proved that a new mode of everyday, practical locomotion has been developed.

All the above is trite. Coincidentally with this immense development of what was once a sport, but is now no more a sport than is any other means of locomotion, has appeared a considerable amount of opposition to the wheel on the part of those who do not ride. A disposition exists to enforce ordinances more rigidly in the case of riders of wheels than is the custom against others, while the old tendency to legislate directly against their use is still shown in places. The wheel, with its pneumatic tire, stealing along silently at a relatively high speed, seems to possess the power of irritating the pedestrian from the apparent danger of collision. It seems not to occur to him that while legislation is being invoked to force trolley cars to be provided with fenders, the very element which makes the bicycles noiseless, which is the pneumatic tire, provides it with a reasonably effective fender. The pneumatic tire is certainly a great safeguard, if, by accident, a pedestrian should be struck by a wheel. Meanwhile, in spite of opposition, the use of the bicycle continues to increase, and one of the best safeguards against iniquitous legislation is certain to be afforded by the probability that the majority of legislators in the near future will be riders themselves.

To transform the everyday progress of a man through the streets from a speed of three or four miles an hour to a speed of ten, to give him as environment, instead of a crowd of other pedestrians, a quantity of vehicles of all descriptions, is a most radical change. The country road invaded by the trolley car running at twenty miles an hour is a parallel illustration of the change of conditions. In the matter of all governmental ordinances the existing conditions have to be considered. The regulations formulated in past days, concerning traffic on roads, in a general way recognize the wagon drawn by horses, the horseback rider, and the foot traveler as the elements to be provided for. As the bicycle came into prominence, the old view of it as an instrument of sport, pure and simple, something for pleasure, not for use, was hard to abandon, and many relics of this opinion still exist.

It is not saying too much to assert that the time has now come for a change. On the roads and streets it is no longer the two thousand pound truck, the lighter carriage and the slow-moving pedestrian that are to be considered; the bicyclist is a new element, which has created a new condition of things which must be recognized and provided for, and is destined sooner or later to have its interest conserved. The day for inimical legislation passed long ago; the time has come for special consideration. The streets of our large cities, as a rule, are ill adapted in the business districts especially for the bicycle. In cities where the business streets are rideable, the bicycle has come into the most extensive use for business men and tradesmen of all classes. But the stone-paved street, adapted to heavy traffic, is but ill adapted to the bicycle, and what seems to be wanted is a compromise pavement, which will suit all classes of traffic. Taking the city of New York, it would not seem impossible to provide one or more through bicycle routes from the upper part of the island to the Battery. A street with proper pavement on it, adapted especially for bicyclists, would not be too much to be granted to the ever-increasing army of riders, but it would be far better to devise some form of pavement which would meet all classes of traffic and which would enable the bicyclists to ride about the business portion of the city as comfortably as they now do in the parks and boulevards. An immense field for the civil engineer is opened in the providing of such streets in business cities. Asphalt, which gives a smooth though dead surface, is being introduced very extensively in the residential portions of the metropolis. It seems questionable if it would answer for the districts devoted to heavy traffic. Vitriified brick has been adopted in many places with satisfaction to bicyclists and truckmen. A small experimental piece has been laid in this city, and it may be laid upon the Ocean Parkway, in Brooklyn. To provide a bicycle path, the asphalt of the space between the tracks of cable car lines or of trolley car lines has been suggested, and this has been done in this city on one street, though not to accommodate cyclists. As the case now stands, there is a new form of traffic to be provided for, one whose magnitude is daily increasing, and which in the near future will excite attention greater than it is now receiving. The

friction between the bicyclists and the pedestrian is bound to decrease in time; it seems at present to be merely due to the difficulty mankind has in recognizing the existence of a new state of things in daily life.

Incidentally the lowering of the price of bicycles and the possibility of procuring cheap ones second hand has imparted to the bicycle a most important element in making it the vehicle of the workman as well as of the rich. A few months' car fare will pay for a wheel, so that it has definitely ceased to be a luxury, and the workman who never could have dreamed of owning a horse, can possess without extravagance a bicycle, which will surpass the ordinary horse in speed.

