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THE UNIVERSITY OF NEW SOUTH WALES

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by

R. T. Hattersley

APRIL, 1961

The University of New South Wales

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INTRODUCTION

The operation of siphon actuated swimming pool cleaning equipment was investigated at the request of Unisearch Ltd. on behalf of the Westfield Building Co.Pty.Ltd. The tests were undertaken to test the effectiveness of coagulating and settling reagents supplied by the Company and to conduct tests on the efficacy of the floc and sediment removal apparatus.

DESCRIPTION OF METHOD OF TREATMENT

The process for cleaning swimming pools which the Westfield Building Co. Pty.Ltd. proposes to put on the market is similar to that already used on the Continent. The process involves overnight treatment of the water with coagulants to remove suspended materials by precipitation in still water and the removal of the settled deposits by means of a suction nozzle of special design connected to an outlet siphon.

TEST ON COAGULATING AND SETTLING REAGENT

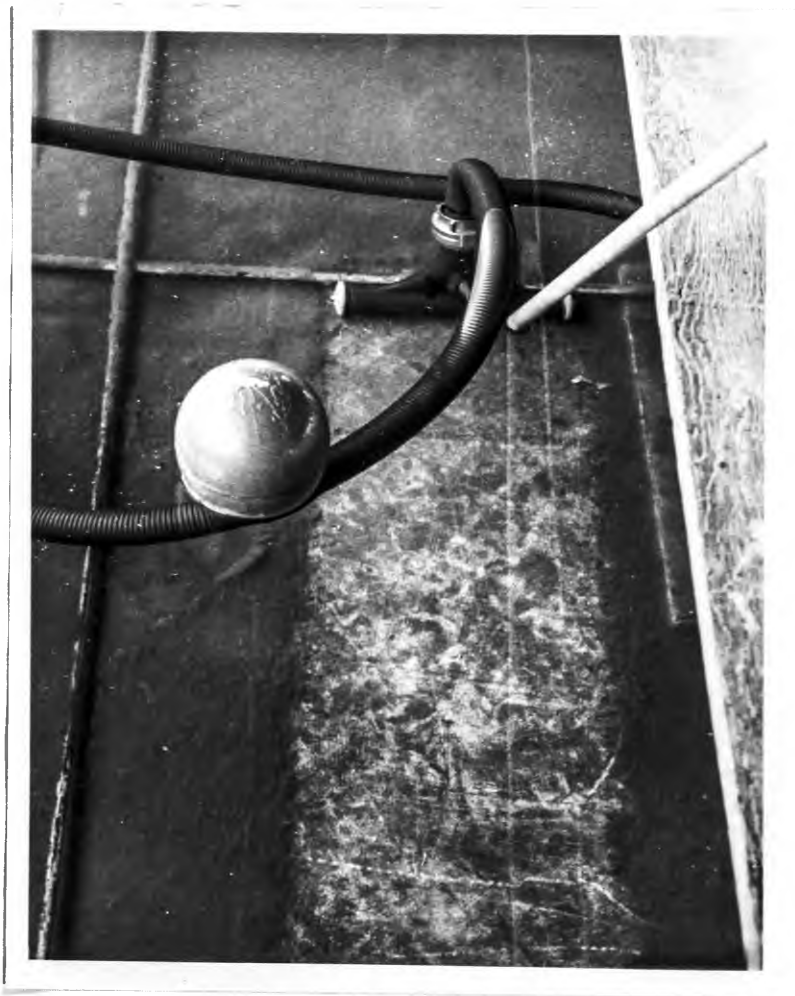
The test of the reagent was carried out on Sydney water as supplied to the northern suburbs of Sydney. This water varies in turbidity from time to time. The sample used in this case is estimated to have a turbidity equivalent to about 10 parts per million.

The reagent which comprised aluminium sulphate with a small addition of copper sulphate (stated to be 2 per cent by weight) was added at the rate of 1 lb. per 1000 gallons by means of a watering can after first preparing a concentrated solution. Satisfactory settlement was achieved overnight and turbidity was reduced to a negligible value. The floc settled out readily on the bottom of the test tank.

DESCRIPTION OF FLOC COLLECTING EQUIPMENT

The equipment supplied by the Westfield Building Co. comprised a siphon outlet chamber, strainer box with patent cover, flexible plastic hose lines fitted with floats and a special suction nozzle. The strainer hose and suction nozzle were fitted with special quick action connecting couplings. The siphon outlet comprised a 2-inch bore galvanised steel pipe. The effective head over the siphon in operation was 6'-0" at the commencement of the floc collecting operation and was drawn down slightly as the test proceeded.

The collecting equipment was set up and the siphon started. The photograph on page 2 illustrates the suction nozzle in operation. Observations were made to determine the optimum rate of traverse of the suction nozzle which was mounted on small wheels, one at each end. It was found that for steady movement up to 3 inches per second the floc



was effectively removed by the nozzle without disturbance of the floc deposit out of range of the nozzle. For movement in excess of 3 inches per second the settled floc tended to be disturbed by the movement of the suction head thus preventing 100 per cent collection of the floc.

The photograph on page 2 illustrates the floc removal achieved with the suction head moving at 3 inches per second. It will be noted that the water in the wake of the suction remained clear and the movement of the head has not resulted in disturbance of the remaining settled floc.

Measurements were made of the rate of draw down of the water level in the tank during the floc removal operations. The rate of draw-off under the siphon action was calculated at 1.08 gallons per second.

From this measurement and the optimum travel rate for the suction head, the sweeping rate was calculated as 4.3 gallons per square foot of pond bottom surface area. This rate corresponds to a total draw-down of pond surface level during the cleansing operation of 8 inches. This observed draw-down conforms to the recommendations of the manufacturer of the equipment. It also represents the replenishment necessary to restore the levels in the pool after the cleansing operation is complete.

SUMMARY AND COMMENT

A small amount of copper sulphate added as part of the clarifying reagent serves to control algae and similar growth and gives a pleasant bluish tint to the clarified water. The copper sulphate, however, tends to discolour galvanised fittings and pipes and it is therefore recommended that fittings should be preferably of copper where in contact continuously with the water. The normal replenishment of water required after the cleansing operation should ensure that chemical constituents added in the cleansing process do not accumulate to an undesirable extent in a pool of ordinary depth.

The tests indicate that the process as described is effective and simple for the removal of turbidity arising from such suspended material in the water as would normally be removed by filtration processes. No tests were conducted in respect to colouring matter from organic or inorganic sources and water containing such material may require separate treatment.