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#### *About the Institute*

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

St. Louis Post-Dispatch, Wed. 5 Dec. 1962  
Section 1116  
Van Schaik photo

# Missourian Who Became a Daffodil Farmer

## John Howe of Pacific, Now 84, Decided to Grow Flowers, Rare Trees Instead of Corn and Cattle

By Dorothy A. Brockhoff

A Special Correspondent of the Post-Dispatch  
PACIFIC, Mo., Dec. 5.

IN THIS AGE of compulsory retirement at 65, John Howe of Pacific is an anomaly. At 84, this workman with the crazy face and spry step manages a 210-acre farm, complete with 210 chickens, 41 sheep and ten horses, working alone except for the help of a young man who drops in occasionally after hours to lend a hand.

Howe, who is a sort of Franklin county Thoreau, lives in simple, Spartan style—but he is not a simple man. And his farm, which is just about a mile long, is not a typical rolling Missouri tract of timber and cultivated land, but a kind of arctostemon and botanical garden where dozens of strange and beautiful trees shade thousands of daffodils.

Like Woodworth, Howe has a passion for daffodils, which he grows professionally. His fields of flowers attract gardeners and botanists from miles around. In the spring people come to view the 300 varieties which Howe cultivates and marks with log stakes, and in the fall they return to purchase bulbs of favorites they spotted earlier.

November afternoons and weekends are busy times for Howe. It is then that he places his daffodils, varying in size from bulbs no bigger than the tip of a lady's forefinger to giant fist-sized ones, in cardboard boxes, arranges them for sale on his long, open wooden porch. Visitors can pick and choose from among hundreds of bulbs priced from one cent to a dollar, or more. To supplement his stock, Howe spends evenings reading other growers' catalogues, searching for new varieties. When he finds one that appeals to him, he picks up a stubby pencil and orders it. Some daffodils he imports directly from Holland; others he orders from dealers on the East and West coasts.

Howe prepares no catalogues of his own. In fact, he has no literature of any kind describing his plants, and has never advertised. A believer in the old saying about a better mousetrap, he depends on customers to spread his fame, and they haven't let him down.

For the faithful—a few of whom started buying from Howe's store as long as he was in his first plants—it is no trick to find Howe's place. But for newcomers it is a little difficult. The farm cannot be seen from Highway 66. It is just outside the city limits of Pacific on an old dirt road recently named the Thoreau road. Perched atop a hill sloping down to this road is a two-story, weather-beaten frame house. Howe, a bachelor, has lived here "ever" since the day before Thanksgiving, 1884," he proudly relates.

"My father bought 80 acres originally back in 1817," he said, "and we moved here from Pacific a few years later. My family wasn't the first to till this land, however. The first were some Pennsylvania Dutch folk who paid \$100 in gold for this place in 1808. Twenty-three years later, my father acquired it for the same price, which proves that real estate doesn't always increase in value."

"Not far from here," he continued, "is some acreage that was originally part of a Spanish land grant, but the title to this place doesn't go back that far. "But the time we came to live here, a granary, barn, chicken house and smokehouse, and part of that house had been built. All of us—my mother, father, two brothers and three sisters—were very proud of the new home."

"Purchasing this homestead was a big step for my father, who came to America in 1839 from Schleswig-Holstein," Howe explained.

A few years earlier, Howe's Uncle John, for whom he was named, had headed for St. Louis, and his three brothers and a sister followed him. Originally, the family spent the winter in Hazle, but the present judge

at Union, Mo., persuaded Howe's father to call himself Howe, and that's the way it has ever since.

"Years ago this was quite a farm," Howe said. "But now a man can't hire help in the country."

Howe's father was content to farm in the traditional manner, specializing in cattle rather than flowers.

"I can't remember why I decided to start growing daffodils," Howe declared after a careful reflection. A quiet, almost taciturn man when he first meets a stranger, Howe seldom says a word about himself, but when the conversation turns to the subject closest to his heart—growing things—he becomes a different man. His blue eyes glint and his speech quickens.

"Daffodils just seemed pretty to me, and I guess that's why I started to raise them," he reminisces. "I remember I started with Sir Watkins—that's one of the early yellows and unusually hardy. I sold a few, and then I began looking around for other varieties. Pretty soon I was in business."

Nobody in Howe's family thought it strange that he should become a daffodil grower and in time a horticulturist.

"Uncle John has been interested in gardening—in fact, when he came to St. Louis in 1836, the first job he had was in a greenhouse out in Webster Groves," Howe recalled. "My uncle, his boss, and a doctor started a vineyard together. Black rot hit it, however, and they had to quit."

"Then a steamboat captain—forgot his name—bired my uncle and told him he wanted an unusually good vineyard and didn't care about expense. My uncle had four men dig some trenches. Then he went to the slaughter houses and gathered up the ground bones and manure. He brought this stuff back and dumped it in the trenches. That was in the day when people didn't generally know that slaughterhouse refuse made good fertilizer, and everybody thought my uncle was crazy. But he planted Concord grapes and when they were taken to the Biddle street market, a Frenchman remarked that they were much better than the ordinary run of grapes."

Howe himself never got beyond McGuffey's Fourth Grade Reader, but explained in answer to a question about how it happened that he knew the Latin names of nearly all the flora on his farm. "But I have been a great reader of fruit, agricultural and horticultural papers."