POSSIBILITIES OF BEET SUGAR INDUSTRIES.

We derive the following from the Sugar Beet:

The total area devoted to beets for the seven beet sugar factories in the United States (this includes the small output of Virginia) was, in 1893-94, 19,647 acres, from which were obtained 195,895 tons beets and 45,191,296 pounds sugar, corresponding to a yield of 2,300 pounds sugar per acre, and an average of 230.7 pounds per ton of beets worked on an average extraction of 11.5 per cent. The average yield of beets per acre was 9.9 tons. Accepting these figures as a basis of calculation for the requirements of the Union, the consumption of sugar during 1894 was 2,024,648 tons, or 4,535,211,520 pounds. To obtain this sugar there would be needed at least 2,000,000 acres of land if the yield be 10 tons to the acre, and beets sell for \$4 per ton. The money for these roots represents the enormous sum of \$80,000,000 that would be put into circulation among our farming population.

If we admit that farmers receive gratuitously 50 per cent in weight of beets furnished by the residuum pulp as it leaves the process, this would be sufficient to feed not less than 2,000,000 head of cattle during the three winter months when fodders are the most expensive. If we admit two pounds increase per head and diem, then would result 400,000,000 pounds meat obtained from a product that is now receiving only a limited attention.

If the entire residuum should find utilization in the United States when the industry exists fully, there would be not less than 550,000,000 pounds meat obtained at a minimum cost.

To make this matter thoroughly clear from a farmer's standpoint, we can suppose that 10 acres of land yield 100 tons of beets, which are sold at the factory for \$400. In return he gets for nothing 50 tons, or 112,000 pounds, residuum pulp. We may admit that the ration consists of about 100 pounds pulp (combined with other products) per diem for 100 days; the consumption per head would be 10,000 pounds pulp, or sufficient for 11 beeves. If the rate of increase is 2 pounds per head per diem, during the time of feeding, the total increase is 2,200 pounds. If the farmer clears 4 cents per pound on his meat he has 88 additional dollars that his land yields him. The resulting manure from this feeding is an item of considerable importance, not to be overlooked.

According to Willett & Gray, the entire consumption of sugar in the United States during 1894 was 2,024,648 tons, i. e., 265,500 tons domestic cane sugar, 20,000 tons domestic beet sugar, 300 tons sorghum sugar, 5,000 tons maple sugar, 15,000 tons domestic manufactured molasses sugar, or 305,800 tons of home-made product, to which must be added 1,554,528 tons of foreign cane sugar, 159,796 tons foreign beet sugar, and 14,524 tons foreign refined sugar, or a total for foreign product of 1,718,848 tons.

Experiments in feeding inferior and superior beets to sheep have shown that there are many advantages to be gained by using roots of high saccharine percentage.

In the manufacture of alcohol, either from beets or beet molasses, there is always a residuum which may be used for the manufacture of potassa, or as a fertilizer. The product left over is known as vinasse, and contains about 12.8 per cent potassa, 3.7 nitrogen, 0.1 per cent phosphoric acid, and 0.1 per cent lime. For beet soils this may be used in quantities corresponding to 7 tons to the acre.

From the official data respecting the sugar campaign for 1893-94 in Germany, we glean some interesting figures; 405 factories were working, and there were 966,200 acres planted in beets. The total weight of beets worked at factories was 10,644,300 tons, giving an average per factory of about 26,000 tons. The average sugar campaign was only 78 days. The total sugar production was 1,319,000 tons, corresponding to an extraction of 12.36 per cent. If we include the sugar extracted from molasses, the extraction becomes nearly 13 per cent. The exportation of home-made sugars was 728,000 tons. The consumption of sugar remains about the same from year to year, and is nearly 600,000 tons.

The returns from an acre of beets in Germany are \$40, while from wheat and other cereals only \$20.

