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BOTANY OF THE FUTURE[1]

By Dr. WILLIAM CROCKER

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DEFINITION

THE speaker has been assigned the task of discussing botany of the future. Perhaps we should first define the term botany. If one were to ask an educated layman or even a specialist in plant science, he would undoubtedly get the glib definition that botany is the science of plants. This is an extremely broad definition, but is it the content of the term that the layman or specialist really has in mind? Is not the layman inclined to think of botany in the limited sense of collecting, classifying and naming plants? However this may be, in this paper botany will be used in the broad sense of the dictionary definition including all plant science.

There are two implications in this assignment that the speaker must limit. First, "Botany of the Future" implies a prophetic effort, and second, botany is a science made up of several distinct disciplines, each too big for the complete mastery by one person. The speaker claims no prophetic power and feels none too competent in his own limited field of plant physiology. It will have to suffice to give a brief history of botany, with especial emphasis on the more recent trends, and from these decide on some of the probable future trends in botanical research and development with merest reference to the meaning of botany to other sciences and to man.

[1] Address before the American Association for the Advancement of Science in the conference on Science and Society, Ottawa, June 28, 1938. This address with the literature citations is to be published in full later by the association.

THE STRUGGLE TO MAKE BOTANY AN INDUCTIVE SCIENCE

Before and immediately following the beginning of the Christian era the Greeks and Romans wrote much about plants. Their statements were based on casual observations, no experiments and much speculative thinking. Their descriptions of plants were often so

the air must be removed or high results will be obtained. A simple and inexpensive apparatus using this principle and sufficiently accurate for industrial health purposes is shown in Fig. 1.

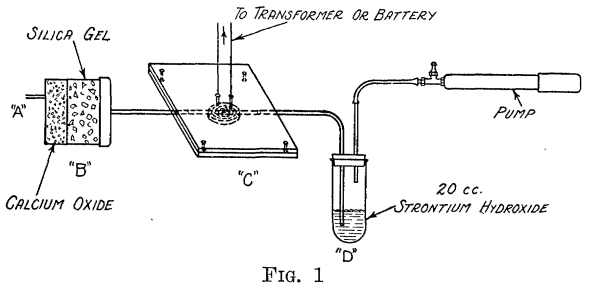

FIG. 1

The letter "A" designates the inlet to the apparatus. 3/16 inch copper tubing with brass fittings similar to those on automobile gasoline lines are used. The canister "B" is of tin and should have a capacity of at least four cubic inches. This canister is two thirds filled with silica gel and one third with calcium oxide for removal of hydrocarbon vapors and carbon dioxide, respectively. The copper outlet tube from canister leads to the combustion unit "C." This unit consists of two 3 inches × 3 inches × ¼ inch pieces of transite (Johns-Mansville) board bolted together with 4-⅛ inch brass bolts. A suitable central recess is made in one board as shown to carry the heating element of a nineteen cent automobile cigar lighter unit. These units are obtainable with one bolt terminal, and the other terminal may be made by notching out the head of a small cylindrical headed bolt and swedging the other end of the element in this notch. The edges of the transite board are made air-tight by the application of a small amount of furnace cement. The exit tube of the combustion unit is connected to a small bubbler "D," as shown. A suction pump of 55–60 cc capacity per stroke can be conveniently made from a 10 inch bicycle pump. A 3/16 inch tee is sweated to the bottom of the pump and then two ball check valves to the tee as shown. The current for the combustion unit may be furnished by a toy transformer supplying nine volts or from a six-volt storage battery.

The solution used in the bubbler is 1/2,500 normal solution of strontium hydroxide. This solution is conveniently standardized against 1/50 normal sulfuric acid (0.55 cc of conc. sulfuric acid (sp. gr. 1.84) in one liter of solution). 100 cc of strontium hydroxide solution is equivalent to 2 cc of N/50 sulfuric acid. Each liter of the strontium hydroxide solution should contain 15 cc of 0.1 per cent. phenolphthalein in 85 per cent. alcohol. The solution is stable if kept away from air containing carbon dioxide. If 20 cc of this solution is placed in bubbler and air pulled through at a rate of 100 cc per minute, then Table I will apply.

TABLE I

If red color (phenolphthalein) disappears after: Number of pump strokes	Parts per million of carbon monoxide present
1	2,000
2	1,000
4	500
8	250
16	125

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GROWING FUNGI ON CELLOPHANE

VARIOUS saprophytic fungi (Aspergillus, Fusarium and Verticillium) isolated from dead leaves were grown successfully on rolls of filter paper and of Cellophane in test-tubes. Each tube contained a few cc of Knop's solution with which the rolled sheets were in contact and by which they were continually moistened. Growth was equally good on both media. The transparency of the Cellophane permitted one to observe the growth of the organism directly, even with considerable magnification. The cellulose acetate appears to be partially hydrolyzed during sterilization and to improve the Knop solution as a nutrient for the fungi.

