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DRAINAGE AND THE GROWING OF GRASS.

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Work for some years as an anti-malaria officer had shaken one's belief in the efficacy of open masonry drains laid in the bottom of water courses of varying depth.

Being used by Nature as storm water channels, by the engineer for disposal of sullage water from nearby built up areas, and by the local inhabitant for sanitary and insanitary purposes, such water courses gain an added notoriety in being beloved by those in search of mosquito breeding, who name and malign them for posterity in annual and other reports.

![Figure 1](image1.jpg)

**Fig. 1.**—(1) The wing walls of the abutments of the bridge showing the line of the original banks, now protected from further erosion. (2) The grass growing beneath the bridge.

In 1930 an experiment was carried out at Rawalpindi in the construction of a length of drain laid at the bottom of the nullah and of such size as to take the normal flow of water. From the edges of the drain firm earth packing was laid in a gentle slope up the highest flood level, and on this grass was planted. The small masonry drain carried the normal flow in a confined space and at a steady rate, while the banks when consolidated stood up to sudden flooding occurring for a short time after rain.

It was learnt in this preliminary construction that there must be no obstruction even of small size in the nullah bed or any sudden change of level. Such change or obstruction inevitably resulted in a disturbance of the flow of water and subsequent erosion even of firm sod.
In 1935 it was noticed that grass could be made to grow easily in Secunderabad and it became possible to suggest a similar work there on a length of drain which was being laid in a shallow nullah normally existing as a series of pools connected by a slowly moving stream and forming ideal mosquito breeding places. Part of the construction, carried out under the direction of the Cantonment Engineer (Mr. V. G. Panwalker, B.E., A.M.I.E.), is illustrated in fig. 1 which shows the central drain of half-round Hume pipe laid in stonework and the extent of the grass planted. The photograph was taken when twenty inches of rain had fallen after completion of the work.

While this construction was in progress, an enthusiastic sanitary inspector was given a gang of six coolies and told to carry out similar work in a tributary of the same nullah, but only down to a "kutch" central...
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drain, as no funds were available for masonry or concrete channels. Of three hundred yards length so treated and finished just before the onset of the rains all but about thirty yards of the upper and last portion completed stood the strain admirably and has remained firm ever since.

This effort was followed by a similar one on the part of a different inspector using a new gang of coolies. The drain before and after treatment is shown in figs. 2 and 3.

A problem of a somewhat different nature was presented by a disused irrigation reservoir or "tank" which, although not holding water to any considerable depth, received and retained sufficient water to form innumerable pools, one of which is illustrated in fig. 4.

![Fig. 4.—A true photograph given unnecessary bias by an over-zealous photographer who limited its background.](image)

The area after work had been carried out is shown in fig 5.

Since the completion of the drains already referred to a number of others have been treated with what are believed to be successful results.

The actual planting of grass presented no special difficulty as sods were available locally. Once the bed was prepared, the sods were laid, pounded well down, and kept watered until a good growth of grass had occurred.

In one place sods were not placed over the whole area to be covered but were distributed in the manner of Reverdin's skin grafts. Results were as satisfactory but slower.

It is not suggested that the idea or methods employed are original. It is known that similar work has, and is, being carried on in other stations in India and the foregoing account may only serve to stress the possible use of grass to assist in the maintenance of drainage and its application in an economical manner with unskilled labour and little technical assistance.

Apology may be due for an attempt to stray into the sphere of the engineer, but he has already disclaimed any interest in what he referred
to as horticulture and so the experiences are put forward for what they are worth.

The fact that it was possible to remove a series of mosquito breeding places such as are shown in fig. 2 without the laying of masonry drains suggests a temporary measure which may be applied prior to the laying of such drains and even a more permanent measure where there is a small intermittent normal flow of water. In either case it has been proved that no harm is done and both possibilities are now being tested locally.

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CORONARY THROMBOSIS: A PERSONAL EXPERIENCE.
By "X."

An article in the June number of the Journal on the "Examination of Elderly Men for Fitness for an Active Physical Life" devotes some space to the subject of coronary occlusion, and as this threat to the senior ranks seems to be increasing in frequency it is thought that an account of a personal experience may be of interest.