LETTERS FROM THE PEOPLE.

THE TRUTH ABOUT WHEAT.

Evidence from the Fields that the Crop Is Short.

To the Editor of The Sun—*Sir:* Your article to-day on the wheat situation, headed "The Truth," would be of great value if it did nothing more than to teach men to look twice at masses of figures given them to be swallowed whole. Fortunately it does that and much more for the truth. I think I can throw a little light on one of the facts that you state respecting the wheat crop in the United States this year. You say, in harmony with all official reports, that from Indiana west the crop is lighter than last year. The total receipts at all of the great primary markets in that section, which includes the principal wheat-producing States, are thus far but a little over half what they were for the same time last year, taking winter wheat from July 1 and spring wheat from Aug. 1. They strongly confirm the reports, but there are three notable exceptions in the list. Detroit, Duluth, and Minneapolis have received quite as much this year as last, and very many people are thereby led to doubt the accuracy of the reports as to this year's short crop. Now it must be borne in mind that the one hundred million bushels that you have generously added to our available supplies as extraordinary surplus carried over from the crop of 1892 was partly in the farmers' hands on July 1, and that the deliveries at the three points named are really not enough to fairly bear out the idea of so large a surplus having been carried over. That may account for Detroit's deliveries being ahead of last year's.

Respecting the more important markets of Duluth and Minneapolis I can speak with greater assurances. In the first place, I know from an extended trip through the country tributary to those great receiving markets that much of the crop averages not over two-thirds of last year's yield. But let this pass; what I wish to call especial attention to is the fact that, within certain limits, the farmers' early deliveries are bound to be about as much one year as another in that section of the country. It is due to the fact that whenever wheat raising is a principal or prominent part of the farming, it is almost the universal custom for farmers to send to market direct from the thrashing machine, enough to pay the year's expenses; and those expenses are not much smaller with a light crop than with a heavy one. Such shipments are now entering Duluth and Minneapolis every day. The large farmers have just finished thrashing from shock, and the small farmers (who, in aggregate results are really the great farmers) are now carrying on the shipments with the same end in view. It is the surplus put in their granaries that varies most, and not their early shipments.

Minneapolis must have pretty steady receipts throughout the year to keep her mills going, but in Duluth by Nov. 1, or earlier, there will be seen a marked falling off from last year's receipts. DATUS C. SMITH.

SEPT. 25.

THE FUTURE OF RAILROADS.

Enormous Development Still to Come.

To the Editor of The Sun—*Sir:* The opinion has been expressed by some writers that the limit of railway construction in this country has been nearly reached. A careful investigation of the distribution of railway mileage would, on the contrary, indicate that it will be at least doubled within the comparatively near future.

The States of Massachusetts and New Jersey already have one mile of railway to four miles of area. Neither of them has a high percentage of good agricultural lands, neither has extensive mining interests, nor does either of them produce any considerable percentage of the raw material consumed in its extensive industrial establishments; neither of them compares in natural resources with many of our trans-Mississippi States which have a very limited railway mileage, nor has either of them reached the limit of railway construction within its borders.

Pennsylvania, Ohio, and Illinois have one mile of railway to five miles of area, while New York and Indiana have one to six—making for the seven central States an average of one mile to five. Minnesota has one mile to fifteen, the two Dakotas have one to thirty-two, Kansas has one to nine, Nebraska has one to fourteen, the two Virginias have one to fourteen, and Alabama and Georgia one to thirteen. The whole country (leaving Alaska out of the calculation), has one to seventeen. The natural resources and industrial possibilities of the two Virginias are quite equal to the average of the seven central States named above, which now have one mile of railway to five miles of area. The same is true of Georgia and Alabama. To give these four States one mile of railway to five of area will require the construction of 23,200 miles of additional roads. To increase the railway mileage of Minnesota and the two Dakotas to one mile to nine, the same as that of Kansas, requires the construction of 16,000 miles. That one to nine is not a high percentage of railway mileage to area for these three States is proven by the fact that Wisconsin already has it, although she is bounded upon the east by Lake Michigan, and has water communication to tidewater for the shipment of her surplus products to market. To increase the railway mileage of these three rich agricultural States to one to five will demand an addition of 33,000 miles. The great State of Texas, rich almost beyond calculation in the advantages of fertile soil, healthful climate, and variety of her productions, lying upon the Gulf of Mexico in close proximity to the Nicaragua Canal, when completed, with the markets of the eastern as well as the western coast of South America at her very doors, and with unlimited advantages and possibilities for industrial development, has only one mile of railway to thirty miles of area. To increase it to one to nine requires the building of 21,000 miles, and to raise the ratio to one to five, 45,000 miles.

California, with its wonderful mineral and marvellous agricultural resources, its unequalled possibilities for fruit culture, its charming and healthful climate, and its commanding position upon the Pacific, has only one mile of railway to thirty-five miles of area. If any State in the Union can support one mile to five, when its industrial possibilities are fully developed, it is California. To increase its railway mileage to one to nine compels the addition of 13,000 miles, and to increase it to one to five requires 27,000 miles.

Oregon and Washington, also possessing immense wealth in their agricultural lands, mines, forests, fisheries, genial and healthful climate, and unsurpassed location upon the Pacific coast for commanding its trade, with no less than six transcontinental railway lines, including the Canadian Pacific, giving them direct communication with all parts of the continent, have only one mile of railway to forty-six miles of area. To give them one to nine requires 18,000 miles; to increase it to one to five, 29,000 miles. No one familiar with the agricultural, commercial, and industrial possibilities of these two States will deny that they are greater, all things considered, than Kansas or Wisconsin. Kansas and Wisconsin will unquestionably in the near future increase their railway mileage to one to five of area.

New Hampshire and Vermont have one mile to eight. Their agricultural and mineral resources are limited, their climate severe. They produce very little of the raw material consumed by their manufacturing industries. They are not in a position to secure any large percentage of our transcontinental traffic through their territory, and yet they have a high percentage of railway mileage to area. Leaving out of the account Alaska, the United States has 3,000,000 square miles of territory and 175,000 miles of railways, or one mile to seventeen. To increase it to one mile to nine requires the building of 158,000 miles, and to increase it to one to five, 425,000 miles, which, with the present mileage, would make a grand total of 600,000 miles. The States which have the highest percentage of railway mileage to area have the greatest accumulated wealth per capita, the largest population per square mile, and the greatest industrial development. The construction of railways invites and secures population. The incoming of population stimulates the construction of additional railways. Railways and population insure the development of the natural resources of the territory occupied, and encourage the promotion of industrial institutions; railways are beneficent in the results which they secure to humanity. The greater the general intelligence, the greater the necessity for them and the more helpful they become. They promote the dissemination of knowledge and general intelligence. They are public educators. They unite and bind together all sections of the nation by creating a common commercial interest among all the parts. They precede, encourage, and insure development, and development insures their increase, financial success, and usefulness. To secure the development of the resources of our Southern and trans-Mississippi States to the same extent as has been accomplished in the seven Eastern and central States above referred to, demands the construction of 225,000 miles of railways. To obtain it requires the expenditure of $15,000,000,000. The expenditure will add three times the amount to the accumulated wealth of the country, as well as increase the productive power of the nation and strengthen the interests of all the parts in maintaining the integrity of the whole.

