

inch reflector, made for the purpose of finding faint nebulae, and an instrument with which he discovered the great spiral nebula in Orion, also a portable transit instrument for determining time and a seismometer for observing earthquakes.

Last year a visual twelve-inch telescope was added to the equipment, so that there can be no failure of the expedition on the ground of lack of instruments. Owing to the lack of building materials in the country where the observatory is erected, the university was obliged to send with the astronomical outfit wood and iron for constructing the buildings and domes and iron piers for the telescopes.

The New York *Herald*, to which we are indebted for the foregoing particulars, has received a special telegram from Prof. Pickering, dated at Arequipa, August 9, in which the professor says:

In my observation of Mars I have seen two large areas near the equator which are permanently blue. Near the edges they appear light blue. The light is slightly polarized.

The total size of the area is about 500,000 square miles, one-half the size of the Mediterranean Sea.

On June 23 a small dark spot appeared in the southern snow cap. Later this spot lengthened rapidly, and early in July it was a thousand miles long, dividing the snow in half.

Sixteen hundred thousand square miles of snow have melted within the last thirty days. The melted snow has apparently been transferred to the seas, across land.

Small, dark areas, surrounded by snow, appeared on July 10, and two days later I first saw a dark line in the fork of a Y shaped mark in the direction of the seas. The line became more conspicuous on July 14, and on the 16th a dark area about the size of Lake Erie appeared on the northern side of the stem of the Y, which was connected with the northern sea. The next day there appeared a large dark gray area near the northern sea.

This had grown much fainter by July 23, and a new area appeared to the south of the northern sea, concealing its outline. The line in the fork of the Y had disappeared, but

the area of the Y had extended. On July 24 a large dark area, apparently either a lake or a sea, appeared near the melting snow, and on July 25 the southern branch of the Y became very narrow. The outlines of the northern sea were seen again, a narrow white line stretching north from the snow.

Many other changes were noted. Rapidly changing, faint whitish areas were seen. Green areas near the poles have not been seen for many weeks, but traces were recently suspected, and a bright green area was distinctly seen near the north pole last night.

Magnetic Photography.

Prof. E. J. Houston describes his new mode of photographing the magnetic groupings of iron filings as follows: I place a dry sensitized photographic plate over the magnet whose field I desire to fix, and after the characteristic groupings of filings have been obtained, I expose such plate while over the magnet to the light of a gas flame for a few seconds.

This operation is necessarily performed in the dark photographic room. After exposure the light is turned out and only the non-actinic red or yellow light left.

The filings are allowed to fall off the surface of the dry plate, and the finer particles that still adhere to it are brushed off by a feather or dry camel's hair brush. The plate is then developed and fixed in the usual manner.

This process of obtaining records of magnetic fields produces true negatives, which, when employed for printing by blue print, silver print, platinotype, or similar process, produce excellent positives.

As the negatives so obtained are more permanent

than the positives obtained by the use of the filings themselves, they permit the taking of an indefinite number of photographic prints.

A DEEP BASEMENT.

To make a basement on Broadway, New York City, as deep as the one shown in our illustration, is a work involving some interesting, though by no means novel, engineering features. To accommodate the great rope traction wheels which are to be used in the cable railway service of the Broadway railroad, it was necessary that this basement, in which the plant is to be located, should be nearly 40 feet deep, and this is the depth at which, on the corner of Houston Street and Broadway, a permanent water-holding stratum is reached. It was especially desirable to have the plant all placed beneath the street level, so that the space above might be profitably utilized for stores and other purposes, Broadway property at this point being very valuable.

In order to have the room in this basement as clear as possible from obstructions, and of the whole size of the building, 200 by 225 feet, the method has been followed of sinking in the water-holding stratum separate foundations for the numerous pillars which are required to support the interior of the superstructure. A great room is thus provided, in which there will be no interior walls, in which will be placed the four engines, of 1,000 horse power each, for driving the cables. The engines are to be arranged in pairs, each pair op-

laws is their first and most important duty. The weakness of these organizations has been, and is to-day, that they claim—not in words, perhaps, but in acts—that the organization of wage workers into unions gives them certain "rights" not before possessed. The leaders of labor unions can engage in no better work than to teach their followers that whatever claim of "rights" cannot be enforced under the law is not right, and must be abandoned. If this had been done by labor union leaders, the twelve men who were recently shot to death at Homestead would be alive to-day, and the red smear of murder would not appear on so many pages of the history of labor unions.