The total area devoted to beets in the empire during 1893-94 was 966,000 acres. The average yield of beets to the acre was nearly 11 tons. To produce 100 pounds

sugar (with the product from molasses) required 906 pounds beets.

In molasses distillation the sugar is changed into glucose, then into alcohol and carbonic acid; and there is a final residuum, which may be used as a fertilizer or for potassa manufacture.

If Congress would pass a bill allowing residuum beet molasses to be distilled free of taxation, it would in a measure compensate for the withdrawal of bounty on sugar. If this distilling of molasses is carried on in connection with sugar making, it may be said that the profits thereon would go considerably toward the cost of working beets into sugar. At present we may admit that \$2.50 to \$3 represents the labor and interest on plant per ton of beets worked into sugar. From a ton of beets there remains nearly 100 pounds molasses, from which may be exhausted 3 gallons of pure alcohol. The sale of it, even at \$2 a gallon, would leave a margin of profit certainly not less than \$2.

One acre of beets at Ames, Nebraska, may be said to cost as follows from data of practical experience on the field:

Manuring \$2.20, plowing \$2, seed \$2, seeding \$0.30, harrowing \$0.50, rolling \$0.31, 1st hoeing \$1.44, bunching \$2.12, thinning \$3.72, 2d hoeing \$5.25, 3d hoeing \$4.81, 4th hoeing \$2.91, cultivating \$1.82, sundry expenses, time-keeping, killing bugs, etc., \$0.77, giving a total cost for "laying by" of \$30.16. To this sum must be added \$4 harvesting, \$2 plowing out, \$2.13 hauling and loading, or a total cost of \$38.29. As the yield was 10 tons to the acre, the beets cost the farmer, even under the most careful cultivation, \$3.83. If the yield had been as during 1893, then the cost per ton would have been only \$2.56.

Some interesting information respecting the working of the Norfolk beet sugar factory is published in the News: "Out of 27,551 tons of beets raised, the company manufactured 5,556,100 pounds fine granulated sugar. To make this, 443 car loads coal were consumed, 225 car loads lime rock, and 33 car loads coke. During the three months the machinery was in operation 2,400 gallons of oil and 1,000 pounds grease were used to keep the machinery in running order; . . . 300 men were employed."

In a speech by Senator Charles F. Manderson, of Nebraska, he says:

"Ten acres of land in Nebraska, Kansas, or Dakota devoted to the cultivation of wheat, corn, or potatoes, would lead to starvation rather than life. But in Nebraska, from same acreage, 220 tons of beets were sold at \$4.05 per ton, amounting to \$901. The total expenditure was \$287.20, leaving a net profit of \$61.30 per acre.

"This is a peculiar crop. It cannot be raised in a slovenly fashion. It means work; it means intelligent, painstaking labor. It requires a much higher order of intelligence to grow beets than it does for wheat or corn. Every acre planted in beets means twenty days labor for one man. If 2,000,000 acres of land are needed to supply this country with sugar, it follows that 40,000,000 days' labor could thus be given to the laborers of the United States. It would also mean the transportation of 26,000,000 pounds freight for the industry."

The Beautiful Star Figure in Gemini.

In the early evening sky in the west now [May 23] may be seen one of the wonders of astronomy. Three of the visible six planets of our system are bunched in the constellation Gemini.

Begin with big blazing Venus; thence down westward is Jupiter, of diminished and diminishing glory as he approaches his conjunction with the sun. Above Venus and to the left, farther away from her than Jupiter is, is the red planet Mars, also nearing his conjunction, and greatly diminished from his normal splendor. Above these three are the fixed stars Castor and Pollux in the heads of the Twins. The five make the figure of a dipper with the handle hung down; and of the five Castor and Pollux are the only ones whose places on the blue vault are permanent.

There is not among all the stars a more beautiful figure than this. Apparently as permanent as any of them, it is really as evanescent as the morning dew. Never seen before, except perhaps in eternal ages past, it will never appear again except perhaps in ages yet to come. Its memory will be preserved in the annals of astronomy as one of the wonders of 1895. Let us name it the Planetary Dipper, or the Dipper of Venus.