The productive value of railway property is greatest in those States which have the highest percentage of railway mileage to area.

Some of our trans-Mississippi States, by unfriendly legislation, are seriously discouraging railway construction west of that river. Their object is to force a reduction in railway transportation charges. Their policy is unwise and unjust, and delays what they most desire and need—development of their marvellous natural resources.

Their true policy to pursue is to stimulate railway construction by friendly legislation and by all lawful and honorable means; to abolish all laws which deter capital from being invested in them; to aid the development of all useful industries which will increase and diversify railway traffic—and then a reduction in transportation rates can come, and will come, without destroying the efficiency of their railway lines.

The increase in the market value of the farming lands in our trans-Mississippi States is one hundredfold greater than all the gain from the construction and operation of all our trans-Mississippi railways.

The magnitude of the interest involved and the beneficent material results which it has secured to the nation, and its influence in promoting and maintaining a common national sentiment in all the parts, demand that our railway system should have the active support of the national Government, and that no foreign railway system should be permitted to prey upon American traffic.

The construction of 225,000 miles of railways in the comparatively near future and the attendant results mean an enormous increase in our already wonderful industrial development. When the financial thunder storm which has for the moment disturbed our financial, commercial, and industrial affairs has passed over, if our people in our trans-Mississippi States will abolish their hostile railway legislation and enact such laws as will be helpful, railway construction will proceed in those States, and rapid development will continue.

It is to be hoped that the "New South" will turn its back upon the past and catch the true spirit of progress and outrun the East, North, and West in the race for internal development.

A completed railway system of 400,000 miles means an enormous expenditure of labor for renewals of roadbed and rolling stock, a permanently increased demand for iron, steel, and skilled labor, and the annual disbursement of nearly $2,000,000,000 for operating expenses. The great, beautiful, and generous city of New York, the financial, commercial, and industrial centre of the nation, will heartily cooperate with all sections in their endeavor to promote the common weal.

FRANCIS WAYLAND GLEN.

BROOKLYN, Sept. 26, 1891.

ANOTHER VIEW OF BRAZIL.

It is a Republic in Name Only.

To the Editor of The Sun—*Sir:* Brazil is a republic only in name, as are the other South American republics. In reality it is an aristocracy, pure and simple. As is but natural in a country where the mass of people are wholly ignorant, those few who have the advantage of education are absolute masters of the political affairs of the nation, and the populace have no voice or share in the Government. Then, too, since the vast majority of Brazilians are of African or Indian descent, those who have a predominance of Caucasian blood in their veins come to the front and the race asserts itself, as it does elsewhere in the world. I doubt if there is any country in Europe, save only Russia and Turkey, where the people have not more power in governmental affairs than in Brazil; and in the other countries of South America the same story may be told.

A revolution there is not the revolt of the people or of part of the people against the rulers, but the revolt of one faction or clique against another. There was never any popular uprising in Brazil at the time of Dom Pedro's deposition. His overthrow was accomplished by a few men in Rio de Janeiro. The people are so ignorant and indolent that a change from a monarchy to a republic was of no moment and occasioned little excitement. It will be apparent, therefore, that the time is far distant when the people of Brazil will "assert their right to rule." In fact it would seem that the people of the African and Indian races who compose so large a proportion of Brazilian population can never assert a right to rule over Caucasians. S.

THE BROOKLYN SCHOOL CONTEST.

Mr. George T. Dowaing Expresses His Views.

To the Editor of The Sun—*Sir:* The abuse and misrepresentation poured upon the Hon. T. McCants Stewart because he has accomplished certain desirable ends, and advocated certain policies which I commend, is the reason for sending this. I have no personal feeling in the matter.

It does not contribute to that peace and good feeling best adapted to a successful management of the public school system, for parties to stir, witch-like, the pot of confusion; to make it foam and boil with rage over the resolve not to employ a certain school teacher, especially when the following facts constitute the real merits of the case:

Miss Putnam, a virtuous and otherwise estimable colored lady, is a veteran school teacher who enjoys an excellent reputation as a disciplinarian and a teacher, a reputation gained in teaching the lower branch of education in a Brooklyn school. This sphere has been her limited field of effort for many years; she also enjoys the reputation of being a persistent "buttonholer."

There is evidence of her discouraging the modern system of instructing; of her clinging to the past; she treats, at least coolly, if I may not say boldly, in an antagonizing manner, the advance idea of non-proscription on account of color in the management of public instruction, so nobly contended for by Dr. Philip A. White.

Should the lady be successful in creating feeling, vituperation, and abuse through her influence with certain parties? She desires to be placed, not simply in but over a school beyond the grade she has been confined to in her school career of late years, her ability to manage which, to say the least, is questionable; eight out of ten of the scholars of which are white. Should the chance of competent colored teachers being promoted and placed over such schools, in fact, in them, be hazarded by persistently pressing to have a colored teacher put into a position she is not qualified to fill? This is aside from her being opposed to the principles upon which the school is managed. EQUAL RIGHTS.

THE OBELISK.

What Should Now Be Done With It?

To the Editor of The Sun—*Sir:* The original suggestion of the transfer of the Alexandrian obelisk to our Central Park was made by a former editor of a New York journal, and the watchful care and friendly influence of the press have never yet failed this lonely monument in a strange land.

Every friend of our obelisk must cordially assent to the timely caution expressed in a recent editorial in a morning journal lest anything be done during the present process of restoration with the mere purpose of decoration. The only safe action is to replace the former gilding of that monument so far as certainly known, i. e., the gilded cap and the gilding of the hieroglyphs. It is well established in regard to the Egyptian obelisks not merely that "some were decorated very elaborately," but that most of them of all periods were capped and gilded in the manner above stated. Indeed, all the obelisks of the eighteenth and nineteenth dynasties were so adorned from the reign of Queen Hatshepu and of her successor, Thothmeses III., the builder of our monolith, at least down to the reign of the great Rameses II., who added his gilding to the brilliance of our shaft as well as to his own monoliths at Luxor, with their glistening caps and gold-filled intaglios. The evidence on this subject has been recently reviewed in the March number of the bulletin of the American Geographical Society.

