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**The Fire Department of Paris.**

The fire department of Paris is, in every sense of the word, a military organization. The members are enlisted like soldiers, have pay, rations, and barracks, like the *gendarmérie*, or municipal guard, and are subject to constant discipline. The members are chosen as much as possible from the class of mechanics and laborers—such as masons, carpenters, plumbers, &c.—as these men are acquainted with the construction of the different parts of a building, as the walls, floors, roof, &c.; and they are also accustomed to work in elevated positions without fear, and are adroit in their movements in places where others would be able to do nothing. They are required to understand reading and writing, in order that they may be able to instruct themselves from books regarding their arduous profession, and also be able to make reports. They are required to be sober and temperate, as by an irregular life, drunkenness or gaming, they would necessarily make more expense than their pay would permit, and would thus be tempted to theft or plunder while in the exercise of their vocation. They are also required to be robust, agile, and in good health, in order that they may act with effect.

43-1

Immediately on their arrival at a fire, they are absolute masters of the locality; all objects of value remain at their disposition and under their charge, still such is the good character of the men and the discipline under which they are kept, that there is very seldom an example of punishment. The officers and men are uniformed, and subjected to the same rules as in the army; every movement is by order from the officers, and the men on duty at a fire are under the same discipline as soldiers on a field of battle, and any neglect or disobedience of orders is punished the same. Soldiers of the line are often recompensed for good conduct by being transferred to the corps of *Sapeurs Pompiers*, as the fire department is named. It often happens that sons of officers of the army enlist in the corps of *Sapeurs Pompiers* but as simple soldiers; because to be an officer in this corps requires experience and knowledge. The officers are generally chosen from the corps of engineers and artillery of the army, and after sufficient experience become acting officers of the corps. The commandant is a member of the staff of the army.

The corps is furnished with a great variety of apparatus. The pump, or what would be called the engine in this country, is essentially the same as that in use here, consisting of two cylinders, five inches in diameter, and an air chamber; the brakes are worked by eight men, and with a discharge pipe of six-tenths of an inch diameter, the stream may be thrown one hundred feet high. But although essentially the same, these machines do not at all resemble the splendid, but heavy, lumbering engines dragged through the streets of the American cities by from fifty to a hundred men and boys, with a noise sufficient to disturb the very paving stones. The machine consists of a platform, to which the cylinders and air chambers are fastened, the whole placed on two wheels, and is drawn by three men. These pumps are constructed very perfectly and carefully.

It has often been recommended to make use of larger pumps. This is a matter which might be discussed. In throwing water a great distance, and in a large stream, it cannot fail to be divided into spray, and this is almost immediately converted into steam on arriving at the fire. The steam is converted by the heat into the two gases, hydrogen and oxygen, which both serve to increase the fire. The combustion of wood is simply the combination of the carbon of the wood with the oxygen of the air, producing carbonic acid and carbonic oxide gases. At the same time a part of the hydrogen and carbon contained in the wood unite, forming carburetted hydrogen, which burns, producing the flame. The manner in which water effects the extinguishment of the flame is in preventing the contact of the air with the wood, thus cutting off the supply of oxygen, which alone supports the combustion. It is necessary, therefore, that the water should arrive in an undivided state, and with force, on the burning portions, in order to penetrate as much as possible the pores of the wood. For this it is also necessary that the man who directs the stream should be as near as possible to the fire, thus making the distance to be passed by the water short, and insuring the arrival in a solid body. This is the reason for the employment of small-sized pumps, but of course they are required in greater number. The men do not stand on the ground and throw the stream into the windows, as is practised here, but endeavor in all cases to place themselves as near as possible to the fire.

It is always sought to attack the fire at the most central point, the windows and the doors being preserved as long as possible, in order to prevent the influx of currents of air. To effect this, entrance is

gained, if possible, by the basement and by the stairs, hose being taken in, and the men thus approach the fire as near as possible. In case of necessity the men who enter are furnished with a blouse which covers the head and shoulders, and is tied at the waist. The head is furnished with eye pieces, like the submarine armor, and the supply of air is furnished by hose leading to an air pump. 43-2

By the aid of this, a man may penetrate into a room filled with smoke and gases with the greatest facility. This is of great use in cases of fires in cellars, where it is of the greatest importance to keep the exterior air excluded, and where, by reason of the smoke and gasses, a man unprotected would be suffocated instantly. The chief care of the man directing the stream is with regard to the parts nearest the fire, but not yet inflamed, thus preventing the fire from spreading, and saving valuable portions instead of those half consumed. He also pays particular attention to saving the stairs, the halls, and those portions by which communication may be preserved throughout the building, and also those portions which sustain others, as pillars and columns, and also to localities enclosing combustible materials; also the doors and windows. If there is a wind, he pays particular attention to those portions towards which the flames are borne, thus striving to save those portions still intact, and at the same time to prevent the spreading of the flames. These principles are well understood, and practiced by the members of the corps, and it is the business of the officers to instruct them on these points.

