BROADWAY DURING A FIRE.

The exigencies and necessities of the crowded life in cities are every day becoming more developed. Special conditions are established under the influence of growth and development, and these have to be met in their turn by new appliances and arrangements. The illustration we present with this article, giving a scene on Broadway during a fire, is one of special interest and exemplifies what we have said above. The shape of Manhattan Island, on which the original city of New York was built, is such that the principal travel is in a general sense north and south, and Broadway monopolizes a greater part of such travel than that which goes over any of the other up and down streets. After much opposition a horse railroad was put in operation over this street, and then, with a further surrender of vested rights on the part of the public, a cable road replaced the horse cars, and the traffic was greatly facilitated.

Our illustration shows a portion of Broadway near the offices of the SCIENTIFIC AMERICAN. It is a reproduction of a photograph taken during a fire, and gives an admirable idea of the great thoroughfare when to a portion of its natural business is superadded the excitement of a fire. Of course the through traffic is to a great extent interrupted, the streets on either side being taken during the time of the fire by trucks and carriages. In the foreground a steam fire engine holds a conspicuous position and the delivery hose therefrom is seen leading across the street over the tops of vehicles and cable cars. It is here that one of the recent advances in city life appears. The Metropolitan Traction Company, who own and operate the cable road, maintain two patrol wagons, whose duty it is to respond to calls sent in by the company's inspectors, who constantly travel up and down the line. One of the calls is for fire service. For use at fires the patrol wagon carries eight pairs of shear legs, 20 feet high, and uses them as shown for raising the fire hose above the tops of the cable cars, thus leaving the track clear for them to go on their regular route. Devices of this sort for street cars have already occupied the thoughts of inventors, and little bridges to enable the cars to pass over the hose have been suggested. But for cable cars such bridges are inapplicable, as the grips would interfere with the hose. Hence the system shown has been adopted with much satisfaction to the public as well as to the car company. In our issue of June 23, 1894, we give a fuller account of the operations of the patrol wagon, of whose work the present cut shows only a single phase.

One of the most striking features of the car traffic on Broadway is the number of cars engaged therein. On the least interruption a long row of cars rapidly accumulates. In the cut is seen a quantity of cars thus brought together in spite of the facility given for their progress by the raising of the hose.

BROADWAY DURING A FIRE.

Gold in Nevada.

In many places on the Pacific coast, says Dan De Quille, a great fuss is made about gold quartz that yields from $5 to $10 a ton. Here but little is thought of such prospects. In regard to some of the gold belts of Nevada, I find the following notices in the local papers for the past three days:

Three and a half tons of ore from the Palmico mine, Hawthorne, yielded $4,050 in gold.

A lot of fifteen tons of ore from the Irish Boy mine, Kennedy district, sent to Selby's smelting works, San Francisco, for reduction, paid $512 a ton. The vein is from two to four feet wide.

A ledge, just found, a mile and a half from Unionville, Humboldt County, assays from $140 to $1,800 a ton in gold. The vein is two feet wide.

In Lincoln County, Scott Allen accidentally found a vein of iron-stained quartz. He did not think much of his find, but an assay showed that the material contained over $3,000 a ton in gold. This find was made in a section of country some distance south of where Captain De Lamar is operating.

These paragraphs are in regard to only a few districts or sections of the many gold belts. In the Kennedy district—first discovered in July, 1891—are the Cricket, Imperial and many other mines as rich as the ones mentioned above. Indeed, it is a region full of rich veins of gold-bearing quartz, and finds are still being made almost every week. No place in Nevada is more worthy of the attention of the capitalist or prospector.

A railroad down through Nevada, one that would connect Salt Lake City with Los Angeles, would open many good gold camps. The whole route would be through a region full of mines of the precious metals. Down toward Death valley lies Montgomery district, a good gold camp, but one that is almost out of the world as regards transportation.

Also down near Death valley, in Tule canyon, some rich gold mines should be opened. On this canyon rich dry diggings were discovered some fifteen years ago. In 1880 a few men were at work there. They had no machines for dry washing, and did not even winnow the dirt by tossing it up in the wind, Mexican fashion. They simply dug over the ground with picks, collecting such pieces of gold as they happened to see. In this way they made good wages in ground from two to four feet deep. Working in this rude way they found one nugget that weighed five pounds, and very many worth from $5 to $75. Pieces of gold worth about fifty cents were about the smallest saved working in this way, "by eye." With water or even dry washing machines, such ground should have paid immensely. As all the placers in the Great Basin region are of local origin, Tule canyon must cut one or more large and rich veins of gold-bearing quartz. At present we hear but little about these diggings, though there is always more or less gold coming from them, which is said to be ground out in arrastras by some of the ranchers living in the vicinity.

