fermentations) the penicillin yield is a function of the corn steep liquor level used.

Addendum: It is regretted that publication delay has caused this preliminary report to lose some of its significance during the interval since the manuscript was submitted on 30 July 1945. Since that time a number of papers describing work in which Culture X-1612 was used have appeared in this journal and elsewhere, from this and from other laboratories.

The Evolution of Oxygen From Illuminated Suspensions of Frozen, Dried, and Homogenized Chloroplasts

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The evolution of oxygen from suspensions of chloroplasts in solutions containing ferric oxalate and potassium ferricyanide was discovered by Hill and Scarisbrick (*5*). The possible relation of this photochemical and enzymatic reaction to the process of oxygen evolution by green-leaf photosynthesis and further details of the reaction have been discussed by various authors (*1, 2, 3, 4, 6, 7, 8*). It is the purpose of this note to summarize some data on the activity of chloroplast preparations that have been treated in various ways.

The significance of this work lies in the fact that chloroplast preparations are shown to be amenable to some treatments, such as would be necessary for the separation of their active components. By the use of similar preparations it may be possible to study some of the enzymes involved in a reaction which is initiated by light absorbed by chlorophyll and which results in oxygen evolution.

The participation of an enzyme system in the reaction appears to be indicated from the thermolability of the preparation and also from the inhibition by low concentrations of enzyme poisons such as NH_2OH, Duponol, NaF, and NaN_3. The Hill reaction is considerably less sensitive to NaN_3 than is the catalytic decomposition of H_2O_2 by chloroplasts.

Concomitant with the oxygen evolution there is also a production of H^+ which affords a simple means of measuring the reaction velocity. We have used a constant pH titration procedure for many of the activity measurements. In order to obtain quantitative results it is necessary to use a red filter to prevent the effects of light on the reagents themselves at high light intensity. The pH optimum was found to be at pH 7.0 or 7.5, depending on the conditions of measurement. Higher rates and a greater total evolution of oxygen were found if nitrogen was used instead of air in the manometer vessels. Temperatures of about 10° are most suitable for the measurement of this reaction, since the activity is rapidly lost at room temperature. Chloroplasts suspended in solutions of potassium ferricyanide alone were found to produce oxygen when illuminated, but at a lower rate than when ferric oxalate was also present. Supersonic irradiation breaks up the chloroplasts to give solutions which, when centrifuged for ¾ hour at *ca.* 20,000g, are green and appear clear but show the Tyndall scattering effect in an intense beam of light. The effects of various treatments on the activity of preparations of chloroplasts in ferric oxalate solution with ferricyanide are shown in Table 1.

TABLE 1

THE INFLUENCE OF VARIOUS TREATMENTS ON THE PHOTOCHEMICAL O_2 EVOLUTION BY CHLOROPLASTS IN A SOLUTION CONTAINING FERRIC OXALATE AND POTASSIUM FERRICYANIDE

Original material	Treatment	Per cent of original activity retained after treatment
Suspension of intact chloroplasts in 0.5 M sucrose	Frozen 15 hr.	72
"	Disintegrated in blender	54
Suspension of intact chloroplasts washed with water	Lyophilized	69, 31
"	Dried with molten $Na_2SO_4 \cdot 10\ H_2O$	78, 69
Suspension of intact chloroplasts in 0.5 M sucrose	Supersonic 1 min.	118
"	Supersonic 1 min. followed by ½ hr. centrifugation at 800g. Supernatant used after 15 hr. at 0°	81
Suspension of chloroplasts in water	Supersonic 1 min., centrifuged at 20,000g for ½ hr. Supernatant green solution used.	134
"	Sediment from the above centrifugation.	0
Fragments of leaves after 5 min. in blender strained, collected by centrifugation for ½ hr. at *ca.* 20,000g	Washed by suspension in water, recentrifuged, precipitate used.	57
	Above plus boiled water extract of leaves.	100
	Precipitated with ½ saturation $(NH_4)_2SO_4$	94, 85, 54, 55, 67

From these data it is seen that freezing, drying, thorough disintegration of the chloroplasts, or precipitation by ammonium sulfate results in preparations that still retain considerable activity. In conclusion, we may say that these experiments show that the ability to produce oxygen is a property not only of intact chloroplasts but also of material which has been exposed to some of the conditions that would be necessary in attempts to fractionate the enzymes involved in the reaction by which oxygen is produced.

