Clinical and other Notes

4 staples; 1 used outer motor tyre (sufficient for 36 hinges). The tools required: 1 hammer; 1 nail; 1 penknife.

To make the hinge, cut out a strip from the rubber tyre 6 × 2 inches and cut a hole in each corner (fig. 1). Thread the wire through the holes in the strip and draw it tight, squaring it off with a few blows of the hammer. Bore corresponding holes in the latrine cover and seat (fig. 4), thread the wire through these and bend it over, finishing the attachment by a staple straddling each wire below (figs. 2 and 3). The rubber should be attached with the outer side upward to give full effect.

With this device the lid can be easily opened beyond a right angle, indeed to 180°, yet closes automatically by the natural elasticity of the hinges. The need for a wooden bar and its supports is eliminated, a very much lighter lid of three-ply wood can be used, the hinge can be fixed far back allowing a longer resting area for the buttocks, and a larger hole can be constructed. Finally the cost of the improvement is less than 1d. per hinge.

A second difficulty encountered is in deficiency of the bucket guides and platform. The guides below the seats have here been shaped to fit closely to the rim of the bucket (fig. 5). This prevents the seat sliding and the holes moving from the opening of the bucket thus giving rise to soiling of the ground and entrance of flies to the bucket contents.

These guides are readily shaped and attached with the aid of a saw, penknife, nails and hammer.

To prevent the bucket rocking on its platform the following apparatus is designed (figs. 6 and 7). It consists in a wooden square with hinged wooden attachments the free edges of which are cut to fit the bucket. These free edges are joined together by means of pieces of rubber tyre (fig. 7). Thus if the bucket tilts in one direction the opposite wooden support presses upon it and restores it to the vertical. This structure does not prevent the easy removal of the bucket for cleansing.

The material needed is wood, a used tyre, staples, and wire, and the tools, a spokeshave, nail and hammer.

HYDROPONICS AND AGGREGATE CULTURE.

By Major R. S. de C. Bennett,
Royal Army Medical Corps.

The above subject has interested me for a considerable time and now that the war is turning towards the East, I feel that if hydroponics and aggregate culture were scientifically developed it would have a very definite bearing on the general health of troops.

Hydroponics is a type of culture that has been done by natives in a crude way for centuries and has only recently been placed on a scientific basis by Professor Gerichi.
PUMP CONNECTION FOR AERATION

1" scale section.

Isometric sketch.
Hydroponics consists of cultivating plants in nutrient solutions or, put more simply, water plus essential mineral salts for plant life.

The mineral elements essential to plant life besides water and carbon are nitrogen, calcium, magnesium, potassium, phosphorous, sulphur plus trace elements such as manganese, iron, boron and zinc. These minerals are normally in soil; in hydroponics and aggregate culture these minerals are added to the water to make a growing solution or medium. The ideal regions for outdoor hydroponics are tropical or subtropical desert regions where there is bright light, heat, the minimum of plant pests and an average nutrient temperature of 70° to 75°.

Most people know the very elementary form of growing mustard and cress on wet flannel or a hyacinth bulb in a bulb glass. The more elaborate form of culture consists of a watertight non-corrosive tank made of glazed earthenware, wood, steel, iron, or cement suitably treated. This is encased in outer walls, the space between being filled with non-conducting material; the tank is then half-filled with the mineral solution; an outlet drain is provided at the bottom of each tank and used as an overflow or aerating pipe as necessary; a wire mesh tray is fitted on the top of the tank containing the bedding material, excelsior or wood wool with a surface covering of peat moss. This supports the plant and excludes light from the nutrient solution, eliminating the growth of algae.

This is only a rough description of the common variety of tank and one of the most suitable on account of its cheapness and efficiency, so that an idea may be gained as to the type of container used. On a large scale commercial installation these tanks are connected together by pipes, etc.

In the diagram it will be noticed that the tray has four uprights (which may vary in length) joined together and used either for lifting out the tray and if necessary examining the plant’s roots or attaching cross wire supports for tall growing plants. The amount of fluid medium required for a depth of 4 inches would be approximately 34 gallons. The air space under the tray is generally about one inch or so according to the type of plant root growth; the air space at the end allows for aeration and gives room for checking the depth of nutrient medium after evaporation, etc. Aeration is of vital importance and may be simply done by an air pump or cycle pump attached to the air pipe which is aerated for a minute or so once or twice a day, at the same time thoroughly mixing the medium the salts of which tend to sink to different levels.

