

braces extending from a flat ring around the middle of each rung, to the side pieces, and tightened by a nut and washer. This ladder, though much lighter than ordinary ones of equal length, was yet more rigid, and was free from the springing of ordinary ladders under the step. A good tension brace is oftentimes more effective than those which offer resistance in both directions, and this form of bracing is becoming more and more used in modern bridge building, and in the construction and setting up of machines. But with these, as with the other class of braces, it is true that the nearer equal they can be made to the other sides of the triangles of which they form the third sides, the more rigid will be the structures they are designed to strengthen.

PYROTECHNIC MIXTURES.

Lieutenant Harder, of the Artillery Corps, recently presented to the Physical Society of Frankfort the following table of mixtures for producing colored lights. As they are founded upon practical experience, we copy them for the benefit of our readers:

1. White light: 8 parts saltpeter, 2 parts sulphur, 2 parts antimony.
2. Red light: 20 parts nitrate of strontia, 5 parts chlorate of potash, 6½ parts sulphur, 1 part charcoal.
3. Blue light: 9 parts chlorate of potash, 3 parts sulphur, 3 parts mountain blue (carbonate of copper).
4. Yellow light: 24 parts nitrate of soda, 8 parts antimony, 6 parts sulphur, 1 part charcoal.
5. Green light: 20 parts nitrate of baryta, 18 parts chlorate of potash, 10 parts sulphur.
6. Violet light: 4 parts nitrate of strontia, 9 parts chlorate of potash, 5 parts sulphur, 1 part carbonate of copper, 1 part calomel.

For the so-called stars, the ingredients of which are to be stirred in with alcohol, the following mixtures can be recommended:

1. White stars: 9 parts saltpeter, 3 parts sulphur, 2 parts antimony.
2. Red stars: 20 parts nitrate of strontia, 12 parts chlorate of potash, 11 parts of sulphur, 2 parts charcoal, 2 parts antimony, 1 part mastic.
3. Blue stars: 20 parts chlorate of potash, 14 parts carbonate of copper, 12 parts sulphur, 1 part mastic.
4. Yellow stars: 20 parts of chlorate of potash, 10 parts of bicarbonate of soda, 5 parts of sulphur, 1 part of mastic.
5. Green stars: 12 parts of nitrate of baryta, 28 parts of chlorate of potash, 15 parts of sulphur, 1 part of mastic.
6. Violet stars: 9 parts chlorate of potash, 4 parts nitrate of strontia, 6 parts sulphur, 1 part carbonate of copper, 1 part calomel, 1 part mastic.

APPLICATION OF BURNKORFF'S INDUCTION COIL TO THE COPYING OF DRAWINGS.

All draftsmen are acquainted with the simple device of puncturing holes through a drawing for the purpose of obtaining an outline and afterwards transferring the outline by sifting fine plumbago or other powder through the small holes. The fatigue of making the holes by hand is, very great, and M. Caudey, of Lausanne, proposes to employ the induction coil for this purpose.

A table covered with tin foil is connected with the negative pole; on it may be placed as many sheets of paper as the spark will pass through. The positive pole, consisting of a metal bar, insulated with gutta-percha, can serve as a pencil for copying the tracings. The metal point of the pencil being moved about on the contour and outline of the engraving, electric sparks spring across every time a connection is made, and puncture fine holes through the paper.

It is said to require little skill to guide the pencil, as the ink tracings being good conductors, carry the pencil easily along. In the case of valuable engravings it is better to make a copy with the pantograph and use that for the punching process. The pantograph is connected with the positive pole of the induction apparatus, and it is placed upon a table, one half of which is covered with tin-foil. The drawing to be copied lies upon the insulated half, and the sheets of paper to be punctured are laid upon the tin-foil. The pointer of the pantograph moves around the outlines of the engraving and between the pen and the foil the sparks pass to pierce the paper upon which the outline is to be made. In this way the engraving or original drawing is in no way injured.

Important to Manufacturers.

The law granting to foreigners patents on designs and trademarks, is of great importance to manufacturers abroad, whose goods are brought to the American market; and it is well they should know that manufacturers in this country who have been in the habit of copying foreign designs in the fabrication of their goods are opposed to this law and will besiege Congress during the winter session for its repeal or modification, so as to discriminate against foreign manufacturers. It is therefore important to manufacturers abroad to avail themselves at once of the law as it now exists. Pamphlets of information furnished free at this office.

Female Type-Setters.

"It is said that there is no hope of there ever being a large supply of female type-setters in the market. As soon as a girl becomes a proficient and valuable compositor some male printer marries her, and that puts an end to her work in the printing office."

