Houses from Earth

WHY BUILD THICK WALLS?

Written for "The Listener" by R. AMMER

LETTERS I have received show that there is some scepticism about the minimum thickness of *pisé* walls mentioned in my second article on earth houses. The doubters have probably read articles and books by writers whose experience, or lack of it, has led them to believe that earth walls should be not less than 15 to 18 inches thick. Mr. Clough Williams-Ellis, in his book on earth building, recommends that thickness, but when you read the results of tests, as tabulated near the end of the book, you can understand why. If he had obtained similar tests to those which the writer of this article got from the earth he used nearly 30 years ago, and had seen the house after the lapse of that time he, too, would agree that a 12-inch minimum is feasible. The reason for making walls 18 inches thick is to neutralise poor materials and (or) poor workmanship. You pay more for both because you have to dig, move, and ram about 50 per cent. more earth, and add to the roof area to get the same floor space. If, by a little more care and a little more ramming, you can make a 12-inch wall do, why add another six inches? Better to make your rooms larger and have a better house.

In the house mentioned above the external and internal walls were 12 inches and nine inches respectively. They have not deteriorated in the least, still retain their original surface, and several earthquakes have had no effect on them. The strength of these walls may, perhaps, be explained (when compared with the Williams-Ellis 15-18-inch walls) by the fact that he gives the building rate per man-day as one cubic yard, whereas the rate for my building (there were no loafers on the job) was about half of that, with the result that the walls were like rock when dry.

In collaboration with Mr. Williams-Ellis, a building firm in England had some *pisé* blocks tested by the National Physical Laboratory. In these the best result was a crushing strength of about 101 pounds per square inch. The test of earth for my experimental house was 305 pounds, and later I tested some from Ponsonby, Auckland, and the result varied from 553 to 645 pounds per square inch. The builders mentioned above seemed to think that a safety factor of three was sufficient. I would not use a lower factor than nine, but am hoping to develop a method under which such a uniformity in texture and strength will be achieved that the only safety factor will be that needed to take care of accidental loading, not of a possible weakness in the material.

Comparative Figures

Here is a comparison in figures, between thick and not so thick walls: 18-inch wall (101 pound test), safe load 2181.6lb., less self load, has a margin, for carrying roof and other loads, of 426.6lb. per linear foot; 12-inch wall (300lb. test) safe load 4320lb., less self load, has a margin of 2760lb., or over two thousand pounds more reserve strength than the thicker wall which costs more to build and to roof.

To those not prepared to make exhaustive tests of the soil they propose to use, and who prefer the rule of thumb tests, such as pressing a ball of earth in the hand, I would say, "Certainly stick to 18-inch walls and plaster them both sides, but don't call it a cheap method of building!"

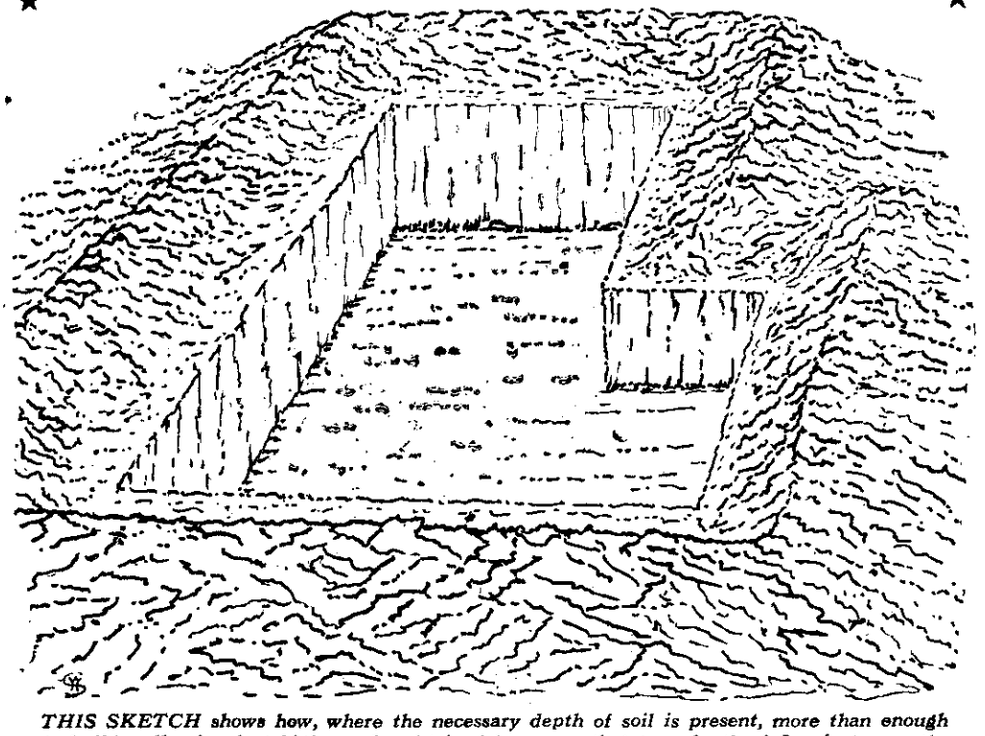
A cheap house can be produced only by saving material, labour, and transport and by using the best material suitable for the purpose. Again I would stress the point that you must mix brains with your earth, not earth with your brains.

With reference to the idea that *pisé* building is not suited to quarter-acre sections, I may say that it would be possible to build two houses on a quarter-acre, in some places, by using the soil taken from the area occupied by one of them, and making a useful basement under that one. Of course, there are some sections without suitable earth, in which case the would-be builder must consider whether it is economic to transport soil when concrete might serve better. By soil I mean just earth: not necessarily garden soil.

Then there is the idea that one has to be a Sandow to be able to use a rammer. I took note of the work done by a 70-year-old man who was building a nine-inch wall, which requires more labour per cubic foot than a 12- or an 18-inch one. He was working alone that day, and getting his own supply of earth, and rammed one-third of a cubic yard in four hours. The next day he had a man supplying him with earth, and turned out half a cubic yard.

Thus the labourer added only one-third to the rammer's output, but he probably saved him a lot of hard work. This work was being done in full sunshine during the hottest month of the year, but the old man lived another 20

Dig Your Walls Out of the Basement!



THIS SKETCH shows how, where the necessary depth of soil is present, more than enough to build walls nine feet high can be obtained by excavating to a depth of five feet over the whole site of a building. More concrete for foundations will, of course, have to be used, but by making foundations eight or nine feet high a useful basement can be obtained. One important point must be kept in mind: A sump, and means for draining it, should be provided in case water accidentally enters the basement. If the position allows a drain with a natural fall to the outlet, it is a simple matter, but in some cases a pump (power or manual) will be needed