One of the facts which organized labor would do well to understand is that under the laws of this country a man may work for whom he pleases and for any price that may be agreed on between him and his employer, and that the employer may at any time cease to employ him and hire some one else in his place. Employes and employers have precisely equal rights in these matters. Another fact equally important is that the law will punish the man who, by physical force, prevents another from working. To do so is a lawless act, and that it is done by or for the benefit of organized labor makes no difference. The law does not take cognizance of organized labor any more than it does of red-haired or temperance, or Catholic or Protestant labor. And not only the law of the land, but also the sentiment of right-thinking people every-

where makes it an evil and an inexcusable act to prevent the man who needs work and wants to work from doing so. How much sympathy for labor is there in the sentiment which beats a man black and blue when he applies for the work the wages of which his hungry family needs—because he does not belong to a union? What sort of charity would that be which would refuse help to a starving child unless it was enrolled in some Sunday school mission class?

Still another point to be learned by combinations of labor is that they cannot claim from the law the same recognition which it gives to employers until they become equally responsible before the law. As it is



DEEP BASEMENT OF THE BROADWAY R.R. POWER HOUSE, CORNER OF HOUSTON STREET.

erating a shaft on which is a rope traction wheel, from which the power is transmitted, through other traction wheels, to the large wheels on the shafts carrying the cable drums. There will be four of these large traction wheels on cable drum shafts, the wheels being each 32 feet in diameter and 8 feet 4 inches wide over the face, weighing over 100 tons each.

The Rights of Labor and the Laws of the Land.

The laws of this country are the fairest, the most reasonable and the most just laws that history records. The principles which they embody are those which have been recognized as fair and just by all civilized nations in all ages, by the best and ablest men in those nations, and also by the great religious leaders and organizations of the world. The liberty of the individual and the welfare of the state are the two chief interests of all just laws and all good government. These two interests are cared for in this country more carefully and intelligently than they have been or are in any other. This is proved by the fact that to get an anarchist we have to import him ready made. The sunshine of our laws and customs is too genial for their breeding here. It is also proved by the fact that hundreds of thousands, yes, millions of men, since we became a nation, have under our laws developed their lives from a low beginning in ignorance, poverty and obscurity into intelligence, usefulness and prosperity. It is not under bad laws that such things can be done.

It is only reasonable, therefore, that labor organizations should be urged not only to obey the laws of the land, but to teach their adherents that to obey these

now the employer can be compelled to make good any violations of contract with his employes. But if his employes, acting through a labor union, sign a contract to-day and break it, greatly to his pecuniary injury, to-morrow, he has no redress. This has recently happened at Pittsburg, where several hundred employes, after signing an agreement to work, broke their agreement without any lawful reason, leaving the works idle. In such a case the employer has no remedy. The labor union insists on being "recognized," and uses all lawful and even many unlawful means to secure recognition, and yet has nothing of that responsibility before the law upon which, only, can one business concern recognize another. When the law compels labor unions to become pecuniarily responsible for their actions, some phases of the labor question will be settled. Employers will prefer to deal with a responsible organization rather than with individuals.—*Railway Master Mechanic.*

THE following directions for joining band saws are given by the Defiance Machine Works: Bevel each end of the saw the length of two teeth. Make a good joint. Fasten the saw in brazing clamps with the back against the shoulder, and wet the joints with solder water, or with a creamy mixture made by rubbing a lump of borax in a teaspoonful of water on a slate. Put in the joint a piece of silver solder the full size thereof, and clamp with tongs heated to a light red (not white) heat. As soon as the solder fuses, blacken the tongs with water, and take them off. Remove the saw, hammer it if necessary, file down to an even thickness, finishing by draw-filing lengthwise.