They are supplied with books, and are exercised at mock fires, in which all the phases of a real fire are presented, and they are thus rendered skillful and expert. At the theatres great precautions are taken against fire. Large reservoirs are placed at the top of the building, and also in the basement. Pumps are also placed in the basement, furnished with tubes leading to the upper reservoirs. These tubes are provided at each floor with openings, and hose attached, and which are always ready for use, under a head from the upper reservoirs. The engines in the cellars are fed from the inferior reservoirs, and are arranged to furnish a large quantity of water. There are also large reservoirs of air compressed to three atmospheres, which being applied to the cisterns, will force the water through the hose with great force until the air is exhausted. The Theatre des Tuileries is provided with two reservoirs in the cellar, each holding 2,000 gallons, and four at the roof, each 700, besides the ordinary provision of pumps, &c. This theatre has twenty-one *sapeurs* and officers on duty during the representation. The Theatre de l'Opera is provided with very large reservoirs, and has a guard during the representation, of thirty-two *sapeurs* and officers. The service for balls is forty-two of the corps. The Theatre des Italiens has reservoirs of six thousand gallons capacity, and a guard of fifteen *sapeurs*. All the other theatres and places of amusement are similarly provided for according to their size. Great attention is paid by the corps to the saving of life and property at fires. The principal apparatus for this purpose is what is called the *sac de sauvetage*. It consists of a long sack of leather, three or four feet in diameter, and long enough to reach to the highest windows. One end of the sack being taken up to a window by a fireman, and fastened there by means of rods attached to the sack, and the other end held by three or four men at some distance from the foot of the building, so that the sack assumes an inclined position. It is readily seen how easily a person would slide down the interior without the slightest shock, owing to the inclined position of the bag. The first portion of the fall would be rather rapid, but the latter would be almost horizontal. Furniture and articles of value are also saved in this way with the greatest facility. The most fragile articles may be lowered in this way without a shock. This sack is used to a great extent by the corps. When the upper windows cannot be reached by the stairs on account of the fire, the firemen climb the *façade* or front of the building, by means of an iron ladder twenty feet in length, with a joint to fold u

in the middle, for convenience of carriage, and having at one end the sides curved in a manner to be able to hook over a window seat. The *sapeur* takes this, hooks it over the seat of the first window, and passes up with a comrade to that window. Then, standing in the window, and steadied by his comrade, he hooks his ladder over the next window seat above, and thus passes to the top of the building in an incredibly short space of time. He can thus take up with him either one end of the sack alluded to, or the hose, according to the circumstances. This short ladder is much more convenient than the long unwieldy ones in use in this country; but to use them, it is necessary to have men who are expert and practical. These ladders are packed up and placed on the hose cart. In Paris, very strict laws are enforced with regard to the construction of buildings. Every stovepipe, every chimney, has to be arranged according to the laws of safety. All constructions in the city are constantly under the inspection of government officials; and this caution, together with their fine corps of firemen, account for the little destruction of property by fire in that city. During the year 1850 there were in that city of over 1,200,000 inhabitants, only three hundred cases of fire. The *Corps des Sapeurs Pompiers* is composed of 623 *sous officiers*, corporals, and soldiers—five captains, four lieutenants, five *sous lieutenants*, one treasurer, two surgeons, and two adjutants. 43-3

These 623 men are divided into four companies, placed at the four cardinal points of the capital. There is in Paris thirty-eight posts, including four barracks, fifteen theatres, and the quarters of the staff. Each post is furnished with an armed pump, hose, &c. Those of the barracks have seven or eight pumps, and of the staff as many.

Each post is composed of three men, sufficient to draw the pump and its apparatus, and to put it working, and in taking bystanders to work it until other soldiers arrive.

The captain receives per year..... 2,500 francs.  
Lieutenant..... 1,500 do.  
Sous do..... 1,300 do.  
Sapeur (fireman)..... 475 do.

The pay cited above for the *sapeur* means the expense of each man. Being a soldier, he has rations, barracks, &c.; but his actual pay is about four dollars per month.

It must be remembered that in France labor and wages of all kinds are forty or fifty per cent lower than in this country. The cost of an engine such as has been referred to, is 800 francs, ladders 40 francs each, and *sac de sauvetage* 120 francs. M. Gustave Paulin, *Colonel du Genie, ex-Commandant des Sapeurs Pompiers de Paris*, says with regard to this corps, "The *Sapeurs Pompiers* were never able to render any efficient services till after they were under military organization. At Paris the mean loss annually by fires is only 500,000 francs, and it is to the military organization that the corps owe this good result."

