piled by Miss Lockyer and Lady Lockyer with remarkable completeness. Then follow chapters by various writers appreciative of the several sections of his scientific and special work. From the general biography, we learn everything material in his career —in fact, it is possible to trace almost his daily occupation. Although most explicit, in a measure, the account is rather lacking in feeling—it is the work of a writer who has not known his subject sufficiently closely and at the early critical period of his activity to paint a really intimate picture. It is, in fact, as are so many portraits—technically good yet not quite the man himself. At times, the story is a little exaggerated, if not misleading, at least to one who, like myself, lived through the period under notice and was a close follower of all that happened, even sometimes behind the scenes. Probably Lockyer is best summed up in some of the doggerel current in early days: such as—

There was a young astronomer called Lockyer,
Who each year grew cockier and cockier,
Till he thought he was owner of the solar corona,
Did this young astronomer Lockyer;

or the following amusing item in a program of an entertainment on shipboard on one of the eclipse expeditions to India: "Mr. Lockyer will play upon his own trumpet: Wait until the clouds roll by!"

In early days, Lockyer was irrepressible, overflowing with energy and enthusiasm, at times displaying an overmastering tendency to fill the picture, often making the rashest assertions. The unco' guid dryasdusts were a little shocked by such conduct. Fortunately he had a large circle of friends able to discount his little foibles, who gave him their support. The element of a strong personal vanity was undoubtedly there, you saw it in him, yet behind all such display there was clearly nothing but generosity and the desire to make others share with him the intensity of his belief in the value of scientific purpose. He had no academic training; to his great advantage, I think, he was self-taught and unhampered by professional prejudice.

REPORTS

THE CENSUS OF 1930

PLANS are being made for the 1930 census of population to be taken next April. A conference was held recently at the Department of Commerce by Secretary Lamont, census officials and members of the advisory committee appointed to consider the range of inquiries to be included in the questionnaires.

Dr. Louis I. Dublin, statistician of the Metropolitan Life Insurance Company of New York, was named chairman. The New Yorkers and others present at the conference were:

A. W. Page, vice-president American Telephone and Telegraph Company, for President Walter S. Gifford.

N. W. Barnes, International Advertising Association, 420 Lexington Avenue.

Dr. Robert E. Chaddock, Columbia University.

Edgar Sydenstricker, Milbank Memorial Fund, 49 Wall Street.

Dr. C. Luther Fry, Institute of Social and Religious Research, 230 Park Avenue.

Dr. Thomas Jesse Jones, educational director of Phelps Stokes Fund, 101 Park Avenue.

William Carpenter, National Electric Light Association, 420 Lexington Avenue, for Preston S. Arkwright, president.

Dr. Warren S. Thompson, director of the Scripps Foundation for Research in Population Problems, Miami University, Oxford, Ohio.

Fred Bremier, Curtis Publishing Company, for C. C. Parlin.

W. W. Husband, Assistant Secretary of Labor.

Dr. E. Dana Durand, of the Bureau of Foreign and Domestic Commerce.

J. Chester Bowen, Bureau of Labor Statistics.

L. W. Wallace, American Federated Engineering Societies.

William Green, president of the American Federation of Labor.

William M. Stuart, Director of the Census.

Joseph A. Hill, assistant to the director.

Dr. Leon E. Truesdell, chief statistician for population.

A review of the work of the Advisory Committee for the census of population made public on July 31 by the Department of Commerce follows in full text:

The afternoon session of the committee was devoted mainly to a further discussion of some of the topics left over from the morning session and to the approval of resolutions covering a number of points.

Resolutions passed by the conference on the population census included the following:

1. With regard to the elimination of the item of mother tongue. This committee is in accord with the decision of the Census Bureau.

