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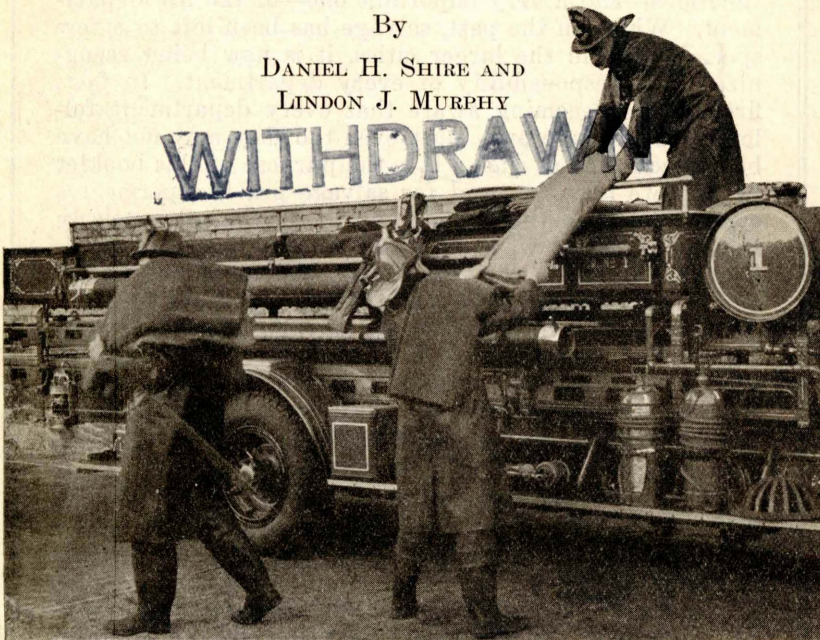
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Practical Salvage Suggestions for
the Fire Department

By

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FIREMANSHIP today constantly presents new challenges to the alert fireman. As buildings have grown from one or two room frame structures to veritable giant beehives, some stretching many stories upward, the fire fighters' problems have similarly increased. Chemical and electrical hazards have been added to complicated structural hazards.

The science of firemanship has nevertheless kept pace with the growing complexities of fire fighting. The intelligent use of ventilation, the utilization of small streams on minor fires, and the scientific control of chemicals involved in a fire are all recent developments in the art. To this list should now be added the organized practice of salvage principles.

Salvage is just coming to be recognized as one of the functions—and a very important one—of the fire department. Where in the past, salvage has been left to a few special corps in the larger cities, it is now being recognized as a responsibility of every department. In fact, firemen are becoming aware that every department follows some salvage principles, even tho they may not have been recognized as such. It is the purpose of this booklet to indicate how the need for salvage practice permeates every activity of the fireman and to clearly but concisely suggest practical ways in which firemen can utilize salvage principles to the tremendous benefit of the public and to the equal advantage of the fire department.

Much of the information on salvage work has been known for generations. The authors have attempted merely to collect and present it in concise and practical form for the use of firemen. Grateful acknowledgement is made to the many fire department officers and engineers who have spoken or written on this subject.

Particular reference has been made to the work and writings of Chief Edward H. Warr of the Fire Insurance Salvage Corps of Baltimore, Maryland; Chief Richard L. Smith of the Fire Department of Pittsburgh, Pa.; Chief Frank C. McAuliffe of the Fire Insurance Patrols, Chicago, Ill.; and to the publication on Fire Fighting, Bulletin No. 155, issued by the Federal Board of Vocational Education.

A special class on Salvage Practices for Firemen was held during the 1932 Iowa Fire School at the Iowa State College, Ames, under the direction of Chief Shire. This publication contains much of the instruction given in that course and it is presented in this form in answer to many requests for practical salvage information.

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Practical Salvage Suggestions for the Fire Department

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Why Fire Salvage

Fire fighting has become a science. As the hazards from fire have increased and the difficulties of control have multiplied, so firemanship has likewise developed to meet the new needs and problems. Methods which sufficed a decade or so ago are now inadequate. To merely drown out a fire with a deluge of water is no longer sufficient. Alert firemen are realizing that the damage from extinguishing the fire has often been greater than the damage from the flames. Losses have frequently been estimated at 25 per cent fire damage and 75 per cent water and other damage incident to extinguishment.

Every fire department has for its major obligations the protection of life and property; while the saving of life must, of course, receive first consideration, it is the preservation of property which brings to the fireman his most frequent and difficult problems. Thoughtful firemen have come to question the effectiveness of methods of handling fires where the extinguishment has been responsible for three-fourths of the total loss. Evidently fire departments have not always been successful in adequately protecting property. Fires have been well fought but the total loss has been far too large.

It is with good reason therefore that salvage is being rediscovered as an important part of a fire department's mission. Firemen are carefully scrutinizing fire fighting methods with a view of finding those ways of handling fires which will result in the least possible damage. They are also studying and adopting those salvage practices which will minimize the loss due to water and the action of the elements, and which will leave the property in the best possible condition for the repair of the fire damage and the resumption of normal activities.

Salvage by Every Department

Many fire chiefs have the impression that salvage work is only for the large city department; that because their departments are small they cannot spare men to do extensive salvage; and, in a few isolated cases this is undoubtedly true. There are naturally occasions with every fire department where all available men are needed in saving lives and extinguishing fire, or in preventing its spread. At these times, covering and similar salvage work must be suspended temporarily.

Upon studying the situation, it has surprised many chiefs that, once the lines were in operation, firemen could be found available to place covers and carry out other salvage needs in a large percentage of fires, even going ones. Ceilings and floors will hold much water for a short time, hence effective salvage work can still be done in five minutes or twenty minutes as firemen become available from the lines. Even the smallest departments can do salvage on this basis. In fact some of the best salvage work in the state is being done by small volunteer departments.

What Is Salvage?

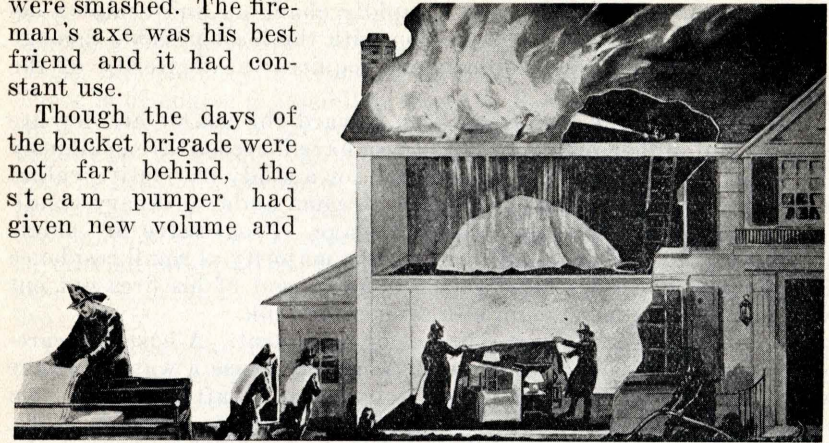
Broadly speaking, salvage is the practice of common sense in handling fires. It enters into the way in which the fire is fought as well as the condition in which the fire-stricken premises are left. It begins with the attack on the fire; the methods used, the points of approach, the ventilation secured, and the size and kind of streams all effect the total damage. Salvage has to do with the covering or removal of goods which may be damaged by fire or water. It includes the diversion and removal of excess water from floors and stairways, and lastly, it includes the protection of property saved from the fire. This may mean the temporary covering of roof and wall holes, cleaning out of debris after a fire, covering and protection of exposed furniture from the elements, and drying of polished furniture which may have been made wet by water or chemicals. At times it may even require heating and drying out the building.

Salvage Practices in Attacking the Fire

In the good old days when firemen fought for the privilege of putting out a fire, firemanship was spectacular. The clamorous fire bell, the noisy red steam engine, and the clattering fire horses all added to the glamor and excitement of the occasion. Is it any wonder that, in the confusion, firemen frequently did not have time to unlock doors; hence in the hurry to get at the fire, windows and openings

were smashed. The fireman's axe was his best friend and it had constant use.

Though the days of the bucket brigade were not far behind, the steam pumper had given new volume and



Courtesy Fulton Bag and Cotton Co.
The use of salvage covers to protect the contents of a home during a fire.

power to the fire stream. Water was king. "Drown 'er out," were the orders, and they were fully carried out. Water and more water was poured on at every fire. To combat a fire was to work against great odds, and rough and ready measures sufficed.

Gaining Entrance

Those days are gone forever. The axe has been relegated to its proper place as a tool of last resort. Where entrance to a fire must be forced firemen are frequently able to enter through windows. Often second story windows are left unlocked and may be utilized instead of forcing entrance doors. In entering through heavy paneled doors, it is usually better to break the glass panel than to force the door, as the latter method may result in both a damaged door frame and broken glass. Inside doors can be easily opened by removing the door stop and springing the lock with a bar. In opening a door from the side opposite the stop, the hinge bolts can often be removed and the door lifted out. Effective tools have been designed for gaining entrance, and the old ruthless methods of breaking in can no longer be tolerated.

New Methods of Attack

The days when all a fireman had to do was to pour on water are gone, too. Modern methods of fire fighting, the use of ventilation, and the introduction of improved salvage practices have changed all

that. Firemanship has become a rapidly changing and complex occupation. To subdue a conflagration with the least possible damage is a science, and its accomplishment requires the dexterity of the artisan.

