

THE
BRITISH FIRE PREVENTION COMMITTEE

FIRES & FIRE TESTS

A SELECTION
of
PAPERS AND REPORTS

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Vol. B. Floors and Partitions.
Vol. C. Doors, Shutters and Glazing.

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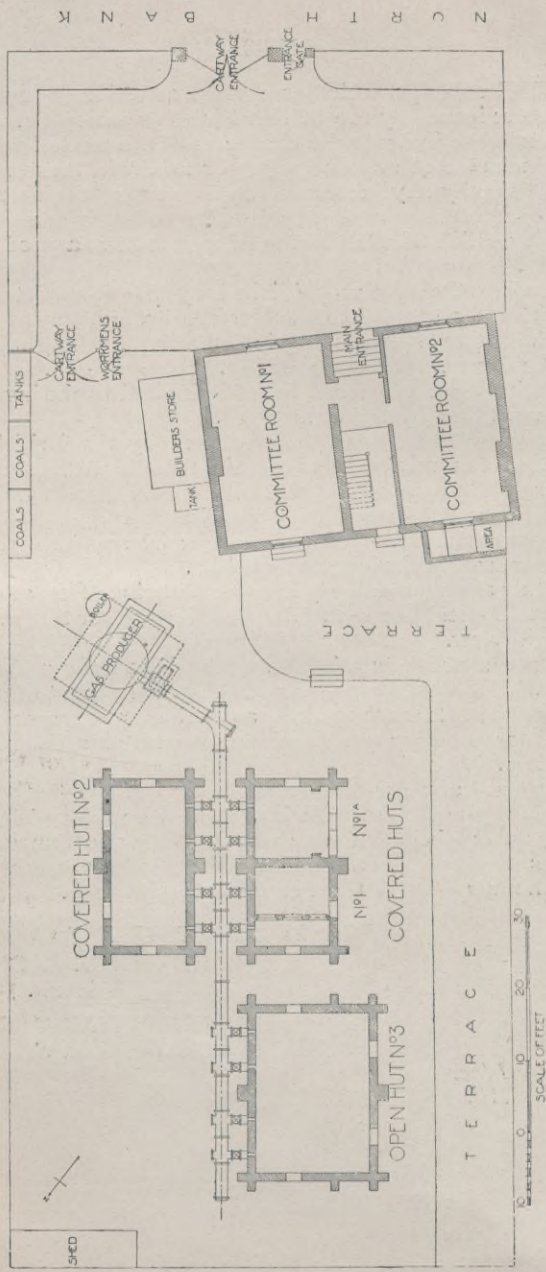
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FOR THE EXECUTIVE,

EDWIN O. SACHS.
Chairman.

ELLIS MARSLAND,
General Hon. Secretary.

8 Waterloo Place,
London, S.W.



SKETCH PLAN OF THE COMMITTEE'S THIRD TESTING STATION

What is Fire Protection?

A Study

BY

EDWIN O. SACHS,

ARCHITECT,

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AUTHOR OF "MODERN OPERA HOUSES AND THEATRES,"

"FIRES AND PUBLIC ENTERTAINMENTS,"

ETC., ETC.

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No. 1.—WHAT IS FIRE PROTECTION?

No. 2.—AMERICAN OPINIONS ON FIRE
PREVENTION.

No. 3.—THE PARIS BAZAAR FIRE.

NOTE.

IN complying with the request to prepare the first paper for this series of publications, I was aware that some general remarks on the subject under consideration of the Committee would be required. Hence I have avoided dealing with any one of the many sections into which the question of fire protection can be divided, and have only attempted to explain the scope of the subject without referring to the work of individual persons, bodies or communities, and without tendering suggestions. In fact, I have been particularly careful to avoid the mention of names, and to abstain from saying that which might read like a preference or partiality.

These pages are only intended to summarise some of the many sections alluded to, and to recapitulate a few of the more important theories and methods promulgated or practised at home and abroad. If I may say so, there is also, purposely, no new matter introduced into these pages. The short notice given for the preparation of this study would alone have prevented my bringing forward new aspects of the matter had I wished it. I cannot but point out that nearly every sentence is more or less a repetition of what I have said before when speaking of Fire Protection. And yet, perhaps, just this repetition of facts may be more

useful in the early stages of the Committee's work than arguments on some specific points or features of the subject.

Our annual loss of property by fire is enormous; several statisticians place the amount of this loss in the British Isles at £70,000,000 per annum; and yet very little has been done to lessen this waste. Our annual death-roll is also serious; nevertheless, no effective remedy has yet been introduced. One of the reasons for this state of affairs is that but few appreciate the full meaning of fire protection as practised so successfully by several nations whose increasing prosperity is to some extent due to the sound economy insisted upon in all directions. The minimising of fire losses will, however, soon have to become an important factor in the work of our communities, for many are tiring of the constant havoc wrought by fire. Before, however, we can hope to reform this state of things, it is necessary to appreciate fully the question: What is Fire Protection? And I trust that the following pages, though containing nothing that is new, will contribute somewhat in this direction.

EDWIN O. SACHS.

London,

November 1st, 1897.

The first edition of this publication having been exhausted, a second issue has been prepared, which, however, practically leaves the text unaltered but for a few minor corrections and some slight modifications.

E. O. S.

January 3rd, 1898.

What is Fire Protection?

INTRODUCTION.

I SHOULD first explain what I understand fire protection to be. The term is, I am afraid, too often misunderstood. Fire-extinguishing—in other words, fire brigade work—is what the majority have in their mind, and many towns consider themselves well protected if they can boast of an efficiently manned fire-engine establishment. In reality the fire brigade as such has but a minor rôle in a rational system of protection. Really well-protected towns owe their position in the first place to properly applied preventive legislation based on the practical experience and research of architects, engineers, and fire experts, insurance, and municipal officials.

The term Fire Protection.

Fire protection, as I understand it, is a combination of fire prevention, fire combating, and fire research. Under the heading of "Fire Prevention," I class all preventive measures, including the education of the public; and under the heading "Fire Combating," I class both self-help and outside help.

Preventive measures may be the result of private initiative, but as a rule they are defined by the local authority, and contained partly in Building Acts, and partly in separate codes of fire-survey regulations—supplemented, if necessary, by special rules as to the treatment of extraordinary risks, such as the storage of petroleum, the manufacture of explosives, and the performance of plays.

Preventive Legislation.

Education of
the Public.

The education of the public I speak of may be simply such as can be quite informally commenced at school and continued by official or semi-official warnings, and a judicious arrangement with the ever-powerful Press as to the tendency of their fire reports.

I am not writing in the abstract, as such forms of training have already been successfully introduced. I know of towns where the authorities have, for instance, had some of the meaningless fables of the Board School "Standard Reader" replaced by more instructive ones, which warn children not to play with matches, and teach them to run for help in case of an emergency. Instructive copy-book headings have been arranged in place of the meaningless sentences so often used in elementary schools. There are quite a number of municipalities where regular warnings are issued (to take an instance again) every December, as to the dangerous Christmas-tree. In such places every inhabitant has at least an opportunity of learning how to throw a bucket of water properly, and the neatest way to trip up a burning woman and roll her up without fanning the flames. The householder is officially informed where the nearest fire-call point is, and how long he must expect to wait till the first engine can reach his house. If he is a newspaper reader, he will also have ample opportunity of knowing the resources of his town, and the local reporter's fire report will give him much useful information based on facts or hints supplied by the authorities.

