minutes—estimated—after its disappearance we heard quite a loud report as of an explosion. Other observers in various parts of the state report hearing a roaring sound and all, without exception, report that an explosion either accompanied (the disappearance) or else followed the disappearance at varying intervals according to different observers.

Reports from several localities spoke of the finding of fragments of the meteorite. All these localities were visited by me and the specimens examined with negative results in all cases.

At Neillsville, Wisconsin, some 60 miles west of Stevens Point, I talked with two intelligent observers separately—who estimated the flight to be further north than I did. One thought the course a little east of north and the other that it was a little west of north. They were both out in the open (golf links) and so had a very fine view of the spectacle. One of them thought the object was as large as a bushel basket; the other said it seemed to him as large as a gasoline barrel. The meteor was seen as far south as Racine and as far north as Green Bay, Wis., a distance of about 150 miles.

G. E. CULVER

STEVENS POINT, WISCONSIN
SEPTEMBER 6

REPORTS

DOCTORATES CONFERRED IN THE SCIENCES BY AMERICAN UNIVERSITIES, 1931–1932

THE Research Information Service of the National Research Council, with the cooperation of the registrars of the various American universities, is again able to present information regarding the doctorates in science.

The following data for the academic year 1931–32 supplement those in SCIENCE 72: 357–358 (1930) and 74: 659–660 (1931), where a survey is given for the period 1898–1930 and 1930–1931.

Detailed data for the year 1931–1932, with the comparative statistics for the past ten years and with the names of the recipients of the degrees and the

TABLE I

DOCTORATES CONFERRED ACCORDING TO SUBJECTS

	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
Chemistry	185	251	250	257	270	278	310	317	390	420
Zoology	45	42	71	55	70	89	91	102	117	127
Physics	54	58	59	76	92	78	101	91	94	113
Psychology	46	51	51	60	74	66	112	97	105	104
Botany	64	57	69	69	53	61	76	81	81	79
Mathematics	28	32	24	47	46	44	61	75	73	75
Engineering	5	5	2	11	10	28	34	49	25	47
Bacteriology	32	12	20	21	20	29	26	27	38	46
Physiology	20	17	17	43	35	28	37	46	46	46
Geology	34	41	25	27	42	35	45	63	39	45
Pathology	21	12	5	4	16	31	27	31	26	43
Agriculture	10	11	16	19	19	31	27	29	45	31
Anatomy	10	5	4	11	13	11	15	12	11	16
Astronomy	6	7	3	7	9	3	8	4	11	8
Med. and Surg.	..	..	..	..	..	..	..	4	2	8
Public Health	..	..	..	3	4	4	15	8	20	8
Metallurgy	2	2	3	10	4	13	8	4	5	7
Anthropology	3	3	2	5	3	5	13	6	7	6
Geography	7	3	13	11	14	7	12	17	6	5
Archeology	0	0	0	0	0	0	2	2	2	3
Paleontology	2	2	1	7	0	1	2	6	3	2
Seismology	..	..	..	..	..	..	..	..	..	2
Meteorology	0	0	0	0	0	0	2	0	0	0
Mineralogy	1	1	4	4	2	0	1	3	1	0
Totals	575	611	640	748	796	842	1025	1074	1147	1241