Today Howe has a small but excellent library, including such texts as Bailey's "Standard Cyclopedias of Horticulture." From books he has learned a great deal about both botany and horticulture; so much, in fact, that he is able to converse with specialists from the Missouri Botanical Garden in their own technical language. He is a friend of many botanists, including Edgar Anderson, curator of useful plants Shaw's Garden.

"I remember getting a letter sent about half a bushel of Sir



JOHN HOWE. . . He lets his customers beat a path to his door.

Watkins over to Gray Summit together with about a gallon of Pennycuik variety. That's an old-fashioned variety. A few

days later, Dr. Anderson turned up and wanted to know all about them. That's how we became circle tour."

The circle tour is a field trip around Howe's place which he conducts for visitors who take

the time to talk with him a bit about daffodils. Those who take the tour seldom forget it, for it provides a close-up view of Howe's rare evergreens and magnolias, including a biggest specimen which he calls by its technical name, *M. macrophylla*. The largest of all his magnolias, however, is a magnificent grandiflora with shining green leaves that sparkle in the sun on a trunk as tall as a three-story building.

"A few years ago, the director of Shaw's Garden, Dr. Fritz W. Went, was here," Howe related matter-of-factly. "and I showed him around. When he saw the grandiflora he paused for several minutes, and then told me that it was in better shape than any of his specimens at the Garden."

Not far from the magnolia are a snowball from West China, privets from Japan, and a species of witch-hazel which blooms in the fall. Howe pauses to cut a branch of tiny yellow flowers from this tree for visitors who come in the autumn. In the spring people often return from a Howe field trip carrying huge bouquets of daffodils and magnolia blossoms which he cuts as he talks.

Many of Howe's evergreens, including 20-foot yews and giant firs from Japan and Southwest Asia, grow beside one of three ponds which he has constructed over the years. Some distance away is an orchard of nut trees he has planted. Here one can find such unusual varieties as the heart nut, a cross between a Japanese walnut and an American lantern nut, first developed in British Columbia. Nearby are grafts which Howe has made himself. There are, for example, a heart nut which Howe grafted on a black walnut, and an English walnut which he crossed with a black walnut.

Howe isn't much of a traveler now. He last visited the Missouri Botanical Garden about 60 years ago, and he hasn't been to St. Louis for two years. The traffic in the city bothers him.

"I can't understand why people all go to work at the same time and leave about the same time," he added. "We got caught in the 3 a.m. and 2 p.m. rush," he said, "and I haven't been back since."

WASHINGTON UNIVERSITY  
The Graduate School of Arts and Sciences

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FINAL EXAMINATION  
of  
REINO OLAVI ALAVA  
M. A., University of Turku, Finland, 1947

for the degree of

DOCTOR OF PHILOSOPHY

---

Monday, May 21, 1951, 9:00 A. M.  
Room 308, Rebstock Hall  
Washington University

---

COMMITTEE OF EXAMINERS

Professor Henry N. Andrews, Jr., Chairman  
Professor Edgar Anderson  
Professor Erich P. Hofacker  
Professor Gustav A. L. Mehlquist  
Associate Professor Albert I. Lansing  
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Associate Professor James B. Watson

WASHINGTON UNIVERSITY  
The Graduate School of Arts and Sciences

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FINAL EXAMINATION  
of

**ALICE FABER TRYON**

B. S., Milwaukee State Teachers College, 1941  
M. A., University of Wisconsin, 1945

for the degree of

**DOCTOR OF PHILOSOPHY**

oooooooooooo

Monday, May 19, 1952, 9:00 a.m.  
Room 308, Rebstock Hall  
Washington University

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COMMITTEE OF EXAMINERS

Professor Henry N. Andrews, Jr., Chairman  
Professor Carroll W. Dodge  
Professor Gustav A. L. Mehlquist  
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Associate Professor Courtney Werner

WASHINGTON UNIVERSITY  
The Graduate School of Arts and Sciences

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FINAL EXAMINATION  
of

**JOHN MONTAGUE GILLETT**  
B. A. (Hon.), Queen's University, Ontario, 1949

for the degree of  
**DOCTOR OF PHILOSOPHY**

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Thursday, May 8, 1952, 9:00 a.m.  
Room 308, Rebstock Hall  
Washington University

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COMMITTEE OF EXAMINERS

Professor Henry N. Andrews, Jr., Chairman  
Professor Carroll W. Dodge  
Professor Gustav A. L. Mehlquist  
Professor Robert E. Woodson, Jr.  
Associate Professor Hampton L. Carson  
Associate Professor Rolla M. Tryon, Jr.  
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Associate Professor James B. Watson

WASHINGTON UNIVERSITY  
The Graduate School of Arts and Sciences

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FINAL EXAMINATION  
of

**HUGH HELLMUT ILTIS**

B. A., University of Tennessee, 1948

M. A., Washington University, 1950

for the degree of

**DOCTOR OF PHILOSOPHY**

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Thursday, May 22, 1952, 9:00 a.m.  
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Washington University

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COMMITTEE OF EXAMINERS

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Professor Carroll W. Dodge  
Professor Thomas S. Hall  
Professor Robert E. Woodson, Jr.  
Associate Professor Barry Commoner  
Associate Professor Harrison D. Stalker  
Associate Professor Rolla M. Tryon, Jr.  
Associate Professor George B. Van Schaack