Until recently the trend has been toward the use of heavier fire streams and higher pressures. As these have increased tremendously the water damage, there is a need now for a study in relative values—of the possibility of using smaller streams under ordinary conditions with vastly decreased water damage. Progressive fire chiefs are finding the 1½" line sufficient for the majority of small residence fires; in fact one Iowa chief reports 98 per cent of his fires put out with hand extinguishers and a small booster tank.

The manner of attack on a fire is all important. A hasty or carelessly directed attack with large streams may cause a water damage which no amount of painstaking salvage work after the fire can remedy. Water causes an irreparable damage to feathers, silks, satins, and trimmings in a millinery store, to flour and feed in a warehouse, to iron, steel and nickel utensils in a hardware store, and to papered and plastered walls and ceilings in a home. Each particular type of building and occupancy presents a special problem in firemanship; but there is always one best way of handling a fire so the total flame and water loss will be the minimum.

Locating the Fire

The up-to-date chief first locates the fire. He knows that smoke may travel a considerable distance from the blazing embers, that it may billow in dense volumes around corners and thru small openings, while the flames are yet out of reach of a fire stream. He knows that by first locating the blaze a strategic attack can often be made whereby a hand chemical or a small amount of water applied at the heart of the flames will result in quick extinguishment, and conversely, that a tremendous amount of water poured into the building in a haphazard manner might not reach the burning material, but instead would cause an inexcusably great damage from water.

Every fireman will recall numerous illustrations of this fact. The fire may be in a closet, under a staircase, or in any one of many common locations; or the flames may even be visible from the street, and the smoke may be pouring from the windows and eaves. If attacked from the outside, the streams may extinguish the fire, but they are also likely to soak everything in the room. If the fire is attacked from the inside, the stream can be directed at the heart of the fire and the rest of the room may be salvaged.

Ventilation

Frequently firemen will penetrate a smoke filled building and be

ready with loaded lines before their fellow helpers have had time to ventilate the enclosure. Where it is extremely hot and the smoke dense, the tendency is strong to open the nozzle without seeing fire. There is of course a possibility that the fire may be ahead thru the smoke; but there is an equal possibility, if the firemen have advanced as far as they can and still do not see flames, that the blaze may be around a corner or over a partition. In this case they will be able to advance upon the fire to much greater advantage and with less punishment to themselves by waiting until their fellows have secured ventilation of the building. By withholding water they may also have greatly reduced the damage resulting from fighting the fire.

The wide-awake officer thus practices salvage principles in attacking a burning structure. He first locates the fire. Next he secures whatever ventilation may be advisable. Then he tempers his attack by the type of fire which he finds. Where, in his judgment, chemicals are the best extinguishing agent, he uses them. Where small streams will serve the purpose he uses the booster tank and 1½" lines. And likewise where tremendous cooling and extinguishing power are needed he uses heavy streams and the deluge set. In short, the alert chief so directs his attack that the total fire and water damage will be a minimum.

Salvage During the Fire

Modern fire departments have practiced some salvage principles for years. They have attempted to minimize the losses from water at fires, in as quickly as possible replacing large lines with fewer lead-in lines. They have used chemicals and booster lines, mainly because the water damage would be less. They have introduced the use of carbon tetrachloride, carbon dioxide gas, and foam, as extinguishing agents. They have used shut-off nozzles so that water need not be thrown until they were in advantageous positions, and so that it could be stopped immediately when the need for a particular stream has ceased. This is all truly salvage work. Why not recognize it as such, and adopt the principle fully by installing and using salvage covers and practicing salvage methods in every phase of the battle with fire? There is nothing to lose and much to gain.

Openings for Ventilation

In securing ventilation the principles of salvage can be equally well observed. Skylights can often be utilized to ventilate; the frames and glass being pried loose and removed. If the glass must be broken it can be done in such a manner as to leave the frames intact.



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Cutting down the loss in a dry goods store fire by coverage.

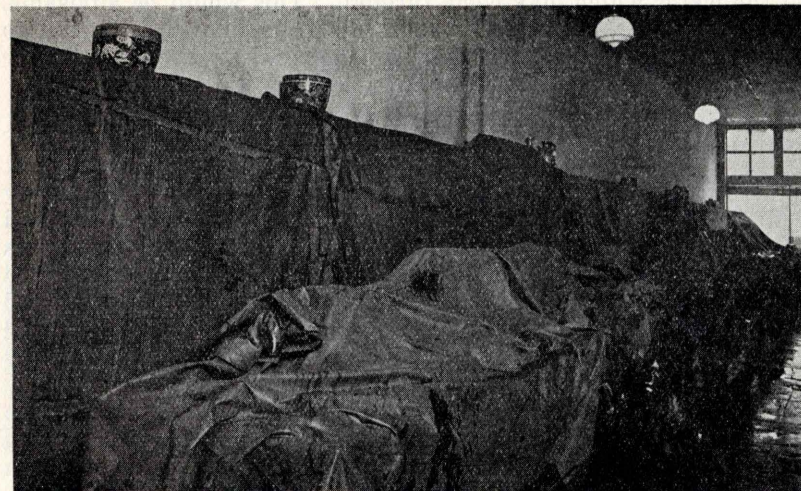
Where it is necessary to open a roof, one large clean-cut hole can be made, at a location which has been determined as being most satisfactory. This practice is vastly preferable to that of cutting several small holes indiscriminately over the roof, as these latter are more difficult to cover and protect from the elements, as well as being more expensive to repair.

Firemen are often charged with unnecessary breakage of glass at fires. While in most cases the breakage has been necessary, the criticism can well be kept in mind, as broken windows present a very poor advertisement of the protection given by the fire department.

Conditions Affecting Salvage

Salvage during a fire consists largely of protecting against the effect of water. To prevent serious water damage, stock and furnishings must be removed or adequately covered, and excessive water must be directed to points where it can be readily taken up or drained.

The method of salvage to be followed depends largely upon two ever-present factors, time and the character of the contents of the building. Time is naturally an important element. There may be time, before the fire spreads from one point to another, to remove or cover articles which would otherwise be damaged; or the fire may have reached a stage where all that can be done is to clean up after control is secured and attempt to limit the permanent damage from water.



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Protecting a stock of china and glassware with covers.

Likewise the character of the contents of a building materially influences the salvage method. It may be necessary to leave valuable pieces to be destroyed by fire or water merely because they are heavy, unwieldy, or difficult to move, while readily removable articles may be quickly and easily saved. Similarly, where the contents of a building are incombustible or slow burning, the salvage procedure can be very different than with an intense or flash burning stock such as celluloid or pyroxylin plastic. And again, the salvage methods used with relation to a stock little damaged by fire or water, would be vastly different from those with a stock such as notions, millinery, or silk where a great amount of damage would be done by heat, water, dirt and falling debris. In any case, the location and extent of the fire, and the immediate facilities for protection, together with the characteristics of the building contents, will largely govern the methods used in salvage.

Cover Work at Fires

Salvage operations should start as soon as the fire is located. Firemen should begin at once to remove or cover furnishings and stock in the exposed section. If the fire is on the roof or an upper floor, the rooms underneath should be covered. At times, when it is evident that such a fire can be killed at will, and that it is in hand as far as spreading is concerned, fire officers may deliberately withhold water until the floor below can be covered and catch-alls placed to

hold the water which may come through. This would be advisable, of course, only when the additional loss from allowing the fire to burn would be less than the water damage resulting from immediate attack with fire streams.

Holding Water with Covers

Where it is found that the water can be held to the floor below the fire, catch-alls can be formed to prevent further leakage and damage. The contents of the room are protected first with covers arranged to drain. Then the floor is covered, the edges being rolled to retain water. Where the water threatens to run over the rolled edges, chairs, boards and boxes may be commandeered and utilized to further elevate the side walls. Or the edges of the covers may be fastened to the mop boards by nails through the grommets.

At times it is advisable to catch the water at the ceiling, in which case one edge of the cover is nailed to the side wall close to the ceiling, and the opposite end is placed so that the water will run through an open window to the outside.

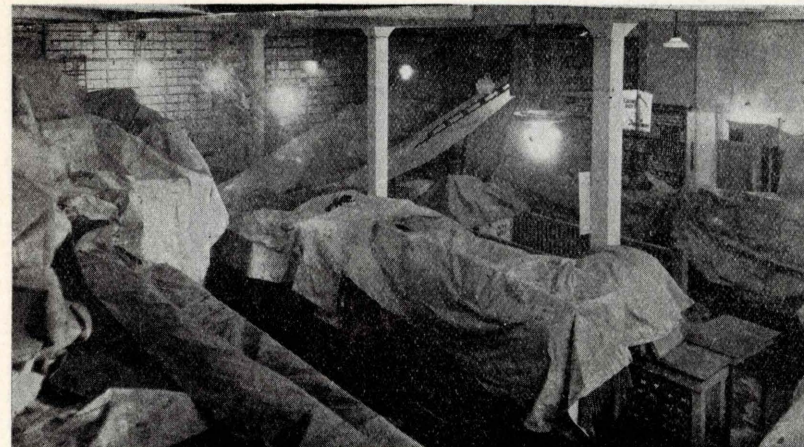
Covering a Room

A simple procedure for covering a room which has proved effective is as follows: The contents of the room are moved quickly but carefully to the center of the room and covered with as many salvage covers as may be necessary. With particularly valuable furnishings it may be wise to double the number of protective covers. The floor may or may not be covered and bagged as the conditions may suggest.

