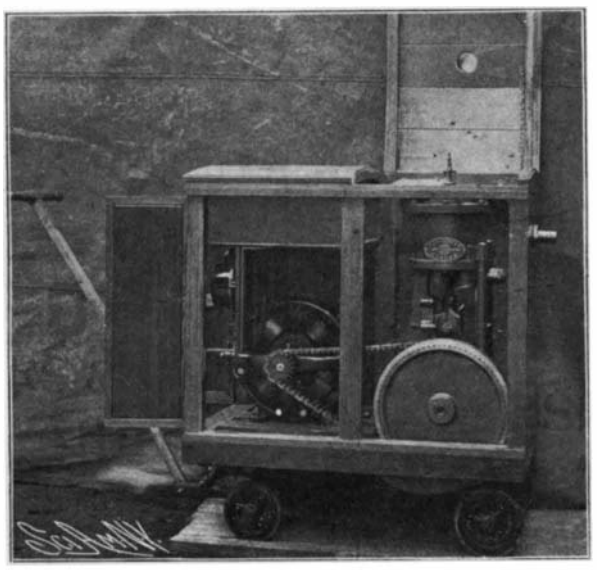
SANITARY HOUSE CLEANING.

BY DAY ALLEN WILLEY.

Several years ago the idea of using what might be called an air blast in cleaning fabrics suggested itself to a number of the railroad companies in this country, and since that time the seats and curtains, as well as the ceilings and walls of passenger coaches, in several systems have been freed from dust by the application of air through hose. The air has been compressed to various densities, the usual plan being to connect the tubing with apparatus attached to a yard locomotive, thus providing a portable compressor which could be placed wherever convenient. The jet from the hose pipe was directed against the surface to be cleaned. The plan was considered by no means perfect, as no means was provided for collecting the dirt, but most of the railroad companies which have employed it have preferred it to the broom method.

The idea, however, has originated a more elaborate system which has been tried in several cities with much success. The apparatus is constructed in a variety of forms, so that every kind of an object covered with fabric can be freed from the dirt which may settle into the covering. Even billiard tables, heavy carpets, and rugs are renovated, as well as upholstery, pillows, and bolsters. The air is supplied by compressors operated either by steam engine or electric motor, the latter usually being preferable. The compressors are constructed in various sizes, according to the service to be performed, ranging from 50 cubic feet of free air per minute upward. As they are intended for installation in hotels, apartment houses and other large buildings where the facilities for repairs are not at hand, they are especially designed for durability and the working parts are inclosed to exclude all dust and grit, while the lubrication is automatic. This is one of the interesting features of the compressor, as no sight-feed lubricator is required. The piston rod passes through a specially constructed metallic packing box, which is self-adjusting. It is provided with an improved form of packing rings, which are carefully fitted in place, both in the piston and against the surface of the cylinder, so as to form a perfect sliding joint. The extended end of the crank shaft is provided with a gear which meshes with a pinion arranged on the armature shaft immediately above. The gear chamber and the crank chamber are connected in such a way that the gear as well as the pinion are operated in a bath of oil, which oil is also supplied automatically to the bearings at the pinion end of the motor. The gear and pinion are of the helical herring-bone type, thereby reducing the noise of operation.



