

2 ml. of aqueous methylene blue solution (1%) with 100 ml. of 0.04% solution of methyl red in 50% alcohol. The change at the end point is from pink through grey to green and is quite sharp. A blank is also carried out with the reagents used.

3. *The Proposed Method*.—100 mg. of the sample is accurately weighed and dissolved in 5 ml. of pure nitrogen-free sulphuric acid. The solution is neutralised by slow addition through a dropping funnel to a mixture of 30 ml. of 1:1 caustic soda solution and 100 ml. of ammonia-free distilled-water in the distillation flask which is connected to the ammonia distillation train. The funnel is then washed down with two or three 2 ml. portions of pure sulphuric acid, two 50 ml. portions of ammonia-free distilled-water and 5 ml. of ANALAR ethyl

alcohol. The solution in the flask is pale yellow or practically colourless. De Varda's alloy (1.5 g., 60 mesh) is introduced into the distillation flask through a side tube which is immediately stoppered. The evolution of hydrogen is complete in about half-an-hour. The solution is then raised to boil and the distillation continued for half-an-hour. All the ammonia distils over within this time. The ammonia that distils over is estimated as described previously. A blank is also carried out with the reagents used.

The results are given in Table I. From the results it can be seen that the proposed method gives values in close agreement with those obtained by the Lunge's method. It is also evident that the modified De Varda's or the alkaline peroxide digestion method gives consistently lower values.

TABLE I

*Estimation of nitrogen in cellulose nitrate. The numbers given are the percentage of N, found as an average of three measurements in each case*

Sample number	Lunge's method	Modified De Varda's method	Proposed method
1	8.71	8.23	8.76
2	10.5	9.85	10.46
3	11.23	10.16	11.2
4	12.46	11.56	12.43
5	12.86	12.43	12.93

1. *The Methods of Cellulose Chemistry*, C. Dorée, 1947 edn., Chapman and Hall, p. 244.
2. —, *Ibid*, pp. 247-48.
3. G. F. Davidson, *J. Text Inst.*, 1938, 29, 198T.
4. W. O. Kenyon and Co-workers, *J. Amer. Chem. Soc.*, 1947, 69, 342.
5. W. O. Kenyon and H. LeB. Gray *Ibid.*, 1936, 58, 1422.
6. W. Will, *Ber.*, 1891, 24, 400.
7. C. Hausserman, *Chem Ztg.*, 1905, 29, 421.
8. A. Bechamp, *Compte Rendus* 1855, 41, 817.
9. I. Sakurada, *Cellulosechem.* 1934, 15, 18; see also *Cellulose Chemistry*, E. Heuser, 1944 edn., p. 184, John Wiley.
10. A. C. Andersen and B. N. Jensen, *Z. Anal. Chem.*, 1931, 83, 114.

## ATOMIC WASTE PRODUCTS

THE probable increase in the number of atomic power plants within the next few years poses a serious problem to the industry. That is the disposal of the radioactive materials which are produced in the reactors.

One proposed method is to enclose it in large concrete blocks and drop it into the ooze at the bottom of the deepest part of the ocean. By the time the concrete is worn away, thousands of years would elapse and the radioactivity would have decreased to almost zero. But some experts feel that there may be strong currents in the sea at great depths, so the concrete would be worn away more rapidly and the radioactivity would be released; it would thus find its way into plants and fish and become dangerous as human food. On the other hand, even if this happened, the radioactivity would concentrate only in the bones and scales of the fish, which are not used as food.

Another suggested method of disposal is to bury these materials under heavy concrete in deep abandoned mines or even in deep natural caves. This would be safe enough except that explorers and archaeologists centuries into the future might unsuspectingly encounter their rays. The strangest suggestion was made by an American professor who proposed that these materials should be loaded into a space rocket and sent permanently far from the earth, cruising through the remote regions of the universe like a lost star!

It was agreed at the United Nations Conference on the Peaceful Uses of Atomic Energy in Geneva that the problem must be solved, and that meanwhile scientists and governments should make certain, probably by international action, that proper precautions are always taken for the disposal of radioactive waste.