In covering a room in a residence, say specifically, a bedroom, the same general procedure is followed. The bed is shoved to the center of the room and the rug pulled from under it; everything on top of the dresser is swept into the top drawer and the dresser placed flat on the bed with the drawers up. Next, the chairs, the pictures on the walls, and all the clothing from the closets are also piled on the bed. The rug is thrown over the top and then covers spread over the whole, care being taken to see that they lap well so that no water can enter. When it is impossible to remove the rugs from the floor, they should be rolled close to the pile and the edges of the covers tucked under them.

Outdoor Coverage

In residential and suburban sections it at times becomes necessary to remove and cover the contents of a building which is in danger of being burned to the ground. This can be effectively done as follows: Where the furnishings and contents of the building are to be car-



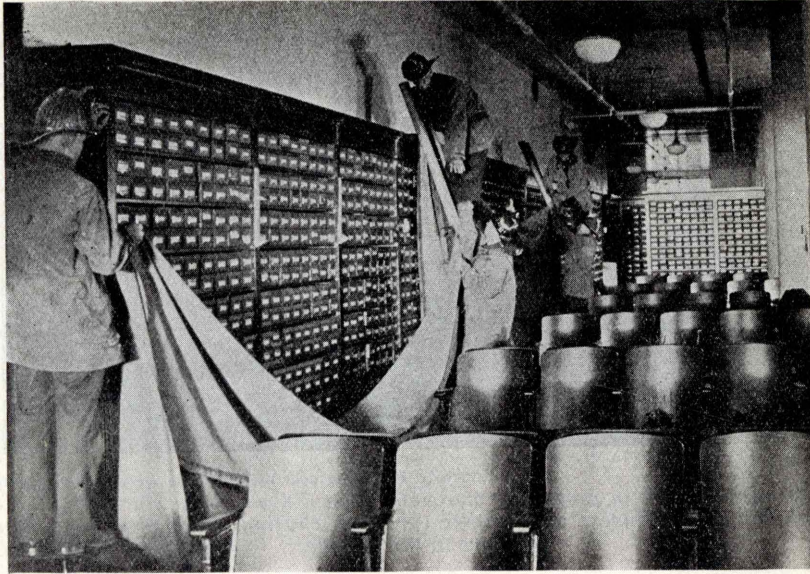
Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
The use of covers in protecting merchandise at a department store fire. Note also the use of ladders and salvage covers in chuting water from the upper floors to the outside.

ried outdoors, covers should first be placed on the ground. The contents can then be compactly arranged on the covers; other covers are then spread over the salvage material, carefully protecting each article. Lastly, the ends of the covers on the ground are tucked under the covers on top so that water may not find its way between the two, thus damaging the bottom articles.

Salvage in Commercial and Industrial Establishments

Salvage work, including coverage, is particularly necessary in mercantile establishments, because of the very serious damage to stocks such as silks, linens, embroideries and cotton goods from smoke and water. Colored goods may streak and fade; silks will become rough and hard; and bale and bolt goods will likewise be ruined. Staple goods, foodstuffs, flour, etc., are easily damaged by water and smoke. Millinery, lace, trimmings, furs, fabrics of all kinds, jewelry, hardware, furniture, etc., are all susceptible to serious damage from fire, smoke and water.

Salvage work with most of this merchandise consists largely of covering stocks and of removing excess water. Frequently salvage is made doubly difficult or impossible by the arrangement of machinery, furnishings and stock. Where shelving is built to the ceiling and directly against the wall, the possibility of satisfactory salvage is minimized, for water in following the wall is very likely to soak and damage the goods piled on the shelves. Where time per-



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Covering stock in a shoe store.

mits it may be possible to remove the goods from the top shelf, thereupon spreading a cover on the shelf lengthwise, with the edge rolled, and forced between the back of the shelf and the wall.

When the shelving is properly constructed with the top left at least 18" below the ceiling, and the back covered with wire netting and set out two or three inches from the wall effective covering is a simple and speedy matter. With covers drawn over the top and dropped down a couple of feet in the back the water will harmlessly follow the wall down to the floor.

Salvage is also made difficult where goods are piled directly on the floor. In fact when a considerable quantity of water is used in fighting the fire the bottom goods are almost sure to be soaked and seriously damaged in spite of good coverage. Goods in cartons and paper boxes resting directly on the floor have the same serious hazard. Even though excellently covered the fibre boxes on the bottom have a tendency to collapse when wet and may overturn the piles, with the possibility of thus ruining additional stock.

When covering glass show cases it is well to place some sign on the cover, or a chair or similar article across the frame, to prevent truck and hose men from climbing on them. Double covering is advisable to protect show cases where ceilings must be pulled.

It is frequently necessary to group stock and furnishings into piles before covering. This requires care and judgment in securing compact groupings, and in handling and covering in such a way as to avoid breakage. In covering large stock piles, the first cover should be drawn from the floor up, and the second cover spread from that point back, allowing sufficient lap to prevent water from getting in between and into the stock.

When fragile articles on tables are to be covered it is helpful to place substantial pieces, such as chairs and boxes, on the tables to support the covers in position to drain. If more than one cover is used to a table the common edges should be rolled to prevent water from working through the lap thus formed.

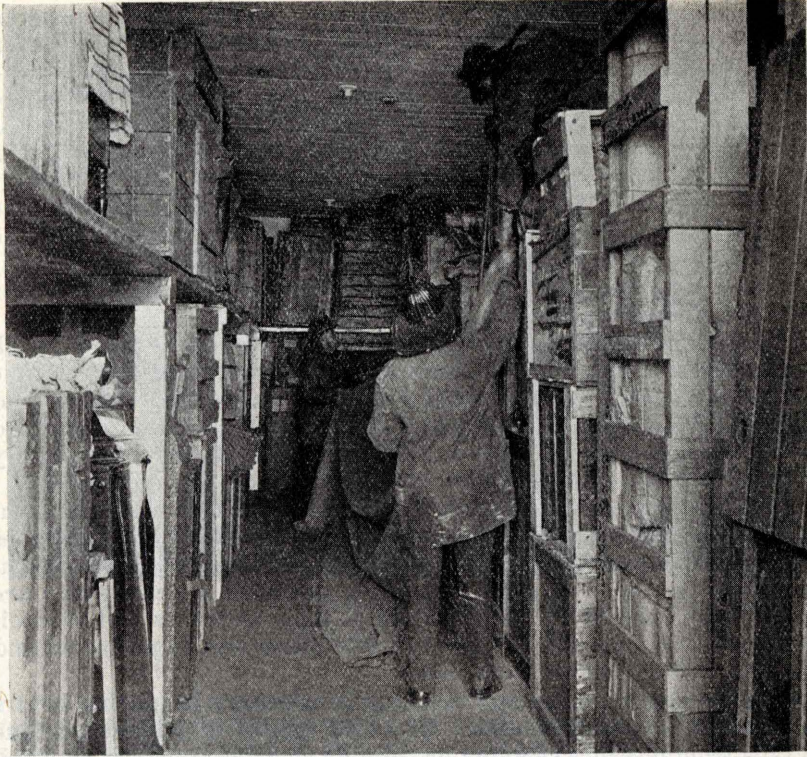
Especial care must be exercised in covering delicate fabrics, such as silk dresses. Where wrapping paper can be obtained and the time allows, salvagemen should build a cover of paper and then spread over this the regular salvage cover. The covers should not be pulled across the material under any conditions, but should be carefully lifted across and dropped down into position.

At times firemen will be confronted with situations where it is impossible to protect all of the exposed goods before water reaches them. The logical thing to do, of course, is to cover or remove immediately the more valuable and easily damaged articles which are likely to be reached by water. Then as time, or the arrival of additional help, may permit, the less valuable pieces can be protected and the more difficult cover work done.

Considerable climbing and reaching is necessary in placing covers in mercantile establishments. To avoid injury to salvagemen due to falls from insecure shelving or through show cases which may fail under their weight, the use of short ladders is recommended.

The protection of the contents of commercial and industrial establishments presents many difficult problems. Frequently valuable stock, machinery, fixtures and appliances are in danger of being seriously damaged. In this group may be mentioned electrical motors and switch boards, printing presses and linotype machines. Immediate attention must be given to the covering and protection of such equipment as it is very easily damaged by water. Belt-driven machinery is the most difficult to handle. Where the belt can be easily removed, this should be done or if the amount of water expected is small, the cover may be spread over the machine and the edge tied to the belt in such a manner as to prevent water from following the belt and damaging the machinery. Where belts must be forcibly removed, they should be cut at the lacing where rawhide has been used, or near here when the belt is laced with steel. Where any moisture is in evidence on machinery it should be carefully wiped off.

Convenience often dictates that excess water be directed to the elevator shaft in the larger commercial and industrial risks. In this



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Salvage work in a warehouse. Usually a difficult job.

case the elevator machinery, which is usually located in the basement, should be carefully covered.

Leakage from floors which are flooded with water may be expected from light fixtures and along pipes through the floor. Salvagemen should therefore avoid piling articles to be covered under these particular points. Water which is following a pipe may be caught by a cover, one edge of which is wrapped around the pipe and tied, the remainder being formed into a "catch-all" on the floor.

