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OUR communication on the growth of the tritium content of free hydrogen in the atmosphere was written before the publication by Begemann and Friedman[1] of detailed measurements for the period 1954–56. These showed considerable seasonal variation, but no pronounced increase during the two years following the Castle test series. Their earliest determination in January 1954 before the Castle test series was $9{\cdot}18 \times 10^4$ tritium units compared with $1{\cdot}66 \pm 0{\cdot}097 \times 10^4$ tritium units found by Grosse *et al.*[2] in the spring of 1952. This obvious increase was concluded by Begemann and Friedman to be due to the Ivy test series of November 1952. Evidence for an earlier increase based on the value $0{\cdot}38 \pm 0{\cdot}125 \times 10^4$ tritium units obtained by Faltings and Harteck[3] in 1948–49 now appears to be refuted by the value of $3{\cdot}5 \times 10^4$ tritium units reported by Bainbridge, Suess and Friedman. It may be noted, however, that this value is more than twice that observed by Grosse in 1952. With three sets of observations indicating a substantial increase prior to the Castle tests, it is difficult to support the conclusion of Bainbridge *et al.* that such an increase is "unlikely".

Our measurements[4] of the tritium content of atmospheric methane collected at Wembley by the British Oxygen Company gave values ranging from $1{\cdot}59 \times 10^4$ to $3{\cdot}36 \times 10^4$ tritium units during the period October 1958 to February 1959, the average value being $2{\cdot}19 \times 10^4$ tritium units. One sample collected on December 7, 1959, had a value of $2{\cdot}85 \times 10^4$ tritium units and another collected on February 8, 1960, a value of $1{\cdot}59 \times 10^4$ tritium units. It is true that the present reported value ($1{\cdot}94 \times 10^4$ tritium units) falls within the range of values obtained by us, but to state that it "is exactly the same" as the average of our samples collected in the northern hemisphere during 1958 and 1959 may give the incorrect impression that short-term fluctuations are very small.

Furthermore, in addition to the considerable short-term fluctuations observed at Wembley, we found that the levels in the northern hemisphere stratosphere and in the southern hemisphere generally were all about $0{\cdot}8 \times 10^4$ tritium units, considerably lower than those at Wembley. The level in the southern hemisphere troposphere has also shown a continuous rise during 1953–58 when our measurements ceased.

It is clear, therefore, that though the future measurements proposed by Bainbridge *et al.* will give some useful information, a more comprehensive sampling programme would be necessary to unravel the origin and distribution of tritiated methane in the atmosphere.

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ENGINEERING

A Novel Electrostatic Machine: the Corona Motor

WE would like to direct the attention of readers to a new type of electrostatic motor which may find use in some specialized application. The operation of the motor demonstrates one of the fundamental properties of electrostatic fields, namely, motion of charge under the influence of a voltage gradient.

The motor is shown in Fig. 1 and consists of a disk, made from an insulating material, which is mounted on a spindle, and three pairs of electrodes mounted circumferentially around the disk. The electrodes are alternately connected to the positive and negative terminals of a source of high-voltage direct current. The diameter of the disk is 1·5 in., and a supply of 8–13 kV. is sufficient to operate the motor. The disk rotates either clockwise or anti-clockwise, depending on the direction in which it was started. When running freely in air with the axis turning in jewel bearings, speeds of up to 12,000 r.p.m. are attained.

During running of the motor a corona discharge takes place along the circumference of the disk and extends from each positive electrode towards the next negative electrode against the direction of rotation. The glow discharge increases in intensity and extent with increase in voltage until at a critical voltage flashover occurs between the electrodes.

We surmise that the operation of the motor can be explained as follows (Fig. 2): Consider that the voltage

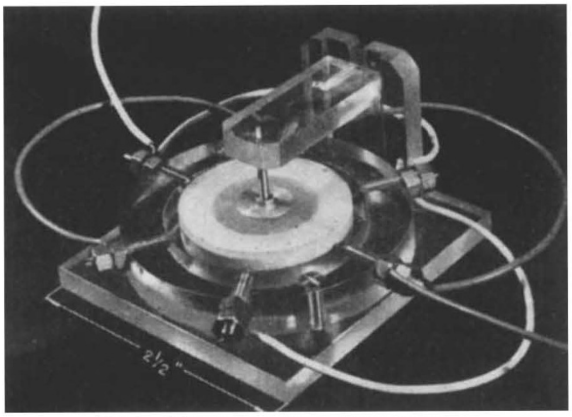

Fig. 1. Photograph of a six-electrode motor