I mentioned, just above, that I classed both self-help and outside help under the heading of "Fire Combating."

Self-Help.

The self-help I speak of, mainly deals with the protection of large risks, such as factories, stores, public places of amusement, where it lends itself to regulation. The requirements of the fire survey code may allow for hydrants or sprinklers in certain risks, and also for their regular inspection, and the means for self-help may thus be given. These means will, however, probably not be properly employed unless some of the

employés engaged on the risk are instructed as to their purpose, and have confidence in the apparatus at their disposal. The possibility of proper self-help in dangerous risks may be encouraged by enforcing regular drills for the *employés*, and regular inspections to test their efficiency. There are towns where great reliance is placed on the efforts of such amateur firemen. In some cities they even receive extra pay and are formed into units, properly uniformed and equipped, and retained by the fire brigade as a reserve force for emergencies.

Self-help for the shopkeeper, the lodger, or the householder can scarcely be regulated. The opportunities I mentioned above under the heading of "Public Training" would already assure an intelligent behaviour on the part of a large percentage of the community. I know places where, without any regulation being attempted, and thanks entirely to the influence referred to, most residences can boast of a hand-pump, a bucket, and a crowbar, the proper use of which is known to most of the household. Self-help in small risks may, however, be distinctly encouraged by the authorities, without any irksome interference with personal liberty, simply by the provision of street pillar-boxes, with the necessaries of first aid, including perhaps a couple of scaling ladders, and, further, by opportunities being given to householders to learn how to handle them. Put a street pillar-box of this kind in a fire-station, reserve certain afternoons in the year on which this elementary instruction will be given, and the students afterwards shown over the fire-station, or treated to a "turn-out," and there will be quite a number taking advantage of the occasion. No matter whether curiosity or real interest brings them there, the object in view will be attained.

When I speak of outside help I, of course, in the first place, mean organised outside help, and not simply such as is tendered by the casual passer-by or by a neighbour. The link between self-help and outside help is the fire-call.

The Fire-Call.

The efficiency of the fire-call depends not only on the instrument employed and its position, but also on its conspicuous appearance and the indications given to find its whereabouts. These indications are quite as important as the instruments themselves. The conspicuousness of the instrument alone does not suffice. Of the official notifications given in the Press, those in regard to the position of the call-points are among the most useful. An indication at every street corner as to the direction to take to reach the point—or perhaps better, as I also know it, the conspicuous advertisement of the nearest call-point over every post pillar-box and inside every front door—may enable the veriest stranger to call assistance, and minimise the chances of time being lost in search of the instrument. I will not now refer to the instrument itself. It is immaterial for the moment if the helpers are called by a bell outside a fire-station, by a messenger from some special messenger service, a call through a telephone, or an electric or automatic appliance. Any instrument will do that insures the call being transmitted with maximum speed and certainty, and in full accord with the requirements of the locality.

Outside Help.

As to organised outside help, it may not be limited simply to the attendance of the fire brigade. Special arrangements can be made for the attendance of the local police force, a public or private salvage corps, an ambulance, or, in cases, a military guard. Then in some instances arrangements are made for the attendance of the water and gas companies' servants, and even officials from the public works' office, insurance surveyors, and the Press. I know places where the salvage corps arrives on the scene almost simultaneously with the fire-brigade and others where the police are generally on the spot in good force five minutes after the arrival of the first engines. There are two cities where the ambulance waggon and the steamers arrive together, and another city where the military authorities always send a fire piquet which can be turned out in a few minutes.

If all these helpers come together, and no matter how high the rank of the individual commanders, the senior officer of the fire brigade, even if he holds only non-commissioned officer's rank, should have the reins, and his authority be fully recognised. Unfortunately there are not many places where this is the case; I would, however, insist on this fact, that the efficiency of outside help depends in the first instance on clearly defining the duties and powers of all concerned—on the legal foundation, in fact; then on the organisation, the theoretically as well as practically correct executive, and, last, but by no means least, the prestige, the social standing, the education of commanders and their ability to handle men. For the rank and file of the brigade, clear-headedness, pluck, smartness, and agility will be as invaluable as it is dangerous to have reckless daredevilry, showy acrobatism, or an insanè ambition for distinction among the members of the force.

Definition of Powers.

Under the heading "Fire Research" I include all theoretical and experimental investigation as to materials and construction, combined with the chronicling of practical experience in fires, then the careful investigation and chronicling of the causes of fires, assisted where necessary by a power for holding fire inquests in interesting, suspicious, or fatal cases. I also include experimental investigation as to natural and accidental causes as distinct from criminal causes. Research in criminal cases may not only be assisted by a fire inquest as we understand it, but also by immediate formal inquiries held on the spot, by the senior fire brigade and police officers present, or by immediate Government investigations held on the same lines as inquiries into explosions. As to general research work I would mention that there are several cities where, of late years, a number of experts have been regularly employed to superintend a series of experiments on the resistance to fire of iron, steel, wood, and stone. Some towns have special commissions of experts who visit all big fires which occur within a day's travelling distance, take photographs

Investigations.

and sketches, and issue reports as to how the materials were effected. Then there are the usual statistics as to outbreaks, their recurrence and causes, and in some places such tables are supplemented by reports on experiments with oil lamps, their burners and wicks, electric wiring, and the like.

I have stated that "Fire Protection" consisted of "Fire Prevention," "Fire Combating" and "Fire Research," and I have tried to explain to the best of my ability what these headings cover. Before entering into detail, I shall touch on the financial aspects of such protection, and mainly on its relation to the public purse.

FIRE PROTECTION AND FIRE LOSSES.

Distribution of
Losses.

We all know that property destroyed by fire is practically an absolute loss. This loss may only actually affect the owner, or it may be distributed among a number of people who are taxed for it in the form of a contribution to their national or local fire fund, a share in some mutual insurance 'ring,' or the more usual insurance companies' premium. In the first two cases there are also some expenses to subscribe to in connection with the management of the fund or 'ring.' In the latter case, not only the expenses of management have to be covered, but also the costs incurred in running the insurance enterprise as such, and then a further amount for division amongst those who share the risk of the venture—namely, the insurance company's shareholders.

Loss and
Expenditure.

We must here distinctly discern what is a loss and what is mere expenditure. The sinking fund of the large property owner should cover a loss with a minimum extra expense; insurance in an extravagantly managed company paying large dividends will cover a loss, but with an unnecessarily large extra outlay. In every case the loss remains; and as property may always be considered part of the community, the province or nation, as the case may be, suffers. It is always in the interest of a nation

to minimise its national losses, no matter whether they fall on one individual's shoulders or on many, and whether such losses are good for certain trades or not.

With a suitable system of fire protection it is possible to bring these losses to a minimum, but this minimum would probably only be reached by an extra expense, which would fall heavier on the insurers' pockets in the form of municipal rates than the higher premium for the greater risk. A *practical* minimum is all that can be attempted, and that *practical* minimum varies according to circumstances. Most property-owners would, I believe, grumble if a greater immunity from fire were to cost them much more than the danger. They would prefer the risk of the heavier loss to an extra annual expenditure.