Removal of Excess Water

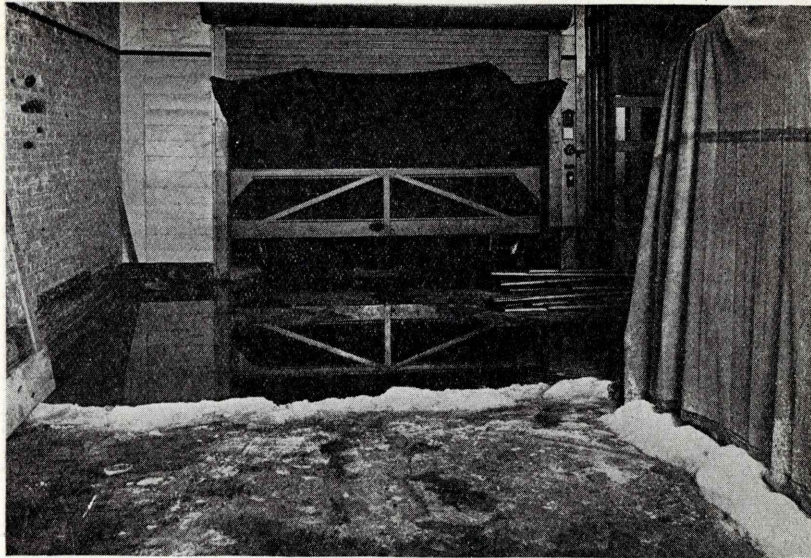
Salvage work of all kinds is a very real test of the skill and ingenuity of a fireman. The removal of excess water is no exception. While it is desirable to hold water to the upper floors in order to avoid water damage to the rest of the building, it is possible only to a limited extent. Catch-alls and dikes are effective in holding water



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
The use of salvage covers and sawdust in carrying water downstairs and out of the building.

only a few inches in depth. Further, the weight of water is so great that any considerable depth may cause the floors to pull away from the walls and collapse. Excess water is therefore a double hazard and must be gotten rid of in some manner.

One simple and effective way is to lead the water by sawdust



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Sawdust and salvage covers used to divert water down an elevator shaft. Note also the salvage covers used to protect the merchandise on the right.

dikes to stairways where it can be carried down and out of the building by canvas troughs. In commercial establishments the water may be merely directed to the elevator shaft and allowed to fall to the basement. Where this is done it is very important that the basement floor drains are unobstructed, and that no stock rests directly on the floor.

Considerable damage often results from improperly piled goods and from inadequate provisions for drainage. The former either obstruct the flow of water to the drains or are piled without skids so that they are seriously injured by water. Drain gratings are a real aid in catching debris which might otherwise clog the outlet sewer. Where floor drains are inadequate or obstructed the roof drains or soil pipe may be broken at the floor level to aid in removing excess water.

Emergency Drainage

Where other methods have failed, drainage may be secured by cutting holes through the floor. Care should be taken to select a low point in the floor for the hole and also a location where the drainage can be readily handled below. Auger holes are preferred by some, though water has a tendency to swell the wood in the floor, causing

the auger to stick. A small workmanlike opening cut with an axe provides better drainage and is almost as readily repaired.

Emergency drainage through bored or chopped holes is particularly warranted where slower drainage by other methods would cause a larger water damage to stocks. This is often the case where paper, rags, broom corn and the like are included in the stock. Such practice is also justified where the stock of goods is of a nature which will absorb water and cause excessive expansion or weight strains upon the floor and joists.

Drainage from floors above can be handled by improvised troughs of various sorts. Salvage covers can be used as "catch-alls" or they can be shaped into funnels leading to the outside or to holes. Chutes, through lower floors, either improvised or already constructed, are a practical means of carrying water from upper floors, particularly where the water level will permit draining a floor to an outside window or door. Doors may be removed from their hinges, and, with boards nailed on the sides, together with salvage covers, used to make effective, short chutes. Even greater ingenuity is required to construct longer chutes, using poles, boards, tarpaulins, and whatever other material may be at hand.

Salvage After the Fire

It is important to get the firemen and fire apparatus back to the station as soon as possible after a fire in order to be ready for other calls which might come in. It is equally important to leave the fire stricken property in such shape that the total loss may be a minimum. What profit is there in quickly and effectively extinguishing a fire if the water used in fighting the fire is allowed to saturate and permanently injure the remaining structure and its contents? Why put out a fire if we allow inclement weather conditions to do more damage than the flames; to ruin much that has been saved from the fire?

The test of firemanship is not in how quickly the fire has been extinguished, but in how low the total loss has been kept. For this reason salvage after the fire is a vital part of a fire department's job. The effectiveness of a department's salvage operations are shown by the condition in which the premises are left.

When the fire is extinguished most of the men and apparatus can be ordered back to the station. Sufficient men should be left, however, to effectively clean up the premises.

Cleaning Up

The first job after the fire should be to remove all of the water possible. While the greater volume of water has been carried out during the fire by means of sawdust dikes and troughs, and by canvas

catch-alls, funnels, and chutes, there will still remain a sufficient quantity to do considerable damage.

Brooms are efficient in sweeping out the larger amounts of water. For the final clean-up, however, squeegees are preferable as they remove more of the moisture. The metal tops of the better squeegees can be used to push any appreciable quantities of water toward the outlets, while the rubber bottoms are effective in removing moisture from both rugs and floors. Care should be exercised in sweeping water through aisles or back of counters not to throw water upon material stacked on lower shelves or hung on racks.

Fallen plaster, lath, and other debris should be gathered into piles which are carried from the rooms. Sawdust may be spread over the floors as it has been found to be particularly helpful in drying up moisture in corners, around machinery, and other inaccessible places. After the moisture has been absorbed, the sawdust is swept up and removed.

Drying Wet Stock

When water has ceased to drip from ceilings above, the covers may be taken off furnishings and stock. Furniture and fixtures which have become wet should be carefully dried with a chamois or dry cloth. Machinery should likewise be dried and oiled to prevent it from becoming rusty. Smoke and moisture damage after the fire may be tremendous, hence it may be advisable to provide circulation of drying currents of air by means of fans, and in cold weather to install emergency heating units.

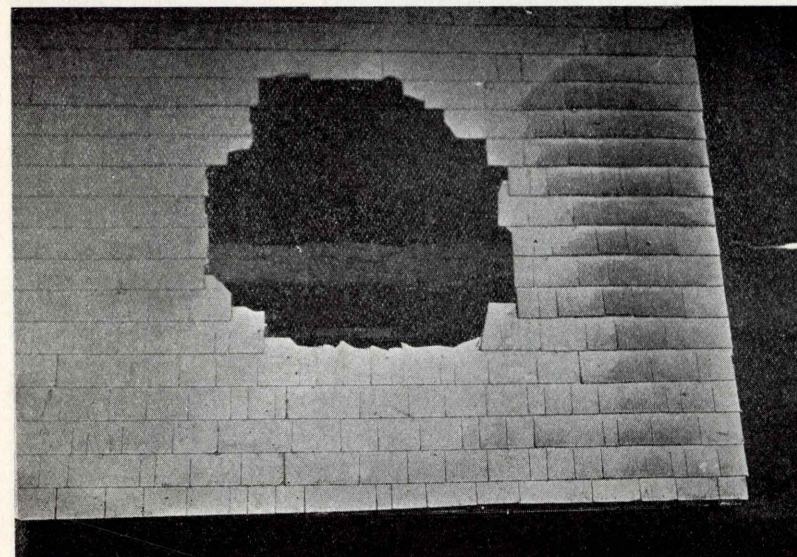
At times wet articles may be adjacent to dry articles which will be damaged by water. These should therefore be placed in separate piles.

Similarly, packing material, when wet, may permanently injure stocks of furniture and like merchandise. Varnished and polished surfaces will spot and discolor; glued parts will loosen; veneered and thin wood sections will warp; and upholstery will stain and fade. Salvage of such stock requires that wet packing be removed and the merchandise dried with a chamois.

Protection of Openings

Roof Holes. In fires which have involved the roof, or where openings have been made for ventilation, it is important to protect the interior of the building and contents against weather damage.

On sloping roofs a small hole can be readily protected by first placing boards across the hole to act as temporary sheathing, and then covering with tar paper which is stretched lengthwise across the hole, starting at the eaves. If more than one strip of tar paper is needed, the upper strip is lapped at least 6 inches over the one

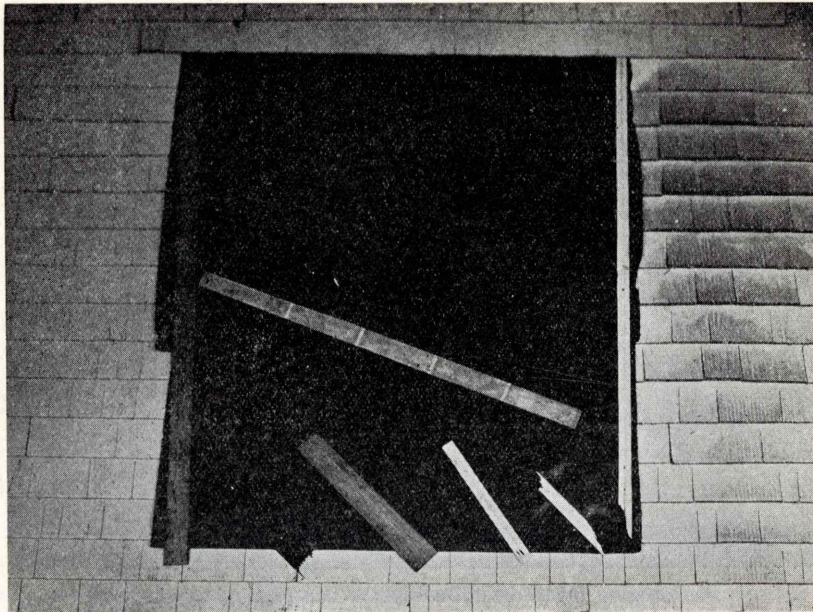


An opening in a roof exposing the contents of the home.

below. At the top of the burned opening the roofing material can be pried up and the tar paper inserted underneath, after which the roofing is fastened down with large headed roof nails. Wooden strips or lath are nailed around the edges of the tar paper to protect against blowing.