Addendum: The papers of Warburg and Lüttgens (*9*), announcing the discovery of a similar reaction of chloroplasts which form oxygen and hydroquinone with an energy uptake of 52,000 calories, supplied by light, have recently become available to us. The quinone reaction appears even more promising than the one here described as a means of investigating the mechanism of photosynthetic oxygen evolution in green plants.

References

1. FRENCH, C. S., and ANSON, M. L. *Amer. J. Bot.*, 1944, **31**, 9s. (Abstract.)
2. FRENCH, C. S., NEWCOMB, E., and ANSON, M. L. *Amer. J. Bot.*, 1942, **29**, 8s. (Abstract.)
3. FRENCH, C. S., and RABIDEAU, G. S. *J. gen. Physiol.*, 1945, **28**, 329.
4. HILL, R. *Nature, Lond.*, 1937, **139**, 881; *Proc. roy. Soc.*, 1939, **127B**, 192.
5. HILL, R., and SCARISBRICK, R. *Nature, Lond.*, 1940, **146**, 31.
6. HILL, R., and SCARISBRICK, R. *Proc. roy. Soc.*, 1940, **129B**, 238.
7. JOHNSTON, E. S., and MYERS, J. *Annu. Rev. Biochem.*, 1943, **12**, 473.
8. KUMM, J., and FRENCH, C. S. *Amer. J. Bot.*, 1945, **32**, 291
9. WARBURG, O., and LÜTTGENS, W. *Naturwiss.*, 1944, **32**, 161, 301.

Association Affairs

The One Hundred Twelfth Meeting of the American Association for the Advancement of Science

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THE ONE HUNDRED TWELFTH MEETING of the American Association for the Advancement of Science was held in St. Louis, Missouri, 27–31 March 1946, inclusive. At this meeting, the fifth held in St. Louis, a completely revised constitution of the Association was formally adopted by the Council. The preceding constitution of the Association was adopted at the third St. Louis meeting, held in December of 1919.

Never before has the Association held an annual meeting under such trying conditions. The prohibition on the holding of meetings by the Office of Defense Transportation was removed so late in the year that only three months were available for preparations for the St. Louis meeting. An obvious suggestion would be that it should have been held later or in some other city. The answers to this suggestion are that there was no other city which would undertake to provide even limited accommodations for such a large meeting and that there were no other four consecutive days in which some other convention had not been scheduled for St. Louis. Since only one meeting of the Association had been held in the preceding four years, and since the next available time for a meeting would be a year later (in December 1946), it was decided to proceed with plans in spite of difficulties.

The St. Louis meeting was not a simple convention but a joint meeting of 41 independent societies and 13 sections of the Association. All meeting arrangements for these 54 organizations, including rooms and facilities for 229 sessions, were made by the staff of the Association. In order to provide accommodations for them it was necessary to have 58 different meeting rooms, many of which had to be equipped with projection apparatus. At times as many as 40 sessions were held simultaneously, necessitating the use of practically all suitable meeting rooms throughout the city. The most difficult problem, however, was that of providing living accommodations for those attending the meeting. The St. Louis Convention and Publicity Bureau gave the Association unfailing cooperation and assistance in obtaining rooms in all possible places, including hotels, local educational institutions, and private homes. Written appeals for assistance were sent by the Association to its 300 members in St. Louis, and they generously extended it up to the limits of their capacities to accept temporary guests in their homes. Despite these efforts it was