EXAMINATION QUESTIONS FOR PLUMBERS.

IN view of the examinations now being held in this city for applicants for plumbers' licenses, the publication of the following list of questions propounded by the examiners last year will doubtless prove interesting; and although the questions this year are not likely to be the same as appear on this list, the plumber who familiarizes himself with the subjects referred to in this question list, will without doubt stand a better chance of passing the present examination:

1. State in general terms the drainage and plumbing requirements of a city dwelling.
2. Give a short description of the principal materials and fixtures used in drainage and plumbing.
3. Describe the different classes of water-closets, slop sinks and scullery sinks in use in this city, and state the advantages and defects of each.
4. Write a concise specification of materials and workmanship required in the plumbing of a house, as shown on the accompanying plans.
5. Give a description of the different makes of traps, stating the advantage and defects of each.
6. Describe the arrangements necessary for the proper disposal of subsoil water, rain water and sewage.
7. Describe the manner in which the following joints should be made: (*a*) connection of soil pipe with street drain; (*b*) of lead with iron pipe; (*c*) of iron pipes with each other, and (*d*) of a water closet with a soil pipe.
8. What purposes do ventilation or anti-siphon pipes serve, and how should they be run?
9. Where should traps in fixtures be placed, and how should connections from overflows be made?
10. What is the benefit of foot ventilation, and where should it be placed?
11. Why should a soil pipe be carried out through the roof, and what circumstances should govern its position and height?
12. How should the main trap of a house drain be set, and what should govern its position?
13. What are safes under fixtures for, and where should water from same be discharged?
14. How should the waste water from a refrigerator be disposed of?
15. How should overflows from supply cisterns be put in, and where should the waste from same be discharged?
16. How would you dispose of a safe waste from urinal?
17. Describe the construction of a grease trap, and under what circumstances should one be used?
18. How should the water pipes in an ordinary house heated by stoves be run to prevent freezing?
19. In what manner should water and waste pipes be run and fixtures set to meet the requirements of first-class work?
20. Describe the different methods of testing soil-pipes, drains, etc.
21. Describe the methods you would follow to discover any sanitary defects in a house. Plumbing and drainage defects are not alone referred to in this connection.
22. What conditions cause the movement of air in ventilation ducts or pipes, and what are the principal retarding influences?

THE ACTION OF WATER UPON LEAD PIPES.

DR W. R. THOMAS, senior physician to the Sheffield Public Hospital, in the course of a clinical lecture on "Lead Poisoning from Drinking Water," reported in the *Lancet* for April 7th, said: "Water generally contains a certain amount of carbonic acid. This acid acts upon the inner surface of the pipe, forming an insoluble internal coat of oxy-carbonate of lead, which effectually prevents the water from further acting upon the pipe. Hence old pipes which have been down for years are far less dangerous than new ones. Water which contains lime salts, as the carbonates and sulphates, also assist in forming an internal insolution coat, as the carbonates and sulphates unite with the lead. New pipes are apt to be acted upon by the oxygen which the water contains; a soluble oxide is formed, which contaminates the water. The nitrites, nitrates and chlorides found in water contaminated by sewage are very injurious, as they dissolve the lead; so also peat and other vegetable matter have a similar deleterious effect. The Sheffield water from a certain sources is acid, and most certainly dissolves the lead. The water in other towns has had a similar effect upon the lead. For some time the inhabitants of Keighley suffered from plumbism, as we do now, from drinking water. Mr. Jarmaine, of Huddersfield, recommended the authorities of Keighley to use limestone, to counteract the acidity of the water. This was placed in conduits, and the water was allowed to pass over it. They have found at Keighley that it has been necessary occasionally to add quicklime to aid the limestone, especially in summer, when the water is scarce. This plan, which has been adopted at Keighley and found to succeed, is now being tried in Sheffield, and I trust it will be equally successful here. It is a matter of vast importance to the town of Sheffield, as the drinking-water containing lead is now giving rise to a great amount of disease and suffering."

DETECTING GAS LEAKAGE.

TO detect a leakage of gas, Dr. Bunte, in the *Canadian Magazine of Science*, suggests the use of paper dipped in palladium chloride solution. Such paper changes its color in the presence of gas coming from leaks imperceptible by the odor, and which produce no effect upon the earth covering the pipes. Dr. Bunte suggests the following method of practically applying the test to street mains: Above the pipes are excavated, at intervals of two or three yards, holes twelve to sixteen inches deep, corresponding to the joints and sleeves. In each opening is placed an iron tube, half an inch in diameter, within which is a glass tube containing a roll of the test paper. The air from about the main enters the iron tube, and the trace of gas which may be present reveals itself by coloring the paper brown or black, according to its quantity. If, after ten or twenty minutes, the paper is still white, it may be certainly concluded that at the point tested there is not the smallest escape of gas. Various authorities who have experimented with Bunte's method certify to its efficacy.

The Deseronto *Tribune* is waging war in a commendable fashion on the piggeries which abound within the thickly populated portion of that town.

A lump of soda laid upon the drain-pipe down which waste water passes will prevent the clogging of the pipe with grease, especially if the pipe is flooded every week with boiling water.