2. The committee approves the questions on unemployment.

3. The committee is opposed to the inclusion of the suggested question on number of rooms per family.

4. The committee is opposed to the question on income of wage or salary workers.

5. The committee is opposed to the question of religious affiliation.

6. The committee is opposed to the addition of the question on ownership of radio sets.

7. The committee is opposed to the inclusion of the suggested group of questions on children born (number of children born to each married woman, number of these children living, age at first marriage [or duration of marriage], whether first, second or later marriage), and recommends that the executive committee give favorable consideration to the inclusion of these items in a special sample inquiry.

8. The conference desires to emphasize as a general principle that the population schedule should be used only for the purpose of completing enumeration and should be confined therefore to those items for which information on every individual is necessary and should not include items for which data can be collected in special surveys, or by canvassers of samples of the population.

In accordance with this principle the conference is of the opinion that the schedule should be restricted to the minimum item of the items but recommends that the director take into consideration a supplementary family schedule for a sample of the population to include several important items for which a special enumeration is not needed or practicable, the choice of which items to be left for consideration by the executive committee of this conference.

9. That a question be added to the schedule to determine the extent of migration between farms and cities during 1929. The schedule already contains a question as to farm residence on the census date. The additional question would read, "Did this person live on a farm 12 months ago?" and the migrants would be those persons who answered "Yes" to one question and "No" to the other.

10. The conference strongly approves the proposal of the Census Bureau to draw up a family card and recommends that the details of this card be left to the executive committee in consultation with the director.

11. The committee authorizes the chairman to appoint an executive committee to work in conjunction with the director.

At a recent meeting of the full advisory committee, made up of representatives from a wide range of business, governmental and other organizations, such as the American Federation of Labor; the Curtis Publishing Company; the Department of Labor; the National Electric Light Association; the Scripps Foundation for Research in Population Problems; the Institute for Government Research; Columbia University; the Metropolitan Life Insurance Company; the International Advertising Association, and similar interests, it was recommended that a small executive committee be named by the Secretary of Commerce to carry on the work of the full committee.

The nominations for the executive committee as recommended by the parent advisory committee have been approved by the Secretary of Commerce as follows:

Dr. Louis I. Dublin, statistician, Metropolitan Life Insurance Company, Madison Square, New York City.

Dr. Robert E. Chaddock, Columbia University, New York City.

Dr. Lewis Meriam, Institute for Government Research, 28 Jackson Place, Washington, D. C.

Edgar Sydenstricker, Milbank Memorial Fund, 49 Wall Street, New York City.

Dr. Warren S. Thompson, director, Scripps Foundation for Research in Population Problems, Miami University, Oxford, Ohio.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

CONSTRUCTION OF MICRO-THERMO-COUPLES

THE purpose of this paper is to describe a method of constructing micro-thermocouples which are small enough and at the same time strong enough to be inserted by means of a micro-manipulation instrument into small living cells or into tissues. They are small enough to be used in measuring light absorption of a single plastid or for any purpose requiring temperature measurements at minute points.

The method of drawing various metals in glass to wires or filaments of exceedingly small size was first employed by G. F. Taylor.[1,2] The same method was independently discovered a few months later by C. V. Taylor[3] in the construction of microelectrodes and micromagnets.

If a small wire of nearly any metal is inserted into a slightly tapered capillary of glass or quartz until it fits tightly and the region of tight fit is melted over a very small gas or oxygen-gas flame, a sudden pull will draw the glass and metal to microscopic dimensions. Glass-covered electrodes less than one micron in diameter can readily be made. Certain requirements must be met, however, in choosing the metal and the glass. The coefficient of expansion of the metal must be at least as great as that of the glass

[1] G. F. Taylor, "A Method of Drawing Metallic Filaments and a Discussion of their Properties and Uses," *Phys. Rev.*, xxiii, p. 655, 1924.

[2] Fine wires made by this process may be obtained from Baker and Co., Newark, New Jersey.

[3] C. V. Taylor, "Microelectrodes and Micromagnets," Proc. Soc. Exp. Biol. and Med., xxiii, p. 147, 1925. See also C. V. Taylor and D. M. Whitaker, "Potentiometric Determinations in the Protoplasm and Cell-sap of Nitella," *Protoplasma*, 1927, iii, no. 1.