



Fig. 5. Effect of light on the slow oxidation of methane; oxygen varying

With heavier hydrocarbons the characteristics of degenerate branching are similarly observed, and we believe that the heavier aldehydes which are first produced are similarly responsible for the delayed branching reaction. On this basis it is possible to build a self-consistent mechanism of a pattern resembling the simpler reactions treated here⁶. It is significant that light readily accelerates the oxidation of butane, and the shapes of the curves in the dark and in the light suggest different end points; it is probable that the phenomenon will be found to be general for hydrocarbons.

This photochemical effect provides a new experimental approach to the study of the reaction kinetics of combustion, and cannot fail to be revealing.

¹ Semenov, *Z. phys. Chem.*, **11B**, 464 (1930); *Phys. Z. d. Sowjetunion*, **1**, 546 (1932); "Chemical Kinetics and Chain Reactions", 68 (Oxford, 1935).

² Bone, Haffner and Rance, *Proc. Roy. Soc., A*, **143**, 16 (1933).

³ Harding and Norrish, *Nature*, **163**, 797 (1949).

⁴ Norrish and Foord, *Proc. Roy. Soc., A*, **157**, 503 (1936).

⁵ Axford and Norrish, *Proc. Roy. Soc., A*, **192**, 518 (1948).

⁶ Norrish, communication to the Centre National de la Recherche Scientifique, Paris, 1948 (in course of publication).

⁷ Herzberg and Franz, *Z. Phys.*, **76**, 720 (1932). Gradstein, *Z. phys. Chem.*, **B**, **22**, 384 (1933).

OPTICAL PROPERTIES OF SOLID THIN FILMS

A MOST successful international colloquium on the optical properties of solid thin films was held at Marseille during the week April 19-23 under the auspices of the Centre National de la Recherche Scientifique. Some forty-four physicists attended by invitation, and, of these, twenty-five contributed papers. There was, of course, a strong contingent from France, including, among others, P. Jacquinot, M. Perrot and P. Rouard. From Great Britain contributions were read by K. M. Greenland, O. S. Heavens, H. Kuhn and S. Tolansky. The United States were represented by B. H. Billings, N. W. Scott, J. Strong and A. F. Turner, the Netherlands by P. van Alphen and B. Blaisse, Italy by M. Ballerini, Switzerland by M. Schaetti and Czechoslovakia by A. Vasicek.

The conference was well organised by Prof. P. Rouard, director of the physical laboratory in the University of Marseille, and was characterized by smooth, efficient working and excellent programme

planning. This meeting was held in a provincial university as part of deliberate policy of the Centre National de la Recherche Scientifique, which is arranging a series of international conferences in French provincial university centres. The choice of Marseille for this particular subject of optical properties of thin films was a happy one indeed; for it was there, at the beginning of this century, that Fabry laid the foundation of the very subject under discussion, and it was there, too, under his inspiration that the branch of classical optics associated with the names of Fabry, Buisson, Macé de Lepinay and others was created. Indeed, the visitors all derived considerable pleasure from an exhibition of the original apparatus used by these masters of experimental optics, and were much moved, too, by listening to a recording of the voice of Fabry.

Although a considerable number of papers were read (many contributors read several: for example, the writer contributed five), these all crystallized into four fairly distinct groups: (a) determination of optical properties and thickness of thin metal or dielectric films; (b) the principles and applications of multiple-beam interferometry; (c) preparation of interferometric wave-length filters and discussion of their characteristics; (d) improving the optical properties of surfaces by deposition of multiple films with alternate low and high refractive indices.

The conference opened with a session of theoretical papers on the properties of single and multiple thin films, and then plunged into its main work, which consisted of formal papers on experimental aspects connected with the properties and optics of thin films. Occasionally the conference assumed the character of informal discussions on experimental techniques, yet all were agreed that these informal exchanges constituted one of the most valuable features of the whole conference. For it is a fact that success with experimental interferometry, or with those other branches of applied optics which involve surface deposition of films, depends largely upon minor details of personal techniques which are not easily publishable, and are, indeed, often even difficult to describe. For example, a most lively discussion ensued simply on the question of the best method of cleaning a glass surface which is to accept a film by deposition by vacuum evaporation. There were perhaps ten speakers, with the inevitable result that perhaps ten distinctly different techniques were described; but all had one thing in common, namely, final cleaning by ions with a gas discharge. It appears that any reasonable method of cleaning is satisfactory provided the glow discharge is the final cleansing agent.

Many striking and novel optical results were described, and it is anticipated that all the papers contributed will be published together in some form. Such a collection will make a notable contribution to a subject rapidly becoming of considerable importance to technical optics, particularly those fields concerned with either reduction or enhancement of reflectivities of surfaces. The conference was an unqualified scientific success and equally successful socially, thanks largely to Prof. Rouard. The visitors will long remember the magnificent hospitality of their French colleagues. A visit was paid to the astronomical observatory at St. Michel, the visit being of mutual benefit to visitors and residents, for the astronomers there were glad to welcome so much expert opinion on the problems associated with the coating of the mirrors of their reflector telescopes.

On the break-up of the conference everyone felt that he was carrying away many new techniques, little tricks of the trade and valuable 'know-hows', for there was a very frank exchange of knowledge, even from those who represented large commercial organisations, and who might have been forgiven for hesitating to release trade secrets. There were, in fact, no such hesitations, either from the commercial or government representatives who attended, and, indeed, the liaison between the industrial and academic research workers was all that could be desired.

