nymphs, and still less in that of the 1st-instar nymphs. These observations would be in accordance with those of Dias. If, however, the Ft had been prolonged for 36-40 days, there would have been little possibility of excretion of faeces by the adults, since by that time 80% of the contents of the digestive tract would have been evacuated; on the other hand, the nymphs would have defaecated in greater percentage and with greater frequency, since their Rt is about 30-40 days.

(5) It is likely that the Rt observed in this study corresponds to the digestion time of the blood-meal, but we have no direct evidence for that.

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We should like to express our thanks to Dr E. Paulini, Chief of the Chemical Laboratory, National Institute for Rural Endemic Diseases, for his advice, constructive criticism and many helpful suggestions.

Adapter for Pressure Gauge of the Hudson X-pert Sprayer*

by OSCAR LARREA, *Sanitary Engineer, WHO Malaria Eradication Project, São Paulo, Brazil*

A cause of great concern in spraying operations is the loss of pressure gauges by early deterioration, owing to the corrosive action of the insecticide on their operating mechanism.

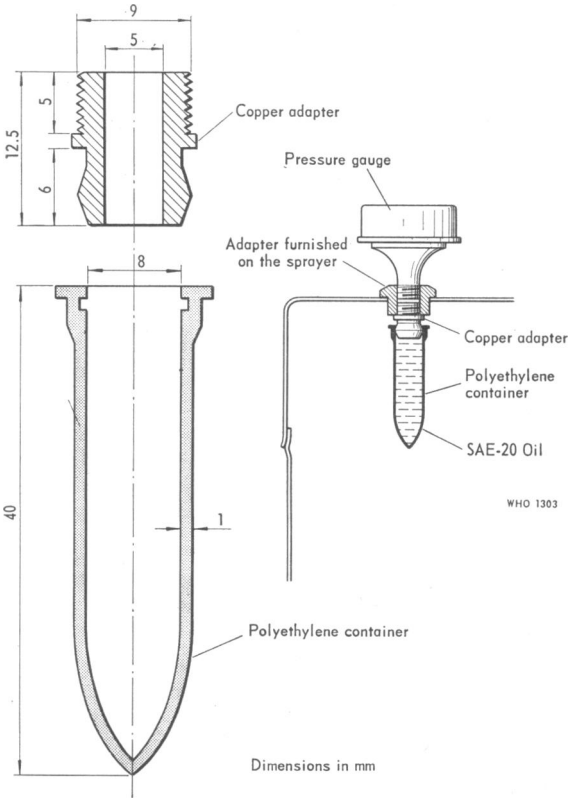
A WHO-assisted malaria eradication project in Brazil began its first cycle of coverage with 475 new Hudson X-pert sprayers equipped with pressure gauges. After 30 days of operation, 30% of the pressure gauges failed to function, and at the end of four months of work, 90% of them were no longer in use. This caused serious drawbacks, as summarized below:

(1) The sprayman loses the notion of minimum pressure and becomes accustomed to restore it often, usually working between limits higher than the established ones.

(2) The maximum pressure cannot be controlled. The sprayman gets into the habit of applying pressure to the sprayer until the pump action becomes stiff. Under such conditions, the maximum pressure is almost always over 55 p.s.i. (about 11 kg/cm²), and as much as 70-90 p.s.i. (12-13 kg/cm²) has been noted in practice.

(3) During the last two months, it was noticed that some sprayer tanks became deformed, and it was suspected that the lack of the pressure gauge contributed towards causing such defects, since the initial pressure was high.

ADAPTER FOR PRESSURE GAUGE OF HUDSON X-PERT SPRAYER



* This note will also be published, in Spanish, in the *Boletín de la Oficina Sanitaria Panamericana.*

In view of these difficulties, various experiments were made in order to prevent the insecticide from penetrating the pressure gauge. A simple idea immediately evolved was to utilize pressure transmitted through some elastic and undeformable medium that would not be affected by the solvents used in the DDT formulations.

In order to test the degree of reliability that the theory merited, since February 1960 a simple rubber adapter filled with common lubricating oil was put into use in the field, and it was found that there was practically no loss of pressure. Furthermore, it was observed that the pressure gauge operated under better conditions than was common, as its sensitivity had increased considerably. During almost five months of operations, the results have been excellent, as the pressure gauges thus protected have not become defective or corroded.

At the same time, various laboratory investigations were made to determine the best material to use. So far, I am convinced that the best material is a simple polyethylene container of the dimensions indicated in the accompanying figure. The physical characteristics (strength and elasticity) are the same as those of the polyethylene dropper bottles so widely used for medicine vials. This material has been tested in the laboratory for more than four months, with emulsions, solutions, and solvents of various kinds and concentrations, without having suffered any deterioration whatever.

The oil placed within the plastic container acts on the mechanism of the pressure gauge without causing damage and, in addition, prevents deformation of the walls of the container and provides for prompt restoration to size. So far, SAE-20 grade oil has given the best results.

Economic considerations

It was established that, in practice, the programme would not be in a position to replace more than one pressure gauge per sprayer, per cycle. The cost of each pressure gauge in São Paulo is 520 cruzeiros.[a] Thus the relevant expenditure would be as follows:

Cost of pressure gauge replacement per year

Number of sprayers	600
Number of pressure gauges per sprayer per year	2
Total number of pressure gauges	1 200
	Cruzeiros
Unit cost	520
Annual cost	624 000

Cost of adapters per year

Number of copper adapters (should last 4 years)	600
Number of polyethylene containers	1 200
	Cruzeiros
Unit cost of copper adapter	5
Unit cost of polyethylene container	5
Total cost of adapters	3 000
Total cost of polyethylene containers	6 000
Grand total	9 000

The polyethylene container can last for practically one year; however, for safety, one replacement per cycle is calculated.

From the above, it can be assumed that the programme will make an appreciable saving in the cost of the pressure gauges. In fact, this system was adopted for the second cycle, which was started on 1 September 1960.

The present study and its conclusions do not mean that the problem of pressure gauges has been solved. They merely show that it is possible to prolong the life of the gauges for perhaps three to four cycles.

[a] 200 cruzeiros = US$1.00.