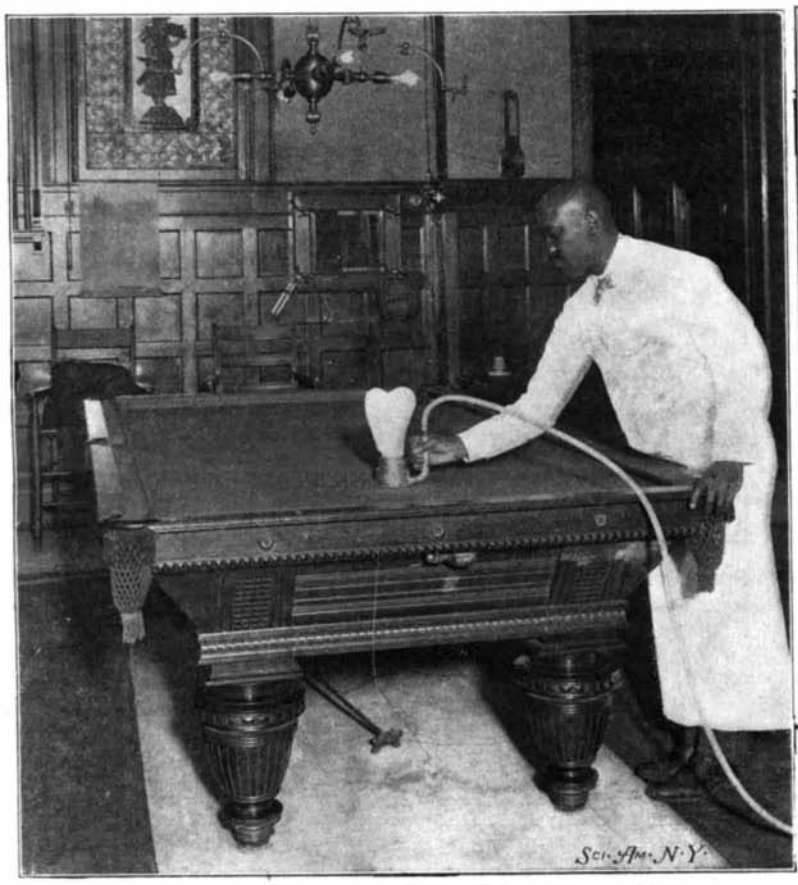
A Portable Electrically-Driven Suction Pump for House Cleaning Used in England.

If the compressor is operated by electricity the motor is usually direct-connected, taking the current from an isolated plant, or the generating set, which may be installed in the building. The motor is of the series-wound type, with formed coils of the latest pattern, and so constructed that the compressor can be started without using resistance on the motor circuit, closing the circuit in the same manner as with a knife-switch. This avoids considerable wear and tear.

As already stated, some of the compressor plants used for supplying air for cleaning large buildings are stationary. They are generally located in the basement, for convenience.

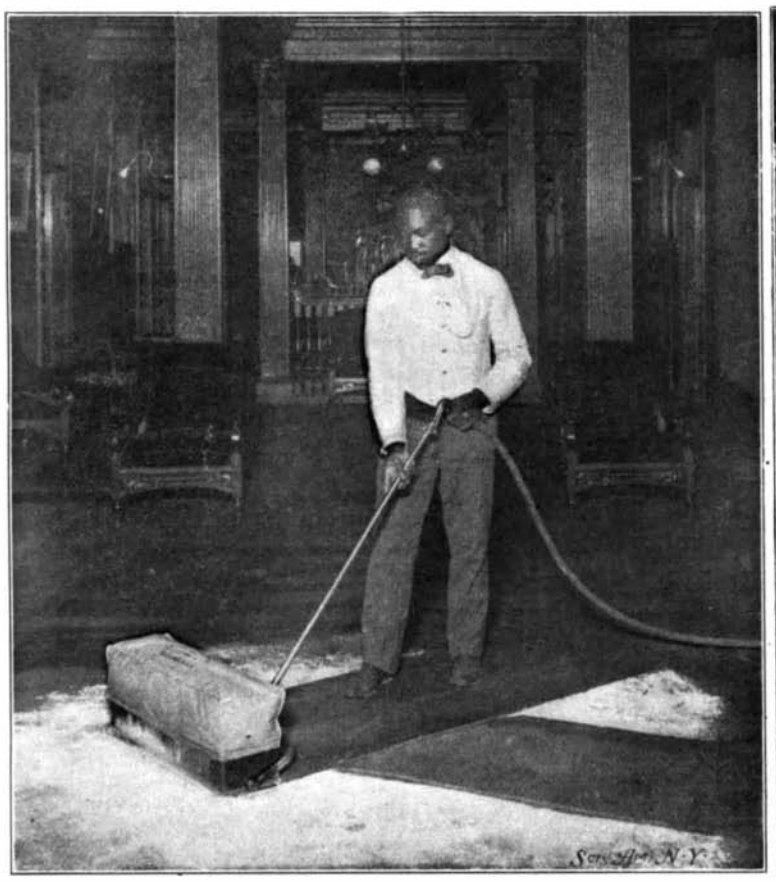
From the air reservoir extend standpipes, as they might be termed, to each floor of the building. Usually they are laid along on the inside of the elevator well or air shaft. At each floor a valve is inserted in the pipe connected with a nozzle to which a hose length can be fastened like an ordinary water pipe. To supply air to the various floors it is, of course, only necessary to start the compressor and allow the air to escape through the various valves into the hose lines. These are fastened to the apparatus to be used for floor, furniture, or tapestry cleaning, and the operation can be performed as often as desired. As is well known, hotel rooms are great collectors of dust, since the doors and windows are opened so frequently and the various apartments are in such continual use. In a well-managed hotel the floor coverings of the halls, dining room and parlors are usually swept or "run over" with the carpet cleaner at least once a day, while the bedrooms are cleaned several times a week, depending upon the extent to which they are used. Consequently the compressor plant is apt to be almost in daily use in a building of this kind.