WASHINGTON UNIVERSITY

GRADUATE SCHOOL OF ARTS AND SCIENCES

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FINAL EXAMINATION

of

DING HOU

B. S., National Cheng Chung University, China, 1945  
M. A., Washington University, St. Louis, 1952

for the degree of

DOCTOR OF PHILOSOPHY

Wednesday, May 11, 1955, 9:00 a.m.  
Room 308, Rebstock Hall

\* \* \* \*

Committee of Examiners

Professor Robert E. Woodson, Jr., Chairman  
Professor Henry N. Andrews, Jr.  
Professor Carroll W. Dodge  
Professor Robert M. Schmitz  
Associate Professor Hugh C. Cutler  
Associate Professor Harrison D. Stalker  
Associate Professor Rolla M. Tryon, Jr.  
Associate Professor George B. Van Schaack  
Assistant Professor Reino O. Alava

\* \* \* \*

Field of Study:

Botany (Taxonomy)

WASHINGTON UNIVERSITY

GRADUATE SCHOOL OF ARTS AND SCIENCES

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FINAL EXAMINATION

of

EMANUEL DAVID RUDOLPH

A. B., New York University, 1950

for the degree of

DOCTOR OF PHILOSOPHY

Wednesday, May 18, 1955, 9:00 a.m.  
Room 308, Rebstock Hall

\* \* \* \*

Committee of Examiners

Professor Carroll W. Dodge, Chairman  
Professor Edgar Anderson  
Professor Henry N. Andrews, Jr.  
Professor Barry Commoner  
Professor Robert E. Woodson, Jr.  
Associate Professor Hugh C. Cutler  
Associate Professor Courtney Werner  
Assistant Professor Richard V. Bovbjerg  
Assistant Professor Charles R. Burton

\* \* \* \*

Field of Study:

Botany (Mycology)

WASHINGTON UNIVERSITY  
GRADUATE SCHOOL OF ARTS AND SCIENCES

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FINAL EXAMINATION

of

NALINI NIRODI

B. Sc., University of Mysore, 1946  
B. Sc. (Hons), University of Mysore, 1948  
M. Sc., University of Mysore, 1949

for the degree of

DOCTOR OF PHILOSOPHY

Thursday, May 27, 1954, 9:00 a.m.  
Room 308, Rebstock Hall

\* \* \* \*

Committee of Examiners

Professor Edgar Anderson, Chairman  
Professor Henry N. Andrews, Jr.  
Professor Barry Commoner  
Professor Carroll W. Dodge  
Professor Robert E. Woodson, Jr.  
Associate Professor Hampton L. Carson  
Associate Professor Hugh C. Cutler  
✓ Associate Professor George B. Van Schaack  
Assistant Professor Preston Holder

\* \* \* \*

Field of Study

Botany (Genetics)

WASHINGTON UNIVERSITY  
GRADUATE SCHOOL OF ARTS AND SCIENCES

---

FINAL EXAMINATION

of

MORTON HART NICKERSON

B.S., University of Massachusetts, 1949  
M.A., University of Texas, 1951

for the degree of

DOCTOR OF PHILOSOPHY

Tuesday, April 14, 1953, 9:30 a.m.  
Room 308, Rebstock Hall

\* \* \* \*

Committee of Examiners

Professor Edgar Anderson  
Professor Henry N. Andrews, Jr.  
Professor Philip H. DuBois  
Associate Professor Hugh C. Cutler  
Associate Professor Rolla M. Tryon  
Associate Professor George B. Van Schaack  
Associate Professor James B. Watson  
Assistant Professor Preston Holder

\* \* \* \*

Field of Study:

Botany

WASHINGTON UNIVERSITY  
GRADUATE SCHOOL OF ARTS AND SCIENCES

---

FINAL EXAMINATION

of

BERNARD CARL MIKULA

B. S., College of William and Mary, 1951

for the degree of

DOCTOR OF PHILOSOPHY

Monday, May 14, 1956, 9:00 a.m.  
Rebstock Hall, Room 308

\* \* \* \*

Committee of Examiners

Professor Edgar Anderson, Chairman  
Professor Henry N. Andrews, Jr.  
Professor Donald C. Bryant  
Professor Barry Commoner  
Professor Carroll W. Dodge  
Associate Professor Hugh C. Cutler  
Associate Professor Rolla M. Tryon  
Associate Professor George B. Van Schaack ✓  
Assistant Professor John H. Kautsky

Field of Study

Botany (Genetics)

WASHINGTON UNIVERSITY  
GRADUATE SCHOOL OF ARTS AND SCIENCES

---

FINAL EXAMINATION

of

ROBERT H. MOHLENBROCK

B. A., Southern Illinois University, 1953  
M. S., Southern Illinois University, 1954

for the degree of

DOCTOR OF PHILOSOPHY

Wednesday, December 19, 1956, 9:00 a.m.