TABLE II

DOCTORATES CONFERRED ACCORDING TO UNIVERSITIES

	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
Chicago	71	75	59	78	86	70	99	94	82	116
Wisconsin	44	41	64	53	55	60	66	86	86	88
Cornell	41	60	39	43	62	67	60	80	57	80
Johns Hopkins	58	44	36	50	44	56	62	58	67	67
Ohio State	21	20	33	25	30	25	48	50	74	61
Columbia	58	57	51	49	62	46	61	44	51	58
Minnesota	17	23	23	30	29	41	53	53	47	58
Yale	34	22	41	38	34	38	47	43	53	57
Michigan	15	25	15	32	30	52	38	55	55	55
California	27	20	31	38	42	37	50	47	48	48
Illinois	33	20	32	44	31	36	34	43	45	46
Harvard	31	35	25	35	42	33	40	40	49	45
Iowa	12	16	19	28	24	32	38	28	33	43
Iowa State	..	9	12	14	13	26	28	26	39	34
Mass. Inst.	11	18	18	13	18	13	20	29	16	32
Pittsburgh	7	5	8	7	11	13	8	15	15	31
Pennsylvania	8	12	12	14	27	18	24	26	19	27
Princeton	9	17	15	12	18	17	25	22	16	27
Calif. Inst.	0	9	8	15	8	18	22	18	23	21
Stanford	8	14	15	17	17	17	26	26	28	21
Indiana	5	5	8	7	5	8	9	11	7	16
Brown	3	3	8	4	4	5	7	9	7	14
New York	10	2	5	7	4	11	13	10	23	13
Washington	0	1	3	1	1	5	8	5	6	13
Cincinnati	3	4	7	8	5	1	14	6	13	12
Penn. State	..	..	..	..	1	4	3	3	8	11
Northwestern	2	6	2	4	6	8	5	8	13	10
Rutgers	..	..	..	2	3	9	4	5	5	10
Texas	1	0	0	1	3	0	7	6	5	10
Nebraska	2	5	7	2	2	3	4	6	7	9
Wash. U. St. L.	8	2	0	5	7	2	7	7	8	8
West. Reserve	..	..	..	..	..	..	3	5	9	8
Catholic	1	3	3	6	5	8	6	2	7	7
Duke	..	..	..	..	..	..	4	4	5	7
Kansas	2	2	4	8	8	5	10	11	5	7
Radcliffe	3	2	3	3	2	1	2	5	2	7
Colorado	1	0	1	3	1	3	3	2	3	5
G. Washington	13	5	6	4	4	2	5	2	3	5
Mich. State	0	0	1	4	2	2	6	2	8	5
Missouri	0	5	4	3	7	2	3	6	9	5
Rochester	..	..	1	0	3	3	0	2	5	5
St. Louis	..	..	..	..	2	3	2	3	4	5
Virginia	1	3	5	5	8	3	5	12	9	5
American	..	..	..	3	3	3	1	5	3	3
Bryn Mawr	0	1	1	2	4	0	1	2	1	3
N. Carolina	2	1	0	7	3	4	3	6	12	3
Syracuse	0	0	0	2	3	2	1	5	1	3

TABLE II—*Continued*

DOCTORATES CONFERRED ACCORDING TO UNIVERSITIES

	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
Clark	8	3	6	7	7	5	11	11	4	2
Maryland	0	1	5	6	3	6	8	3	12	2
Purdue	..	..	..	..	..	..	1	4	6	2
Rensselaer	0	2	0	2	2	7	3	2	4	2
Rice	0	1	2	1	1	3	4	3	5	2
Vanderbilt	..	..	..	..	..	..	..	..	3	2
Fordham	2	0	2	2	1	2	8	6	4	1
George Peabody.	..	..	..	..	..	..	..	..	3	1
Oregon	..	..	..	1	0	0	0	2	1	1
Tulane	..	..	..	..	1	2	1	1	0	1

TABLE II—*Concluded*

DOCTORATES CONFERRED ACCORDING TO UNIVERSITIES

	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32
S. Col. Wash.	..	..	..	..	..	..	..	1	3	1
Arizona	..	..	..	..	1	0	0	0	1	0
Boston	1	0	0	1	0	0	0	2	0	0
Georgetown	..	..	..	..	..	..	1	0	2	0
Marquette	..	..	..	..	..	1	0	0	1	0
Mass. State	1	1	0	1	0	1	1	3	4	0
Notre Dame	1	2	0	0	0	0	1	3	2	0
N. Y. S. Col. For.	..	..	..	1	1	2	2	0	1	0
Totals	575	611	640	748	796	842	1025	1074	1147	1241