For the cleaning of smaller buildings, such as dwellings and offices where the installation of a plant would be too expensive, a portable system is employed. A compressor of suitable size, operated by a gasoline engine, is mounted upon a truck especially built for the purpose and hauled from house to house. Hose lines are attached to the air reservoir and extended into the building as pipe is laid in extinguishing fires, and in this way the house cleaning can be performed as often as desired without removing the furniture or even taking up the carpets if it is not desirable. It is interesting to note that the



Cleaning the Chalk from a Pool Table with the Hand Machine.

Cleaning Upholstery with the Hand Machine.



Testing a Renovator by Removing Flour from a Carpet. The Dark Strips Show the Portions Which Have Been Cleaned by the Machine.

Removing Dust from Curtains.

SANITARY HOUSE CLEANING.

automobile has been brought into use in this service, the motor which operates the air plant being also used to propel the machine when under way. Such is the capacity of a portable plant that three men can clean every portion of an ordinary ten-room house in a day of ten hours.

The types of apparatus for applying the air to the material vary, of course, according to the work to be performed. In the Nation-Christensen system, which has been installed in a number of large hotels and buildings, the carpet renovators are of various sizes, ranging from 12 to 36 inches in width. They consist of a steel framework which lies flat on the surface of the fabric. This is termed a hood, and contains an expanded nozzle connecting with the hose. In the bottom of the hood is a slot about 1-100 inch in width, through which the air passes in what might be termed a sheet. It is forced into the fabric at various pressures, according to the thickness of the latter and the amount of dirt which has accumulated. The usual pressure varies from 60 to 70 pounds to the square inch. This is sufficient to blow the dirt out of and from under the covering. It passes upward through two other slots into the hood, as it cannot escape outside of the machine on account of the weight on the surface. It is prevented from escaping into the air by a cloth bag which collects it but is loose enough to allow the air to pass through. The dirt settles into a pan especially designed to collect it. When filled, this can be readily removed by taking off the bag and emptied. To the renovator is attached a handle for moving it over the floor. The handle also acts as a conduit for the compressed air, the supply of which is regulated by an ordinary valve. The apparatus is usually pushed over the carpet and does its work so thoroughly that it will remove any kind of substance which can be driven out by air pressure. In several instances, flour was thrown upon a rug and trod in with the feet. When the renovator was applied it apparently collected every particle of the flour, none escaping into the air.

In treating lambrequins and other kinds of upholstery the hose is connected with a jointed steel tube long enough to extend to the upper portion of the apartment. The ordinary air blast is directed against the draperies and the dirt allowed to settle upon the floor and furniture. Obviously the draperies and upper portions of an apartment are the first cleaned, then the furniture and floor covering. For removing the dust from upholstered chairs, sofas, and other kinds of furniture, what might be called a hand renovator is employed. It is constructed on the same principle as the larger type with the slots for applying the air pressure and collecting the dust, and is pushed over the surface by hand. If the chair, for example, is stuffed with cotton or some other material more power is employed to force the air through this material as well. As already stated, even billiard table coverings are thoroughly cleaned of the chalk and dirt in the same way. In freeing such articles as pillows and mattresses a simple pneumatic needle is used, the air being injected with sufficient force to circulate among the feathers, straw or other stuffing and expel the dust which may have collected.

In England a vacuum-cleaner is used which depends upon a somewhat different principle. This apparatus consists essentially of a bronze suction pump driven by an electric motor. The suction pipe is connected by flexible tubing with a metal cone, which is provided with short rubber tubes disposed very much as are the bristles of a brush. Between this air brush and the pump is a hermetically sealed box which acts as a condenser of the dust gathered up. The air which is drawn in is discharged against a baffle plate so that the larger particles of dust are precipitated. The remaining portions are filtered by passing through filtering material, the clean air being then discharged into the atmosphere. The dust collected in the box can be removed by opening a valve in the bottom of the box. The apparatus which we have described is used in many English hotels and also on the steamships of the Cunard line.