As to a finial upon the pyramidion, however, with the exception of the "sitting figure of a man," formerly seen by travellers upon the summit of the obelisk which still remains on the site of the ancient city of An, there is little or no evidence of such a termination to any shaft in Egypt. It would plainly be unwise, therefore, to venture from Roman precedents on the selection and addition of a ball, bulb, pschent, flame, or other object as a finial to the New York obelisk, even the "sun-sphere," suggested in the editorial referred to, as in correspondence with "the sunburst in the coat of arms of New York" or that of Erin. For the upper half of the pyramidal top of our obelisk it is proposed, by the Park authorities, to replace simply a pyramidal cap of thin, durable metal (gilded aluminium), fitting closely to the faces of the pyramidion, to present to the rising sun the golden crest which always glittered on these symbols of the sunbeam at daybreak in Egypt thirty centuries ago.

The adage which formed the heading of the editorial, "Why Gild the Lily?" is a modified quotation belonging now to a class of already mouldy saws which are unsafe guides. Nature has both painted and gilded the most royal of lilies, "the golden-rayed" lily of Japan; and the poorest use to which this lily could be put would be to lay it aside, to darken and shrivel as a "venerable relic," rather than to do all we could to keep the glorious *Lilium auratum* alive in all her golden splendor. The gilding, which is an integral part of the lily, is equally essential to this sun symbol from the Orient. Our museums contain enough "ruins and dilapidated things" to stir our imaginations, and we have a better use for our obelisk. The chief ruin about our stout monolith is that which we allowed to begin just after its erection here, between the years 1881 and 1885, but, thanks to the decision of our Board of Park Commissioners, that ruin has entirely stopped since that date, and there is no longer call for solicitude. Through the careful application of the preservative to the partly injured surface, and the further protection which may be expected from the replacement of the metal cap and gilding, we trust our obelisk shall yet stand for a thousand years or more as a symbol of gladness and hope. Its partial loss of the ancient polish, nicked edges, and almost entire loss of the original bright rose-red color of the granite of Syene emphasize the more the necessity of the restoration of the gilding over the deeply-carved hieroglyphs.

As there appears to be, unfortunately, no present appropriation for the amount yet needed for this latter purpose (about $1,000) within the reach of our Park Board, it is to be hoped that a friend of the obelisk may speedily come to its aid by a donation of this amount before the present costly staging is removed. The regilding—which the archæologists of London and Paris have been as yet unable to accomplish for the dismal and discolored Egyptian monoliths in those cities—will then restore to this most interesting obelisk of New York its original beauty and intended effect, and will render it unique among all such monuments in its truthfulness to the past. ALEXIS A. JULIEN.

COLUMBIA COLLEGE, Sept. 20.

SOCIAL SCIENCE.

A Study of Barbers.

To the Editor of The Sun—*Sir:* The question in The Sun of Sept. 19: "Has anybody ever seen an elderly barber?" has prompted me to make some inquiries, not only about this matter, but as to several other facts and features of the tonsorial art and to a study of those who practise it. My conclusions are that among the most industrious, quiet, respectable, and intelligent workingmen of this and every other place are the barbers. As a class, barbers are modest men. Whoever heard of a barber obtruding himself or of manifesting the habits of a "prominent" citizen? Whoever heard a barber make a speech or "speak in meeting" or join with others in giving three cheers? I know a barber in Troy who was successively a private, a Major, a Colonel, and then relinquished the sword he had wielded so well and again took up the lather brush, the razor, and the shears.

As a class barbers are good citizens, and among them are many men of rare intelligence, with whom it is a pleasure to hold conversation. There are, to be sure, some who talk a great deal and don't say much, and others who, when your mouth is submerged with lather, persist in questions to which common politeness requires a reply. These last should be put in the Litany.

Barbers seldom mingle with men of other trades and professions. They keep by themselves—very much by themselves. Except in very rare instances they do not get rich; but they live decently, dress respectably, deport themselves commendably, pay their ways, as a rule, keep out of debt, or pay debts upon honor when they are able to contract them. Barbers are not often known to talk loud, or swear, or indulge in the vulgarity of speech. Of all gossips they are the most cautious. They are never direct in personal criticism, and rarely even inferential; but they eat onions. Strange as it may seem, but an experienced barber told me, the eating of onions is done in self-defence. "Why," said one to me, "the public don't know what a barber has to suffer from some of his customers."

Finding my barber to be an intelligent man and of many years' experience in the profession, I thought it a good opportunity to get further information on various points of custom, fashion, and peculiarity, and therefore asked:

"How is the hair worn now?"

"Longer than it has been, especially on the back of the head. The regulation cut is two inches for the front and half an inch for the back of the head. Men bald on the crown are usually very particular about the cut of their side and back hair. They want it left longer."

"Are hair dyes, pomades, bear's grease, and the like used as much now as formerly?"

"No. Hair dyes are no good. I do not sell them or use them any more. I have been in the business now more than forty years, and I have never yet known any successful artificial means of making hair grow on bald heads. We generally ask customers if they will have grease or pomades applied, and there are very few who say yes. The nasty custom of their use went out when it became the fashion to wear the hair short."

"The fashion of wearing the hair has changed very much, has it not?"

"Well, I should say so. Why, when I first worked as a journeyman barber in New York (let me see, that was more than forty years ago) the custom and fashion was for men to wear their hair long. We were called hair dressers then. The style then was to part the hair on each side of the head, about on a line with the eyes, comb it straight down long in front of the ears on the sides, into 'soap locks,' while the hair on the top of the head, between the two partings, was rolled backward in graceful coils and curls. Those were the days for bear's grease and pomades. It was a most hideous fashion. Why, a man with his hair dressed in that manner now would be taken for a—fool."

"Is it much of a knack to cut hair; and how do barbers become barbers anyhow?"

"Any man with a steady hand will soon learn how to shave. Hair cutting is much more difficult, to do well. Boys come to barber shops to black shoes and to brush customers' clothes, to sweep out the shop and do chores, and somehow they gradually work into the use of the razor and the shears, and pretty soon set themselves up as barbers."

"How about shaving?"

"Sandy-complexioned men are hardest to shave. They have thin and tender skin, and are much more liable to get cut. There are some faces like glass; the razor glides right over them. Full-faced men shave the easiest. There are men who shave every day, and more who shave three or four times a week."

"How about whiskers, beard, and moustaches?"

"Few men, especially as they grow old, can afford to do without hair on the face in some form. They look better for it. Occasionally there is a handsome man, like ex-Sheriff-Senator Jas. O'Brien, for instance, who lives to be fair and smooth and fresh if he lives to be a hundred. These are the kind of men who look best with a 'clean' face. The moustache is becoming to almost any face, and is very popularly worn. Side whiskers, if worn at all, are worn short, seldom below the mouth and kept well clipped."