\* \* \* \* \*

Committee of Examiners

Professor Robert E. Woodson, Jr., Chairman  
Professor Henry N. Andrews, Jr.  
Professor Hampton L. Carson  
Professor Barry Commoner  
Professor Carroll W. Dodge  
Associate Professor David B. Carpenter  
Associate Professor Rolla M. Tryon, Jr.  
✓ Associate Professor George B. Van Schaack

\* \* \* \* \*

Field of Study

Botany (Taxonomy)

WASHINGTON UNIVERSITY  
GRADUATE SCHOOL OF ARTS AND SCIENCES

---

FINAL EXAMINATION

of

FRANK WINSTEAD MARTIN

B. S., St. Louis College of Pharmacy, 1949  
M. A., Washington University, 1953

for the degree of

D O C T O R O F P H I L O S O P H Y

Wednesday, May 8, 1957, 9:00 a.m.  
Room 308, Rebstock Hall

\* \* \* \* \*

Committee of Examiners

Professor Edgar Anderson, Chairman  
Professor Henry N. Andrews, Jr.  
Professor Hampton L. Carson  
Professor Carroll W. Dodge  
Professor Jules Henry  
Professor Harrison D. Stalker  
Professor Robert E. Woodson, Jr.  
Associate Professor Hugh C. Cutler  
Associate Professor Rolla M. Tryon, Jr.  
Associate Professor George B. Van Schaack

\* \* \* \* \*

Field of Study:

Botany

George B. Van Schaack Curriculum vitae  
1964 Harris St.  
Eugene, Or. 97405

November 8, 1973

Born: Coxsackie, N. Y.; September 13, 1903

Education:

1921-22	Syracuse University	Music (Piano and theory)
1922-25	University of Rochester	Music (Piano and theory)
1925-29	Harvard College	B.S. in Mathematics
1929-32		
1933-35	Harvard University	A.M. & Ph. D. in Mathematics
1960-61	Washington University	Elementary and Advanced Cataloging
1962	" "	Elementary Reference

Employment:

1935-36	Equitable Life Assurance Society	Mathematics Clerk
1936-38	University of Rochester	Instructor in Mathematics
1938-45	Michigan State College	Assistant Professor of Mathematics
1943-45	U.S. Naval Reserve, Lt.	Instructor in Anti-submarine Warfare
1946-47	Union College, Schenectady	Asst. Prof. of Mathematics
1947-60	Washington University	Assoc. Prof. of Mathematics
1948-55	Missouri Botanical Garden	Honorary Curator of Grasses
1955-58	" " "	Acting Curator of Herbarium
1958-65	" " "	Curator of Grasses
1958-67	" " "	Librarian
1967-72	Morton Arboreum (Lisle, Ill.)	Bibliographer
1972-	Retired	

Member: Phi Beta Kappa; Alpha Chi Sigma; International Association of Plant Taxonomists; Sierra Club.

Publications:

1. (with Marston Morse) The critical point theory under general boundary conditions. *Annals of Mathematics*. 35:545-571. 1934.
2. (with Marston Morse) Abstract critical sets. *Proc. National Academy of Sciences*. 21:252-263. 1935.
3. (with Marston Morse) Critical point theory under general boundary conditions. *Duke Mathematical Journal*. 2:220-242. 1936.
4. Problem 3999. *Amer. Math. Monthly*. 48:409. 1941.
5. Flowers of Island (Attu Island) U.S. Navy 163. 1945. 38 p.
6. (Rev.) Elementary concepts of mathematics, by B.W. Jones. *Amer. Math. Monthly*. 55:515-517. 1948
7. *Sporobolus hiang* spec. nov. in *Miscellanea taxonomica* 1. *Annals of the Missouri Botanical Garden*. 37:397. 1950
8. Jointed goat-grass. *Mo. Bot. Gard. Bull.* 41:114-115. 1953.
9. (Rev.) The trees and shrubs of the Southwestern deserts, by Lyman Benson & Robert A. Darrow. *Mo. Bot. Gard. Bull.* 13. 1955.
10. (Rev.) Manual of the plants of Colorado, by H. D. Harrington. *Mo. Bot. Gard. Bull.* 43:14-15. 1955.
11. An exhibit of flower books. *Mo. Bot. Gard.* 1959. 24 p.
12. The grasses. *Mo. Bot. Gard. Bull.* 43:104-107. 1960.
13. (Obit.) (with Edgar Anderson) Robert Everard Woodson, Jr. *Taxon* 13:45-48. 1964.
14. (with H. Wm Matheson) Historic books and manuscripts, 1474-1874 exhibition catalogue. Washington University. 1964. 7 p.
15. Clarification on works by d'Ardene and Moet. *Huntia*, 1:194-201. 1964.
16. An epilogue on two exhibitions of books. *Mo. Bot. Gard. Bull.* 52(9):1-6. 1964.
17. English holly. *Mo. Bot. Gard. Bull.* 55(8):2. 1967.
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19. *Narcissus* V. *Mo. Bot. Gard.* 56(2):3-4. 1968.

Carla Lange

Missouri Botanical Garden

BULLETIN

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Schweinitz - Berg + Post

A SKETCH OF THE LIFE AND SCIENTIFIC WORK  
OF LEWIS DAVID VON SCHWEINITZ.

LEWIS DAVID VON SCHWEINITZ was born at Bethlehem, Northampton County, Pennsylvania, on the thirteenth of February, 1780. His father, Hans Christian Alexander von Schweinitz was of an ancient and distinguished family in Silesia, in Germany, and exercised here the functions of Superintendent of the fiscal and secular concerns of the "*Unitas Fratrum*" or Moravian Brethren in North America. His mother was Dorothea Elizabeth de Watteville, daughter of Baron, afterwards Bishop, John de Watteville, and of Benja, who was a daughter of Count Zinzendorf. Of the last mentioned ancestor, it may not, for reasons which will appear in the sequel, be inappropriate to make a passing reminiscence.