Practical protection must mean smaller annual insurance dues, and the actual extra cost of this protection should be something less than the saving off these dues. Then the nation not only has a smaller dead loss, but the owner also has a smaller annual expenditure for his combined contribution towards the losses, the management of his insurance, and the protective measures. Where there is mutual insurance or municipal insurance in its best sense, the losses by fire and the costs of the protection are often booked in one account, and the better protection up to a certain point should mean a smaller individual annual share. Where there is company insurance the municipal rates are increased to cover the cost of extra protection, while the insurance premiums are expected to proportionately decrease. Competition and public opinion generally force this decrease of the insurance rates as soon as there is a greater immunity from fire. Where the insurance companies are well managed, and the shareholders are satisfied with reasonable dividends, *practical* protection can be said to find favour with all concerned, but if the protection is arranged for and the companies do not moderate their charges accordingly, the result for the property owner is by no means a pleasant one.

The Practical
Minimum.

Practical
Protection and
Insurance.

Maintenance
of Fire
Brigades.

I may as well at once touch here on the question of insurance companies subscribing towards the maintenance of a fire brigade. The argument which municipalities use is to the effect that the insurance companies derive all the profit from a good fire service, and should contribute towards its cost. Now, as just said, where properly managed companies have the business, a better fire service means a smaller premium to the ratepayer. If the ratepayer has to pay for extra protection in the form of an increased municipal rate, or in the form of an increased premium raised to meet the contribution levied, surely it is simply juggling with figures. Of course I know full well that the contribution in the latter form helps to popularise the municipal budget, but surely this is not of any real account. Now this is all quite independent of any argument in favour of fire protection being considered in the same light as police protection or sanitation, which are everywhere held to be ratepayers' affairs in the fullest sense of the expression. We do not hear of municipalities in want of a popular budget asking burglary and life insurance companies respectively to contribute to the expenses of their police force or sanitary department.

Municipal
Insurance and
Protection.

To refer here to the advantages and disadvantages of municipal insurance in connection with this study would lead too far, and I scarcely hold the question to have any considerable bearing on the subject. At the most, to my mind, such municipal insurance could only further the actual protection by the opportunity it would give the authorities to fully realise the extent of the losses and the effect of their efforts. Any saving accruing to the ratepayers owing to shareholders' dividends and other extra costs not having to be covered in the insurance premiums, should not affect actual protection. Of course, the municipal insurance premiums may be so figured as to leave the authorities a revenue which is devoted to protective measures. This again, however, is generally only done to reduce municipal rates and juggle with figures. The protection actually required remains the same, and the ratepayer will have to pay for it, no matter in what form.

I am no friend of municipal insurance if planned with the idea of obtaining a revenue from it, and I do not even consider that a general fire insurance business lends itself to official management. I, however, know a number of cities where the authorities limited themselves to taking house risks only, and most satisfactory results were thus obtained. In these cases, the chief ambition of the authorities was simply to arrange for a maximum distribution of losses, a rapid re-erection of buildings gutted and a reduction of the ratepayers' insurance expenses. Mortgages on house property were facilitated and a reduction of criminal cases obtained.

Municipal
Insurance.

THE COST OF FIRE PROTECTION.

As to the actual extra cost of a practical system of fire protection above that of the more usual merely combative establishment, I can only say that where changes for the better were made, it was really astounding how cheaply the greater immunity from fire was obtained. In the first place, I would point out that the special fire clauses embodied in a Building Act would, of course, be attended to by the same executive authorities who would in any case superintend general structural matters, and that the additional work would at the most require some increased clerical aid. If the execution of the fire survey regulations were delegated to the same authority, there would again simply be some extra clerical aid to pay for, and the salaries of perhaps a few extra surveyors. To make the inspections thoroughly efficient, it has been found advisable in instances to form parties of three for the rounds. The second man would, in this case, be a fire brigade officer, and the third probably a master chimney sweep, who would have to receive a special retaining fee.

Building
Regulations
and Fire
Survey.

The cost of the public training I referred to would be small, as the elementary part would simply be included in the schoolmaster's work, and the Press matters could

Training of
the Public.

be easily managed in the fire brigade office. Payments would only have to be made for advertisements, such as the official warnings, lists for fire-call points, etc., and perhaps for the publication of semi-official hints. Self-help, as far as inspection and drills for amateurs are concerned, would be in the hands of the fire brigade. There would, however, be an extra expense for the purchase and maintenance of the street appliances to which I have referred.

Fire-Call.

The most expensive items in the system of fire protection undoubtedly come under the headings "Fire-Call" and "Fire Brigade." As to the former, however, I would mention that there are quite a number of cities where the cost is modified by having the whole of the electrical service for the police force, the ambulance and fire brigade, managed by a separate municipal department. The same wires call up each of these services, and as the same staff attend to their maintenance, the fire protection of a city need only be booked with perhaps a third of the outlay it would occasion if managed independently. The combined system has also the great advantage of facilitating the mutual working of the different services in case of an emergency. The indicators which I have referred to, of course, also involve an outlay; but here again, if the three services work together, the expenses on the count of fire protection can be lessened. Speaking of money rewards given in some cities to individuals who first call the fire-engines, I would point out that such gratuities can become a heavy item, and I have some doubts if in reality they do much good.

Fire Brigade.

As to the outlay on fire brigade establishment, I would here only say that I am a friend of systems which allow for a strong active force supported by efficient reserves. The latter should be as inexpensive as possible, but by all means at least a part-paid and disciplined body which could be easily called in for emergencies. Fire brigade budgets cannot allow for an active force being ready for such curious coincidences as an unusual number of large

fires starting simultaneously, but they must allow for an ample strength always being forthcoming for the ordinary emergencies, and this with all due consideration for men's rest and possible sickness. An undermanned fire brigade is an anomaly which is generally fatal not only to the property owner, but also to the whole efficiency and *esprit* of the force. The budget must also allow for an attractive pay, as the profession is one which requires men who have a maximum of sterling qualities which we look for in the pick of a nation. It must also not be forgotten that the fire service is one of the few where a system of pensions is the only fair way of recognising the risks of limb and health, and at the same time influencing that stability of a force in which practical experience from long service is so essential. The budget must allow for an ample reserve of appliances.

Whether a fire brigade should be so strong as to permit of its having a separate section for salvage corps purposes depends on circumstances. I, at all events, hold that if a salvage corps is required, it should be part and parcel of the municipal brigade organised on the same lines with a reserve, no matter whether the insurance of the locality be managed by the authorities or by the companies. Again, if the corps is necessary, it matters little whether it be paid for out of premiums or out of rates. To my mind there would, however, not be very many towns where a special salvage section would find sufficient work, taking it for granted that general protective measures are good, and that the tactics of the firemen are such as will give no occasion to fear unnecessary water damage.

Of further expenses which have to be considered, there are items for fire research and fire inquest. If managed economically, due confidence being placed in the opinions of the fire officers and surveyors, there is no reason why the outlay should be great. The statistical work would only require some clerical aid. Where special coroners are retained for criminal cases some extra money will, of course, be required; but even here the costs need not be

excessive, as there are many retired fire brigade officers and fire surveyors who are well suited for the work, and would be satisfied with a small emolument.