"How do present prices compare with those of the past?"

"In 1856, when I went into business for myself in a shop corner of Ninth street and Broadway, New York, the regular price for a shave was four cents, and for a hair cut nine cents. Journeymen barbers then received $4 a week and were boarded by their 'boss.' Now, the regular prices in all first-class shops are 25 cents for a shave and 50 cents for a hair cut. In my two shops I run from sixteen to twenty chairs. I pay my men $15 a week each and my foremen $20 each a week. A fair average week's earnings for good men is $50. The best day's work I ever knew one of my men to do was here in Saratoga. It was a Convention day. He earned $22. Men will occasionally earn from $12 to $15 a day, but a fair average is $50 a week."

"Is it a growing custom for gentlemen to shave themselves?"

"I think, on the whole, it is. Merchants and professional men are the most regular customers. With gentlemen the practice of shaving themselves is regulated somewhat by fashion. Now they do it, and, again, pretty soon they don't do it. Among my regular customers in New York used to be Jay Gould and the Vanderbilts. I shaved William H. Vanderbilt in my Windsor Hotel shop that day less than two hours before he fell dead in his own house. Jay Gould didn't shave. He wore a full beard, and he was very particular about having it and his hair well kept."

"The habits of barbers are good."

"Yes, as a rule. They are not drunkards, nor heavy drinkers. They cannot be and carry a steady hand and do safe or good work. Their chiefest tendency here is to bet on the races, and everywhere to fight the faro bank."

"And now, what becomes of all the barbers when they get to be old?"

"It is a fact that nearly all the journeymen barbers are young men. Customers prefer such. When a barber gets to be, say, about forty to forty-five years old, he somehow drops out, goes at something else—opens a cigar stand, or sells beer, or such like, or gets a little piece of land and raises chickens or garden truck. The mistake of many is they try to hang onto the razor and the shears too long."

"Do barbers become rich?"

"I can best answer that question by asking another: Do any men get rich with their coats off, or by the labor of their own hands?" A. G. PEASE.

SARATOGA, Sept. 20, 1893.

A Lament for Wanamaker.

To the Editor of The Sun—*Sir:* I never use one of the artistic Columbian postage stamps that I am not filled with lamentation that they are to be so soon discontinued. Where in the world is there another set of stamps equal in coloring and beauty to these?

Do you not think well enough of them to urge their continuance? JULIA L. LANGDON BARBER.

DOBBS FERRY, Sept. 25.

NOTES ON SCIENCE AND INDUSTRY.

It appears that the experiments for some time past made in France for obtaining a satisfactory method of color printing on leather have been so far successful as to open up a prospect of a new and attractive industry. The method, as thus perfected, and which is described in its essential details in the columns of *L'Industrie Textile*, is easily practicable. The skins must be free from grease, and if they have been prepared with tannin are first steeped in a preparation of sumac. The application of the color can be accomplished in several ways, according to the effect which it is desired to produce, and in one of several colors. It can be done by dyeing the skin and discharging with acids in certain parts, so that the natural color of the leather appears, or printing with a reserve composed of four parts of virgin wax, four of castor oil, one of borax, and one of copal varnish, these ingredients—all of course of the purest quality obtainable—being mixed together and warmed. The castor oil may be replaced by any mineral or vegetable oil.

The recent successful test, as announced, of a small copper model gun, tempered by the process invented by Allard of Quebec, has attracted considerable attention. Before firing the gun was carefully gauged at two different points, one and two inches from the breech end of the powder chamber. In the first experiment the gun was charged with three-fourths of an ounce of sporting powder, and wadded with a plug of paper driven well home with a mallet. After firing the charge the gun was examined and gauged at the above-mentioned points, and the diameters were unchanged. The next test was a very severe one, one and three-fourths ounces of sporting powder being used, leaving only sufficient room for a plug of paper, which, as before, was driven hard home, filling the piece to the muzzle. This charge was fired with Bickford fuse, and subsequent examination of the gun showed no flaw or perceptible expansion.

A new London steam plant has been constructed of a character so largely automatic in its various mechanisms as to appear almost independent of human attention. This is particularly marked in the case of the huge boilers, in the management of which, so long as the steam pressure is under 100 pounds, the automatic stokers keep steadily at their work feeding the furnaces, and the steam blast keeps the fires roaring. As, however, the indicator on the pressure gauge creeps up toward the 100 pounds, a driving belt begins to slide off one wheel on to another, and precisely at the maximum pressure the steam blast is shut off, the stokers stop dead, and the fires begin to die down; then the driving band begins to reverse its movement, and presently the steam blast is turned on and the fires begin to be fed again, the vast and magnificent driving wheel of thirty feet in diameter, in the centre of the building, all the while revolving with the utmost possible steadiness and regularity. The self-regulating character of the different parts is pronounced one of the typical wonders of modern machinery.

According to a correspondent of the "Photographisches Archiv," the desideratum of printing photographs on marble has now been realized to such a degree as to insure a genuine artistic result, and this by a process both simple and economical. In carrying out this method, an unpolished plate of marble is carefully coated with a solution consisting of five hundred parts benzine, five hundred parts spirits of turpentine, fifty parts of asphaltum, and five parts of pure wax; when dry it is exposed under a negative, which will take in sunshine, about twenty minutes. After developing with spirits of turpentine or benzine, and washing in plenty of water, the plate is covered where it is intended to be left white with an alcoholic solution of shellac, and this is immersed in any dye which is soluble in water; after a certain time has elapsed, and when a sufficient quantity of the coloring matter is found to have entered the pores of the stone, it is taken out and polished, the product being very satisfactory.

A more effective extraction of iron from the gangues, ore, or sponges in which it exists, is now effected by means of a contrivance consisting, as briefly described, of an endless belt or band, having along its surface a series of conducting strips, and by means of a series of rollers above and below the band it is made to assume an undulating, corrugated or serpentine form: this band is placed in an inclined position, so that the ores dropped upon it travel naturally upon an inclined corrugated plane, means being also provided for imparting to the strips, upon the band, or passing through it, an electric current. Upon this corrugated band the ores or gangues are dropped. The current passing through the conducting strips, crossing the same, causes the particles of iron on the band to attach themselves to the conducting strips. At the same time a stream of water is directed upon the band, which, being inclined, flows in the direction opposite to that in which the band is travelling, washing backwardly the gold or copper or other metal composing the gangue or sponge which does not adhere to the metal strips that continue to flow backward until washed off of the lower end of the band into a receptacle placed there to catch them. The iron particles continue to adhere to the strips and travel with them to the other end of the apparatus, when the circuit passing through the strips is broken, and the iron particles fall to their designed place.