A. DUSSEAU
LABORATOIRE DE BIOLOGIE VÉGÉTALE, P. C. B.
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BOOKS RECEIVED

ADAMS, LEVERETT A. *An Introduction to the Vertebrates.* Second edition. Pp. vii + 479. 327 figures. Wiley. $3.50.

Annual Report of the South African Institute for Medical Research, December 31, 1937. Pp. 88. Illustrated. The Institute, Johannesburg.

Bollettino Del Centro Volpi Di Elettrologia. English edition. *1938; XVI, No. 2.* Pp. 118. Volpi Centre of Electrology, Venice. L. 10.–

CHAPIN, WILLIAM H. and LUKE E. STEINER. *Second Year College Chemistry.* Fourth edition, revised. Pp. xv + 407. 43 figures. Wiley. $3.00.

DALY, REGINALD A. *Architecture of the Earth.* Pp. xiii + 211. 152 figures. Appleton-Century. $3.00.

KUBIËNA, WALTER L. *Micropedology.* Pp. xvi + 243. 132 figures. Collegiate Press, Ames, Iowa. $3.00.

LEVY, JOHN and RUTH MUNROE. *The Happy Family.* Pp. 319. Knopf. $2.75.

Memoirs of the College of Science, Kyoto Imperial University; Series B, Vol. XIV, No. 1, May, 1938. Pp. 154. Illustrated. Maruzen, Tokyo.

Nauka Polska; Jej Potrzeby, Organizacja I Rozwój, XXIII. Pp. ix + 411. Instytuto Popierania Nauki, Warszawa. 9 zlotys.

PELLETT, FRANK C. *History of American Beekeeping.* Pp. ix + 213. Illustrated. Collegiate Press.

Science Reports of the Tôhoku Imperial University; First Series (Mathematics, Physics, Chemistry) Vol. XXVII, No. 1. Pp. 154. *Fourth Series (Biology) Vol. XIII, No. 1.* Pp. 88. Both illustrated. Maruzen, Tokyo.

SNEDECOR, GEORGE W. *Statistical Methods Applied to Experiments in Agriculture and Biology.* Pp. xiii + 388. Collegiate Press. $3.75.

TERMAN, LEWIS M. and others. *Psychological Factors in Marital Happiness.* Pp. xiv + 474. McGraw-Hill.

WHITEHEAD, ALFRED N. *Modes of Thought.* Pp. viii + 241. Macmillan. $2.50.

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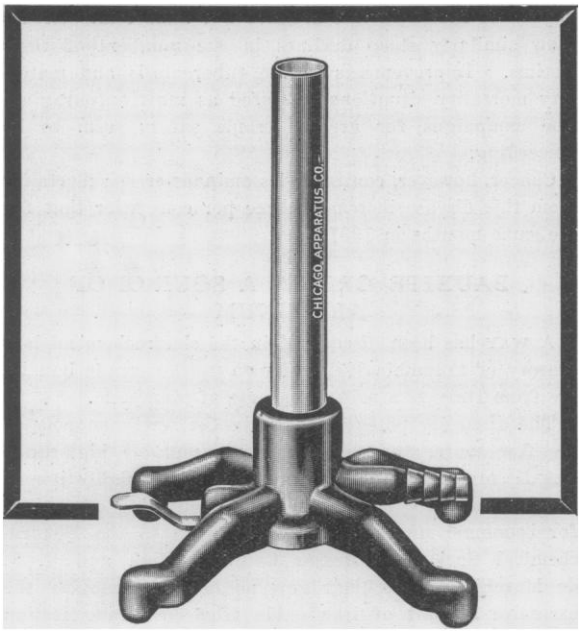

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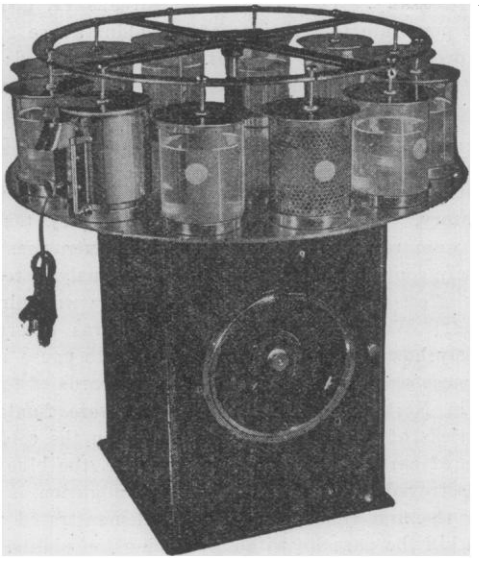

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