Finish of the Endurance Test.

By the arrival at Pittsburg, Pa., on October 16, of five more machines from Cleveland, the total of survivors in the endurance run from New York to Pittsburg is increased to twenty-five. The contest was to have closed at midnight, but the extraordinary severity of the test warranted the recognition of the finish of the newcomers.

The examination of the surviving machines began October 16, and will be continued for several days, during which time the cars will remain officially "sealed" in the garage. Considering the ordeal through which they have gone, all the machines are in surprisingly good condition. Bent axles and broken springs seem to have been the main troubles to the running gears, while engines have been remarkably free from mishap. The Contest Committee made a hasty examination of the observers' reports October 16. They found that nine cars had reached all the night controls on time, or within a few minutes after closing time.

The scores indicate that the best record had been made by George Saules (two-cylinder Toledo), with a loss of only thirteen points from a total of 300.

WORK OF THE FISHERIES COMMISSION.

BY FREDERICK MOORE.

Of recent years the annual catch of salmon in the Pacific States and Alaska (which latter supplies half the pack of the world) has been over 100,000,000 pounds. In 1899 the quantity of salmon packed was 2,450,000 cases of 48-pound cans. The weight of the fish represented by this pack, together with the large quantities sold fresh, salted, and smoked, was about 175,000,000 pounds, in market value, $9,000,000.

According to its species and size each salmon lays from a few hundred to thousands of eggs at each spawning. Although the lays are so multitudinous the time required for the hatch and development of a fish is, according to the temperature of the water in which he is, and his variety, from three to five years; the eggs are often largely destroyed; some are diseased and never hatch; some of the fish are taken off by disease, and many become the food of other fish. When in the rivers they are comparatively safe from enemies, but those in Alaskan waters are destroyed even there by otters, ospreys, and fishers, and are terribly slaughtered at the mouths of the rivers, when entering and leaving them, by seals and sea-lions. The enormous catch, therefore, were it not for the government propagation of the fish and the restocking of the rivers, would have by now exterminated salmon, or exhausted them for all commercial purposes, at least, in western waters. Since the work of propagating the fish began in 1873 on the McCloud River, it has grown to large proportions and engages the attention of all the coast States as well as the general government, and is now more extensive than ever before.

When salmon return from the sea each year to spawn they crowd up the rivers most persistently, and have been seen so far up the rivulets that form the head waters of the Sacramento that their bodies were exposed to the air. No matter how far the headwaters are from the ocean they will press forward until stopped by impassable obstructions or water too shallow for them to swim in. As they ascend the rivers they are caught at the government stations in gill nets, fyke nets, pounds, weirs, seines, wheels, and other devices. A species called the chinook is the principal salmon artificially propagated, and while the propagation at other stations throughout the country is about the same, the work on that specimen at the hatcheries on the McCloud River and Battle Creek (tributaries to the Sacramento) are taken for example. In 1899 the number of eggs of this variety alone collected by the commission was 48,043,000, of which about 43,775,000 were successfully hatched and planted. At these two stations the ascent of the fish is stopped by heavy wooden racks or barricades, below which their capture is effected by various means. After they are secured they are, for convenience in handling, placed in pens or live-boxes, the ripe or nearly ripe males and females being kept separate. When the eggs are taken in large quantities separate compartments are maintained for the ripe males, ripe females, nearly ripe females, and males partially spent that it may be necessary to use again.

The fish are usually stripped every day, as the eggs of the females confined in the pens are likely to be injured within the fish, which is a serious objection to keeping the parent in confinement any longer than is absolutely necessary. The spawning operations are conducted on a platform over the compartments containing the ripe fish, which are accessible through hinged covers set in the flooring. When taking the eggs one or two men stand ready with dip-nets to hand the females to the spawn-taker, and one or more perform the same office with the males. After the salmon are taken from the pens they are held suspended in the net until their violent struggles are over, after which they become quiet enough to handle and the eggs and milt can be expressed easily. All methods of taking salmon spawn are very much the same. Where there are plenty of assistants, and the salmon are of medium size, the most expeditious way is for the man who takes the spawn to hold the female in one hand and press out the eggs with the other, another in the meantime holding the tail of the fish. The male is handled in the same way. But on the Columbia River, where the salmon is larger and harder to manage, a "strait-jacket" is used. This is a sort of a trough made the average length of the salmon and hollowed out to fit its general shape. Across the lower end is a permanent cleat and across the upper a strap with a buckle. The fish is slid into the trough, the tail going down below the cleat, where it is securely held, and the head is buckled down with the strap. Under this control it cannot do itself nor anybody any harm and the eggs can be pressed out easily. The strait-jacket is indispensable with the very large salmon, and when operators are few.