Water Supply.

The last items I wish to enumerate relate to water supply. There are but few places where special fire high-pressure mains are laid on in the interests of fire protection. As a rule the costs which are debited to the heading "Fire Protection" have simply to cover the maintenance of hydrants and tablets, or at the most the cost of the water actually used for fire-extinguishing purposes. Sometimes the cost of hydrants is shared with the scavenging department or the Commission of Sewers, which also have the use of them. Where the provision of water and hydrants falls to a private water company, the property owners will, of course, be paying their share for them, indirectly, in the form of water rates.

Safe
Construction,
and Property
Owners.

Now, it will have been noticed that all the expenses referred to are, to my mind, such as fall on the public purse, and that I have not taken into account the actual cost of the better construction or arrangements which the Building Act and fire survey regulations would require. The property owners would have to cover this expense individually, but I shall not call it a special or extra outlay, as I consider that stability, with due attention to sanitation and fire protection, should be the essence of modern building construction. Surely inferior construction not only shortens the life of a building, but it is also in every way detrimental to the interests of a *bonâ fide* investor. Safe construction enhances the value of a property, and protective measures need not occasion much additional expense. Why not consider fire protection just as much a primary necessity for building as the block-signal system is for railway construction? Is there much difference in aiding a man's death by fire and his death in a railway accident? Why consider it more legitimate to spoil your neighbour's property by fire than to steal it? Bad construction means a risk to one's neighbour's life and property as

well as to one's own. It may not only cause a direct loss, but also spoil the man's business for years, and throw those out of employment who are dependent upon him. Why permit injuries of this kind ?

Now, this is the first time I have in any way distinguished between the safety of life and the safety of property. The protection of property, to which I may have seemed to be specially referring, must in any case include measures for the protection of life, as no fire can originate without there being some personal danger. It is practically immaterial if this danger affects the inmates or the firemen. The protective measures will serve for both and means for life-saving must be forthcoming as soon as possible after an outbreak has been signalled, as the helpers themselves may want them quite as much as those in or near the risks attacked. It should also be remembered that both a good staircase and a ladder are often quite as useful for the manœuvring of the firemen as for life-saving purposes, and that they are practically quite as essential for the saving of property as for saving life. I do not hold that any distinction need be made between the two risks when speaking of fire protection in general ; but as the safety of a single human life must always be classed higher than that of the most valuable property, it may be well to give life-saving the first place when alluding to the two separately.

Safety of Life
and Safety of
Property.

Up to the present it will have been noticed I have practically only referred to the prevention of fires originating from natural causes, negligence, or accident. Criminal fire-raising may seem not to have had sufficient attention. To my mind there is little or no criminal work where a perfect system of fire protection has been introduced. What with good construction and a fire survey, the quick arrival of the firemen, and careful inquests, the risks of detection are by far too great to encourage its growth.

Criminal
Fire-raising.

FIRE PREVENTION.

Protection of
Life.

Under "Fire Prevention" I first referred to the special requirements of the Building Act, the clauses of which can greatly influence the safety of life by requiring practical exits and sufficient staircase accommodation. I cannot here specially refer to the risks in theatres and assembly halls, which, to my mind, require separate legislation; I simply speak of factories, offices, business premises, hotels and tenement houses. In no case should any inmate of a building be more than sixty feet away from a staircase, and preferably there should be two staircases at his disposal in the event of one being blocked. Generally, attention is only given to the construction of staircases; but it must be pointed out that their ventilation is equally important. Smoke is even a greater danger than fire, and may hamper the helpers terribly. The possibility of opening a window has saved many a life.

Protection of
Property.

As far as the protection of property is concerned, the prevention of outbreaks can be influenced by the careful construction of flues, hearths, stoves, and in certain classes of buildings by the construction of floors and ceilings, the arrangement of sky-lights, shutters, and lightning conductors. Then comes the prevention of the fire spreading, first, by the division of risks; secondly, by the materials used in construction.

Adjoining
Hazard.

When I speak of the division of risks the legislator's first ambition must be to prevent a fire in one house spreading to another, and a stranger's property, so to say, being endangered. This is quite possible, given good party walls carried well over the roof to a height regulated by the nature of the risk, the arrangement of shutters to windows where necessary, or the use of fire-resisting glass, again, a thoroughly good roof—or, still better, a fire-resisting attic floor—can do much. If the

locality has a fire brigade, and the force is decently handled, "spreads" from one house to another should never occur. Narrow thoroughfares and courts are however, a source of danger which may baffle all efforts to localise a fire. This should be remembered by those responsible for street improvements.

The division of a building or a large "risk" into a number of minor ones is only possible to a certain extent. I do not hold with spending enormous sums in order to make each of the minor "risks" impregnable. Our desire should be simply to try to retard the spread for a certain limited time after the flames have really taken hold of the contents. In those minutes most fires will have been discovered, and, where there is an efficient fire-extinguishing establishment, a sufficient number of firemen can be on the spot to localise the outbreak, and prevent the conflagration from being a big one.

Take a drawing-room in an ordinary well-built house. If the joists are strong and the boards grooved, if some light pugging be used and the plastering properly done, if the doors are made well-fitting and fairly strong, a very considerable amount of furniture and fittings can remain well alight for half-an-hour before there is a spread. In a warehouse or factory "risk" the same holds good. With well-built wooden floors, thickly pugged, and the ceilings perhaps run on wire netting or on metal instead of on laths, with ordinary double-ledged doors safely hung, at the most perhaps lined with sheet iron on asbestos cloth, a very stiff blaze can be imprisoned for a considerable time. Many of the recent forms of "patent" flooring are exceedingly useful for the division of "risks," and with their aid a fire can be limited to an individual storey of a building, but it should, of course, not be forgotten that even the best of flooring is useless if carried by unprotected iron girders supported, say, by some light framing or weak partition.

Division of
Risks.

Slow-
Combustion
Construction.*

* I believe that in one country "slow combustion buildings" is spoken of, an excellent term, as the expression "fire proof" is a misnomer, and "fire proof" buildings are impossible for practical purposes.

Non-
Combustion
Construction.

The two general mistakes in using expensive iron and concrete construction is the aptitude to allow some breach to be made (for lifts, shafting, etc.) through which the fire spreads, or to entirely forget that the supports and girder-work require most careful attention.

As to the various systems of "patent" flooring I would only here say that as a rule the simpler forms of construction are the more satisfactory, and as an architect I should mostly advise them. It should, however, always be remembered that any specific form of flooring alone does not prevent a fire breaking from one "risk" to another. They should go hand in hand with general good construction and naked ironwork must be non-existent. Some of the modern fire-resisting floors, I would add, are to my mind too expensive to allow their introduction for fire protection alone. In considering their introduction, the general advantages which they afford as to spans, thickness, general stability, etc., should be considered. A practical installation of floors, partitions, doors, etc., should, firstly, not increase the cost of a building more than 10 per cent., and secondly, add to the general value of the structure by giving the building a more substantial character.

