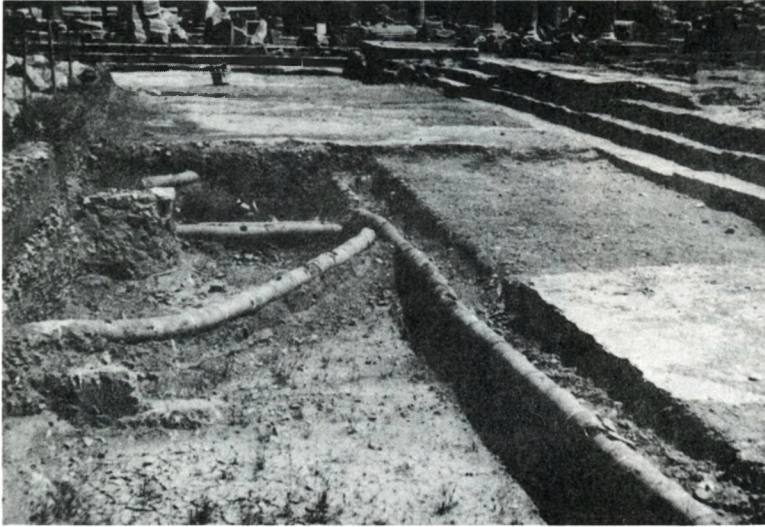


## PLAIN END PIPE – FROM AGE TO AGE



The Clay Pipes of Ephesus

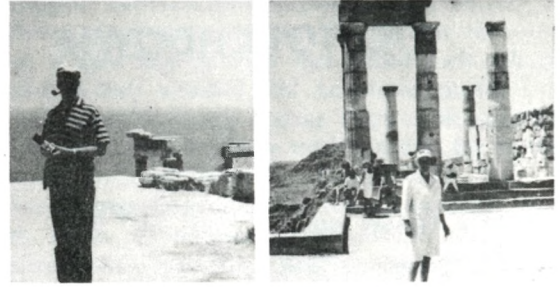
The ancient City of Ephesus is slowly rising from the effects of many wars and earthquakes extending over a period of more than 3000 years. Located in the Aegean region of Turkey, some 77 Kilometers south of the City of Izmir, (formerly Smyrna), the ruins have been under excavation by the Turkish Government for a number of years.

Although most of this once prosperous City still sleeps peacefully under fields of grain, much has been done to reveal the City planning and construction of civic services attributed principally to the Roman occupation which commenced some 2300 years ago. As an example, in a good state of preservation are the remains of the Gymnasium of Vedius which contained the public lavatories with marble seats and a constant supply of running water. Here also is the large dressing room with cold water (Frigidarium), warm water (Tepidarium) and hot water (Caldarium).

The rooms were kept at the required temperatures by means of hot air produced by furnaces which can still be seen.



The author and his wife Mary pictured at Lindos, the Isle of Rhodes.



The Author of The Clay Pipes of Ephesus is R.W. Brotherhood, P. Eng., O.L.S., Managing Partner of Sutcliffe Company, Consulting Engineers and Ontario Land Surveyors, of New Liskeard, Ontario. The Brotherhood family recently enjoyed a visit to several Countries of the Eastern Mediterranean and the Black Sea.

The marble paved streets were liberally graced by marble fountains. The fountain honouring the Roman Emperor Trajan, for example, measures 12 meters by 1 meter.

As an Engineer I was most interested in the underground system of pipes which supplied water to these fountains and to the many public and private buildings in the City.

Fortunately part of the service mains had recently been excavated, as shown in the above picture which illustrates the mains and branches exposed still in excellent condition on their granular bedding.

The pipes, which are pictured in the close-up on the back page, were made of clay, shaped by moulds and were no doubt Vitrified in the kilns of those days, to produce the pipe hardness which has survived almost 2000 years. Lengths of individual pipes measure about 15 inches with outside diameter about 8 inches and inside diameter about 5 inches, giving a wall thickness of 1-½ inches. These pipes could individually withstand considerable internal pressure. They were butt-jointed by a compound which may have been comprised of ground marble with some matrix to produce a terrazzo-like hardness, as on close inspection the jointing material was as hard as the clay pipes themselves.

Most interesting was that the water came from the nearby mountains under considerable static head which could not have been contained without displacing the joints. The explanation would seem to be that the fountains, etc., ran continuously without exerting much internal pressure on the water system.

An efficient combined-sewer network was constructed under the marble-paved streets, of similar clay pipes, to carry the overflow and sanitary effluent to the harbour which has long since silted up.

Although Ephesus was the site of the Temple of Artemis, one of the seven wonders of the world, I shall always remember Ephesus for the Roman Engineers and the wonders of its water and sewer works, much of which could be put into operation again today.