Observe the nightly changes in this figure. It will distort, dissolve, and its component parts soon fade and disappear in the twilight of the eastward traveling sun. At the last of June the sun will have advanced to Gemini, to near where Jupiter is now.

Another of the visible six planets is up in the early evening now, eastward, about the beginning of Libra, and near the feet of Virgo; Cancer, Leo, and Virgo of the zodiac alone intervening between it and its friends in Gemini. It is Saturn, the ringed planet, twice as far outward from us as is Jupiter, and almost in fact the outermost visible planet; for Uranus, next outside of him, is hard for an amateur to identify even with the aid of a telescope. The next and last out-

side, Neptune, is not visible at all except through a telescope.

But one other planet is now to be accounted for, fleet Mercury, occasionally visible low down in the west or the east flitting past the sun on his little orbit, always white, bright, and pretty.—R. W. Musser, Ashville, N. C., Citizen.

Photo Hints.

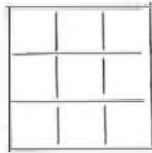
RICHARD FENLAKE.

This does not pretend to be an article which devotes itself entirely to one given subject. It is a mixture; it embraces simple rules of composition and simple methods of manipulation whereby certain effects can be obtained, and divers other little points which may prove of value to those just starting on the sea of photography, as well as those who are within sight of port.

We will suppose that the camera has been purchased and the artist is ready and eager for the fray. Every one knows how easy photography appears to be to those who have not mastered the art. You simply take off the cap, or pull the string, put the plate in developing salts, and in the words of the song, "There's a picture for you." But, alas for young hopes! there generally is no picture at all. If development has been satisfactory and exposure correct, there are the hundred and one rocks of lighting, composition, etc., upon which the poor amateur may be cast away.

The simplest branch of study is landscape. Some are contented to take landscapes haphazard as they find them, while others walk about and select a point of view most likely to produce a pleasing picture. A building or some like structure which has sufficient pictorial element in its composition should be included, but a great fault is that of trying to get too much on one plate. Pictures should not appear crowded.

Never take a view with the sun directly opposite the camera, for if this is done the plate will be hopelessly fogged and consequently rendered useless. The sun should occupy a position over one of the shoulders, and the artist should stand to obtain as much side light as possible. In this manner a harmonious blending of light and shade will be obtained, whereas if the sun were shining directly on the subject the result would lack contrast and be void of pluck and brilliancy. The chief mass of a picture should rarely occupy the center, but should have a position a little to one side. A good plan is to mark the focusing screen in the manner shown in the diagram. Nine squares



will thus be formed. The center square is the weakest point, and the points where the two lines intersect are the strongest. The horizon line should rarely, if ever, run across the exact center of the plate, but should be about one-third from the top or bottom, the upper for views taken from a height, the lower for ordinary landscapes. There are, however, exceptions to this rule.

For the sake of variety a building should never be taken "full on," but at an angle. Plant the camera slightly at one side, much better effects are obtained. Be careful not to have any prominent object, other than the principal one, to distract the attention. The interest should be centered on the principal object.

Never stand in the middle of a street when photographing it, but slightly on one side. It looks better. As often as possible select an interesting foreground, as a bad one spoils an otherwise good picture. H. P. Robinson, one of our celebrated landscape photographers, says:

"In the selection of a view great attention should be paid to the foreground. . . . The foreground is of so much importance, that I do not hesitate to say that if a view is not well fitted in this respect, it can never be an effective picture. A landscape photograph seems to require a good foreground more than any other kind of picture." It is a matter for wonder, since a photographer is deprived of the use of color in his work, that he does not turn his attention with greater earnestness to design and arrangement. Some do so and with good effect.

We were shown in these pages a short time ago what great changes could be effected in the way of cutting and mounting. Much good work is undoubtedly sacrificed by an inch too much at top or bottom, on one or the other side. Many subjects that spread over the full area of the plate are tame, uninteresting, and may be improved by cutting down. The difficulties of judging the proportions best suited to the subject are great, and require careful thought and consideration. How charming some of those long, narrow pictures are, which, if printed full size, would be pictorially worthless.