Nicholas Lewis, Count Zinzendorf, was born at Dresden, in 1700, and was celebrated in his youth for forming religious societies, six or seven of which are said to have originated from his own efforts, and one at least to have been planned at the early age of ten years.

He was associated with Watteville in founding the great missionary system of the "*Unitas Fratrum*." At the age of twenty-one he became Count of Berthelsdorf, in Lusatia, by purchasing the estate appendant to that title, and soon after established there the village of Herrnhut, whence the Moravians are sometimes called *Herrnhutters*. In prosecution of his favorite scheme, he, in connexion with his new colony, many of whom were natives of Moravia, commenced the sending of missionaries to instruct the heathen, and at the end of nine years, though their numbers did not when they first made the attempt exceed 600, had actually formed establishments in Greenland, St. Thomas, St. Croix, Surinam, Rio de Berbice, among the Indians of North America, and the Negroes of Carolina, in Lapland, Tartary, Algiers, Guinea, in the Island of Ceylon, and at the Cape of Good Hope. In his ardour for attain-

NOTE.—This sketch is compiled from the memoir of von Schweinitz, by Walter R. Johnson, read before the Academy of Natural Sciences of Philadelphia in 1835, and published by the Academy, and from facts contributed by his son, Bishop Edmund de Schweinitz. The above mentioned memoir has, as a rule, been closely followed, and often exactly reproduced. The portrait of Dr. von Schweinitz, placed as frontispiece to this Journal, was presented by his family.

EDITOR.



*Lewis David Van Scherwinck.*

dence among the control population by 6 percent on the basis of the incidences at 88 and 200  $\mu\text{c}/\text{kg}$  (6). The projected incidences for man based upon cats weighing 2.5 kg and having a life expectancy of 15 years range from 54 to 84 percent (Fig. 5). These incidences divided by the 6 percent established for the mouse give quotients of from 9 to 14.

These extrapolations from mice through dogs and cats suggest that strontium-90 is from 7 to 14 times as toxic in man as in mice. The lowest dose that could be shown to have any effect in the mouse was 8.9  $\mu\text{c}/\text{kg}$ , which decreased the time interval to the appearance of reticular tissue tumors. This is equivalent to 1  $\mu\text{c}$  retained per kilogram, or to a body burden of 70  $\mu\text{c}$  per 70-kg man. Dividing this dose by the mouse-to-man factor of from 7 to 14 leads to the estimate that the minimum effective dose in man may be a body burden of from 5 to 10  $\mu\text{c}$  of strontium-90.

#### Danger from Present Fallout Contamination

Perhaps it is merely coincidence that the 6 to 15  $\mu\text{c}$  estimated for the minimum effective dose in man based on the ra-

dium method of extrapolation and the 5 to 10  $\mu\text{c}$  estimated from the mouse, dog, and cat data are so similar. In spite of their very tentative nature, these calculations are presented here to illustrate how experimental animal data may be used. In the next few years there should be additional information on radium toxicity in man, since several hundred persons with a possible radium burden are currently under investigation. Consequently, the level of minimum effect will be known with greater exactness. Also, the dog experiments now in progress in several laboratories should provide information over a range of doses so that extrapolations from mouse through dog to man will be possible at more than one level.

The lowest prediction of a harmful dose to man that can be made from the present data attaches significance to the statistically insignificant differences in average survival time at the lowest doses in the mouse experiment. The line passing through these points intersects the control value at an injected dose of 0.4  $\mu\text{c}/\text{kg}$ . This dose is equivalent to a retained dose in mice at 600 days of 0.044  $\mu\text{c}/\text{kg}$ , or to a body burden in a 70-kg man of 3.08  $\mu\text{c}$ . If the life-shortening factor in going from mouse to man

is as great as the estimated tumor-inducing factor—an unlikely assumption for several reasons—a threshold value for man would lie between 0.22 and 0.44  $\mu\text{c}$  of strontium-90. A more likely value is one that lies between 5 and 15  $\mu\text{c}$ , as discussed above. In any case, the present contamination with strontium-90 from fallout is so very much lower than any of these levels that it is extremely unlikely to induce even one bone tumor or one case of leukemia.

#### References and Notes

1. The Manhattan Project, which developed the atomic bomb, was terminated in 1947. The biological work in progress at that time was continued without interruption under the sponsorship of the newly created Atomic Energy Commission.
2. This work was performed under the auspices of the U.S. Atomic Energy Commission. The views expressed are my own and do not necessarily reflect those of the Biological and Medical Research Division of Argonne National Laboratory.
3. *Natl. Bur. Standards (U.S.) Handbook No. 52* (U.S. Dept. Commerce, Washington, D.C., 1955).
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6. M. P. Finkel, B. O. Biskis, G. M. Scribner, *Argonne Natl. Lab. Biol. and Med. Research Div. Semian. Rept. No. ANL-5841*, in press.
7. M. P. Finkel, B. J. Tellekson, J. Levine, B. O. Biskis, *Argonne Natl. Lab. Biol. and Med. Research Div. Semian. Rept. No. ANL-5732* (1957), p. 21.

ject in many of our leading universities. Moreover, scholars the world over consult his numerous publications, of which *Isis* and the *Introduction to the History of Science* are the best known (1).

George Sarton's early education was obtained first at the Athénée in Ghent and then at that in Chimay. He attended the University of Ghent in the department of philosophy, studied by himself for a year, and returned to the university to study the natural sciences, chemistry and crystallography, and mathematics, in which he received a doctorate in 1911 (2).