Where a large hole has been burned in the roof, it may be necessary to use salvage covers for protection. The procedure is the same as in covering with tar paper; the covers are stretched over the roof, upper covers lapping lower ones at least 6 inches. For protection from wind and drafts the edges of the covers should be held down with lath or wooden strips, making sure that the nails holding the strips go through the grommets and not the canvas of the covers.

A somewhat different procedure must be followed where holes have been burned in flat roofs. To keep out roof water, the roofing material is loosened around the hole and raised to a height of four to six inches, where it is held in place by boards. A framework to hold covers can then be erected over the hole. This is done by nailing short upright boards to the roof rafters at each end of the hole. These are connected with a cross piece to form a temporary ridgepole. Other boards are nailed from this ridgepole to the burned ends of the roof rafters, and a cover is thrown over the whole. The edges of the cover are fastened down with boards nailed through the grommets or are weighted with stones.



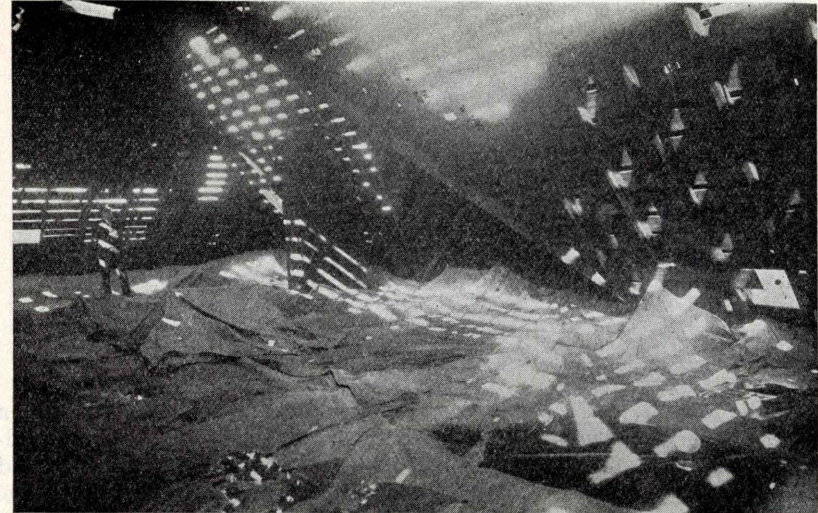
The roof opening protected with tar paper and wood strips.

Where the section of the roof burned is too large to cover, the roof drainage is diverted and the floor below covered. The roofing material should therefore be raised, as previously explained, with the exception of a short section, below which a trough can be arranged to divert the roof drainage through a window. The attic is then cleared and the floor under the burned opening bagged to catch whatever rain may come through.

Window Openings. Openings due to broken windows may be protected temporarily by covering with tar paper. Lath or wooden strips can be nailed across on the inside of the frames to hold the paper in place and keep it from being torn by the wind.

Floor Openings. Not infrequently a stairway may be burned away. When this has happened it is important that these openings be protected by blocking entrances to them. Where doors are only partially burned or merely torn from their hinges they can be placed back in position and held with boards nailed across the back from frame to frame. Under other conditions, door openings may be closed by nailing boards across at about waist height.

Open staircases and elevator shafts can be protected with rough board railings. Small holes in the floor are readily covered with boards nailed across the openings. Temporarily a piece of furni-



*Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Covering the attic to protect the contents of the house after an extensive roof fire.*

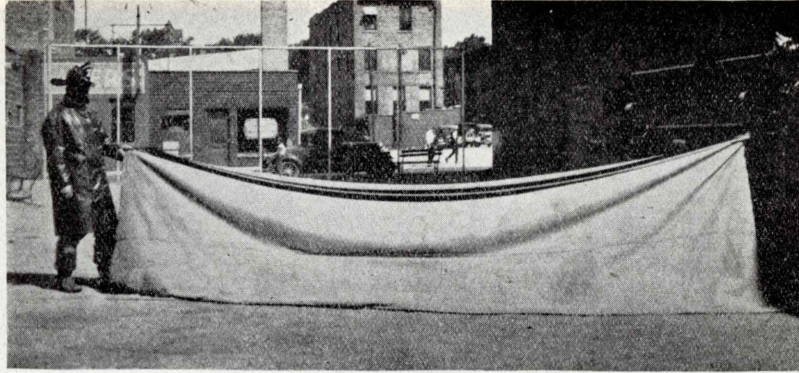
ture can be moved over them. With larger floor holes which cannot be covered, a light should be left in front and all persons coming near warned of the danger.

Guarding the Premises

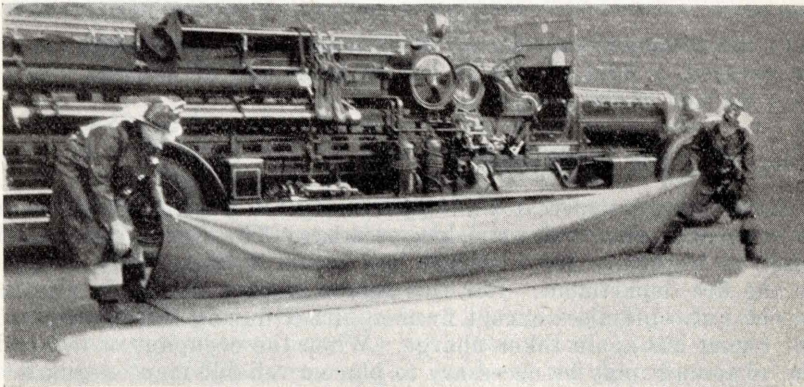
A fire frequently creates an opportunity for unprincipled persons to enter and ransack fire stricken premises. The risk of detection is small as the blame for whatever loss occurs is likely to be charged to the fire department. For this reason no one should be allowed to enter the premises except firemen either during the fire or until the owner has again taken charge. When the occupant or owner is out of town it may be necessary to place a reliable man on guard to protect the building and its contents.

Salvage Evolutions

Salvage, perhaps more than any other phase of firemanship, calls for ingenuity. It taxes a fireman's ability to think fast, to take advantage of every shift in the fire front, and to utilize whatever may be at hand in minimizing the loss from fire and water. For this reason much of a salvageman's work is dependent upon the exigencies



of the moment. There are, however, some few operations that a salvageman performs at almost every fire. These can be standardized, thereby assuring that they will be done in the quickest and most effective manner, and by thus becoming almost second nature, will leave the fireman's mind free to concentrate on other salvage problems.



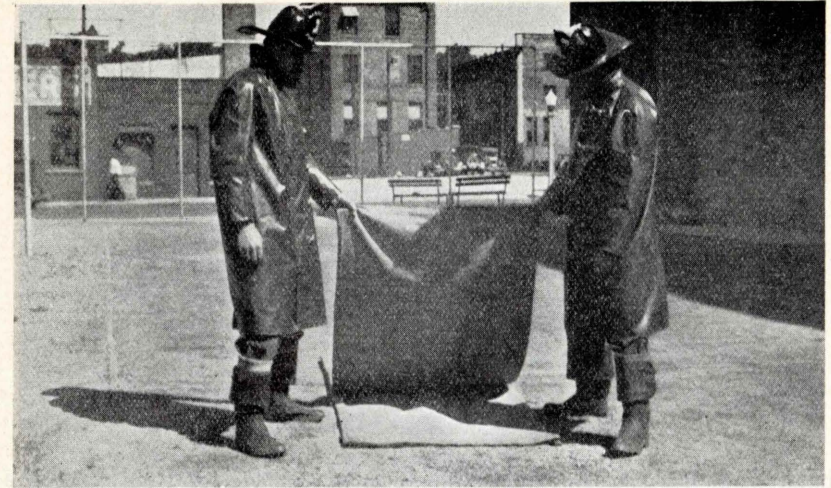
The following are a few of the salvage operations which may be standardized to advantage:

Folding Salvage Covers

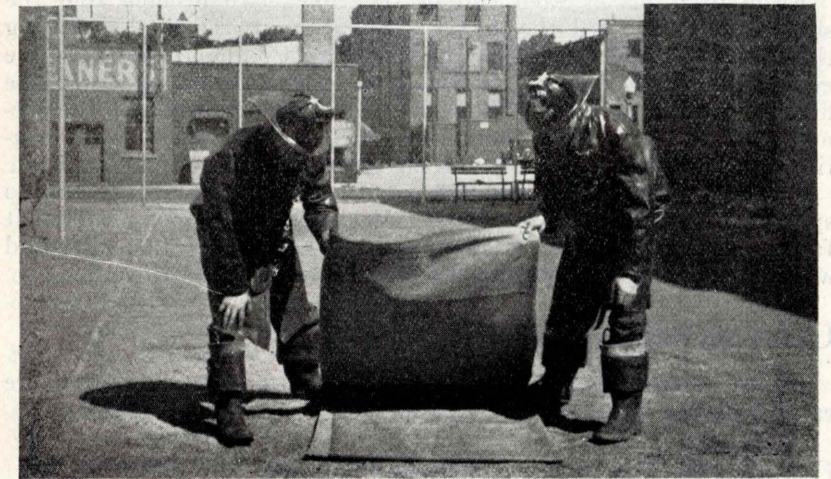
Several methods of folding are in use, the choice depending largely upon the number of men available for cover work.