S. TOLANSKY

13/6

PHYSICAL SOCIETY

ANNUAL MEETING

AT the annual general meeting of the Physical Society, held at the Royal Institution on May 6, the reports of the Council and Treasurer and the accounts and balance sheet for 1948 were presented and adopted, and the officers and Council for 1949-50 were elected as follows: *President*, Prof. S. Chapman; *Re-Presidents* who have filled the office of president, Prof. C. H. Lees, Sir Frank Smith, Sir Owen Richardson, Dr. W. H. Eccles, Prof. A. O. Rankine, Mr. T. Smith, Dr. Allan Ferguson, Sir Charles Darwin, Prof. E. N. da C. Andrade, Prof. D. Brunt, Prof. G. I. Finch; *Vice-Presidents*, Dr. W. D. Wright, Dr. W. Jevons, Mr. C. H. Collie, Prof. R. Peierls; *Honorary Secretaries*, Mr. C. G. Wynne, Dr. H. H. Hopkins; *Honorary Foreign Secretary*, Prof. E. N. da C. Andrade; *Honorary Treasurer*, Dr. H. Shaw; *Honorary Librarian*, Dr. R. W. B. Pearse; *Members of Council*, Dr. D. Roaf, Dr. A. C. G. Menzies, Dr. F. C. Toy, Mr. J. H. Awbery, Prof. L. F. Bates, Dr. R. C. Evans, Prof. L. C. Martin, Dr. C. E. Wynn-Williams, Dr. A. G. Quarrell, Dr. A. B. Wood, Prof. Willis Jackson, Prof. H. S. W. Massey.

The officers for 1949-50 of the four Groups of the Society are as follows: *Colour Group*: Chairman, Dr. W. S. Stiles; *Honorary Secretary*, Mr. R. G. Horner. *Optical Group*: Chairman, Prof. L. C. Martin; *Honorary Secretary*, Mr. G. S. Speak. *Low Temperature Group*: Chairman, Prof. F. E. Simon; *Honorary Secretary*, Dr. G. G. Haselden. *Acoustics Group*: Chairman, Mr. H. L. Kirke; *Honorary Secretaries*, Mr. W. H. Allen and Mr. A. T. Pickles.

During 1948, which the Council report states was a satisfactory year for the Society, there was a net increase in the membership of some six per cent, making the total at the end of the year only a few short of two thousand. Despite the increase in the fellows' annual subscription from two to three guineas, there were very few resignations and lapses. The financial position, though somewhat improved, still gives cause for anxiety.

In addition to the ordinary science meetings, a two-day summer meeting devoted to microwave spectroscopy was held at the Clarendon Laboratory, Oxford, and a full-day meeting at the Research Department of Metropolitan-Vickers Electrical Co., Ltd., Manchester, on surface structure and electrical properties of semiconductors. Prof. E. O. Lawrence was elected an honorary fellow in May, and Prof. R. W. Wood, one of the honorary fellows of the Society, lectured at one of the science meetings on the spontaneous deformation of crystals. The thirty-second Guthrie Lecture was delivered by Sir George

Thomson, who spoke on the growth of crystals, and Profs. S. Tolansky and Y. Rocard were the recipients of the fourth (1948) Charles Vernon Boys Prize, and the third (1948) Holweck Prize of the Physical Society and Holweck Medal of the Société Française de Physique, respectively.

The thirty-second exhibition of scientific instruments and apparatus, held in April, had an attendance of about 9,400 visitors, and was again a great success. The four subject-Groups of the Society, the Colour, Optical, Low Temperature, and Acoustics Groups, have all been active during the year, and brief details of their composition and meetings are listed in the annual report.

In addition to the *Proceedings*, the publications of the Society during the year included: vol. 11 (1946-47) of *Reports on Progress in Physics*; and special reports such as the "Report on Colour Terminology", the "Strength of Solids", a report of the 1947 Bristol Conference, and "Emission Spectra of the Night Sky and Auroræ". In order to cope with the increased number of papers suitable for publication in the *Proceedings*, and to expedite publication, it was decided that from January 1949 the *Proceedings* should appear monthly in two sections, section *A* covering atomic and sub-atomic physics, including such subjects as crystal structure, quantum mechanics and spectra, and section *B* macroscopic physics, including such subjects as acoustics, optical design and radio. A new feature, introduced in 1948 and now appearing regularly in the *Proceedings*, is "Letters to the Editor", a section similar to that of the same name appearing in *Nature*.

It is to be hoped that the sales of the special reports will improve, so that the decision of the Council to curtail the production of these reports will be rescinded.

S. WEINTROUB

9/6

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REPORT FOR 1947-48

THE report of the Secretary of the Smithsonian Institution for the year ended June 30, 1948*, again emphasizes the handicap placed on the work of the Institution by shortage of staff and of adequate buildings. Additions to the collections of the National Museum during the year numbered 507,000, and field parties from the Museum visited Arnhem Land in Australia, the antarctic continent, the Bikini area in the Pacific, the Persian Gulf, Colombia, Panama, and other parts of the world. The Department of Biology has been divided into those of Zoology and Botany, and the Division of Aeronautics has become the nucleus of the National Air Museum.

The director of the Bureau of American Ethnology conducted archaeological excavations in western Panama in co-operation with the National Geographic Society, discovering a new, very early culture, while the associate director of the Bureau was occupied mainly with the river basin surveys. Surveys made in eighteen States and thirty-eight reservoir areas have led to 250 sites being recommended for excavation to recover archaeological material which might be lost through the construction of dams and river valley reservoirs. An autonomous unit of the

* Report of the Secretary of the Smithsonian Institution and Financial Report of the Executive Committee of the Board of Regents for the Year ended June 30, 1948. (Publication 3952.) Pp. ix+158. (Washington, D.C.: Government Printing Office, 1948.) 55 cents.

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