No says one of our exchanges, and there is considerable truth in its statement. We have had female compositors in our office for several years, and like them very much indeed. They have proved sober, truthful, and faithful in the dis-

charge of duty. It is true that we have lost some excellent girls in consequence of the greater attractions of matrimony, but what we lost in this way was gained by the man fortunate enough to find so good a partner. We have found it somewhat inconvenient to tolerate much courting in our office, but this intrusion upon business hours done away with, makes us decidedly favor the employment of female type-setters.

LETTERS FROM THE SOUTH.

ATLANTA, Ga., Oct. 23, 1870.

Atlanta—Great Progress—Future—Rolling Mill—The Fair—Climate of Northern Georgia—Marietta and Dalton Railroads—New & Old Ga. R. R.—Athens—Cotton Factories—Augusta and its Surroundings.

Twenty years ago Atlanta was a place of about 2,000 inhabitants. Previous to the war it contained nearly or quite 15,000. Almost totally destroyed by the misfortunes of war in 1864, it has rallied, and the census now gives 29,000 inhabitants. The traveler who looks on the thriving, rushing city of to-day is little disposed to believe that the fires of the war left only 3 business and 300 dwelling houses in the place, yet such is the fact. It truly deserves the name an enthusiast gave it of the "Chicago of the South." It has been much improved by the burning out, as hardly a house or store has been erected that is not of brick, and many new streets have been opened. The influx of settlers is great, as much as 2,000 in six months. What makes the place grow is hard to tell, but it grows, and grows with a solid class of inhabitants—mechanics and their families. It has one of the finest climates in the world. A number of railroad workshops are located here, as are also a large rolling-mill, a paper-mill, and other large manufactories, while a cotton factory to be run by steam is talked of, and will soon be built. The enterprising Kimball Bros. have it in hand, and they stop at nothing, and everything they touch seems to flourish.

The two great wonders of Atlanta just now are the Kimball House, and the new railroad passenger depot. The first is the largest, finest, and most complete hotel in the South, and if kept as well as it is fitted up, will bring many travelers to the place. It was commenced on the 28th of March, 1870, and the brick work was fully completed, and one half the house ready for guests on Oct. 17. This rapidity of construction would seem to make it insecure, but my Northern readers must remember first that Atlanta is a very dry climate, then the warm summer gave an advantage.

The railroad depot is entirely of iron, with galvanized roof, and with a row of brick offices on one side. It is 355 feet long, and 120 feet wide in one span. Its cost was \$135,000, and the work is being done by a Philadelphia firm. It is to contain at least five tracks, to accommodate the five railroads which center at Atlanta.

Just in the city limits is the large rolling mill of Messrs. Scofield & Co. They roll railroad rails and merchant bars. The same firm own a couple of furnaces near Cartersville, on the Western & Atlantic R. R. Previous to the war they only re-rolled old rails; they have since placed the mill in a better location and enlarged it. They employ a large number of hands, and, I am informed, have made it a profitable business.

This is the week of the State Fair, and it has been in progress since last Wednesday. The show of machinery is very good, but nearly every piece of it is from the Northern or Western States. The engine which drives the shafting is from Corning, N. Y., and the boiler one of Root's patent.

The great increase in the use of improved plows and other agricultural labor-savers at the South was very apparent throughout my trip, and it is easy to see the great interest taken in them here. In vehicles the Atlanta manufactory makes a handsome show, fully equal to those from the North. In the line of cotton and woolen manufactures, the latter is creditable, the former almost disgraceful to a State which has 25 cotton factories, and raises so much of the staple. Only five are represented—one of these strictly woolen, another part cotton and part woolen. Two paper mills exhibit their products—the Atlanta and the Pioneer. The factories are the Eagle & Phoenix, Columbus, Chattahoochee, Kemp, and Concord—last woolen.

Dr. Land, a chemist, with Pemberton, Taylor & Co., exhibits for that firm numerous chemicals and perfumes, all manufactured in Atlanta. They are as good as I ever saw.

In stock there is not a great variety, though some very fine. Mr. Peters, of Calhoun, exhibits some fine bloods and crosses. I mention his name, for to him and his neighbor, Dr. Woring, is due much credit for improving the grade of Georgia stock.

The grounds are well arranged, and the buildings of a good character, and the general management of the Fair is very good. The officers of the society are polite and attentive, and but for that nonsensical show called a Tournament, in which a young man was killed, all would have passed off well. Col. D. W. Lewis, the present secretary, held the same position in the first State Society, twenty-five years ago.

At a County Fair which I attended at Dalton, in Northern Georgia, I saw some household furniture manufactured there from native woods, which in every respect would compare favorably with any of Northern make. Here all is from the North. But there is a rapidly growing sentiment here in favor of building up home manufactures, and Northern mechanics who come in and establish such are eagerly welcomed.

Atlanta has four daily papers, all supposed to be flourishing, though one of them said a day or two ago that all put together did not have the circulation one should have. The *New Era* and the *Constitution* seem to take the lead. Besides

these there are two agricultural, and several religious weeklies.