By-the-by, when speaking of the separation of minor "risks," the dangerous lift wells, skylights, and shaft openings should not be forgotten. The latter should be as small as possible, well armed with shutters, the skylights again should have fire-resisting glass, and the lifts not only vertical doors, but also horizontal flaps, which would cut up the well into sections. The question of light partitions must also not be neglected.

Structural
Requirements.

Division of "risks," common sense construction, and proper staircase accommodation are really all that fire protection requires, and where the special Building Act clauses have been kept within the lines I have indicated, there has been little friction and discontent. It is only when, to quote an instance which I have known, a tenement is required to have a large passage-way,

through which a fire-engine could gallop into a courtyard, that the property owner very rightly considers himself harassed by protective measures.

As to the fire survey regulations, they should mainly prevent the actual outbreak of fire. In certain classes of risks fire survey can also increase the personal safety of the inmates, and the possibility of a fire spreading may be lessened. The provision of fire-escapes or ladders, and a regular inspection of their efficiency, will do much. The examination of a rusty door-catch may save a building, The actual preventive work of the surveyor will, however, mostly consist in the warning of property owners against temporary stoves standing on ordinary floor boards, sooty chimneys, badly hung lamps, dangerous burners and gas-brackets fixed in risky positions. Self-help will be greatly facilitated by the judicious arrangement of fire-extinguishing gear, and a like inspection of its efficiency. Hydrants and cocks must not rust, nor must the hose get so stiff that water cannot pass through it, or sprinklers choked. Hand pumps and pails must always stand ready filled. As to distributing such apparatus, I would point out that one of the greatest errors generally made is to forget that the amateur likes to have an easy retreat if his efforts are unsuccessful, and if this is not the case, he may not, perhaps, use the gear at all.

Fire Survey
Regulations.

It is, unfortunately, quite impossible in this pamphlet to touch on regulations governing "special risks" referred to. I will only here say that as far as the safety of the public in theatres and public assembly halls is concerned, attention, to my mind, should be chiefly given to the exits. Spread of fire, and even its outbreak, are secondary considerations. A panic caused by a suspicion of fire can be quite as fatal as where a conflagration is actually started. As to the petroleum storage in shops, I would give most attention to prevent any direct communication between the shop or cellar and the main staircase or the living-rooms. As

Special Risks.

to the lamp question, why not prohibit the sale of dangerous lamps and burners in the same way as the sale of dangerous food?

FIRE COMBATING.

SELF-HELP.

Organised
Self-Help.

As to self-help, I would only add that complications must always be avoided, and that above all the amateur fireman must be drilled on the simplest lines. I am a great friend of competition where volunteer work is concerned, and have always found annual prizes to be a good investment. One thing, however, must be instilled into the amateur mind, and that is not to waste water—a sure sign of lack of training. Of course, the drills must be on the same lines as those of the local brigade, and on no account should other gear be used for self-help than is generally customary in that force. When volunteers and regulars work together, the latter should always remember that the paid force are experts, though the regulars must never have that contempt for volunteer work so often noticeable. Volunteers are men who are probably experts in some other vocation outside fire fighting, and have not had the opportunities which a professional fire fighter has had.

Independent
Self-Help.

There is one point still regarding self-help which I may touch on. There are authorities who dispute the advantages of both organised and independent self-help, and who prefer the immediate call of outside help only. These authorities remember the futile help of the amateur, and perhaps the door he opened which fanned the flames before there was a sufficient supply of water to counteract the effect. When there is more than one helper at hand, one should always see that the regular fire brigade is called, and where there is one man only, he should never attempt self-help if the fire is well alight, but call the engines. If the fire, however, is small, and engines cannot be had within a few minutes, self-help should always be

tried. Of course, so much depends on the circumstances, and also on the nationality and temperament of the first comer. Except for one or two countries where the amateur is apt to be too excitable, I hold that self-help, both organised and unorganised, should be encouraged.

FIRE-CALL.

I must now give some space to the invaluable fire-call. Direct Calls. There are several methods of transmitting the message. The simplest is, of course, to run direct to the nearest fire-station; but this is only possible where the distance is quite short. In one or two cities, however, the number of fire-stations is so great that they are very close to one another, and hence what I will term "direct" calls are generally recorded.

Then comes the system of special messengers. Special Messengers. The fire is reported at some public office, police-station, or guard-room, where there are always runners ready to start off to the nearest fire-station. The special runner is, of course, here practically a makeshift for the more modern telegraph or telephone line, and the only city in which I know this system to be employed is one where the unsettled political atmosphere has compelled the authorities to prohibit the construction of any telegraph line other than those for the use of the general postal service. Similar messenger services have, however, also been introduced in connection with the telegraphic signalling system. I refer to the private enterprises known as "general messenger" or "call-boy" services, which are organised for business purposes, and have the advantage of the fire-call and the police-call thrown in. In the same way that a cab can be signalled, a call may come for a fire-engine, and the ever-ready runner makes off to the fire-station instead of to the cab rank. As a rule, these messenger offices are near the fire-station. The combination is really rather a curious one, as it embraces the most advanced notions of giving every "risk" its own fire-call, and the somewhat ancient one of the special

runner. I have often wondered why these messenger offices have no special wires to the fire-stations themselves.

The General Telephone.

Another system for facilitating the fire-call, relies entirely on the public telephone system, the terms of subscription to which may compel holders to forward fire messages if required to do so. This system allows for such development as the payment of retaining fees to porters in public and other buildings which have a night service, on condition that the fire-call shall be promptly despatched. The telephones are, perhaps, even provided free, if they are not forthcoming; but it should be remembered that the service always goes through a General Telephone Exchange, which is, of course, open day and night.

Special Telephones.

Then there is the special telephone line system, where special wires are laid on to buildings which are practically open all the year round, direct to their nearest fire-stations, and some payment is again made for prompt attention. Sometimes the telegraph takes the place of the telephone, but this requires the porter or attendant to be specially trained to the work. To simplify matters, the buildings are sometimes provided with automatic fire-calls instead of telephones; but the principle of the system remains the same. In districts where there are few public offices, the list of buildings at which messages can be handed in, has been frequently augmented by a set of bakeries or apothecaries' shops, where night service is not unusual.

Semi-Public Street Alarms.

What may be termed semi-public street alarms, come next. Automatic fire-calls are put up in the street, but their handles are under lock and key, and the keys are only distributed among policemen, watchmen, or householders, and the messages can, hence, only be given by persons known to the authorities.

Public Street Alarms.

The public automatic street-call is the last on my list. It is the simplest system next to the direct message. Of course, I know that private automatic fire-calls or telephones can be laid on from dangerous

risks, and there has even been an instance where an attempt was made to give every householder a private fire-call. This system is, however, unfortunately too extreme for the municipal purse. If in connection with some other paying enterprise, as in the case of the messenger services referred to, it would be a different matter, though it should also not be forgotten that too great a number of call points means a probable repetition of signals of the same fire. As every call should be answered, with two separate fires quite easily occurring about the same time in the same neighbourhood, there is a risk of too many sections of the fire brigade being on the road to the same fire.