In the early days an impression prevailed among our miners and prospectors—mostly from California—that the gold veins on this side of the mountains would not prove permanent. They said it was merely a surface production and would not hold out in depth. This soon came to be accepted as an established fact; therefore little attention was given to veins that were purely gold-bearing by those who went forth on prospecting raids. Now the truth is that our gold mines are the most permanent in the country. The first gold mines opened and worked were in Devil's Gate district, at Silver City. These have been worked right along unceasingly for over thirty years, and to-day are paying their owners as well as at first. Wherever paying gold mines have been found in Nevada they are still paying, as in the beginning, and this is more than can be said of many of the silver mines.

MRS. ERNEST HART, who recently made a trip around the world, appears to come to the conclusion that meat eating is bad for the temper. She says that in no country is home rendered so unhappy and life made so miserable by the ill-temper of those who are obliged to live together as in England. If we compare domestic life and manners in England with those of other countries where meat does not form such an integral article of diet, a notable improvement will be remarked. In less meat-eating France, urbanity is the rule of the home; in fish and rice eating Japan, harsh words are unknown.

Use of Peat Fuel in Germany.

The United States consul at Bamberg says, in his last report, that the numerous inquiries that have been addressed to him on the subject of cheap fuel have caused him to give careful attention to the process by which many parts of the German empire secure their supplies of that comparatively inexpensive, but yet satisfactory, fuel—peat or turf. Peat or turf is used throughout Europe generally, wherein the ordinary cost of its production is not materially increased by cost of transportation. In the large and small cities, as well as in the country districts, it is used for fuel; in fact in many localities it is the only substance used for heating purposes Peat is the product of decayed organic matter. The main cause of the transformation of vegetable substances into peat is water of a certain composition and temperature, which, being almost still or flowing slowly in or above the earth, permits of the development of swamp plants, and, at the same time, preserves the latter from total decomposition, by reason of exclusion of the air. These conditions are found to exist more particularly in the temperate zone, where the necessary variations of temperature occur, and where tracts of land are found whose impervious beds lead to continual accumulations of water, while, on the other hand, other portions of territory with loose and penetrable beds, especially in regions inundated by the overflowing of rivers, are subjected periodically or continuously to an extraordinary saturation. The various theories that have heretofore been advanced to account for the origin and development of peat bogs generally agree that the moors are the product of a more or less extensive decay of certain plants in a mass of vegetation which, under favorable conditions as regards locality, climate, and moisture, is continually being renewed in one section and matured in another. The upper layer of peat or turf, which consists for the greater part of varieties of moss, is, when broken into fragments, a loose fibrous substance—a mixture of root fibers, leaves, stems, etc. The bottom layer, known as pechtorf or specktorf ("pitch turf"), consists of a black, compact, pitchy mass, which shrinks rapidly on being separated into small pieces.

It has, when cut evenly, a smooth, wax-like surface, contains the greatest amount of nitrogen, and, consequently, is the most valuable for heating purposes. Every rational operation of peat bogs or moors must be begun by the draining of the territory to be worked, and this draining must be undertaken sufficiently in advance of the working of the peat moor itself, in order that the territory in question may attain the requisite degree of dryness. Even after this has been effected, the peat still contains water in quantity equal to from 70 to 80 per cent of its weight, and this remaining moisture is then almost entirely removed by successive processes of drying in the air, manipulation with machinery, or subjection to artificial heat. Until within the last few years, manual labor has been employed to work the peat bogs, but a very ingenious machine has recently been invented to take its place. This machine consists of three lancet-like knives, which, by operation of a toothed rod, cogwheel, and crank, are sunk into the peat, cutting out a square piece, which is received upon a horizontally working shelf and removed by a simple reversing of the above-mentioned contrivance. Another method consists in plowing and harrowing the bog or moor by the use of steam power and wire cables, the material for which is manufactured at Mannheim. The process of drying the peat or turf, in so far as small moors are concerned, consists simply of exposure to the open air. When extensive territories are worked, artificial drying is resorted to, and the expense involved in the latter operation is by far the greatest incurred in the production of peat. In Germany the following kinds of peat are known: Cut peat, which is cut into the form of bricks by hand spades or special machines; moulded peat, which is produced by cutting the peat moss into irregular pieces, mixing it with water and then moulding it into the respective forms; machine or pressed peat, which is the result of pressing the turf, after previous separation into pieces and drying in ovens. In the category of "machine peat" is also included the so-called "ball peat" (kugeltorf)—globes of turf about four inches in diameter, made by passing the turf pulp through specially contrived appliances. In the district of Bamberg, the moor to be worked is first freed from vegetation, leveled, plowed, and harrowed, and the loosened peat broken, so as to be exposed to the action of the air. It is then gathered by means of a kind of snow plow, brought to the separating machine, taken thence to the drying oven and the press, whence it issues in the shape of smooth, shiny, dark brown bricks. A machine in operation at one of the chief peat works in Germany produces, provided suitable material is used, from 10,000 to 15,000 bricks in ten hours. Another machine, requiring six horse power to work it, can produce from 60,000 to 100,000 bricks a day. In Germany the relative cost of peat as compared with hard coal is as follows: One hundred kilogrammes (kilogramme=2·2 lb.) of good Zwickau hard coal cost at the mine 1·20 to 1·62 marks (mark=1s.), while the cost of production of the same quantity of peat amounts to from 0·30 to 1·40 marks, according to quality. Besides its use as fuel, peat is turned into account in Germany as a fertilizer and as building material, it being successfully used as a filter for vacant spaces, separating layers for waterworks, reservoirs, ice houses, etc. By means of a process patented by a tanner in Mayence, it has also been made to do service in tanneries. The waste or superfluous particles of peat, known as peat dust, have recently been brought into extensive use as a material for fitting up and preserving odorless vaults, an innovation, says Consul Stern, deserving strong commendation, especially in localities where the sewerage is inadequate. Hanover and Mecklenburg alone have from 140 to 150 square miles, and Bavaria has 22 square miles of peat moors.