Improvements have been made in the purification of lead and the recovery of silver from argentiferous lead, which result in the production of chlorine—a gas which can be most advantageously employed in chemical manufactures. The operation is said to be very simple; that is, the chlorides of calcium and magnesium are decomposed with lead nitrate, and the lead chloride so formed is utilized for the electrolytic production of chlorine, while the nitrates of calcium and magnesium, which are also the results of the decomposition, are heated for the recovery of nitric acid, which is used for dissolving fresh quantities of crude oxidized lead to form lead nitrate. Silver and other metals, it is found, may be precipitated from this solution by the addition of spongy lead. The fused chloride is, according to the above proceeding, electrolyzed in a glazed earthenware or enamelled iron vessel kept at a suitable temperature; the cell is closed on the top, and is provided with a feed pipe for the lead chloride, a chlorine outlet pipe, and a siphon for drawing off the purified molten lead. The carbon electrodes—alternately anodes and cathodes—are securely fastened to the lid. Or, the carbon plates may be all anodes, the molten lead forming the cathode.

The largest locomotive ever built in England—an honor belonging to the Messrs. Hawthorn of Newcastle—runs upon a four-wheeled leading bogie and two pairs of independent driving wheels of seven feet six inches diameter, and there are four high-pressure cylinders. Two cylinders placed inside under the smokebox are seventeen by twenty-two inches, and actuate the first pair of driving wheels; two outside cylinders are placed behind the bogie wheels—they are sixteen and one-half by twenty-four inches, and work the second or trailing pair of driving wheels; the total tractive force exerted by the four cylinders upon the four driving wheels is, therefore, one hundred and forty-three pounds for each pound of effected pressure. The boiler works at a pressure of one hundred and seventy-five pounds, but is constructed to carry two hundred pounds if necessary, and it is of oval section, in order that it may be placed between the tops of the driving wheels. The number of tubes is one hundred and eighty-nine, with a diameter of two and three-eighths inches, sixteen feet long, and a total heating surface of two thousand and eighteen square feet. The area of firegrate is 28 square feet, the weight of engine in working order sixty tons, and the tender when loaded tons.

Experiments have been made with the new plan of wire shafts for steamships, the result showing that when the shaft is in position and rotating stress is applied, a tensile force is exerted upon the individual wires and their several fastenings—each is a unit of strength sustaining its part of the total amount of stress. The strength of the individual wires and of the fastening being known, it is practicable to ascertain the strength of the shaft as a whole. Thus, if made, for instance, in five sections, its total length one hundred feet, and its diameter fifteen inches, the shaft will have twenty-five thousand No. 7 steel wires, each twenty-feet long, with their fifty thousand fastenings; each wire and each fastening will sustain a load of five hundred pounds without rupture or injury, making a total inherent strength of 37,500,000 pounds, or twenty-five times greater in amount than the continuous force of an engine of five thousand horse power. A stress of twenty-five pounds only upon each unit of strength—each point of resistance existing in a wire shaft as named—will more than equal the force of such an engine. The details of this plan, as suggested by Mr. Jerome, a well-known engineer, are given at length in the technical journals.

Some of the common ideas concerning asbestos appear to have resulted in mistakes of a serious practical nature. Thus, the usual conception that it is no wise affected by heat is true only to the extent that, though infusible except at very high temperature, it is a fact that only a very moderate degree of heat—heating to low redness in a platinum crucible, for instance,—is required to entirely destroy the flexibility of the fibre, and render it so brittle that it may easily be crumbled between the thumb and finger. Another mistake is that relating to its high non-conductivity or power of resisting the action of heat—the assumption being that because asbestos is infusible, it must, of necessity, be a good non-conductor. The contrary assertion to this is made and proved on good authority, namely, that by placing a vessel of water on a sheet of asbestos cardboard, and applying heat from below, or, more simple proof still, by placing a piece of wood on a sheet of asbestos millboard on a hot stove. If, however, asbestos is teased out and worked into a fluffy mass, there is thus obtained a non-conducting material, but it is the air enclosed by the fibres that is the real non-conductor, the asbestos serving simply to entangle the air.

The sugar interest, commercially and industrially considered, has been enhanced in value by the introduction of some highly perfected machinery, the latest example being an evaporating apparatus for insuring complete and rapid circulation of the cane juice, combined with the most effective distribution of the steam for heating the juice. The condensed water outlets from the calandrias are made very large and are connected to special water and vapor receivers; there is also an ingenious arrangement of pipes and cocks connected to the main condenser, and by means of which gases of any density, lodging in any part of the calandrias are immediately drawn off, the accumulation of such gases being one of the sources of interruption to the free distribution and circulation of the vapor steam in the calandrias. The usual back pressure or exhaust steam of three to five pounds per square inch is ample to work the apparatus, which is automatic in its action. Both labor and fuel are said to be largely saved by the use of this apparatus.

A very extensive series of experiments has lately been conducted by Prof. Liversidge of Sydney, New South Wales, with almost every description of iron ore from all quarters of the globe, and with other bodies, such as spenel, garnet, serpentine, bornite, tin-stone conglomerate, artificially prepared ferric hydrate, jewellers' rouge, chrome iron, franklinite, hornblendschist, and dufrenite. Samples of each of these were ground in a porcelain mortar and crushed to a fine powder in an agate mortar. An electro-magnet, capable of lifting eighteen ounces, was employed; and in all cases but one, viz., pyrrhotite, where the mineral showed signs of a magnetic property, varying amounts of magnetite were separated out of the powder by the magnet. The portions separated by this means were in every case analyzed chemically in order to make sure that they consisted of magnetite; and thus the magnetic properties of specimens of chrome iron, franklinite, spenel, garnet, some hematites and other minerals, were found to be entirely due to the presence of particles of magnetite distributed through their mass, and only pyrrhotite shares with magnetite the inherent property of being attracted by the magnet.

An expert in railway matters declares that the day is not far distant when the switching engine will be entirely done away with, its place being taken by the electric capstan. The latter is already in use to a certain extent on some of the Pennsylvania lines. The motor, which actuates the capstan by means of gearing, runs at the rate of some twelve hundred revolutions a minute, and the gearing, motor, and switch of the capstan are all contained in a water-tight iron case, the top of which comes flush with the ground; there is a cover to it which is readily removable, so as to give easy access to the motor for oiling and cleaning. The wires containing the current for the motor are carried through an iron pipe below the surface of the ground, and the switch for starting and stopping the motor is operated readily by the foot of the attendant in charge of the capstan.

THE FAMOUS PONY EXPRESS.

Fast, Hard, and Dangerous Riding with Letters for the Gold Diggers.