Besides these forms of "call," we, of course, also have the private alarm. Dangerous buildings are frequently provided with telephones, alarm-posts, or even automatic temperature indicators, by which a call can be given direct from the "risk" involved. Private Alarms

As to the position of call points, they should not only be conspicuous, but they must also be in most frequented positions. Possibly, in some towns, a point in front of a church would be the best; in others, it may be more advisable in front of a public-house. It should always be remembered that every facility should be given to enable as many people as possible to know the whereabouts of the call points without any distinct effort on their part. Red paint may make a call pillar conspicuous by day, and a coloured lamp by night. Position of Call Points.

As to the indication I spoke of, the plate on every letter-box as to the whereabouts of the nearest call point is perhaps one of the best. The letter-box is one of the instruments most in use in a modern city, and hence the plate is read by many. In an Oriental town the public fountain would, however, of course, take the place of the letter-box. Plates put up inside every front door are somewhat extreme measures. In one city I saw small red darts painted on the glass of every street lamp, indicating the direction to be taken to find a street alarm. This sign, however, has the disad- Indication of Call Points.

vantage of requiring a previous knowledge of its meaning. It is generally useless to a stranger in the town.

Rewards for
Calls.

As to rewards paid to messengers, I know them to vary from one shilling to half a sovereign. In some places every call is rewarded—that is to say, even those to chimney fires—and this often results in an abuse of the privilege. I have actually known rogues to light bogus fires on the top of a chimney, and then run to call the engines. If a reward be given, a limitation should be made. In one town I know of no relation or *employé* of the owner receives a reward. In other cities no rewards are given for calls to a fire in a dust-bin or a chimney. As to the value of the reward, of course it depends on the value of money in the respective countries.

False Alarms.

Here I must add a few words as to false alarms. No true fireman would be annoyed at a false alarm given by mistake. The possibility of a fire, or the suspicion or one, are *bonâ-fide* reasons for a call which should not be discouraged. Malicious alarms should, however, be treated with the utmost rigour, as the absence of firemen from their stations always means an extra risk to life and property. More distant helpers may arrive too late. Combined “lynch law” and imprisonment has been adopted with good effect in one city I know. The rascal when caught was put over the pole of the engine and thrashed with a broad fireman’s-belt, and after that he was handed to the police. Hard labour has had much effect especially when inflicted on persons of position. Only a short time back the son of a well-known mayor had a month’s hard labour for a malicious call, and there was at once an abatement of the evil. Fines are a ridiculous punishment for this kind of offence. Where the punishment for malicious alarm is severe there need be no recourse to the semi-public automaton I spoke of, excepting perhaps in the veriest slums of a city.

Fire
Intelligence.

The fire-call, should if possible, also be so constructed as to facilitate intercommunication between the scene of a fire and the headquarters of the fire brigade. Where the runner is employed or the telephone is used no special

arrangements are required, but where the telegraph or automatic call point have been introduced, the apparatus must be adapted for this contingency. At some automatic fire-call points a few signals can be given, at others a telegraphic or telephonic transmitter can be applied. Much valuable time may be saved in this way when more assistance is required. On the other hand, I again know towns which make a point of keeping up a line of intercommunication for every fire, so that in case of an emergency part of the men in attendance there could be called away to help elsewhere. In some places the headquarters of a fire brigade are in communication with some watchmen on a neighbouring tower or steeple, who can signal any increase in a large fire by the change of the "light" the blaze shows.

FIRE BRIGADE.

The organisation of fire brigades varies greatly. As to the hours of duty, there are brigades where officers and men are practically constantly ready to attend a fire, and others where they are ready on alternate days, two days out of every three, or three days out of every four, and the off day is entirely their own, or at the most, only partially used by the authorities for some light work. The men off duty are only expected to attend a fire if there is a great emergency. The brigade is strong enough without them for ordinary eventualities. Both systems can be worked with or without part-paid or volunteer reserve. These would be only called out for great calamities. They could be organised as a practically independent reserve force, or the reserve men might be attached to sections of the regulars and mixed with them when the occasion arises, in the same way as our naval reserve men mostly are. The reserves can either consist of retired firemen who have a few regular drills, or amateurs who have to go through a special course of training, have some series of drills at intervals, and preferably a short spell of service every

As Working
Hours of Staff
and Reserves.

year with the regulars. I prefer the reserves to be a distinct body. As regards the hours of duty for the regulars, forty-eight on to every twenty-four off has given the most satisfactory results.

Division of
Staff.

As to the division of the active force, it may be on a system of a number of small parties of twos and threes backed by one or more strong bodies. Another system allows for sub-division into sections of equal strength, ranging from parties of, say, five men with a non-commissioned officer to thirty non-commissioned officers and men with an officer. The force can, of course, also simply be divided up into parties or sections of different strength not governed by a system of military units. The sections can either work independently, as units, simply governed by one central authority, or there can be a grouping of the units into minor or major bodies or districts, each duly officered, and as a whole individually responsible to headquarters.

Officers.

As to the officers, they may be all taken from the ranks, or they may be "officers and gentlemen" in the military sense, who have only temporarily done work with the file when in training. There could also be a combination of these two systems. Only the captain and deputy-captain might be officers in the military sense, the sections or divisions being officered by "non-coms." Some cities have an officer to every thirty "non-coms" and men, whilst others put a division of as many as two hundred under a fireman who has risen from the ranks. Where protection is treated as a science, and where those in charge of a brigade have really to act as advisers to their employers, officers in the military sense have been found essential. They have also been found advantageous where their scope is limited to fire extinguishing. The prestige of the fire service has been raised everywhere where the officers, besides being fire experts, are educated men of social standing. There are cities where the officers of the fire brigade are in every way recognised as equal to army or navy men, their social

position is the same, and their mess fulfils the same functions as a regimental mess. The fire brigade officer is recognised at Court, and there is no ceremonial without him. On the other hand, there are also cities with brigades several hundred strong where the captain, who may, of course, be a very fine fellow, would unfortunately seem quite out of place in any recognised club room. His social standing is often beneath that of a petty officer or colour-sergeant. As to the primary training of a fire brigade officer, I may as well say that the best men have generally had some experience in another profession, such as the army, the navy, or the architectural and engineering professions, previous to their entering the fire service. Some brigades recruit from army officers only, and preferably from the Royal Engineers or Artillery regiments; others recruit from among architects and engineers, subject to their having at least had some military experience in the reserve forces or the volunteers. Some cities only take engineers or architects, and make a point of it that they should have no previous military experience. I hold that some previous experience in the handling of men is essential. Royal Engineers and architects or engineers of some military experience have, to my mind, nearly always made the best fire brigade officers.

As to the men, there are cities where only trained soldiers are taken as firemen; others where the engines are manned by sailors. In some towns the building trades supply the recruits; in others, all trades are either discriminately or indiscriminately represented. I have generally found a combination from the army or navy on the one side and the building trades on the other most satisfactory. The knowledge of building construction in the ranks stands the force in good stead, and has often saved both lives and property. Where a brigade can boast of a few men of each important trade, much money has been saved the ratepayers by the men doing their own repairs and refitting, but the number of men from sedentary trades

Non.Coms.
and File.

should not be excessive. Where there are only men of one trade or calling, I generally found too great a tendency to one-sidedness, and a wonderful amount of prejudice.