**SCIENCE, ART AND DISCOVERY**

43-4

**A Universal Steam Fire Engine**

Messrs. Editors:—I would propose the following as an improved means of extinguishing fires in Philadelphia: Build one of the reservoirs at Fairmount, one hundred feet higher than it now is, and in case of fire, send by means of the Fire and Police Telegraph, a despatch to a watchman stationed there, whose duty it shall be to immediately stop off the supply from the old reservoirs, and turn on the supply from the new (high) one, when the hydrostatic pressure alone will be found sufficient and ample to throw water, by means of hose alone, and independent of any fire engine whatever, upon the highest building in the city. The advantage of this system of extinguishing fires could hardly be over-estimated. It would entirely dispense with the present fire-engines, with their large accompanying body of men, for a couple of men with a few sections of hose could be upon the ground in infinitely less time, and render more effectual service, than an engine can with its 20 or 30 men. It would be more effectual than any steam fire-engine that can be made; for, in the first place, it would throw water quite as far, if not farther than the "Engine," and, in the next place, it could be in service long before the "Engine" could be upon the ground, and one drop of water in "time" is better than tons applied afterwards. This, in connection with the new "Quintuple Fire-plug," and Mr. Aaron Roberts' (colored) "Fire Telescope," would, in my opinion, be the best, and, in the end, the cheapest mode of extinguishing fires. Apropos—This fire-plug does not as yet seem to be understood by our citizens. Its properties simply consist in this: that five attachments of ordinary fire-hose can be made to it at one and the same time, thereby saving an immense quantity of hose. And by means of Mr. Roberts' Telescope water is thrown into upper stories of houses in a horizontal stream, instead of in an almost perpendicular direction, as is now the case, the water thereby being thrown to the farthest end of a deep house, which is not the case with the present arrangements.

The water department ought, in my opinion, in future plant no other than the above named fire-plugs, and as fast as those already planted wear out they ought to be replaced by the quintuple plug, even if my (the above) system of extinguishing fires should not prevail. These plugs are the very thing required for the "Steam Fire-Engine," for the only difficulty with the engine seems to be that of an inadequate supply of water.

I am perfectly aware what objections will be made to this plan of extinguishing fires. One is, that the pipes already laid are too weak to withstand this additional pressure per square inch; to which I reply, that "mains" within our streets are amply strong enough to withstand double the amount of pressure at present upon them, and that is just the pressure that they would occasionally be required to withstand. (The same may be said of the by far the largest number of hydrant attachments, and the few old and worn out pipes, that will not stand this pressure additional, are unfit for use any how, and ought to be replaced with new and stronger ones. Besides, if it should be found necessary, there will be found plenty of our mechanics who will invent a "valve," or some other contrivance, to be placed at the intersection of the main and the supply pipes, for the purpose of preventing more than a certain or the present amount of pressure to act upon the supply pipes, whatever may be the pressure upon the mains.

The next and last objection will be, the first cost of adding the additional height to the reservoirs. Now I contend that the interest upon this first cost, (and that, after all, becomes the measure of the cost of the enterprise,) will be at least two-thirds less than what it costs the city at present to maintain the "fire engines." And although the city is too poor to pay for unnecessary extravagances, (such as the police force, &c.) that don't pay, it is nevertheless rich enough to pay for a permanent and useful improvement for the benefit of its inhabitants.

Under these circumstances, I say, let us pause before we squander our resources upon steam fire engines, which in themselves are very good, and will suit admirably for towns having no water-works; but for Philadelphia, which was always ahead of her sister cities for her water-works. I say, let us have, I might say, an omnipotent fire engine—one that we can feel proud of—one that is not subject to get out of order, nor that is dependent upon the weather, or the caprices of the firemen for its efficiency. Therefore, I say, let us husband our resources until we can afford (and why not now?) to build a proper machine for extinguishing fires; one that we can hand down to our children, without running the risk of being denominated by them "old fogies."

**NOTICE TO CONTRACTORS**—Sealed Proposals will be received until the 26th day of Decr next, at 8 o'clock, P.M., for erecting the WATER-WORKS for the West Ward Water Company of the Borough of Easton.

The proposals will embrace an Engine of seventy-five horse power, and also an Engine of one hundred horse power, (low pressure,) which may be adopted, with the necessary Pumps, to elevate the water from the river Lehigh to the reservoir; the Water Pipe, the excavation for, and the laying of the same, to the distance of about 30,000 feet; the construction of a double reservoir, to cover three acres of ground, and all the necessary fixtures for a complete set of Water-works, for the supply of the inhabitants and the extinguishment of fires. Plans and specifications for the work will be furnished on application to the President, HENRY KELLER, President, Easton, November 24th, 1855. n029-2w\*23