The regular work of the daring and romantic overland Pony Express riders has never been exceeded, even by the recent specially trained for long distance riding of the German and Austrian army officers. When it is considered that those Pony Express riders travelled over a wild country, without bridges, or even roads deserving the name, crossed two great mountain chains, vast alkali deserts, and had to fight Indians and wolves along much of their journeys, and that the average time made was 250 miles a day, it will be seen that even the Governments which pay attention to such matters have no such courier system to call upon. But this system was organized for the accommodation of the gold miners of California, who were able and willing to pay, and in fact did pay, $5 for each half ounce of mail brought to them from the old folks at home by the daring little Pony Express riders. Each rider was limited to fifteen pounds of mail, which was divided into four packages of equal weight and carried in saddle pockets, two in front and two behind the rider. So it will be seen that each rider carried mail for which the company received $1,200, in addition, of course, to the United States postage.

The route of the Pony Express began at St. Joseph, Mo., and extended due west to Fort Kearney, Neb., thence up the Platte River to Julesburg, Col., across the Platte and to Forts Laramie and Bridges, Wy., and on to Salt Lake, Utah. The descent into the plains of Nevada was made by the route through Ruby Valley and thence along the Humboldt River. The Sierra Nevadas were crossed by way of Cañon City, Placerville, then known as Hangtown, and the Sacramento Valley, reached by the road the miners had made down by Folsom to Sacramento, and thence along the valley and over the foothills into San Francisco, where the long journey ended.

There were always eighty riders in the saddle, forty going east and forty west. Change stations were close together, especially over the mountainous sections, as the ponies were kept at top speed from station to station, no matter what kind of country they had to travel. Many of the brave light weights who rode in the Pony Express service lost their lives in Indian fights, for the gentle red man seemed to esteem it a peculiarly high honor to dangle an Express rider's scalp at his belt.

The wonder was that the service was kept up at all; that so many of the riders escaped the Indians, and the dangers of flood, storm, snow, heat, and cold. Their chief advantage in encounters with the Indians was that the Pony Express riders were always better mounted, on better fed horses, than the Indians, and could take care of themselves in a chase. They were a wary and experienced lot and difficult to ambuscade, so that while an occasional scalp was lost there were not many of the letters longed for which never came over that dangerous route.

The Pony Express went out of existence when the overland railroad and telegraph service was completed in 1869. Few of the old riders are still living, and the promoter of the scheme, William H. Russell, and his chief assistant, B. F. Ficklin, are both dead.

SNAKE STORIES FROM DUTCHESS.

Now that the Crops are Safe Farmers Spin Yarns of the Haying and Hard Cider Season.

POUGHKEEPSIE, Sept. 25.—With the coming of the equinoctial storm Dutchess county farmers get a chance to sit down and think over the incidents of the past summer, and from reports so far received the crop of snake stories is fully up to the average. "Pop" Ball of Podunk Hollow, the best judge of whiskey on the whole of Bog Ridge, comes to the front with a series of remarkable tales, which are vouched for by his nearest neighbor, "Squar" Reach. He says that on the 14th of last June, shortly after sun-up, while he was catching trout out of Jones's Brook by the old-fashioned method of tickling them under the belly, he saw a mammoth water snake mesmerize a toad, getting the latter so completely under his control that when he finally swallowed him the victim did not so much as wink his other eye. The toad, as "Pop" Ball tells the story, was sitting on the bank of Jones's Brook, ruminating over a particularly delicious insect it had just enveloped, when his snakeship cautiously poked his glossy nose from beneath the swamp grass near by and fixed his beady optics on the toad. Both remained perfectly quiet for several minutes, when the toad began to twitch, and a slimy substance oozed from its skin. The convulsions passed over in a few minutes, when the snake slowly wriggled up to its prey and in the course of half an hour had completely swallowed it. "Pop" Ball, in the presence of "Squar" Reach, killed the snake and released the toad, which was none the worse for its entombment.

Along about the latter part of August "Pop" killed a blacksnake in Reach's meadow, which had a two pound and a half bullhead stuck in its throat by its horns, which penetrated the skin on both sides and were plainly visible on the outside of the reptile. But the most remarkable snake that "Pop" came across was at Bullis's pond early in September. It was a milk snake and lay under a pile of old logs which "Pop" pulled down in search of dry timber for a camp fire. When the first log was disturbed the snake glided out, followed by eleven young ones, who, to "Pop's" amazement, disappeared down their mother's throat. That same day, under the dam at Bullis's pond, "Pop" captured a pound and a half trout with a "coachman," and hanging to the trout's tail was a water snake three feet long. He believes that the snake grabbed the trout just as the latter made a dash for the fly.

UTAH AND NEVADA.

Conditions Influencing the Union of the Two as a State of the Union.

After a divorce of more than thirty years, Utah and Nevada may soon become one again. On the very day in September, 1850, when California became a State of the Union Utah was erected into a Territory, and much of what is now Nevada was included in the new jurisdiction thus created. The Territory then had an area of more than 220,000 square miles and a population of a little over 11,000. The Mormons had settled in the region three years before. Brigham Young, their leader, was appointed first Governor of the Territory. "Gentile" settlers in that part of Utah since included in Nevada almost immediately began to complain of oppression at the hands of the Mormons, and in 1859 the Nevadans attempted to set up for themselves by making a Constitution and electing State officers. The Federal Government had already found it necessary to send troops against the Mormons, and early in 1861 Congress was induced to take Nevada away from Utah and to erect it into a separate Territory, with James W. Nye as Governor. The region had by that time become famous for its precious metals, and in the next decade population increased from about 7,000 to 42,500. During the same decade the population of Utah increased from about 40,000 to nearly 87,000, exclusive of tribal Indians.

Utah, left to herself by the gentiles, went on growing up as an agricultural region, with incidental mineral wealth, while Nevada rapidly attracted all sorts of people to her mines. In 1880 Nevada's population had increased to 62,266, while that of Utah had reached 144,000. The partial exhaustion of Nevada's mines and the rapid decline of silver reduced the population of Nevada during the next ten years to less than 46,000, while Utah, although she has felt the decline of silver, has increased in population to about 203,000.