I suppose I need not specially mention that physical strength and perfect constitution are requisite for both officers and men. As to the height of the men, I can only say that I have found small, wiry men to be very useful. First-class eyes, ears, and nose are necessary, also a good memory. There is one point I must here not omit, and that is that many brigades only take single men; "non-coms" and officers only being allowed to marry. As to age, there are many brigades where twenty-two and forty are the limits for the privates, fifty for the "nom-coms.," and sixty for the officers.

General
Equipment.

As to the equipment, there are brigades which have all their sections or units provided with practically the same gear; others where each unit has a double or treble set, one of which is used according to circumstances. The section may have a manual engine, a steamer, and a ladder truck at its disposal, and may turn out with either. Then there are towns where the units are differently equipped, and we find steamer or manual sections called out, as the case may be. In a few extreme cases, where the sections are very strong, they may be equipped with a set of engines and trucks, and the unit, in every case, turns out complete with (say) a manual, a steamer, and a horsed escape. The contrast to this will be found in the small parties of twos or threes referred to, whose turn-out would only consist of a small hose trolley or an escape. Of course, there are all kinds of combinations, the most important of which allows a section to have one or more independent sub-sections. Though practically belonging to the "unit," the sub-sections work independently in charge of a certain gear. This may be a hose-reel, a long ladder, or a smoke helmet, according to circumstances. The sub-sections may

act as outposts—if I may call them so—or simply as specialist parties, which are only called out for particular work.

As for the housing of the units or sections, there are the simple street stations for the small parties referred to. In a few cases, I have known two small parties to be under the same roof. The large bodies that back them are generally quartered together in extensive barracks, from which any number of engines and men can be turned out according to the nature of the call. Then there are cities where every section has its own well-built station; others where one or two sections are housed together, according to circumstances, and perhaps as many as half-a-dozen located at headquarters. If groups are formed, the head-quarters of the group or district has, perhaps, two sections, while each of the other stations has only one. The general head-quarters may be the central station of a district at the same time. The actual working of the district head-quarters would, however, then be kept separate from the working of the head-quarter's staff. The latter would, perhaps, have some sections ready to send anywhere, besides the trucks, etc., necessary for the officers, the general extra gear, etc., that might be required. It is usual to combine workshops, stores, hose-drying towers, etc., with the head-quarters station, and, in some cases, also with the district centres.

Stations.

As to the distribution of the stations, the formation of districts, etc., various systems have been adopted. The most satisfactory results have been obtained where a fully-equipped section (not simply a hose-car or escape-party) can reach any building in the city within seven minutes from the time of the call reaching the station, the seven minutes including for both turn-out and run. Where there are exceptionally large or dangerous risks, this time has had to be shortened to five minutes, and the possibility of an attendance from a second station assured within eight minutes. In dividing up districts, the most satisfactory results were

Distribution of
Stations.

obtained where every house could be reached from the district centre within fifteen minutes from the call. Head-quarters would naturally have a central position in the city. In one or two instances I have known the head-quarters offices to be located in a separate building, which in no way served as a fire-station, but simply as a centre through which all orders and business passed. I do not approve of this arrangement.

Intercommuni-
cation between
Stations.

The different stations must, of course, be in connection with each other. Excepting in the one city already referred to, the special runner or rider has practically disappeared. The telegraph and telephone have taken their place. Some cities favour Morse telegraphy. It certainly had great advantages over the telephone till within a year or so ago, as messages could be easily transmitted to several stations with the same effort; but telephone distributors have now been successfully introduced. Errors are, I believe, less frequent by telegraph than through the telephone, and there is always a record of every message. The most modern forms of telephone communication are, however, more suitable for the fire service than the telegraph, though I should by no means advise the great expense of their introduction where there is a good system of the older means. Head-quarters should be in direct communication with every station, but every station should be able to communicate with its neighbour directly, as well as through the head-quarters office, and there should be a direct wire to its district station if it has one. There should be three routes of communication, so that two would be always ready for use in case of one breaking down. Either head-quarters of the district centres would be in touch with the various auxiliaries referred to, as well as the general telegraph office and the telephone exchange.

Attendance at
Fires.

As to the attendance at fires, some cities turn out but one unit to answer the first call if they have no particulars, others always turn out two or three sections, and there are several cities that I know where the district centre would at least send an officer and a few men as

well. In one brigade, head-quarters is always either represented by the chief or second officer in the case of a call of this kind. The idea is that it is always better to have too strong a force quickly in attendance than too small a number of men, and that it is most important that the first arrivals should be well handled. Further, if two sections answer a call and one breaks down on the road, there is no chance of there being too great a delay in the arrival of organised help. It should, however, not be forgotten that further calls in the same district to other fires are not unusual, and that the absence of too many engines, on account of a first call, is dangerous. In some cities, when a call reaches the firemen one or two of the nearest stations turn out, and if more help is required other sections will be called up individually. In others the reinforcements are not called up separately, but the fires are divided into three classes—small, medium, and large; and on the message arriving of a more extensive conflagration at a certain point, the sections already know beforehand whether they must attend or not. First calls to certain classes of risks, *e.g.*, to theatres or public offices, may always be considered to be for medium or large fires; and the same message will then simultaneously turn out the stronger body without any further detailed instructions being necessary. In two towns I know of, the fire-call automata are so arranged that the messenger can at once call for the different classes of fire. This, however, is not to be recommended, as a messenger will probably consider the smallest fire to be a gigantic blaze, and will bring out too many engines.

It is quite impossible for me to here enter into a description of the appliances or working of brigades. Besides requiring some considerable space, I should have to describe a number of institutions individually, and that is not my intention in these pages. I will only point out that where there is a high-pressure water supply, some brigades simply attend with hose-cars, life-saving gear, and ladders; or, instead of the hose-cars,

Fire-
Extinguishing
Appliances.

take their manuals, which they practically never use. Others take, and make a point of using the manuals, and have a barrel with them ready to supply the first gallons of water necessary. No time is thus lost in connecting with the nearest hydrant or plug; and in case of a hydrant being out of order, there is always sufficient water at hand until the second hydrant has been found. Some cities have lately introduced chemical engines to take the place of this combination of water barrel and manual engine. A supply of water is carried on the chemical engine. Some cities always have an attendance of steamers, which are, however, only used in urgent cases. In other instances the steamer is at once used in the same way as the manual, and this quite independent of the pressure there is in the water service. Where there is no good water service, manuals or steamers have, of course, to be sent out, and are either supplied from the low-pressure service or from the natural water-ways or wells. There are yet a large number of cities where the suburbs have no proper water service, and the water barrel comes in very handy here for portorage. Attempts have also been made to chemically treat water which is to be thrown on to a fire, with the view of increasing its effect, or to use chemicals instead of water. These attempts should not be confused with the application of chemicals to supersede manual labour as indicated above.

Life Saving
and
Manœuvring
Appliances.

As to life saving and manœuvring gear, some brigades rely almost entirely on rope ladders, others almost entirely depend on scaling ladders, or telescopic escapes. In one city I know of, great confidence is placed in the jumping-sheet; in another, chutes are much used; and there are a few where wonderful work is done with life-lines. Simply to indicate the diversity with which any one appliance can be treated, made, or handled in the fire service, I would mention that there are quite ten different ways in which a jumping-sheet can be held. Then there is the material of the jumping-sheet to be considered; the size and the shape—whether round, oblong, square,

or rectangular; then the means of holding it, the way to fold it, how and where to stow it, and at what distance from the endangered building the sheet is to be held. Last, but not least, come the words of command.