In 1908 he wrote a chemical memoir (3) which gained for him a gold medal offered by the four Belgian universities and a silver laurel branch from the city of Ghent. In these early years he also wrote romantic books and poems (4), an exercise which contributed to the development of his eminently readable prose.

Influenced by the writings of Comte, Tannery, Duhem, Poincaré, and others, while he studied pure science, Sarton grew increasingly more interested in the history and philosophy of science. He came to believe that the basis of all

## George Sarton, Historian of Science and New Humanist

"Am flying to-morrow morning to Montreal. Vale *G S*" wrote George Sarton on 21 March 1956. He was scheduled to give a lecture in Montreal on 22 March but became ill on the way to the airport and died that day in his Cambridge, Massachusetts, home. Thus, while he was still active and mentally young, the life on earth of this great historian of science came to an end—a life which had begun 72 years earlier, on 31 August 1884 in Ghent, and which had bridged two continents and more, both physically and spiritually.

Death has not ended Sarton's influence. He had continually emphasized the

idea that the history of science is not the sum of the histories of the separate sciences but rather their integration, that it is itself a specialty built on a thorough understanding of the methods of science and of history, and that it requires more than the leisure hours of capable scientists or of scholarly historians. He frequently referred to it as a new discipline, and he established it as such in the United States. It bears his mark. Thanks to his persistent pleas, expressed in letters, talks, and published works, and the interest he stimulated, there are now chairs of the history of science and courses or series of courses in that sub-

scientific philosophy was the history of science, and by the close of 1912 had determined to devote his life to establishing it as an independent discipline on the same plane with the other scientific disciplines. On it would be focused the history of mankind, because the only human activities which Sarton considered cumulative and progressive are the scientific ones.

In 1911 he had married an English artist. The young couple bought a home at Wondelgem, near Ghent, and there, in 1912, a daughter was born. Sarton's wife was the ideal helpmate. She quietly bore the brunt of their economic difficulties and never complained. Back of George Sarton's dedication to the history of science was Eleanor Mabel Elwes Sarton's dedication to her husband.

In Wondelgem Sarton accumulated notes on the history of science and launched *Isis*, a journal devoted to that subject. The first issue appeared in March 1913. But World War I destroyed the even tenor of the days. After packing the notes in a small metal trunk and burying them in the garden late at night, the Sarton family fled before war's horrors—across the border into Holland and on to England. In 1915 they came to the United States.

The first years in the New World were hard ones. It would not have been difficult to earn a living as a teacher of mathematics or of science or of French. Yet, although he was continually short of funds, it never occurred to Sarton or to his wife that he should earn money otherwise than by teaching the history of science. It was for that purpose that he had come.

A group of Harvard friends collected a small sum of money which they gave to the university to enable Sarton to spend two years in research and teaching. In addition, he delivered the Lowell lectures in Boston. In August 1918 he became research associate of the Carnegie Institution of Washington and chose to live in Cambridge, Massachusetts, with the great Widener Library for use as though it were his own. His offer to give a course in the history of science at Harvard in exchange for a separate room in the library was accepted in 1920, and in 1940 he was named professor.

Volume 2 of *Isis*, begun in June 1914, was completed in September 1919. A trip to Belgium to make the necessary arrangements with the printers was the occasion for the joyful recovery of his buried notes and of a large portion of his library.

Sarton described *Isis* as one result of a philosophical reaction to the analytical trends of 19th-century science (5). From its very inception *Isis* was intended as the organ of the new discipline. Its name was chosen because it evoked "the period of human civilization which is perhaps the most impressive of all,—its beginning" (6) and because the title of a review should be as short as possible. It was to be a synthetic, critical, international, and, in a sense, dogmatic review of the sciences from the historical, philosophical point of view, studying their evolution and logical sequence and less concerned with the science of the present than with that of the past (7). Beyond this, *Isis* was to have a mission—to underline the lessons of tolerance and wisdom which history presents. It was to denounce the imperialistic tendencies which Sarton found some scholars trying to impress on the science of their country or their race (8). It was to be more a philosophical and sociological review than a collection of historical erudition. One or more articles by Sarton in every issue set the tone.

Among the most important features of *Isis* are the "critical bibliographies," of which the last under Sarton's direction appeared in volume 44 (1953). There he wrote, "The seventy-nine bibliographies edited by me contain over 100,000 notes, many of which are short reviews. I must have written an average of seven such notes per day for 15,000 consecutive days almost without respite." A scholar who starts a topic in some aspect of the history of science without consulting the critical bibliographies is treading on thin ice!

On 12 January 1924 the History of Science Society was founded, primarily to guarantee and promote the publication of *Isis*. But Sarton remained the editor and, until 1941, was financially responsible for it. In 1953, I. Bernard Cohen, who had been managing editor for a number of years, became editor, and Sarton at last felt free to devote himself to his planned *A History of Science*, which was to be the reworking of his course lectures. Only the first volume, *Ancient Science in the Golden Age of Greece* (1952), appeared in his lifetime.

In 1936, to relieve *Isis* of the load of longer papers too short to appear separately but deserving publication, another periodical, named *Osis*, was founded. It was never supported by the History of Science Society, but solely by Sarton.