As matters now stand the State with two Senators and a Representative in Congress has a population of less than 45,000, while the Territory with a single delegate in Congress, not entitled to vote, had, according to a recent estimate of its Governor, a population of 223,000, and will shortly have 250,000. Were Utah and Nevada combined into a single State it would have a population of about 275,000 and an area of nearly 200,000 square miles. There are already four States of smaller population, and Texas alone has a greater area. Utah has property assessed at about $120,000,000, and Nevada's assessment is about $100,000,000 less. The revenue of Utah is nearly $675,000. She has sheep, cattle, horses, and mules valued at $8,500,000, and her wool clip is 12,000,000 pounds. Her output of metals was valued in 1892 at $11,500,000. It will be considerably less this year, because $8,750,000 of last year's product was in silver, and the silver mines of Utah, as those of Nevada, have been closed because of the depression in that metal. Utah produces, in addition to the precious metals, iron, copper, sulphur, onyx, and several other minerals. Within the past few years there have been discoveries of natural gas in the territory, and it is believed that this may become an important product. The banks of Utah at last report had a capital of nearly $4,000,000 and deposits of nearly $12,000,000. At the same time, in the fiscal year of 1891-92, the wages of workingmen varied from $2 to $2.50 per day for laborers up to $4.50 to $5.50 for bricklayers and stonemasons. The pay of clerks was from $50 to $100 per month, of barbers from $15 to $20 per week, and of bakers $21 per week. The hours of labor were usually nine per day, though in several trades eight, and in only one of a long list ten.

While the people of Nevada have been almost exclusively occupied in mining, the people of Utah have determinedly set themselves to reclaim the desert land in which they live. Not satisfied with irrigating sandy wastes until they were green with growing crops, they have even undertaken to stock their streams and brackish lakes with fish. They tried the audacious experiment of turning millions of young shad into several of their lakes and rivers, apparently with the idea that the shad would find the brackish waters of Utah congenial, and with the result that, for a time, native shad, weighing from one to two pounds, were sold in the markets of Salt Lake City. They have, however, since become scarce.

Practically all political parties in Utah professed two years ago to be in no hurry for Statehood. Even the newspaper organ of the Mormon Church declared that Utah ought not to seek admission to the Union. The election for the Legislature of 1892, however, was the pivot on which the people of Utah divided upon national issues, and almost immediately afterward the demand for Statehood began to be made. The Democrats triumphed in that election, and the Republicans failed to send a single member to the Legislature. The Liberals, as they call themselves, being the gentiles who still fear the power of the Mormon Church and oppose the admission of Utah into the Union, sent a minority to the Legislature. An important piece of legislation, passed unanimously by that body was a law making polygamy a penal offence.

The conventions of the three parties, the Democratic, the Republican, and the Liberal, in nominating candidates for delegate to the Fifty-third Congress adopted resolutions upon the subject of Statehood. The Democrats boldly declared in favor of the admission of Utah into the Union; the Republicans did the same thing somewhat apologetically, and the Liberals declared themselves unutterably opposed to Utah's admission. The Democratic candidate was elected.

Salt Lake City, now a place of about 50,000 inhabitants, is the stronghold of the Liberals. It was here that they long fought the despotism of the Mormon Church, and they now refuse to believe that conditions are so changed that the Mormons may be trusted with political power, even though they ally themselves with one or the other of the great national parties. The Liberals have counted much upon the countenance of the Utah Commission, a body that has usually preserved an attitude of distrust toward the Mormons. Perhaps the thing that has done most to popularize the demand for Statehood among gentiles was the declaration of the Mormon Church leaders in September, 1890, that by a special revelation from God the saints were permitted to discontinue the holy practice of polygamy. The whole body of the Church accepted this declaration then and a year later, and the Mormon leaders made this the basis of a prayer for amnesty addressed to the Federal Government. The leaders declared that for a year there had been, as far as they knew, no plural marriages celebrated. The Utah Commission expressed doubt of the truth of this declaration, but recommended the amnesty. At the same time the Commission's report of 1892 showed that the chiefs of the Mormon Church under cross-examination had declared their belief that, although God had bidden the Latter Day Saints to suspend the practice of polygamy, He had not condemned the principle. As one of them said, truth is unalterable.

The Republican party, although it has made some gains since the disastrous defeat of the first campaign involving national issues, is weak in Utah, partly because of its hesitancy to advocate home rule, and partly because of the long struggle with Gov. Thomas, a Republican appointee. The indications are, therefore, that the joint State of Nevada and Utah would be Democratic.

Florida Ants.

From the Savannah Morning News.

GAINESVILLE, Fla., Sept. 16.—There are more ants to the square mile in Florida than in any other country in the world. There are ants which will measure more than half an inch in length, and then there are ants so small that they can scarcely be seen to move with the unaided eye. There are red ants and black ants, and troublesome ants. But as bad as they are, I have never heard of them eating out the seat of a man's trousers, as a missionary, the Rev. Mr. Wilson, once told the writer he saw the army ants do in India while the man was sitting on the earth for a few minutes beside him.

But the Florida ants will take out the lettuce and other minute seeds from the soil in which they are planted and actually destroy the beds. They will suck the life out of acres of young cucumbers and melon plants, uproot strawberry plants or cover the buds with earth to such an extent as to kill them. They will get into pie, pickle, sauce, syrup, sugar, on meat, in hash; will riddle a cake or fill a loaf of baker's bread till it is worthless. All remedies failing, I took to baiting them near their nests with slices of meat, bones, apple and pear parings, and when I had from 50,000 to 100,000 out, turn a kettle of boiling water on them. I have killed during the last week over a million in the space of a quarter acre lot, and I have almost whipped them out. I had to do this to secure any lettuce plants, and many unobservant farmers complain of seedsmen when they should attribute their troubles to insects.

It is very curious and instructive to see how promptly the ants which escape the scalding will go to work taking out the dead, and, after piling them outside first, then go to excavating again and rebuilding their cells and run ways. This being done very quickly, the next work on hand is the laying in of a supply of food, by hauling the dead bodies of the hot water victims into their storehouses. You may see a small black ant hauling and tugging at the carcass of a red ant twenty times its own weight; and he always succeeds, in the end, in landing it in the warehouse of the colony. Next you may see a sort of ambulance corps searching for the disabled. These are taken carefully into the underground house, where the surgeons and nurses are in waiting. Then, too, you may see the timekeepers and bosses directing this one, or turning another back on some errand or to some other duty. There is not a moment's delay, no halting feet, no idle hands, but all move as if it was their last day on earth, and this is the only hour left in which to redeem a misspent life. For lessons in industry and in perfect government go to the ants.

IN A MINIATURE BREWERY.

THE STUDY-PLACE OF MEN WHO HOPE TO BECOME BEER BREWERS.

An Academy in Town That Turns Out Sixty Lager and Ale Brewers Every Year—The Course of Study and the Prizes in View.

There is a complete and model brewery very close to the City Hall, but it is one that never sells its beer or advertises it, or whose proprietors show any concern about what becomes of it. This model brewery plant is one that has recently been added to the apparatus in use in the United States Brewers' Academy, in Worth street, where that street runs into Chatham square. The little brewery, established for the teaching and practice of brewing under the observation of those who want to learn the trade, is as pretty a series of bits of mechanism as any machinery exhibited at the Chicago World's Fair, and it is big enough to brew ten barrels of lager beer a day the year around. It occupies four miniature stories built up within two real stories of the academy building, and it forms a brewery entire, from the make-believe cellars to the kiln of the equally complete malthouse which is joined to it. The plant is more than complete, for it combines apparatus for more than one system, in order to allow students to practise more than one method in any branch of the business upon which the brewers disagree.

