PLUMBERS' WORK IN DWELLINGS.

This was the subject of a most interesting lecture delivered at Carpenter's Hall, London, Eng., recently, by Mr. A. Buchanan. It formed one of an organized series of Sanitary Building Construction.

Mr. Buchanan defined plumber's work as the preparing for and fixing of sanitary fittings and connecting them with drains. Such work, he pointed out, must be very carefully done, in order that the gases arising from sewers, which are so deleterious to health, may not be allowed to enter the house. Of course, if proper and adequate ventilation could be given to the sewers, that is to say if there could be a shaft at every ten or twelve feet, no accumulation of gas could take place, and the sanitary arrangements would not need to be so carefully designed and carried out. But it is found impracticable to ventilate sewers at such short intervals.

The lecturer then gave some particulars of lead, the metal chiefly used by the plumber, illustrating with lantern slides the methods of its preparation. Lead is principally found mixed with sulphur. The ore yields about 75 per cent. of metallic lead, and is reduced by roasting and refining in a reverberatory furnace. The chief characteristics of lead are these : It is a bluish grey color, malleable, ductile, tough, flexible, of little tenacity, gives a dull sound when struck with a hammer, melts at 618.8 degrees Fahr., contracts on cooling, oxidises rapidly, alloys with other metals, and has a specific gravity of IL-36.

For plumbers' work lead is cast or rolled into sheets of varying thickness, and is known as 3 lb., 4 lb., 5 lb., up to 14 lb. lead, according to the number of pounds per foot super. Cast sheet lead is harder than rolled lead and is slightly crystalline in structure. It is subject to air balls, is of uneven thickness, has a tougher surface and should not be used of lighter weight than 6 lbs. per foot super. Milled lead is not crystalline ; it is softer, more homogenous, more ductile, and can be had in larger sheets than the cast lead. This is the lead which is now almost universally used for plumbers' work.

Lead pipes are now generally made by hydraulic pressure, and can be obtained from 3-16th in. to 6 in. in diameter and of almost any substance. The apparatus is called a squirting machine. The lead is run into the machine and when in a semifluid state pressure is applied, causing the metal to issue through the dies, a rod or mandrill forming the hollow pipe. Large pipes are sometimes turned up from sheet lead, the seam being either burnt or soldered. In the first process the edges of the lead are fused together by a fierce flame; in the second they are joined by solder. A soldered pipe is not so reliable as the drawn or burnt description, and eventually although not perhaps for a hundred years, the joint is likely to become oxidised and give away.

Plumbers' solder consists of two parts of lead to one of tin; it melts at 440 degrees Fahr. Soldering is carried out as follows : The surfaces and edges of the pieces to be joined are scraped with a shave-hook, and as solder will only adhere to the clean metal, the bright surface is immediately covered with tallow or some such material which acts as a flux and prevents the surfaces becoming oxidised before the solder is applied. The wiped joint is usually soiled, that is, covered with a mixture of lamp-black and size, before the shaving is done. This enables the plumber to prepare the surface to exactly the size required to be covered with solder. The metal is then poured or splashed on, and is manipulated by the plumber with a small pad of fustian called a solder cloth. This has the effect of raising the temperature of the lead to such a point that the tin in the solder combines with the surface of the lead to be joined. The solder is then shaped and the joint finished.

Sometimes a heated copper bolt or bit is used to melt the solder; in such cases solder with a lower melting point is used. As the solder flows these copper-bit joints must be horizontal, or nearly so. Wiped joints can be made in almost any position.

Blow-pipe joints are similar in shape and appearance to copper-bit joints. But the heat it obtained from a jet of flame forced by a column of air on to the joint. A blowpipe joint is considered to be much stronger than a copper-bit joint, as a greater heat is used in the process. joints are produced by burning the joints in a very fierce flame, which melts the joints together at the seam. This is a process which is not often followed on the building; it is more suitable for shop work.

Lead pipes with soldered seams should not be encased in plastered walls. The action of lime on lead converts it into cerusite, and soldered joint seems to be affected more quickly than the lead, particularly in the presence of moist air.

Soil pipes may be made of either lead or cast iron. To conform to the L.C.C. by-laws they must, if of iron, have socket joints, though probably flanged joints would be equally effective. The metal should be at least I-4 inch thick, and have large sockets to admit of at least I-4 inch packing of lead. The iron pipe should be treated by galvanizing, or some similar process, to prevent too rapid oxidation. Lead soil pipes are usually in 10 ft. lengths, and they are usually joined by the wiped joint. The vertical soil pipe is fixed to the walls by means of tacks soldered on to the back of the pipe at intervals of 3 ft., or 3 ft. 6 in. These tacks should be of heavy lead, the metal about the holes being much thicker than the rest.

To bend a lead pipe the throat or inner part of the bend is heated, the outer part being kept cool. The pipe is then bent, causing the inner part to collapse; it is then dressed out, thus thickening the lead at that point. The part is then again warmed and Furnt, and the bossing is continued, the operation being repeated until the required shape has been obtained. In the ordinary course the throat becomes much thicker than other parts of the pipe, but a good plumber will dress the lead until he has worked this excess evenly over the surrounding parts. To see that the pipe is of the same diameter throughout, balls or bobbins of wood are forced through by the aid of a mandril, but great care must be exercised, to avoid breaking the pipe. Bends are sometimes made by hydraulic pressure, and sometimes by shaping two pieces and soldering the seams.

Branch soil pipes should enter the main pipe with an easy curve in the direction of the current, the joints being wiped. Soil pipes should be carried up above the roof or 3 ft. above any window, and should be covered with a cowl to prevent downblow.

Soil pipes are connected to iron drains by means of a copper or brass thimble or sleeve, which is slipped over the pipe and wiped on at the top. The connection is made water-tight by spun yarn and blue lead being run in and caulked. In connecting soil pipes with earthenware drains it is not usual to pass the lead pipe through the thimble, which is simply wiped on to the lead pipe, the joint between the thimble and the drain pipe being made with cement. Sometimes a little silver sand is mixed with the cement to prevent it expanding.

Lead pipes do not require painting. Probably if this were taken into account lead would be found more economical than iron, which needs repainting every year or so.

According to the L.C.C. by-laws all soil pipes must be fixed outside the building. In many ways this is a wise rule, though it has its disadvantages. During a severe winter, it is not an usual thing for soil pipes to burst, owing to leaky taps allowing water to trickle through and freeze before reaching the bottom. The risk of faulty joints is the most important reason for placing the soil pipes outside, but when one considers that in 'lead pipes the joints are soldered and are practically as strong as the pipe itself, the chance of leakage is remote.

To prevent the ingress of sewer gas and bad smells to the house a water trap is necessary under each fitting. A good trap should have a water seal of not less than 2 in. It should be self cleansing, that is to say, the inner surface should be scoured each time it is flushed. The contents of the trap should be forced out, and clean water left after each time of flushing. The mouth of the trap should be larger ehan the trap itself, so that the flush may enter with sulficient force to remove any deposit. All lead pipes should be fixed inside the house and immediately under the fitting.

After showing on the screen several kinds of traps and explaining their characteristics, the lecturer discussed the