The most common method of folding is as follows:

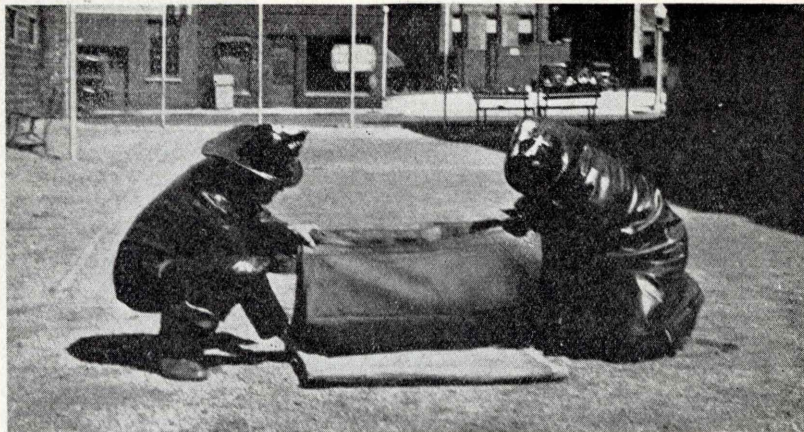
Two firemen take the cover at the center of each end and lift and



shake it to bring the edges together; then they lay it on the floor. It is folded again crosswise, leaving the single edges on the bottom, each man using a foot in the center seam as a guide. Next one fire-



man takes his end of the cover and carries it across to the opposite end, thus folding the cover in half lengthwise. The other man assists by straightening out the ends. This operation is repeated



back and forth three more times, finishing the folding with the open edges of the cover on the bottom.

A variation of this fold is made in exactly the same manner as described above except that the single edges are placed on top in the second fold.

A cover fold which is popular where one man must do the cover work is called the accordion fold and is made as follows:

From positions at each end of the cover two firemen fold the side edges in toward the center; this is again repeated, bringing the folded sides in to the center. Then from one end they fold the cover, accordion fashion, in widths of about twelve inches. The first fold is pulled toward them with the edge underneath; the second fold is away from them, the third toward them, etc.; continuing the folds alternately for the entire length.

This accordion fold, although very convenient for one man to spread, has several disadvantages. It is difficult to carry, and if it falls, is likely to unfold. The outside is exposed to dust, dirt and water, hence it may soil material which it is used to cover.

Carrying Salvage Covers

Under normal conditions three covers make a load. Covers are carried on the left shoulder with the edges in toward the body.

Opening and Spreading Salvage Covers

To open salvage covers folded in the common method the single and double open edges are placed to the front and the closed double edges to the rear. The open single and double edges are divided into two parts, the inner and outer sections. One fireman takes



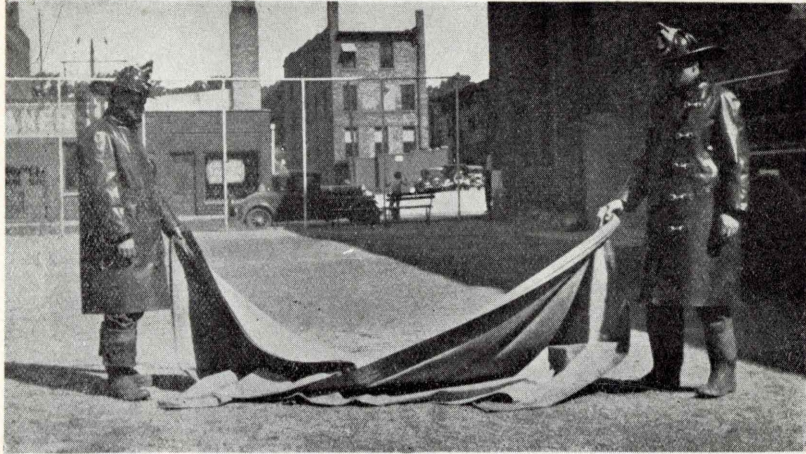
the inner single and double edge section with his right hand, and passes the outer section with his left hand to his team-mate, who steps back with the section, opening the cover.

If the cover is placed on the shoulder with the closed double edges toward the front, the cover may be opened by lifting out the closed sections in the same manner.

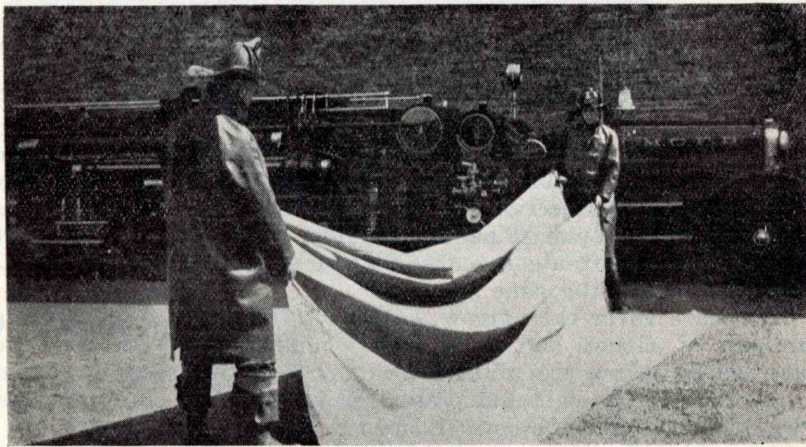
To open a cover the narrow way, as is the practice in covering the ends of shelves and racks, the two inner edges and the two outer single edges are pulled out. One fireman takes the lower single edge of the pair and passes the upper edges to his partner who steps back and the cover is opened.

In covering furniture, stock, clothing, racks, and attic floors the inside face of the cover is placed down.

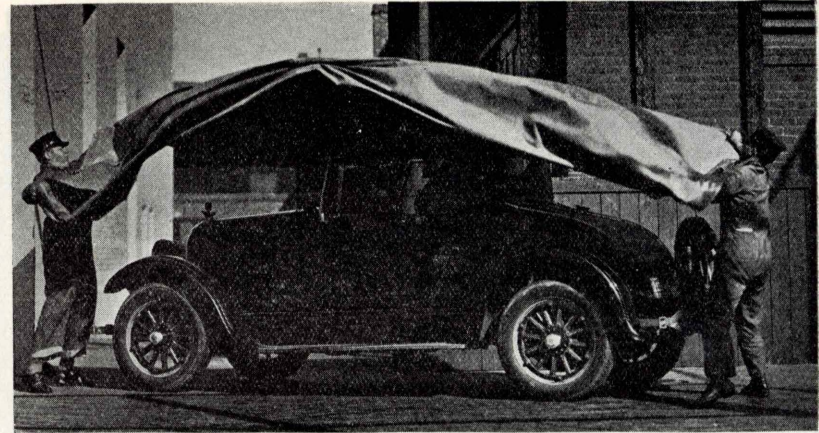
To spread a cover, opened as just described above, the firemen, holding the single corners with the cover stretched between them, allow the folded edge to drop to the floor. The single edge nearest the object to be covered is also dropped; then several feet of slack



are gathered in the hand nearest to the pile. Next the firemen step forward and throw the cover with sufficient force to carry it over the pile. Lastly they make any adjustments necessary to completely cover the material.



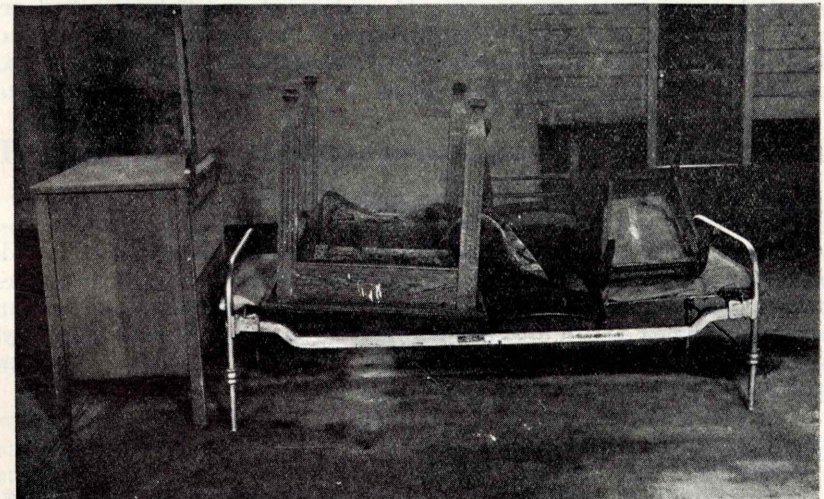
The accordion fold is quickly spread by one man, who grasps an end in one hand, and with the other throws the folded cover over the material to be protected. The sides are pulled down into position.