Another point of great importance is to keep the solution mildly acid and the pH (hydrogen-ion-concentration) should be tested weekly. This should be 4·5 to 6·0, i.e. the alkacid paper should become orange yellow in colour when dipped in the medium. If the medium at the end of a fortnight or so shows an alkaline reaction, sufficient sulphuric acid solution, one ounce to the gallon of water should be added until the orange yellow reaction is obtained.

There are about thirty nutrient formulas in use, according to climatic
conditions; commercial grade salts may be obtained from any good local artificial fertilizer agent. One of the favourite formulas is that of Shive and Robbins of the New Jersey Agricultural Experimental Station:

- Monopotassium phosphate: gr. 109
- Calcium nitrate: gr. 370
- Magnesium sulphate: gr. 200
- Ammonium sulphate: gr. 32
- Water to: gallons 5

To this is added as mentioned before two stock solutions, A and B. A is composed of 49 grams each of boric acid, manganese sulphate and zinc sulphate, dissolved in 64 ounces of water to which is added gr. 10 of copper sulphate.

Two teaspoonfuls of this solution are used to 5 gallons of nutrient medium.

B is simply iron ammonium citrate 12 grams dissolved in 16 ounces of water. Four teaspoonfuls to each gallon of nutrient medium are used.

It is necessary that all stock solutions should be kept in the dark and must be prepared and added to the water in the tank separately in order to prevent precipitation of sulphates and calcium salts.

The following formula would probably be more useful in Egypt or Aden owing to the amount of nitrogen used by plants in relation to the brighter sunlight:

- Double superphosphates: gr. 43
- Magnesium sulphate: gr. 44
- Potassium nitrate: gr. 296
- Ammonium sulphate: gr. 192
- Water to: gallons 5

To this of course trace element solutions A and B, as mentioned before, must be added but with an increase to 14 grams of iron ammonium citrate.

The above formula is one of many recommended by Messrs. Withrow and Biebel of the Perdue University Experimental Station, Indiana.

Aggregate culture is perhaps simpler as mineral aggregate, viz. sand, gravel or cinder, is used in place of soil and the principle more easily grasped. The process is constantly to flush the mineral aggregate with nutrient solution in combination with seepage, etc.

It is difficult to give an unbiased opinion on the merits of the two systems but one or both could be tried.

There have been some remarkable crops grown under soilless culture up to twenty times the normal. Of course these are exceptional and under ideal conditions in California. There is no doubt that this new method is going to play a very important part in the future in arid zones. As an example it is at present being made use of in Wake Island, a Trans-Pacific air-liner station where there is not a vestige of vegetation. An experimental plant of 120 square feet of tank was at first used giving a weekly production of 33 pounds of tomatoes, 20 pounds of string beans, 15 pounds of vegetable marrow, 20 head of lettuce and 44 pounds of sweet corn. The plant has
now been increased tenfold and the air-liners are delivering vegetables to other rocky islands on their route.

The chief points in favour of developing this culture are its cheapness, rapidity of crop growth, greater yield (about eightfold), choice of location, small area of ground used and all the year round supply of vegetables which, from a medical point, cannot be stressed too much on health grounds.

I do not in any way wish to give the impression that hydroponics and aggregate culture is the panacea of agriculture but there is no doubt in my own mind that it is going to play a very important part in the future development of arid zones all over the world.

Experimental work is being carried out at Imperial Chemical Industries Research Station, Zealotts Hill, Bracknell, Herts, and also by Messrs. Suttons, and Reading University.


My whole point in drawing attention to this little known type of agriculture is that a start should be made in the Near East. I would suggest a trial at hospitals in Aden and Egypt, by professional nurserymen, of whom there must be many in the Corps who could adapt themselves to this new science.

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NOCTURNAL ENURESIS.

BY MAJOR R. J. ROSIE,
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One of the most annoying of therapeutic problems with which the medical officer has to deal is that of nocturnal enuresis. This is not uncommon among young soldiers and it is thought that a short account of the disorder and its treatment by suggestion may be of some interest. Enuresis is very common in childhood. Addis (1936) reported that one out of almost every five children brought to the Child Guidance Clinics in London for whatever reason suffered from enuresis. Most of these cases cease about puberty but a few continue into adult life.

In the Army the unfortunate sufferer is too often regarded with suspicion by his unit officers and by the hospital staff. It is occasionally thought that he is himself in some way responsible for his plight and that what he really requires is a good scolding and proper training. Punishment for an act which he cannot resist and of which he is not even aware leads to a