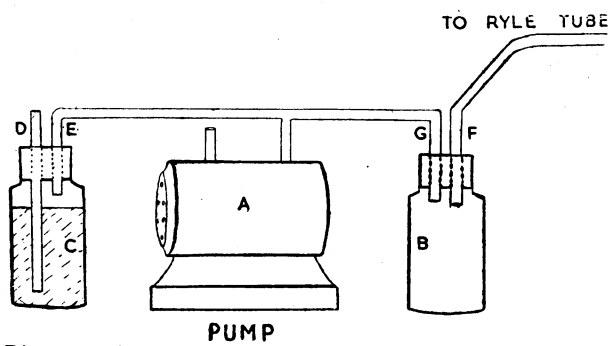
Preparations and Appliances

SIMPLE APPARATUS FOR CONTINUOUS GASTRIC SUCTION

Dr. EUSTACE J. SEQUEIRA, honorary assistant medical officer, Antenatal Department, B.Y.L. Nair Charitable Hospital, Bombay, writes : The apparatus described originally by Wangensteen, though inexpensive and simple enough to use, is somewhat cumbersome. Electrical appliances marketed for gastric suction are undoubtedly efficient but expensive. Therefore an attempt was made to devise an apparatus which is inexpensive, simple, and yet efficient. The apparatus described below, I believe, meets these requirements.

The suction pump used is a 24-volt anti-icer aircraft pump (de-icer pump) obtained from surplus war stock and used in conjunction with a suitable transformer. Equally suitable would be an aeration pump as used by aquarists and obtainable from any fish-fancier's store. As the negative pressure required is small, a powerful pump is unnecessary. The gastric tube would, of course, be connected not to the pressure but to the suction nozzle of the pump.

A difficulty was encountered, in that the gastric mucosa was often sucked up against the orifice of the Ryle tube so that drainage stopped and more and more negative pressure kept developing in the appliance. This put a strain upon the pump and made drainage still more difficult. A simple release valve was therefore introduced which overcame this difficulty and made it possible to maintain trouble-free gastric suction indefinitely at a predetermined negative pressure.



Diagrammatic representation of the apparatus as used for continuous gastric suction.

The apparatus consists of the suction pump (A), the nozzle of which is connected to a T-tube (see Diagram). One arm of this tube is connected by means of a rubber connexion to the bottle (B)—fitted with an airtight rubber bung—which is in turn connected to a Ryle tube. Another bottle (C) acts as a release valve. It is filled with fluid up to a level of 6 in. (15 cm.). It has an airtight rubber bung through which pass two tubes—a longer one (D) that reaches down to ¼ in. (6 mm.) of the bottom of the bottle, and a shorter one (E), whose lower end is clear of the surface of the fluid. This shorter tube is connected by means of a rubber connexion to the other arm of the T-tube.

The whole apparatus is placed on the floor at the patient's bedside so that the stomach is at a higher level than the collecting-bottle. When the pump is started negative pressure is created in the collecting-bottle B, and this, aided by siphon action plus the positive pressure within the stomach itself, causes the gastric contents to be aspirated into the bottle. If the gastric mucosa happens to be sucked against the orifice of the Ryle tube, air is drawn into bottle C through tube D, bubbles through the fluid and up through tube E and the T-tube to neutralize the negative pressure within the bottle B (and within the Ryle tube), and thus releases the mucosa which has been occluding the orifice of the latter. By this means steady uninterrupted drainage of the stomach is maintained. Once the stomach is empty air is sucked in through bottle C, so that at no time is a strain placed upon the pump or trauma caused to the gastric mucosa. When fluid again collects in the stomach drainage restarts automatically. If the gastric contents are thick or if mucus obstructs the Ryle tube, it is a simple matter to close tube D so as to allow the desired level of negative pressure to be built up in order to clear it.

It should be noted that no expensive gauges or valves are necessary. Standard empty saline bottles are used both for the release valve and for the collection of gastric contents. The bore of the two tubes for bottle C is $\frac{3}{16}$ in. (5 mm.), and this is adequate for the pump used by us, which has a suction rate of about 1,000 ml. in about nine minutes. Under these circumstances the negative pressure developed by the apparatus will depend entirely upon the level and the nature of the fluid in bottle C. It follows also that variations in the performance of the pump owing to fluctuations in voltages in the mains will not cause any change in the amount of suction applied to the stomach. It must be emphasized, however, that if a much more powerful pump is employed the bore of tubes D and E must be much larger—as large as possible.

In order to find out the degree of negative pressure obtainable when some common fluids are used in the valve bottle, water, castor oil, and pure glycerin were used in turn. In each case the level of fluid was kept at 6 in. (15 cm.). The collecting-bottle (B) was connected to a mercury manometer and the negative pressure measured, the following values being obtained : water, 20 mm. Hg ; castor oil, 22 mm. Hg ; and pure glycerin, 28 mm. Hg. When the apparatus was used for gastric suction, with the patient in Fowler's position in a bed of normal height, the most suitable fluid was found to be pure glycerin at a level of 6 in. (15 cm.), the negative pressure obtained being 28 mm. Hg.

The apparatus may also be found of use in other situations—for example, drainage of an empyema cavity, or drainage of the urinary bladder in suitable cases. The desired degree of negative pressure could be maintained by simply increasing or decreasing the height of the fluid in the valve bottle.

The apparatus could be easily adapted for irrigation at a constant pressure and rate. When used for this purpose the T-tube is connected to the pressure nozzle of the pump instead of the suction nozzle, and one arm of the T-tube is connected to the short tube (G) of bottle B, which now contains the irrigating fluid. The outlet tube (F) from this bottle must be long enough to reach the bottom. The other arm of the T-tube is connected to tube D of the valve bottle instead of to tube E. By this means the irrigating fluid will be forced out from bottle B at a pressure dependent upon the level and nature of the fluid in the valve bottle. The positive pressures obtained with a 6-in. (15-cm.) column of fluid in this bottle were as follows: water, 20 mm. Hg ; castor oil, 22 mm. Hg ; and pure glycerin, 28 mm. Hg. Further variations of pressure could be obtained by increasing or decreasing the heights of these fluid columns. It should be noted that the apparatus when used for irrigation should be placed at the same height as the cavity to be irrigated.

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Tonic water as a cause of cinchonism is discussed in a recent letter to the *Journal of the American Medical Association* (December 5, 1953, p. 1304). These drinks are popular on both sides of the Atlantic and many of them contain a small quantity of quinine, commonly half a grain to the pint (56 mg. to the litre). Clearly a normal person would have to consume an enormous quantity of tonic water to suffer ill effects from it, but one who has an idiosyncrasy to quinine might begin to experience tinnitus, deafness, and other symptoms after drinking much smaller amounts. The author of the letter reports a case of cinchonism in a man aged 43 due to long-continued drinking of tonic water.