The Suburban Water and Light Co. has been organized to provide an efficient water and light supply to residents on Yonge street, between York mills and the Toronto city limits.

A company has been formed in Toronto to manufacture pure ice. We observe that at a recent meeting of the Local Board of Health the Medical Health Officer recommended the use on sanitary grounds of ice thus manufactured.

We are indebted to the town clerk of Brockville, Ont., for a copy of a by-law to license and regulate plumbers passed March 5th of the present year. The ordinance seems to have been fashioned after the Toronto by-law. We hope to see similar action taken by all the larger towns and cities throughout Canada.

At Buda-Pasth a well has been bored which yields daily 176,000 gallons of water at 159° F. The attempt will be made to bore until the temperature of the water reached shall be 176°, which will be hot enough for heating purposes.

The Belleville Gas Company have signed a contract with the National Gas Light and Fuel Company, of Chicago, looking to the introduction of a process for the manufacture of gas from crude oil, steam and hard coal, with a capacity for 120,000 cubic feet of gas per day.

An experiment is being made in New Albany, Ky., for the purpose of ascertaining the feasibility of operating an electric light machine by the power afforded by the water works system. Should this experiment prove successful, it may be expected to result in cheapening the cost of electric lighting.

Two smoke testing machines have just been imported from Scotland by a firm of Toronto architects and one of our leading city plumbers. We believe these are the only machines of the kind in this city. The machine consists of a smoke reservoir, from which the smoke is propelled by means of a bellows through a rubber tube into the plumbing system, and any leaks in the pipes are quickly discovered.

A contemporary states that the presence of sewer-gas in a room may be detected by the following method: Unglazed paper is saturated with a solution of acetate of lead in rain water, one ounce of lead salt being dissolved in eight ounces of the liquid. Allow the paper to partially dry and then expose it in the room which is suspected of entertaining the deleterious gas. Any considerable quantity of the gas turns the paper black.

BRICKS OF BLOWN GLASS.

WE have already mentioned, say a writer in *La Construction Moderne*, the many applications of glass for building purposes, as exhibited at the last exhibition of decorative arts. Thanks to the decrease in price of coal, and to the recent improvements in glass manufacture, the product is classed at the present time among the usual material the architect employs. It is well known that the process of glass making is by melting or blowing. Sheets of polished glass from 14 to 30 millimeters in thickness are chiefly used for casings of walls in dining rooms, linings of bath-rooms, water-closets or recesses requiring frequent cleaning. They answer the same purpose as pottery tiles or enamelled bricks. Rough glass of greater thickness is employed as flagging for pavements for the purpose of forming a luminous flooring. It is then set by means of putty for cement in iron settings. Blown, in place of melted, glass can be advantageously used when lightness and transparency is preferred to strength, when, for instance, it is desired to use glass in vertical walls or ceilings with the object of lighting lower stories or basements. As applications of the kind have been rare, we are pleased when we have the opportunity of recording them. One of the latest instances of the employment of glass in this manner has been made by M. Falconnier, architect of Nyon, Switzerland, who has used glass in the form of hollow bricks. These bricks are cubes of 10 or 15 centimetres on the side, set in grooved iron casings. The joints in cement or plaster are retained in a grooving hollow around the circumference of each piece, and held by putty. The metallic lattice work, very useful in a wall where strength is required, may be discarded where the object is strictly decorative. One of the principal qualities of these hollow brick is the isolation by the enclosed air which can be replaced by other matter less conductive of heat and sound. Besides, with the hollow glass various decorative effects can be obtained without the necessity of resorting to grinding or enamelling, as it is very easy to coat the inner faces with oil colors. M. Falconnier has also applied these hollow bricks at Lausanne, in attic decorations, and in the construction of balusters and verandas.

HOW TO MEASURE A ROOM FOR WALL PAPER.

IT often happens that a person living at a distance from a city is thrown upon his own resources to determine the amount of wall paper requisite to paper a room. The following rule, says the *Painters' Magazine*, will meet the case, which, however, is only approximately correct, but sufficiently accurate for all practical purposes. It is better to order a little in excess than otherwise, as the extra portion may be used to replace damp or defaced portions or for other purposes.

To determine the number of rolls of wall paper to cover the walls of a room, measure the circumference, from which deduct the widths of doors and windows, and windows, and divide the remainder by three.

Example.—Let us suppose a room 12 ft. x 16 ft., which has two doors and two windows, which average 14 ft. wide

12 + 12 16 + 16 = 56 circumference.
4 x 4 = 16 doors and windows.

56
16

3)40

13⅓ or say 14 rolls.

This rule is calculated for room of not less than 10 or more than 12 feet in height.

For a room under 10 feet high, having a frieze say of 6 inches required, proceed as before with the measurement of the room, deducting the width of doors and windows. But in this case multiply the remainer by 2 and divide by 15, for this reason, that we can cut 5 lengths out of a double roll, which placed side by side on the wall, covers a space 7 ft. 6 in. from floor to ceiling, and instead of multiplying by 7 ft. 6, we multiply both by 2.

Example.—Take a room 14 x 14, with 2 doors and windows.