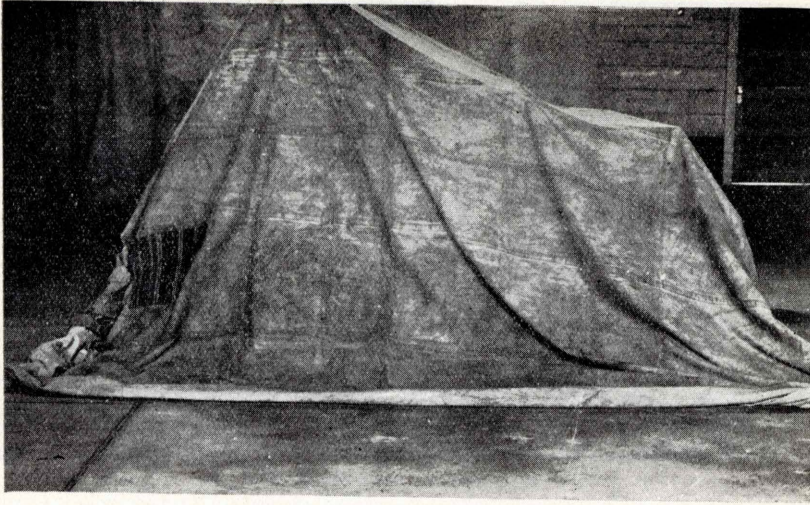
"Ballooning" a salvage cover. Used where articles would be injured by dragging covers over them.

Grouping and Covering Furniture

Furniture is grouped before covering solely to minimize the number of covers which will be necessary for protection. Groups should be placed at points where they will be least exposed to the flow of water. They should thus be kept from under electric light fixtures



Room furnishings stacked and ready to cover.



A room stacked and protected with salvage covers.

or ceiling openings, as these are likely to become outlets for waste water.

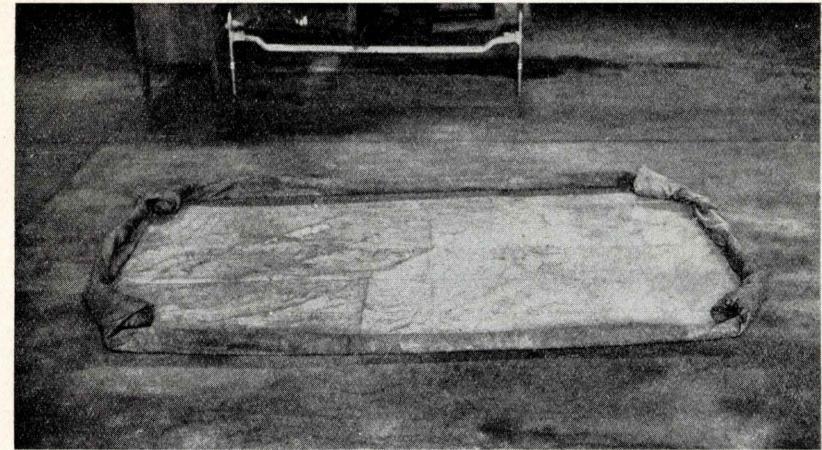
In grouping, the larger pieces should be placed back to back in such a manner that arches are formed over which covers can be thrown. Valuable articles, such as rings, jewel boxes, and silverware should be placed in drawers for security. Pieces easily broken, such as pictures and mirrors, should be placed flat on a bed or table and protected with clothing or other soft material. The entire contents of the room, including clothing from closets, curtains, shades, drapes, and wall bric-a-brac, should be placed in the pile.

Grouping and Covering Merchandise

The principles of grouping and covering merchandise are identical with those suggested for furniture. Stocks are gathered in convenient and fairly large groups so that they may be easily covered and protected from damage. When stock is moved it is very important that it be raised above the floor. Piles should be made in such a manner as to insure drainage when covers are properly spread. Small and breakable articles should be removed from exposed positions and stored away in show cases or on shelves.

Bagging a Floor

Bagging is desirable as a protection to floor and furnishings when water used in fighting a fire is finding its way through the floor and ceiling above. It consists merely in arranging covers so



A catch-all for leakage from the ceiling, made from a salvage cover.

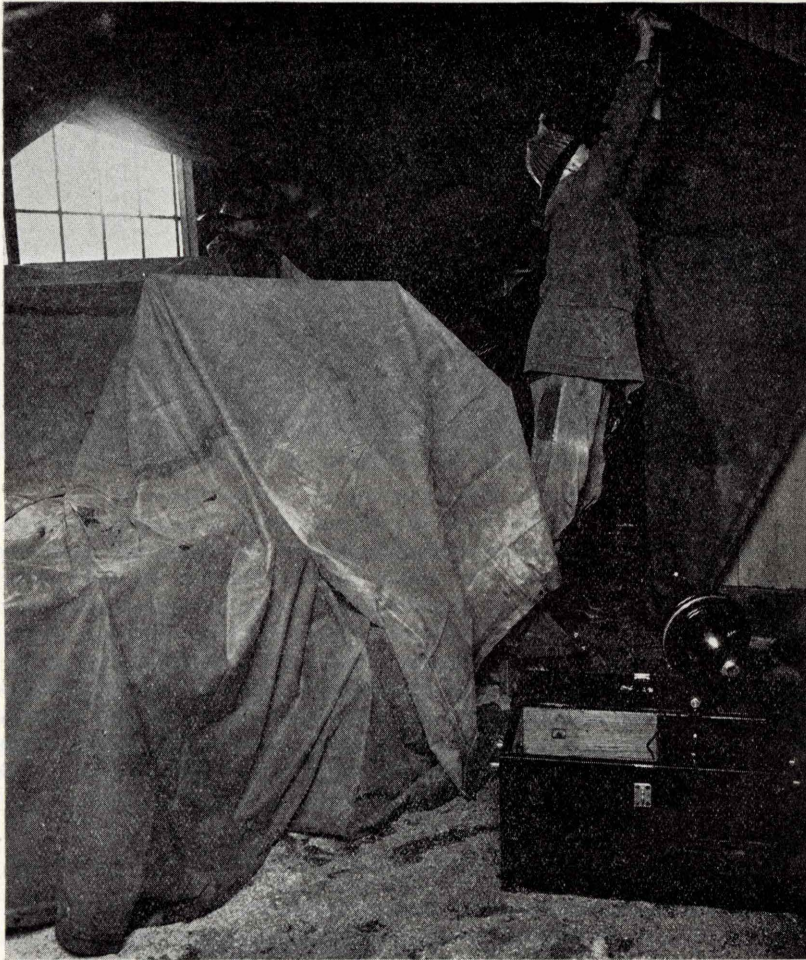
that they will temporarily hold the water which is coming through.

Where the amount of water anticipated is small the cover is spread on the floor and the edges merely turned up and over. Where a larger quantity is expected the cover is spread similarly, and the edges are rolled a number of times with the corners turned in to prevent the escape of water. When it is evident that a still greater volume of water must be handled the edges of the cover must be built up even higher. Chairs, boxes, and boards may be used for this purpose, or a semi-permanent installation can be made by constructing a framework of two-by-fours to which the covers are nailed.

Trapping a Staircase

After the excess water used in fighting a fire is caught in catchalls, or collected in chutes and channels; some means must be found whereby it can be disposed of without further damage. The stairway may furnish a convenient means of exit. To confine the water and also to avoid damage to the woodwork of the staircase, covers have been found to be excellently adapted for temporary stair conduits.

To form the stairway trap, the covers are opened only half their width, as this is sufficient to cover the ordinary stairway and at the same time provide enough extra canvas for side rolls. Covers are spread from the top landing downward, lower covers underlapping those above by two feet. In making the lap the upper edge of the lower cover is folded back to prevent water from seeping in under the lap.



Courtesy Fire Engineering and Int. Assoc. Fire Chiefs
Protecting furnishings in a cheaply built structure. Notice the sawdust to take up moisture on the floor and the portable lamp for night work.

For a semi-permanent stairway trap the covers should be drawn up and fitted to the steps. Wooden strips in the angle between the riser and tread will hold the canvas in position. These are secured by blocks at each end nailed to the sides above the rolled edges.

Constructing a Chute

In draining water from the upper floors of a building, chutes may

often be used to advantage. These can be quickly improvised by using doors, screens, short ladders, boards, or in fact almost any available material about the building for a frame, upon which salvage covers are spread to carry the water. From a fireman's equipment several kinds can be readily made on the spot, the choice being determined, of course, by the conditions.

Perhaps the chute simplest to construct is that made by rolling the sides of a cover. In use, the inside end of this chute may be nailed through the grommets to a wall or ceiling, or by means of wire hooks, it may be fastened to a ladder or pike poles. The outside end will need to be weighted to prevent sagging and insure the flow of water.

A second simple chute is made by placing a rope along each side of the cover, including this rope in the center of each side as it is rolled. The rope gives somewhat greater rigidity to the chute and also provides means of fastening to objects at both ends.

Another efficient chute is constructed from pike poles and a salvage cover. A wire hook should be inserted through the grommet of a cover corner and over the point of a pike pole. Then roll the edge of the cover and the pike pole toward the middle. The same procedure is followed on the other side of the cover. The hooks of the pike poles can be used to secure the upper end of the chute. They may be placed on the rungs of a ladder or even driven into the ceiling; or if desired they can be rested on a high piece of furniture. The poles give stiffness to the chute, hence sagging is reduced to a minimum. The use of weights on the lower end to stretch the chute is also made unnecessary.

Salvage Equipment

The equipment needed by a fire department in salvage operations varies, of course, with local conditions. Fortunately many of the tools required are already carried by most fire companies. A list of additional equipment which will be found helpful is as follows:

- | | |
|--------------------------------|---|
| 10 to 25 canvas covers 12'x18' | 2 hammers and nails |
| 1 roll of tar paper | 1 auger |
| 6 cover wedges | 1 punch and chisel |
| 1 bundle of lath | 1 shingle spade |
| 1 bag of sawdust | 1 sewer drain guard |
| 2 squeegees | 1 pipe wrench |
| 2 brooms | 1 pompiere axe |
| 2 wooden scoops | 1 set of pass keys |
| 1 chamois | 1 box of pipe plugs and caps |
| 2 sponges | 1 door opener |
| 2 mops | 1 box sprinkler heads, stops and wrenches |
| 1 flashlight | |
| 1 saw | |

Salvage Covers. Because of the importance of the tarpaulin in salvage work, and because of the variation in size, material, and construction, it may be helpful to describe somewhat in detail the cover preferred by many experienced salvagemen.

