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SCIENCE IN BRITAIN[1]

By Sir RICHARD GREGORY, Bt., F.R.S.

THE British Association for the Advancement of Science was founded in the year 1831. In the same year the world-renowned naturalist, Charles Darwin, left England in H.M.S. *Beagle* as a member of the famous expedition to the Pacific. Between 1831 and 1836 the expedition surveyed the South American coasts and adjacent islands, including the Galapagos Islands, and also the coasts of Australia and New Zealand. Darwin recorded that the voyage was the most important event in his life and it determined his whole career. The geological and other natural history notes made by him during the voyage, especially along South America, were the basis of most of his later works.

Exactly a century ago, Darwin prepared a short account of the facts observed by him which indicated relationships between different living things and suggested a common line of descent. Also, in the year 1842, was published his great work on "The Structure and Distribution of Coral Reefs," which gave the results of his own observations of coral atolls in the Pacific and Indian Oceans, and threw new light upon their structure. He suggested that cores should be obtained by borings of such reefs in order to discover how deep the coral rock extended below the limit of about thirty fathoms in which the coral organisms can live. The British Association was the first body to set

[1] From the report of the British Association for the Advancement of Science. This is the English text of a broadcast recently prepared by the president of the association for a series of talks on British science given in South American programs of the British Broadcasting Corporation in Spanish and Portuguese. It outlines the peacetime activities of the association, some of which are necessarily in abeyance now; it will therefore interest especially those who have come into contact with the association only during the war period.

easily be dismounted and cleaned and even sterilized if necessary, permitting the use of several solutions in the same burette. The micrometer burette can be conveniently calibrated by titrating a dilute base with

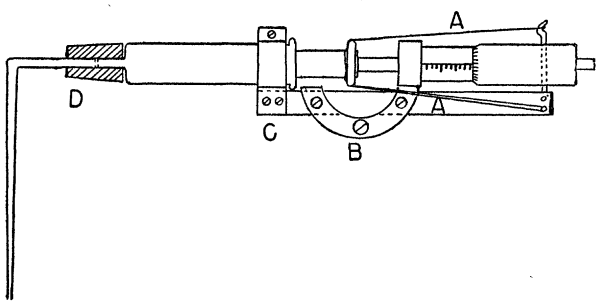

FIG. 1. A, Rubber bands; B, head of screw into boss of burette clamp; C, clamp around syringe barrel; D, rubber stopper.

constant boiling HCl. We have used cheap micrometers[3] and found linear calibrations to one part in 1,000 independent of the speed of delivery. The rest of our procedures did not warrant greater accuracy, but since some micrometers are accurate to 1 part in 10,000 and at least equal accuracy can be obtained with a Krogh syringe pipette,[4] the combination could doubtless be used with a corresponding accuracy.

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A STABLE HYDROGEN PEROXIDE AEROSOL

THE work of Twort and co-workers,[1] of others[2] as well as the recent work of Robertson[3] and his co-workers on the effect of propylene glycol aerosols on the decontamination of virus-infected air has led us to investigate the production and stability of hydrogen peroxide aerosols. Applying principles previously described[4] and using commercial nebulizers, hydrogen peroxide aerosols have readily been formed.

As described previously, the droplet vapor pressure was controlled by 50 per cent. glycerol. A solution of 0.1 per cent. hydrogen peroxide containing a stabilizing agent was nebulized at low pressure for forty-five minutes. During this time the weight decrease of the original solution was about 50 per cent. The hydrogen peroxide titre of the residual solution after nebulization was more than 0.1 per cent. (the original value) in spite of the fact that the solution was filled with bubbles resulting from the aeration. This increase in peroxide content following nebulization will be subsequently explained.

A stronger solution (3 per cent.) of hydrogen peroxide was vigorously nebulized in a closed room, $10 \times 10 \times 15$ feet, for forty-five minutes. The room was continuously filled with a fog produced by our technic of nebulization. Both normal and allergic individuals did not feel any discomfort or irritation while remaining in the room for as long as five minutes. Samples of the air were positive for peroxide. During the forty-five-minute period of nebulization, the volume of the solution decreased one half, but the peroxide content *increased* about 25 per cent. This increase in peroxide content was probably due to evaporation of water. In any event, it was surprising to find that the concentration of peroxide increased after nebulization. This makes the nebulization procedure practical. It is of interest that one may repeatedly breathe in dense mists of this concentration of peroxide without any irritation.

By inverting a two-liter bottle and forming a mist inside, the stability of a sample of a mist in this vessel was followed as well as the stability of the hydrogen peroxide droplets themselves. Potassium iodide starch papers were thrust quickly under the bottle at various intervals and the change in color followed. In this simple fashion it was found that hydrogen peroxide mists formed by nebulization show excellent peroxide activity (gaseous or droplet) for at least as long as one and one-half hours after the mist has been formed.

An investigation of additional biological and chemical properties of these stable hydrogen peroxide aerosols is in progress.

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[3] These can be obtained, for example, at Sears Roebuck and Company, or radio supply houses for about one dollar.

[4] A. Krogh. *Ind. and Eng. Chem. Anal. Ed.*, 7: 130, 1935.

[1] D. C. Twort, A. H. Baker, S. R. Finn and E. O. Powell, *Jour. Hyg. Camb.*, 40: 253, 1940.

[2] An excellent review of the literature: A. H. Baker, *Chem. Prod.*, January, 1941, p. 25.

[3] O. H. Robertson, C. G. Loosli, T. T. Puck, E. Bigg and B. F. Miller, SCIENCE, 94: 612, 1942.

[4] H. A. Abramson, *Arch. Phys. Ther.*, 21: 612, 1940.

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