I have spoken of the fine climate of Atlanta, the same may be said of all Northern Georgia. It is invigorating, never intensely hot in summer, or severely cold in winter. From Atlanta to Dalton is high ground, thence the grade descends to the Valley of the Tennessee, at Chattanooga. Dalton is the terminus of the Selma R. & D. R. R., and the commencement of the Ga., East Tenn. & Va. R. R.; the Western & Atlantic runs through the place. Then a railroad is chartered from Dalton to Western North Carolina, and another to Stevenson, junction of Nashville & Chattanooga, and Memphis & Charleston Railroads. As with all other charters in this State, these roads have \$16,000 in bonds per mile as each twenty miles are finished. The soil is good; on the west of the town the rocks are limestone mostly, and the soil likewise, while on the east the primitive rocks and soil prevail. Water power is not convenient, but coal is within fifteen miles by one of the projected railroads. It is now brought from Tennessee. Wood is abundant, cheap, and good. Iron ore is found close to the town.

Marietta, on the Western & Atlantic R. R., twenty miles north of Atlanta, is a beautiful town, noted for its delightful climate, especially in summer. The place itself has no manufactories except two tanneries, which seem to be flourishing. In fact, the whole line of this road seems to abound with good locations for this business. Near Marietta is the Concord Woolen Mill, mentioned as exhibiting at the State Fair. They employ 42 hands, and run 360 spindles and 16 Crompton looms. They get their fine wool from Pennsylvania, and get abundance of coarse from the surrounding country. The superintendent told me that near him on the Nickajack was a fine water power, about three miles from the railroad, that would run 4,000 spindles, and which might be bought cheap.

I consider the line of the A. & W. R. R. as particularly inviting to Northern people, and especially mechanics. Water power and coal are abundant. The best kinds of wood are cheap, and wagon-making and other species of wood-work might be made very profitable. The railroad is now under very liberal management, and Col. Blodgett, the superintendent, is desirous in every way of encouraging the incoming of settlers. Dalton, I think, is particularly a place of promise. It has been proposed to continue the railroad from Bainbridge to Columbus up to Rowe, and thence to Chattanooga; this would open a new and good country to the westward, and perhaps injure Atlanta, but I do not think it will be so extended.

Traveling eastwards from Atlanta, we pass over the Georgia Railroad, which runs through a country that in the hands of good cultivators will be a fine region. It is already improving, especially near the town of Madison. By a branch road I reached Athens. This place is the seat of the State University, the residence of many of the wealthy and educated men of the State. It is probably the most polished town of the State, and is not the less famous for the talent of its men than the beauty of the ladies. And here I may say that the rich mountain air of this Northern Georgia produces that healthy glow and robust form seldom seen in the Southern beauty, the finest types of which are found in this region.

The town itself has but little vigor and enterprise, but there are located in its immediate vicinity five cotton factories, and one cotton and woolen factory in the town. The last runs 4,488 spindles and 78 looms on cotton, and 260 spindles and 6 looms on wool. It is one of the neatest factories I have been in. The Pioneer Paper Mill is also near the town, and a machine shop and foundry, which have a wide reputation for good work, are in the town itself. There are many other water powers unimproved. The Georgia Factory, one of the five, is the first factory ever built in the State, and some say in the South. None of these suffered from the war. The Athens Company's works have been built since 1860. They prefer American machinery.

North of Athens is a country almost unknown. It is rich in minerals, especially iron and gold, and is also a fine farming region. It is being opened to the world east and west by the Air Line R. R. from Atlanta to Charlotte, and another line is to be built from Athens to Clayton, connecting them with Knoxville & Charleston R. R. Cotton grows well near Athens and for many miles above. There are two small cotton factories in this northern section.

The country surrounding Augusta is a cotton-growing region. It is frequently called the Black Belt because it was a section where many slaves were owned, and cotton almost exclusively grown. They are now rapidly learning that they can grow other crops as well as cotton.

Augusta is a place of considerable business, having a large trade from South Carolina, as well as Georgia. The river is navigated to Savannah by steamboats which might be better and run lighter. It has new railroads to Atlanta, Macon, Savannah, Charleston, and Columbia. I believe no new ones are prepared in the State direct to the place, though the Georgia Road is building several branches which will benefit the place.

There is one cotton factory in the city, which has become somewhat famous by large published profits. It should be remembered in looking at these figures that these profits are made not on the actual cost of the factory, but its present capital. It is certainly a well-managed concern, but I doubt if so well arranged or so perfect as the Eagle and Phoenix, at Columbus. This Augusta factory is stated to contain 15,000 spindles and 600 looms. The water power is apparently inexhaustible, but I was informed that the canal will have to be enlarged to meet the increasing wants of this factory. The canal has three levels, and a fall of 45 feet. Several good sites for small factories are for sale. The city has water-works, using river water, filtered and