A 12'x18' cover is preferred by most chiefs, although the 14'x18' size has a number of proponents. Clean cotton duck, free from knots, dropped threads, or other imperfections, and weighing not less than 7½ oz. per square yard is commonly specified. The strength of the unprocessed fabric, as determined by the "A" test method of the U. S. Bureau of Standards, No. 68, should be not less than 100 pounds per inch of width in warp and 8 pounds in the fill.

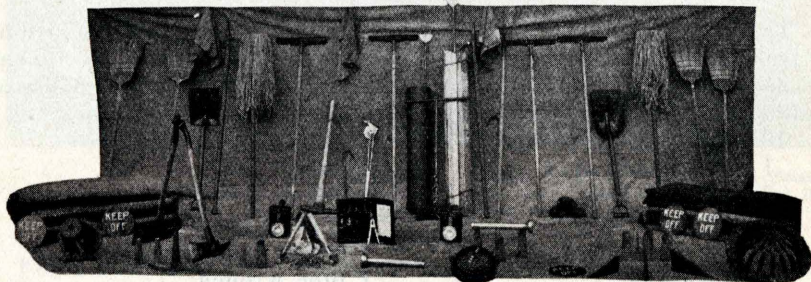
There should not be over two seams to a cover, and they must not be butted, but should be lapped at least one inch. The seams should be in the direction of the greatest length of the cover. All seams are to be cemented. Edges of the cover should be hemmed by turning back the fabric on itself for a distance of 1½ inches, and be cemented in place.

Each cover should have 22 brass grommets of the No. 3 spur type, to be placed two on each corner, four on each side, and three on each end. The corners should be reinforced by means of a 7½-inch triangular piece of canvas cemented on the reverse side under the edges.

Lastly, it is important that the cover be waterproofed.

Tar Paper. A roll of tar paper is extremely useful in covering roof holes and even window openings. The cheapest quality tar roofing will suffice.

Cover Wedges. Small triangular wooden wedges, six to eight inches on a side, have been found helpful by salvagemen in holding salvage covers in place, i.e., between walls and shelving.



Tools and equipment used in salvage work: 1. Salvage covers; 2. Brooms; 3. Shovels; 4. Chamois; 5. Pike poles; 6. Mops; 7. Squeegees; 8. Maul; 9. Claw bar; 10. Door and window pry; 11. Tar paper; 12. Shingle pry; 13. Floor auger; 14. Lath; 15. Pitchfork; 16. Drain grating; 17. Signs for protecting glass; 18. Pipe plugs; 19. Wooden triangle; 20. Sponges; 21. Flash lights; 22. Sprinkler heads and tongs; 23. Hammer and nails; 24. Firemen's axes; 25. Salvage cover hooks.

Lath. To hold the patches of tar paper over openings exposed to the weather, lath are necessary in addition to nails, as the cover is thus the more tightly held over the hole and tearing by wind is forestalled.

Sawdust. A bag of sawdust is a bulky but handy aid in constructing dams and channels to control the flow of excess water. It is also a great help in absorbing water from floors and out-of-the-way corners.

Squeegees and Brooms. These need no further explanation other than to mention that both are used to remove surplus water from floors. The broom (particularly the wire broom) is also useful in cleaning up and removing plaster and other debris.

Wooden Scoops are preferred by many salvagemen in removing excess water and debris from catch-alls and floors, as they will not scratch and cut covers, rugs and flooring where a steel scoop might.

Mops are useful in the final clean-up and removal of moisture from floors.

Sponges and Chamois come in for frequent use in cleaning up after fires where furniture and polished surfaces must be wiped and dried to prevent warping and the ruin of finishes. Sponges can also be used in removing water from corners and other rather inaccessible places.

Flashlights. Small hand electric lanterns are a necessity in salvage work at night. The portable reel and lamp is also useful where current can be secured from an adjoining building as the volume of light given off is considerably greater than that from flashlights.

A *Saw* may come in for miscellaneous use in opening a floor, breaching a frame wall, or in making salvage repairs, hence should be included among the salvage tools.

Hammer and Nails. A small box carrying several ordinary carpenter's claw hammers and assorted common and roofing nails will be found to be one of the most useful pieces of salvage equipment. Hammer and nails are frequently needed in holding catch-alls and salvage covers in place, in constructing temporary troughs and chutes, and in protecting roof and wall openings.

Auger. Although but seldom used, the auger is extremely valuable in providing emergency drainage holes to release surplus water, and in furnishing holes where saws may be used to open up flooring. The auger should be of simple design and rugged construction. A bit 2 inches in diameter has proven most popular.

Punch and Chisel. These tools are self-descriptive, and although but seldom used, are of sufficient value to be included in the salvage kit.

A *Shingle Spade* is a simple tool which is very useful in removing shingles from a roof, or in raising them so that roofing paper can be inserted to protect an opening.

Sewer Drain Guard. In a fire of any duration debris of various sorts is washed down to the floor drains. To minimize the damage it is important that these drains be kept clear, and drain guards have been found a very real help in permitting the water to get to the sewer and away.

A *Pipe Wrench* is often necessary to operate valves which may have become stuck because of rust or long disuse.

The *Pompier Axe* has many uses in forcing entrances, in cutting openings to locate fire, in securing ventilation, and in providing emergency drainage of excess water. It should certainly be included among the salvage tools.

Pass Keys. This item needs no justification as it is apparent that skeleton keys of various sorts may save considerable property damage which would result if doors had to be forced.

Pipe Plugs and Caps. A box of plugs and caps is certain to be useful in minimizing water damage due to ruptured water, steam, chemical or sewer pipes.

Door Opener. A tool carried on practically all fire apparatus but mentioned here because of its importance. A number of different types of door openers and lock breakers are available. The choice depends somewhat upon local conditions and personal preference.

Sprinkler Heads, Stops and Wrenches. Where sprinkler systems are encountered in fighting fires, temporary stops are often necessary to shut off the flow of water from heads until the valves can be closed. The wrenches and sprinkler heads are naturally used in replacing new heads.

While the value of each of these items is such that it is carried by practically every salvage corps, it is not necessary to purchase all of the equipment at one time. The tools whose usefulness is more obvious can be secured first, and the rest added as it becomes apparent that their cost will be justified by the reduction in fire loss resulting from their use. Most fire chiefs will find the equipment listed above to be an absolute minimum, and will add this tool and that accessory as the practice of salvage discloses new needs and uses.

Public Education

The average business man has little knowledge of the value in dollars and cents to him of proper arrangement of his stock and of providing adequate facilities to aid salvage operations in case of fire. Because of this, his stock and fixtures are often arranged so that the water and smoke damage following a fire are disastrous.

Home owners are at times belligerent when they see firemen carrying out the contents of closets and rooms not yet reached by flames.

So frequently have they seen fine furnishings and personal articles of sentimental value soaked and trampled in the course of fighting a fire that it is with mingled surprise and apprehension that they observe salvage operations. But with what gratitude they regard these firemen when they have, through salvage, saved the belongings most dear to them. Once having really carried out fully the principles of salvage at such a fire and having experienced the heartfelt gratitude of those who might otherwise have lost everything, no fireman will be content to go back to the old practice of merely throwing water.

Firemen owe it to themselves and to the public to see that home owners and business men know of the unnecessary losses which can be avoided by salvage practices, of the disruption of business, the ruin of things which money cannot buy, and of the great inconvenience, sometimes worse than the loss,—all of which can be minimized by a knowledge and practice of salvage principles.

Fire prevention inspections offer perhaps the best opportunity for imparting this information to the public. It is here that merchants can be told of the importance of proper arrangement of stocks so that they can be covered and protected; of the value of skidding goods several inches off the floor; of the reasons for building shelving several inches from the wall, backing it with wire netting, and of stopping the shelving eighteen inches below the ceiling; also of placing a top on all shelving on which no goods are to be piled.

It is during such inspections that the necessity of adequate drainage to avoid water damage in case of fire can be explained and particular effort made to keep drains clear and see that their locations are plainly visible. With fragile stocks, such as dishes and glassware, lamps, vases and antiques arranged on tables, the difficulty of covering without breakage can be pointed out, and the construction of racks above the centers of the tables suggested. Likewise floor lamps and other stocks easily tipped and broken can be similarly protected.

The introduction of cellophane and other moisture proof wrappings is a real boon to the salvage of many stocks. While these cellulose wrappers increase the combustibility of the merchandise the additional fire hazard is negligible when compared to their value in protecting goods from smoke and water damage, as the inspector can explain.

Incidentally, salvage work makes better inspectors. It increases tremendously the ability of firemen to observe hazards and know what should be done to improve conditions.

Peculiarly, salvage methods tend to develop and improve the fire department. Haphazard ways of doing things no longer seem acceptable, and unnecessary mutilation of doors, windows, floors and building contents is quickly eliminated as being contrary to the new practices. Experience has shown that salvage methods definitely



raise the morale and add to the efficiency of firemen all along the line.

The success of every fire department rests on the good will and confidence of the public. There is no better or quicker way to sell the fire department to the citizens of a community than by salvage work efficiently performed.