APPROACHING ECLIPSE OF THE MOON.

A partial eclipse of the moon will occur on the night of September 14, 1894. It will be visible throughout North and South America. The beginning will be visible in the western part of Europe and Africa. The accompanying diagram will give the reader some idea of the moon's course as it passes by the earth's shadow. The large shaded circle represents a cross section of the earth's shadow, and the small circles represent the moon at first and last contacts and middle of eclipse. The moon will pass by the lower edge of the shadow, touching it first at the southernmost point. The observer will therefore see the shadow first at the north point of the moon's disk. As the moon moves up toward the left, the shadow will appear to move down toward the right, covering at the middle of the eclipse a little less than a quarter of the diameter of the moon's disk, and leaving it at a point 58° to the west from the north point. The first contact will occur at 9 h. 36 m., central standard time,

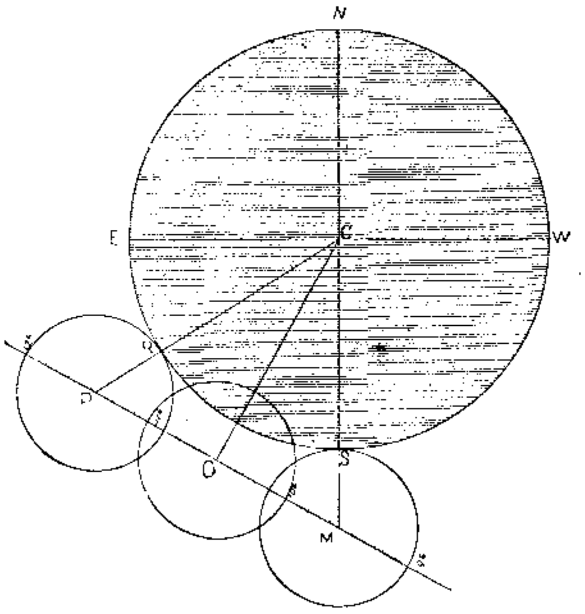

DIAGRAM SHOWING THE COURSE OF THE MOON BY THE EARTH'S SHADOW DURING THE PARTIAL ECLIPSE, SEPTEMBER 14, 1894.

the moon's center being then at the point M. Before this a faint shading, due to the penumbra of the earth's shadow, will have been noticed on the upper part of the disk. At 10 h. 32 m. the moon will be at O, and the eclipse at its maximum. At 11 h. 28 m. the moon will be at P, leaving the shadow at R. After that there will be only the faint penumbral shading on the west side of the disk.

A total eclipse of the sun will occur September 28, 1894. It will be invisible in America. The path of totality passes across the Indian Ocean. The eclipse will be partial in Africa, Persia, Hindostan, and southern Australia. The times marked on the chart are expressed in Greenwich mean time.—Astronomy and Astro-Physics.

Flag Making for the Navy.

The flag lockers of a modern cruiser contain more than 200 ensigns, and in this country, according to the Marine Review, they are made in the flag room of the equipment building at the Brooklyn navy yard. The flags of many nations are of most elaborate design, and composed of every color known to the flagmaker's art; others are severely plain, but all have to be mathematically correct as to size, color, and proportion. Our own flag is a difficult one to make correctly with the forty-four stars in its blue field and have them accurately arranged. Each star must occupy its correct position and not deviate a quarter of an inch, that the symmetry of the union be preserved.