The time has gone by when any man with a tea kettle and a washtub can successfully establish a lager beer brewery in any populous part of this country, as was once the case in the days of the fathers of our big brewers, if not in the days and actual cases of some of those brewers themselves. Even after lager beer had become a popular American drink, and when the best brewers had become millionaires, they still followed the old country custom of appointing as brewmaster or foreman any clever employee who had been a good workman and knew how to brew beer by dumb luck and good mimicry of what he had seen other brewers do. That was the rule until within a very few years, and even then the brewers who expected their sons to succeed them followed another old country custom that was the best that they knew. This led them to apprentice their sons to other brewers, and they always sent the boys to the biggest breweries in this country or in Europe, hoping that they would manage to pick up some secret that was at the bottom of such a brewery's popularity. Of course, in nearly all such cases the prosperity was due to shrewd business methods, which might have been studied in the counting rooms of the breweries, but could not be even guessed at by an apprentice among the workmen. When such an apprenticeship had been served the heir to the business came back and waited for his turn to become foreman of a business managed on blind traditions and operated by the force of dumb luck. All that is part of the dead past. The science of beer brewing is based on chemical processes, and the brewers of the future must understand at least as much of chemistry as enters into the business. They not only must know how beer is brewed, but they must understand why one step follows another, and how to detect and remedy any fault that occurs during the brewings.

To put it as one brewer of the new type expressed it, "the old plan was, when anything went wrong with the brew, to suspect that some discharged workman had put something in the mashtub, and to take it out in damning him. The new plan is to take a saccharometer and determine the stage of fermentation, examine the yeast, note the temperature, and, if necessary, make a chemical examination of the liquor itself. In that way, and in that way alone, can an even grade of beer be produced the year around."

To one who thinks only of the millionaire brewers and makes no account of the great number that merely struggle along, it would seem as though a Brewers' Academy was a school for the making of great fortunes. One would imagine such a school would be mobbed by prospective pupils. The fact is that this academy graduates only about sixty men and boys a year, and that is pretty nearly all that go there to study. It is a school for master workmen and not for brewery owners, although the owners are sending their boys there quite as an essential to the successful ownership of such properties in the future. All pupils in the academy must be practical brewers, above the age of eighteen, and possessors of a good common-school education. The art of brewing must be comparatively simple, because a man or boy need only work two years in a brewery in order to become a "practical brewer;" and they say at the academy that if he is a bright fellow he can become such in one year. Then he needs only to pay $300 in Chatham square for an academical course which is of only four months' duration.

The Brewers' Academy has two terms a year, beginning respectively on the first Monday of October and the first Monday in February. The school is now twelve years old, and until recently its classes were by far smaller classes. They young men who attend it, if they are workmen, are such as may be earning $15 or $18 a week, but the academy fits them to fill places as brewmasters and foremen, and, as such, they may receive anywhere from $1,800 to $15,000 a year. The academy does not promise to secure places for its alumni, but it notifies the brewers of America that they will do well to call on the professors before going elsewhere to fill vacancies in their establishments, and the brewers keep their eyes on the little school. To-day the majority of the graduates hold responsible positions in large breweries. The head of every department in Ehret's brewery in this city, with the single exception of the foreman, is a graduate of the academy. Though nearly all the pupils get diplomas these are not all of the first class, and even if a graduate holds a first-grade diploma he cannot be a foreman or superintendent unless he knows a secret that cannot be taught—the art of managing men. The great and rich brewers are sending their sons through this school, in order that, whether they are to take practical charge of the breweries or not, they may know as much as their master workmen. Among the pupils have been young Busch of the Anheuser-Busch Company, young Huber and two of the Liebmanns of Brooklyn, Lemp of St. Louis, Pabst of Milwaukee, Krueger of Newark, and young Weber and young Schmitt of this city. The superintendents or brewmasters of no fewer than 124 of the breweries of this country are from this school, a fact that argues an improvement in the beverage and a revolution which is taking the business out of the domain of luck and turning it over to science.

The common practice of the big brewers of the country, it seems, is to give their boys a good common-school education and then put them in their own or some one else's brewery for a two years' apprenticeship, after which they send them to the Brewers' Academy for scientific instruction. Then they may put them through college, but they are more likely to give them a term or two in one of the so-called "business colleges" in order to ground them in bookkeeping and office work and leave them fitted to manage both ends of the business. This mainly applies to the German lager beer brewers. The Americans, who are in the ale brewing business, as a rule, are wedded to the old traditions of their business and are content to make ale as their fathers and predecessors made it. They regard brewing as an art, whereas the new idea is that it is a science. However, an English class is maintained at the academy, one that averages about eight or ten pupils. The German class is thirty strong.

There are six professors in the academy corps, and they teach both theoretical and practical brewing. First, they take up an introduction to general chemistry, defining and explaining elements, combinations, acids, bases, and salts, and the characteristics of carbon, alcohols, acids, albuminoids, ethereal oils, resins, coloring matter, and what the German chemists call bitter stuffs. This course includes chemical experiments and the examination of whatever is used in breweries, which is to say not merely the hops and barley and water of old-time brewing, but rice, corn, wheat, glucose, and other sugars—the ingredients for the modern substitutes for and accompaniments of barley malt. Then follow lessons in natural philosophy, optics and thermal studies, and the use of the polariscope, microscope, and thermometer. After this comes the training in the use of the model brewery—the actual making of beers, for draught and for export, the brewing of weiss beer—both according to all popular methods—and the making of malt. These studies are extended by training in the use of the microscope upon all the materials, a study of boilers, engines, pumps, ice machines, atomizers, filters, and other apparatus, and by a study of fermentation, the use of the saccharometer, and by a course in weights and measures and mathematics of such grades as enter into the calculation of vessel capacities, proportions, and the rest.

When a young fellow has gone through the academy he will be fitted to produce as pale and yellow a beer, as nearly like water as present fashion decrees, for the popular taste among users of malt drinks is the same as that among cigar smokers, and both must have their goods made as light and mild as possible.

An Orange 75 Years Old.

From the York Gazette.

Benjamin Hubbard of Wells has an orange that is seventy-five years old. It was found among the valuables of an uncle who died in the West Indies in 1818, and from the associations connected with it has been treasured by the family all these years. It shows no marks of decay, but a gradual shrinking, being now about the size of a hen's egg.