Sarton had a capacity for friendship

and a humility about his own place in the world. Sometimes this humility took on the air of preaching, but if this manner is accepted in the sense in which it was intended, it only enhances Sarton's stature. His attitude of preaching is partly the mark of a teacher but also reflects his deep disturbance over changes occurring in the world. Sometimes he was bitter about the attitudes adopted by people; sometimes he spoke against wealth, stressing its unimportance. In 1938 he wrote, "The German atrocities are terrible; they make me ashamed of being a man!" (9). But in 1944 he seemed happy when he wrote "My 60th birthday was admirably celebrated—first with a magnificent Festschrift . . .—second (even better) with the liberation of my native country and the end of a terrible nightmare" (10). On Christmas 1951 he added, "What we need above all is Peace" (11).

He had the ability to boil down a statement, to restate material in simpler terms, making a comparison with something familiar to his audience, without ever being too glib or too flippant. His method of drawing analogies is characteristic of his authorship. He had no tolerance for inaccuracies. He was tireless in his own application and expected others to exercise the same patience and critical attitude in their work.

Although Sarton was fully aware that we are living in a changed world, one that has changed more in the 20th century than in all the preceding ages, he had reverence for the old because all that he found best in the world is very old—the things which add meaning to our life, such as charity, the love of truth, religion, art, all the graces of life. He stressed the value of quiet study and meditation, for to be intellectually sound one must leave space in life for these. As a young man he was a frequent concertgoer, and later he accumulated a delightful library of recorded music. All his life he saw beauty about him, and his travels gave him the opportunity to visit the beauty spots of the world and drink them in.

For George Sarton science was "the totality of positive knowledge" (12, p. 118). He expressed himself as follows: "Definition. Science is systematized positive knowledge, or what has been taken as such at different ages and in different places. Theorem. The acquisition and systematization of positive knowledge are the only human activities which are truly cumulative and progressive. Corollary. The history of science is the only

*George Engelmann was a noted St. Louis physician and surgeon, a pioneer meteorologist, and a world-famous botanist. His association with Henry Shaw is largely responsible for the development of the Missouri Botanical Garden as a leading scientific center as well as a horticultural showplace.*

## GODFATHER OF THE GARDEN

By EDGAR S. ANDERSON

*Engelmann Professor of Botany*

**D**URING MOST OF HIS seventy-five years in St. Louis, Dr. George Engelmann was active in promoting a botanical garden for St. Louis that would be outstanding both horticulturally and scientifically. There is a possibility that without him there would have been no Missouri Botanical Garden. Almost certainly it would never have become an outstanding scientific center but for him.

Dr. Engelmann was a born botanist. Late in life he wrote: "I began in my fifteenth year to be greatly interested in plants."

He was born in 1809 at Frankfurt am Main, the eldest of thirteen children. His father was a professional man with a doctorate, who with his wife conducted a school for girls. Frau Doktor Engelmann was as able as her husband. Her father had been an artist at the Weimar Court and her mother came from a refugee Huguenot family.

Engelmann entered the University of Heidelberg on a scholarship to begin his medical training. He was an outstanding student, but because of his liberal views he had to transfer first to Berlin and then to Würzburg. Engelmann's doctoral thesis on plant monstrosities was more closely related to philosophical botany than to medicine. Goethe (who was a botanist as well as a philosopher) was so impressed by it that he offered the young man his own notes on the subject, on which Goethe was the world's authority. The excellent drawings in the thesis undoubtedly helped to impress Goethe. The artistic ability which came to Engelmann from his mother had stood him in good stead. It continued to be one of his special assets as a physician and as a botanist. When the thesis was published, it was illustrated with "five plates of figures drawn and transferred to the lithographer's stone with his own hand."

As a surgeon, Engelmann had the trained and gifted

hands of an artist; as a botanist, he delighted in studying plants which required careful dissection before they could be understood. For example, he monographed the genus *Cuscuta*, the dodders, strange leafless plants which grow as a tangled mass over the plants they parasitize by sending out feelers that digest a path into the host and may ultimately kill it. With a plant with no real leaves and a mass of stems, where could a botanist look for characteristics which would serve to classify the different kinds? Dr. Engelmann studied the stamens of their minute flowers and catalogued the different ways they were fringed at the base of each stamen. He also studied the tiny flower buds and noted whether or not they bore hairs. His judgments about these and other matters are still respected by modern experts.

A tabulation of the species of dodder listed in the last edition of the authoritative Gray's *Manual of Botany* shows that Engelmann is responsible for as many of the scientific names of our dodders as are all the rest of the world's experts, both before and after his time. Not only did he make the dissections, he drew a diagnostic sketch of each one and filed it carefully away. The Library of the Missouri Botanical Garden has large bound volumes of these records. Unfortunately, Dr. Engelmann's lawyers, who carried out the provisions of his will, spent the funds he left on ornate bindings and not on arranging the sketches so that they would be easy for future students to consult.