Be careful when focusing to get the minutest details. If the view be a church, focus the clock or leaded

windows, if a house, the window curtains or bricks, in a portrait, the eyes.

Many amateurs make a start by attempting portraiture. This is unwise, as successful landscape work should be mastered before attempting this difficult branch. To accomplish portraiture equal in style to a professional, special lenses, various arrangements of light and shade, besides many years of apprenticeship, are necessary. A few hints will, however, enable a beginner to turn out passable work.

When taking a vignette, or bust portrait, always get the mouth in the center of the plate; by observing this rule, you will have the satisfaction of knowing the head is in a proper position on the plate, and not slipping off at the top or bottom. A vignette should not be taken before a background composed of a brick wall or leaves. The result gives a very curious patchy effect. Good makeshift backgrounds may be made of brown paper, or a blanket, that commonly known as the "workhouse" pattern; at a pinch, a newspaper can be placed a short distance behind the sitter. The reading matter will, of course, be considerably out of focus, thus producing a gray effect in the finished print. Those who require a really serviceable article should buy a plain cloth washable background, costing about three shillings. Always bear in mind that one side of the face is better looking than the other, usually the left side, except in the case of left-handed people, when the right side generally takes best. Carefully observe this when taking what is known as the "three-quarter" face.

When taking a "full face," notice which way the nose bends, as no nose is really straight, and pose accordingly. Let the sitter be at ease and secure as much individuality as possible. Have the camera on a level with the face. If the lens points downward the forehead is exaggerated, if upward, the chin. Use the longest focus lens possible, as a wide angle lens distorts portraits fearfully.

When taking full or three-quarter length portraits, don't mix them; let them be either one or the other. Many are taken with the feet cut off just at or above the ankles. In which of the two poses should these be classed? A proper three-quarter length should be taken to the knees, the top line marked on the screen (as mentioned at the beginning of the article) running across the eyes. For a full length portrait allow a little foreground, so as to give the figure something to stand on.

Figure studies and genre work should be encouraged. This particular branch necessitates extra skill, but the results amply repay for extra time and trouble.—Junior Photographer.

American Association for the Advancement of Science.

For five years in succession efforts have been made to secure the annual meeting of the A. A. S., and its numerous affiliated societies, at San Francisco, or some other point on the Pacific coast. The most alluring offers have been made by the Californians, and it was confidently hoped that they could this year be available. The difficulty is to obtain proper concessions from the railroad companies. Hence the meeting for 1895 will be in some Eastern city, and Springfield, Mass., is now announced as the favored place.

The official time will be from August 26 to September 6 inclusive. The first general public session will be held on Thursday, August 29. Friday, Monday, Tuesday and Wednesday will be wholly given up to scientific discussions. Saturday will be devoted to excursions that have been planned for visiting points of interest in the vicinity.

The hotel headquarters will be at the Worthy. The president's address will be given in Court Square Theater; other evening addresses and receptions will be in the City Hall. The general sessions and section meetings will be in the Y. M. C. A. Hall. Other buildings are also at the disposal of the association, and everything will be done by the citizens of Springfield to make the convention successful.

Further information can be had from Prof. F. W. Putnam, the permanent secretary, Salem, Mass., or from Prof. William Webster, local secretary, Springfield, Mass. A preliminary pamphlet can be had on application, describing excursions, giving hotel rates and other useful particulars.

We have long had slag paint and pavement, but the latest is a slag brick chimney. According to L'Industrie this plan was adopted by the Courrieres and Ortricot companies, and their example is followed by the works of Arbel and Douai. The latter establishment planned a chimney 164 feet high and to weigh but 379 gross tons, about half the weight of a brick chimney of the same dimensions. A special cement was to be used which would bind together the blocks composing the chimney so firmly as to require no chain or iron band for strengthening. This is an interesting application of a cheap industrial by-product, which, should the experiments prove a success, will be appreciated by metallurgists.