One man presses the eggs from the female securely held in the spawning box into a pan held by another. As soon as the eggs are taken the male is drawn from the pen and the milt is pressed from him into the pan in the same way. Milt enough is taken to insure its coming in contact with each egg, after which the pan is gently tilted from side to side and the mass stirred with the fingers until thoroughly mixed. The pan is then filled about two-thirds full of water and left until the eggs separate, the time varying from one to one and a half hours according to the condition of the atmosphere. The average size of the eggs is about one-fourth inch.

The hatching apparatus generally employed on the Pacific Coast consists of a combination of troughs and baskets. The troughs are 16 feet long, 12 or 16 inches wide, and about 6 inches deep. These are divided into compartments just large enough to allow the baskets in which the eggs are placed to be lifted in and out. The egg receptacles are wire trays about 12 inches wide, 24 inches long, and deep enough to project an inch or two above the water (in order that the eggs might not wash out), which is 5 or 6 inches deep in the troughs in which they are placed. Into each of these baskets two gallons of eggs, equivalent to about 30,000, are poured at a time. The eggs suffer no injury whatever from being packed together in this manner, the water being supplied in a way that forces it through the mass, partly supporting as it circulates among the eggs from below. The meshes are too small to allow the eggs to pass through, though the long, slender fry may pass when the eggs are hatched. The eggs are kept in water averaging 54 deg. F. for about 35 days. The allowance of five days' difference in time of hatching for each degree of change in the water temperature is about what is necessary.

The eggs hatch very gradually at first, only a small portion of the fish coming out the first day; but the number increases daily until the climax is reached, when large numbers of young burst their shells together. At this time great care and vigilance are required. The vast numbers of shells clog up the guard-screens at the outlets of the troughs, which must be kept as clear as possible by thoroughly cleansing them quite often.

After the eggs are all hatched and the young fish are safely out of the trays and in the bottom of the troughs their dangers are few, and they require comparatively little care. Almost the only thing to be guarded against now is suffocation. Even where there is an abundance of water and room, with a good circulation, they often crowd together in heaps or dig under one another until some of them die from want of running water, which is not an inch away from them. The only remedy in such cases is to thin them out.

At hatching the young salmon is about an inch long, and has hanging under him a comparatively enormous sack, the "yolk-sac." For a month he eats nothing, living on the essence of vitality stored in the sac. When the yolk-sac has nearly all been absorbed the fish rise from the bottom of the trough, where they have previously remained, and begin to swim. They are now almost ready for food and must be liberated into the streams for which they are intended, or artificial food must be provided them. As a rule the fry are planted at this time. This is regarded as the best practice, and moreover the amount of space required renders the rearing of fry impracticable. They have, however, been successfully retained in troughs from the time they begin to feed, in February, until the middle of May, when on account of the rising temperature of the water they have to be liberated.

For the first few days salmon eggs are very hardy, and at this time they are thoroughly picked over and the dead ones removed, as far as possible, before the delicate stage during the formation of the spinal column comes on, so that in the critical period they may be left in perfect quiet. As soon as the spinal column and the head show plainly the eggs are hardy enough to ship, but when there is time enough a wait of a day or two until the eye-spot is distinctly visible, after which the eggs will stand handling and may be safely shipped if properly packed, is generally allowed.

The packing box used in shipping eggs is made of half-inch pine, 2 feet square and 1 foot deep. At the bottom is placed a thick layer of moss, then a layer of mosquito netting, then a layer of eggs, then mosquito netting again, then successive layers of moss, netting, eggs, netting, and so on to the middle of the box. Here a firm wooden partition is fastened in and the packing continued as before. The cover is then laid on top, and when two boxes are ready they are placed in a wooden crate, made large enough to allow a space of 3 inches on all sides of the boxes. This space is filled with hay to protect the eggs from changes of temperature, and the cover being put on the eggs are ready to ship. In the middle of the crate an open space about 4 inches in depth is left, between the two