**A**FTER RECEIVING HIS DOCTORATE, which in those days always included botany as well as medicine, Dr. Engelmann spent the summer of 1832 in Paris with Agassiz and other young liberal and radical student friends. It was a joyous summer. "We led a glorious life in scientific union



## Persistent Remaindering

(Pena and de l'Obel's *Adversaria*, 1570-1618)

By ALBERT E. LOWNES

PIERRE Pena and Matthias de l'Obel's *Stirpium Adversaria Nova* (London, 1570-1571)<sup>1</sup> is a herbal memorable for many things, not the least of which is that it contains the first engraved representations of the true tobacco plant (*Nicotiana tabacum*) and, beside it on the plate, the first picture of a man in the act of smoking." Thus Lawrence C. Wroth announced the addition of a remarkable book to the John Carter Brown Library.<sup>2</sup>

If space had permitted, Dr. Wroth might have pointed out some of the things that make the volume memorable. The title page, dated 1570, is one of the earliest if not the first engraved title page in an English book. As part of its design it incorporates the earliest engraved English map. The authors, Pierre Pena, a Frenchman, and Matthias de l'Obel, a Belgian, had been students under the famous teacher, Guillaume Rondelet, at Montpellier. After completing their studies they had traveled widely on the Continent before arriving in England in 1559. Their herbal was the most comprehensive work of its kind published in Britain up to that time. Its sole rival might have been William Turner's *A New Herball*, which appeared in three parts,

<sup>1</sup> STC 19595.

<sup>2</sup> *JCB Annual Report, 1950-1951*, p. 53. The picture is a woodcut, not an engraving. See also two plates in *Panacea or Precious Bane, Tobacco in Sixteenth Century Literature*, by Sarah Augusta Dickson (New York Public Library, 1954). The captions read: "Tupinamba Indians Smoking in council deciding when to eat their prisoner, Staden. From *Warhafftige Hitoria und beschreibung*, 1557, by Hans Staden" (p. 110); "Brazilian Indian smoking a primitive cigar. From *Les Singularitez de la France antarctique*, Paris, 1557, by André Thevet" (p. 120).

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PA. 52:245-249. 1958.

# Francis Harper, Noted Zoologist, Dies Here

Dr. Francis Harper, zoologist, author and editor, died Friday, his 86th birthday, at his home at 311 McCauley Street here.

A resident of North Carolina since 1960, Dr. Harper received his A.B. and Ph.D. degrees at Cornell University in 1914 and 1925, respectively.

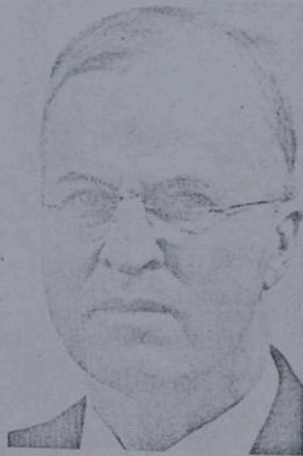
Born in Southbridge, Mass., his eminent career as a zoologist and researcher began in 1914, when he served as zoologist in a geological survey of Canada on an expedition to Great Slave Lake. From 1916-17 and 1919-21, he was assistant biologist with the U.S. Biological Survey. He was curator and instructor in zoology at Cornell from 1921-25.

Over the following four years, he served as secretary, editor and curator of mammals and fishes for the Boston Society of Natural History, and, from 1929-35, he was a member of the editorial staff of the journal, *Biological Abstracts*.

He was research associate for the American Committee for International Wild Life Protection for the next three years. From 1939-42, Dr. Harper served as research associate for the John Bartram Association. He was a member of the editorial staff of the *American Philosophical Society* from 1942-44. He was a Fellow of the John Simon Guggenheim Memorial Foundation from 1950-52.

Dr. Harper's scientific writings include "The Mammals of the Okefenokee Swamp Region of Georgia," 1927; "Extinct and Vanishing Mammals of the Old World," 1945; and many others. In 1942 and 1943, he was the editor of the *Southern Journals* of John and William Bartram and, in 1958, he was responsible for the first annotated edition of "The Travels of William Bartram" in the English language.

Dr. Harper was a member of the American Ornithologists' Union; the American Society of Mammalogists, which he served as corresponding secretary from 1931-32; the Arctic Institute of North America; Cooper Ornithological Society; the Society of Systematic Zoology; and Wilson Ornithological Society.



DR. FRANCIS HARPER

He was elected to Phi Beta Kappa; Sigma Xi, national research society; and Gamma Alpha, graduate scientific fraternity.

His special interests included the study of early American naturalists; Southern dialect, folklore and folk music; and nature photography.

He is survived by his widow, the former Mary Jean Sherwood, a native of Cornwall, N.Y. They were married in 1923.

No funeral or memorial services are planned. The body will be donated to medical research, and the ashes will eventually be interred in the family plot in Cornwall.

In lieu of flowers, memorial contributions may be sent to Defenders of Wildlife, 2000 N. Street, N.W., Suite 201, Washington, D.C. 20036, earmarked for use "toward conservation of wildlife in memory of Francis Harper."

*The Chapel Hill News-Observer  
Nov. 21, 1972*

SMITHSONIAN INSTITUTION  
UNITED STATES NATIONAL MUSEUM  
WASHINGTON, D. C. 20560

January 23, 1967

Mr. George B. Van Schaack  
Librarian  
Missouri Botanical Garden  
2315 Tower Grove Avenue  
St. Louis, Missouri 63110

Dear George:

I am still digging through 3 months of accumulation while I was in Europe, hence the delay in answering your letter of November 4, 1966. Thank you for the copy of my Bromeliaceae XV. I am sorry I could not find any No. XIV. It is in number 161 of the Contributions from the Gray Herbarium. Incidentally, most of my bromel publications are listed in "The Bromeliad Society Bulletin" if you care to check.

← vol. 16: p. 86.

With best regards,

Sincerely yours,

*Lyman*

Lyman B. Smith  
Senior Botanist  
Department of Botany