As to the working of brigades, I must limit myself to saying that there are, first of all, forces where all possible attention is given to the rapidity of the actual turn out, whilst there are others where the speed at which engines run to the fire is considered to be of primary importance. Other brigades, again, give equal attention to both. There are brigades which work entirely on military lines, each man having certain duties marked out for him beforehand for every possible occasion, and there are others where happy-go-lucky working is preferred. Of course there are combinations in the same way as regards command. I know one chief officer who always arrives at a fire with a staff of adjutants and orderlies, and controls the working of his brigade from a position of vantage at a distance. Another chief of a strong brigade always delights to be in the thick of a fire, perhaps at the branch itself, or on some gallant life-saving exploit where he no doubt does good work as a fireman, but in no way fulfils the office of a commander. Officers must remember that they are officers, and not rank and file; and this is generally very difficult to those who have advanced from the lowest grade. Superintendents, however smart, must leave acts of bravery to their men, and chief officers, without going to extremes, must always be in a good position where they can superintend everything pertaining to the outbreak in question. Some brigades seem to make a point of it to work quietly, and shouting is absolutely forbidden. All commands are here given by shrill whistles. In some brigades all commands are given by word of mouth, and there is much bawling. In others, commands, besides being bawled, are even repeated on horns, and the noise becomes ridiculous. As a rule, quiet working is a sign of efficiency.

General
Working.

Some brigades work as close as possible to the fire, Tactics.

others are satisfied with putting water on or about the fire from a distance. Some attack the fire direct, others only try to protect what surrounds the seat of the flames. In several brigades the orders are to always try and attack by the natural routes of the front door and the staircases. In others, the men always have to attempt some more unnatural entrance, with the aid of ladders—through windows, for instance. Some brigades carefully extinguish a fire, some simply swamp it. I know cases where officers will go so far as to let a roof that is alight burn itself out, simply keeping the surrounding walls, or some attic floor, damp. This prevents unnecessary water damage. The roof will have to be renewed in any case; what need is there to spoil a number of rooms below? Handled by judicious officers, several brigades have been able to boast of never having damaged property unnecessarily. They have, for instance, had the patience to suffocate a cellar fire, instead of putting the whole cellar under water. In certain classes of property the bucket, the mop, and the hand-pump have been far more effective in minimising actual destruction than the branch and hose. It is one of the easiest signs by which to judge the training and handling of a fire brigade—to see what damage they do. Even an inconsiderate smashing of doors and windows, when there is absolutely no need for it, can be avoided, where every man in the force feels that his first duty is to prevent damage and loss, and his second to extinguish the fire.

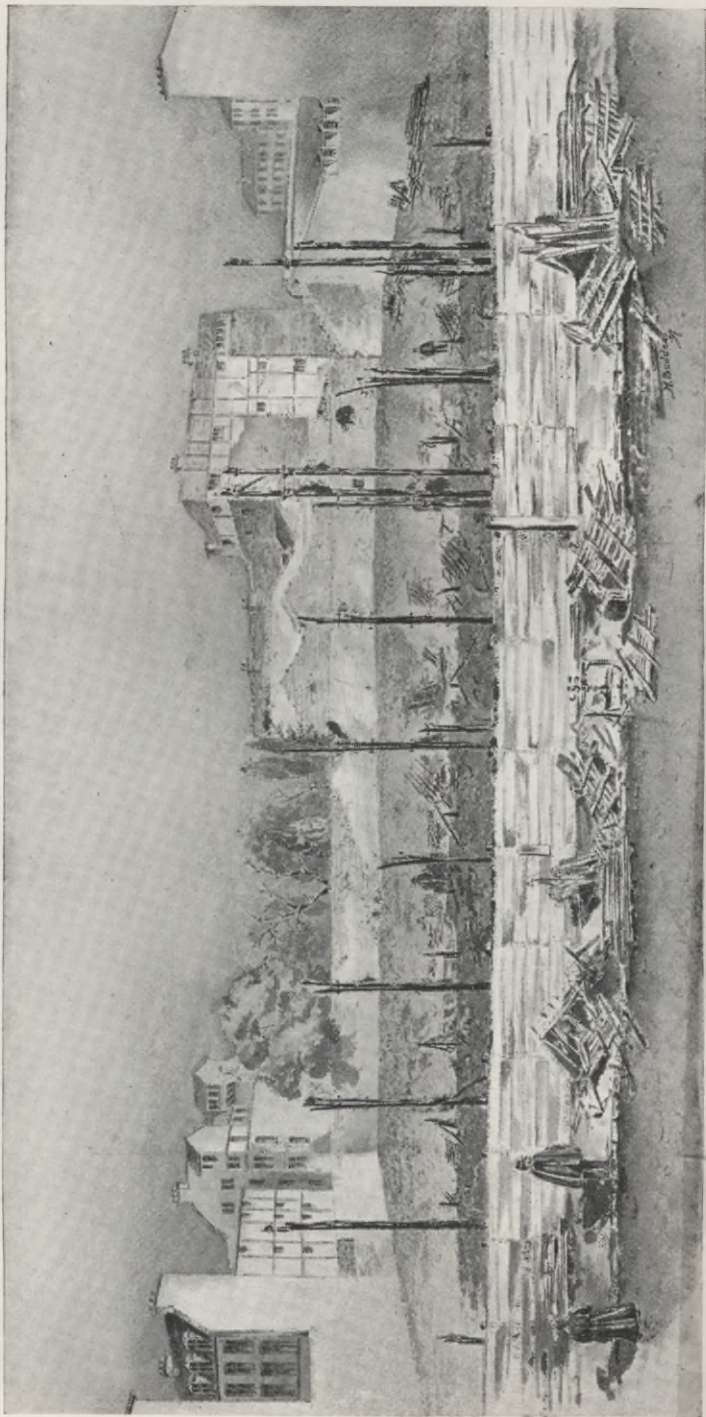
Salvage.

Where the brigade includes a salvage division, it is generally stationed at head-quarters; where this division is split up into sections, there would also be a distribution among the district centres: the salvage men are simply part of the force, told off on special duty. Where there are private salvage corps, their stations are generally near the headquarters or district centres of the brigade, from which they receive notice of the fire. In some cities the salvage corps work quite independ-

ently; in others, they work under the chief of the brigade directly they arrive at the fire.

I am afraid I cannot here even touch on the working of other auxiliaries except to say that there are a number of cities where the advantage of firemen having plenty of room to work in is fully recognised, and the police are at once called out with the fire brigade and brought on to the scene in an incredibly short time. There are always vans ready horsed at the police headquarters to take out a squad of men when the fire-call comes, and a certain number of mounted men are also kept ready for this purpose. The value of these measures should not be underrated, especially in cities where rowdyism exists. Auxiliaries.

In closing I cannot omit to point out that in towns where no independent ambulance corps exists, some of the firemen are often trained to work as ambulance men.



PARIS BAZAAR FIRE, MAY 4, 1897.
VIEW OF BUILDING AFTER FIRE.