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ADDRESS OF THE PRESIDENT OF THE ROYAL SOCIETY[1]

By Sir HENRY DALE, O.M., G.B.E.

THE annual number of *Obituary Notices of Fellows of the Royal Society,* published to-day, and the names which have just been read to us remind us of the losses the society has suffered.

Allow me first to make brief mention of the last service rendered to the society by one who had long been devoted to its interests, and whose name is among those of the fellows whom death has taken from us during the past year. Sir Henry Lyons, who was our foreign secretary for a year, and then achieved so much for the society in his full term of service as treasurer, had acquired in that period a deep interest in the handling of the society's business and in the changes in its structure and its administration over the centuries of its history. He devoted the last four years of his life, under conditions which must have deterred any less resolute enthusiast, to the writing of a historical account of the administration of the Royal Society under its charters, and at the time of his death, last August, he was eagerly awaiting its publication, which war-time difficulties had long delayed. This long-expected contribution to our history was published a few weeks ago, and the society will welcome and cherish it, not only as a record of value and interest in itself, but in memory of one to whose devoted labors the society and its fellows owe so much.

A year ago I reported to the society that our biological secretary, Professor A. V. Hill, had left us on an important mission to India. The council of the society, at the invitation of the Indian Government, had nominated Professor Hill to visit India to see its problems for himself, so that he might offer his advice on scientific matters in general and, in particular, on the adoption for India of a new and progressive program of research and enterprise in science and its applications. From all sources—from the Viceroy and the Secretary of State with their official colleagues

[1] At the anniversary meeting, November 30, 1944.

A horizontal rod (C) is fastened to the front of the bath, and from this eight Erlenmeyer culture flasks are supported in the bath over the glass shelf by means of jaw clamps. Each flask is one-third filled with liquid medium containing the algal cells. The gas mixture of 5 per cent. CO_2 in air from a cylinder of compressed gas is bubbled through the vessels connected in series by glass bends and rubber tubing.

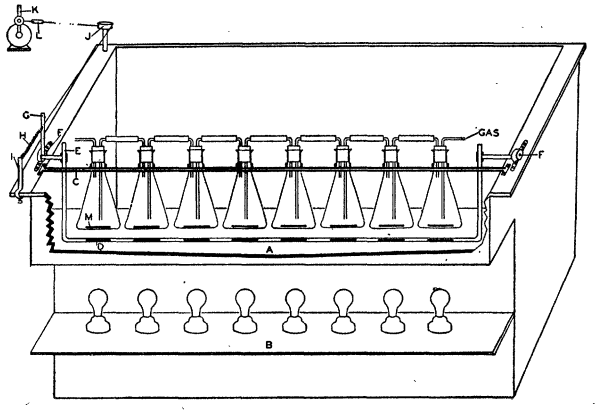

FIG. 1

Stirring of the cultures is effected by paired cylindrical Alnico magnets (4 mm × 45 mm). Eight driving magnets (D) are inserted into a glass tube (4.5 mm bore) with like poles facing, and the tube (E) is bent into a U to fit into the bath. The magnets will tend to distribute themselves equidistantly, but can be moved to desired positions by an externally applied magnet. The U-tube is supported in the bath by clamps attached to wobble bearings (F). Each bearing is made by bending a strap of brass to fit around a roller-skate wheel and then bolting the two together. The lateral extensions of the brass strap are then screwed or clamped to the sides of the bath. These bearings require no lubrication, are practically wear-proof and allow considerable tolerance in alignment of parts. Fastened between the left bearing and its clamp is an upright brass plate (G) (6″ × 1″) with a series of small holes drilled along both edges. A light spring (H) is hooked through a hole in the front edge and connected to a vertical clamp (I) at the corner of the bath. A loop of wire is passed through a hole at the other edge and joined by a braided cord and pulley (J) to an eccentric drive turned by an electric motor. The eccentric is made by attaching a brass bar to the shaft of a reducing gear connected with the motor, drilling a series of holes in the bar, and fastening a roller-skate wheel to it by a wing nut and bolt through one of the holes. The pulley cord is connected to the wheel by a wire loop, and a turnbuckle (L) is inserted to take up slack.

The stirring magnets are similar Alnico cylinders. Each is sealed in Pyrex tubing to render it non-reactive with the cultures. The tubing is thick-walled to withstand mechanical shock, and is thoroughly annealed to eliminate strain. One such stirrer (M) is inserted into each flask of medium prior to sterilization and inoculation. These stirring magnets automatically assume proper polar orientation with respect to the driving magnets.

In operation, the turning of the motor causes the U-tube with the driving magnets to swing as a pendulum under the flasks. The driving magnets in turn impel the stirring magnets to roll back and forth in the culture flasks, setting up mixing currents. An oscillation rate of about one swing per second has been found to keep even the heaviest cultures in indefinite suspension. The rate is most readily adjusted by a rheostat in series with the motor. The amplitude of the swing can be regulated by changing the position of the wheel on the motor eccentric and by adjusting the ratio of the length of the brass plate (G) (from attachment to bearing) in relation to the length of the vertical part of the U-tube (from bearing to bend).

This magnetic stirring arrangement has several advantages over the usual propeller or pump stirrers or shakers. Mechanically, it is simple to construct and operate. Continuous serial gas flow may be maintained through the vessels. Gas connections do not have to be wired to prevent their shaking loose. Single flasks may be removed for sampling without interrupting the agitation of the others. Since stirring is effected within a sealed system, the purity of cultures can be maintained. Actual use has shown that the stirring is gentle but effective and causes no evident damage to the cells. On the contrary, the improvement in the cultural conditions is such that more than double the yield is obtained in half the time. Though originally designed for algal-growth experiments, this magnetic stirrer may well find use in a wide range of biological and chemical procedures in which continuous gentle agitation is desired.

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BOOKS RECEIVED

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