In constructing flags eight colors are used. They are red, white, blue, yellow, green, brown, black, and lately canary yellow has been added. The yellow first mentioned is rather of an orange tone. The canary shade was adopted to take the place of white in signal flags, as at a distance it was found that the white blended in with the horizon and made the accurate reading of a signal almost impossible; in consequence the Navy Department has recently ordered the change. The brown bunting is used to typify bronze, and is used quite extensively in the more elaborate foreign flags.

The largest flag made for our navy is the American ensign No. 1. This has a fly of 36 feet and a hoist of 28·9 feet. It is a flag that is rarely made. The cruisers Brooklyn and Minneapolis will be the only vessels of our navy to carry it. The flag borne by all our other ships is the No. 2, which is 27·19 feet long and 14·35 feet wide, and is the chief standard of the man-of-war. In this flag the side of the blue field in which the stars are placed is four-tenths the length of the fly, and in the same manner the size of flag and field is designated for every flag from the No. 2 down to the No. 8, which is only 4½ feet long and 2·67 feet wide.

In the Brooklyn yard flag room are made flags of forty-four different nations, two sizes for each. The No. 1 is 34·86 feet long and 13·12 feet wide. The No. 2 is smaller. The United States flag is given to our cruisers in seven sizes for use in various parts of the ship and in small boats and on various occasions. All the bunting used is of American make and comes from either the United States Bunting Company or the New England Bunting Company, both of Lowell. About 50,000 yards are used every year, and to guard against any possible defects in its manufacture, each piece is put to a rigorous test. Severe tests are made for fast color. A generous clipping is steeped in fresh water for twenty-four hours, after which it is vigorously scrubbed with soap, and when thoroughly rinsed out is dried in direct sunlight for eighteen hours. Bunting that will withstand all this is considered fit to be put into Uncle Sam's flags.

The most difficult flags to make are those of San Salvador and Costa Rica. The first is very elaborate and requires all the colors, and the second is not less elaborate and takes every color but brown. The intricate designs are cut out by means of zinc patterns. The American ensign is a comparatively plain flag. By aid of copper patterns the stars are cut out with chisels from muslin folded thirty times. The chisels are of various sizes for various stars, and only ten cuts are required to cut every thirty stars.

Weight and Horse Power of Rain.

One inch of rain falling upon an area of one square mile is equivalent to 2,323,200 cubic feet, or nearly 17,500,000 gallons, and this quantity of water will weigh 145,200,000 pounds, or 72,600 short tons. If one inch of rain fell over the entire area of the city of Philadelphia, 129 square miles, the quantity of water which would be precipitated would be represented by 2,250,000,000 gallons, or 18,730,000,000 pounds, or 9,365,000 short tons. Therefore the quantity of water represented by one inch of rainfall distributed over 24 hours falling upon the area of Philadelphia would be nearly ten times the maximum pumping capacity of all our waterworks engines for a day, and is more than twice the total capacity of all the reservoirs now connected with the city water supply. Professor Loomis gives the average height of clouds as about two miles, and as the aqueous vapor always present in the atmosphere is suspended for a considerable time and carried for great distances by winds, it is highly probable that the great majority of the water which falls as rain has been elevated by the sun to a height approximating 10,000 feet. While it would be fair to assume this figure in calculations, there may be objection to it on the ground that the clouds from which much of our rain is precipitated are not more than a half mile above the earth, and, therefore, a height of but 3,000 feet will be estimated for, but those who desire to assume the greater elevation can readily calculate what the figures would be for 10,000 feet. As above shown, the weight of one inch of rain upon one square mile is 145,200,000 pounds; multiplying this by 3,000 feet for the height, and dividing by 60 on the assumption that this inch of rain fell in one hour, we have as a result 7,260,000,000 foot pounds representing the amount of work done by the sun per minute if the water was raised as rapidly as it fell. This is equivalent to 220,000 horse power. If pumping machinery worked at the low economy of 2 pounds of coal per horse power per hour, or if the pumps gave a duty of 100,000,000 foot pounds, 200 gross tons of coal would be required to raise to a height of 3,000 feet the water represented by one inch of rain on a square mile; now multiplying this by 129 to represent the area of Philadelphia, we have 28,380,000 horse power and a coal consumption of 25,800 long tons.—Mr. John Birkinbine, before the Engineers' Club of Philadelphia.

A SYSTEM of electric lighting is being put in at Juneau, one of the best known of Alaskan settlements—a place of 2,000 inhabitants. When completed this will be the first central electric light plant in the Territory. Electricity, however, has been used for some time in a limited way in the Alaska mines. Water power is abundant everywhere, and the current is generated on the streams and carried to the mines by cables.