TABLE III

DISTRIBUTION OF DOCTORATES FOR THE CURRENT YEAR BY UNIVERSITY BY SUBJECT

	Agriculture	Anatomy	Anthropology	Archeology	Astronomy	Bacteriology	Botany	Chemistry	Engineering	Geography	Geology	Mathematics	Medicine and Surg.	Metallurgy	Paleontology	Pathology	Physics	Physiology	Psychology	Public Health	Seismology	Zoology	Total
American	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	3
Brown	.....	.....	.....	.....	.....	2	.....	5	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	14
Bryn Mawr	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	3
California	.....	1	2	1	1	1	6	11	.....	1	1	1	.....	.....	.....	1	8	4	1	.....	1	7	48
Calif. Inst. Tech.	.....	.....	.....	.....	.....	.....	.....	6	6	.....	2	1	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	21
Catholic	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	2	.....	.....	.....	.....	2	.....	1	.....	.....	.....	7
Chicago	.....	2	.....	.....	2	5	16	32	.....	2	4	13	1	.....	.....	3	9	8	8	.....	.....	11	116
Cincinnati	.....	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	12
Clark	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2
Colorado	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5
Columbia	.....	.....	2	.....	.....	1	4	29	1	.....	3	1	.....	.....	.....	.....	2	.....	10	.....	.....	5	58
Cornell	4	1	.....	.....	.....	4	3	17	2	.....	1	9	.....	.....	1	9	4	4	4	.....	.....	17	80
Duke	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	7
Fordham	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
George Peabody	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1
George Washington	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	1	.....	.....	1	.....	.....	1	5
Harvard	.....	.....	.....	1	1	.....	3	18	.....	.....	3	6	.....	.....	.....	.....	8	.....	4	.....	.....	1	45
Illinois	3	.....	.....	.....	.....	.....	2	23	1	.....	2	3	.....	.....	.....	.....	5	.....	2	.....	.....	5	46
Indiana	.....	.....	.....	.....	.....	.....	1	4	.....	.....	2	1	.....	.....	.....	.....	6	.....	1	.....	.....	1	16
Iowa	.....	.....	.....	.....	.....	.....	.....	19	.....	.....	3	4	.....	.....	1	.....	3	.....	10	.....	.....	3	43
Iowa State	5	.....	.....	.....	.....	7	1	15	3	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	2	34
Johns Hopkins	.....	.....	.....	1	.....	2	.....	25	4	.....	2	2	1	.....	.....	2	3	5	6	5	.....	9	67
Kansas	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	.....	.....	.....	7
Maryland	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Mass. Inst. Tech.	.....	.....	.....	.....	.....	1	.....	14	11	.....	.....	1	.....	1	.....	.....	4	.....	.....	.....	.....	.....	32
Michigan	.....	.....	.....	.....	2	1	4	8	11	.....	1	6	.....	.....	.....	.....	9	1	2	2	.....	8	55
Michigan State	1	.....	.....	.....	.....	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Minnesota	.....	2	.....	.....	.....	2	3	19	1	.....	3	.....	6	.....	.....	6	5	4	6	.....	.....	1	58
Missouri	1	.....	.....	.....	.....	.....	1	1	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Nebraska	.....	.....	.....	.....	.....	.....	1	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	9
New York	.....	1	.....	.....	.....	.....	.....	6	.....	.....	2	1	.....	.....	.....	1	2	.....	.....	.....	.....	.....	13
North Carolina	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Northwestern	.....	1	.....	.....	.....	.....	.....	4	.....	.....	1	.....	.....	.....	.....	1	.....	2	1	.....	.....	.....	10
Ohio State	1	.....	.....	.....	.....	1	5	18	3	1	.....	4	.....	.....	.....	.....	4	3	9	.....	.....	12	61
Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Pennsylvania	.....	.....	.....	.....	.....	1	2	8	.....	.....	.....	2	.....	.....	.....	.....	2	1	8	.....	.....	3	27
Penn. State	2	.....	.....	.....	.....	.....	2	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11
Pittsburgh	.....	.....	.....	.....	.....	1	3	15	.....	.....	.....	2	.....	.....	.....	.....	3	.....	1	.....	.....	6	31
Princeton	.....	.....	.....	.....	1	.....	.....	11	.....	.....	4	3	.....	.....	.....	.....	2	3	2	.....	.....	1	27
Purdue	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Radcliffe	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	1	1	.....	.....	.....	1	7
Rensselaer	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	2
Rice	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	2
Rochester	.....	.....	.....	.....	.....	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	5
Rutgers	3	.....	.....	.....	.....	1	1	2	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	10

TABLE III—*Concluded*

	Agriculture	Anatomy	Anthropology	Archeology	Astronomy	Bacteriology	Botany	Chemistry	Engineering	Geography	Geology	Mathematics	Medicine and Surg.	Metallurgy	Paleontology	Pathology	Physics	Physiology	Psychology	Public Health	Seismology	Zoology	Total
St. Louis	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	1	.....	5
Stanford	.....	.....	.....	.....	.....	.....	1	7	1	.....	1	1	.....	.....	.....	1	1	1	6	.....	.....	1	21
State College Wash.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Syracuse	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3
Texas	.....	.....	.....	.....	.....	.....	3	1	.....	.....	.....	2	.....	.....	.....	.....	2	.....	1	.....	.....	1	10
Tulane	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Vanderbilt	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Virginia	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	5
Washington	.....	.....	.....	.....	.....	1	2	7	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	13
Wash. Univ. St. Louis	.....	1	.....	.....	.....	.....	3	2	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	8
Western Reserve	.....	1	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	1	8
Wisconsin	6	1	.....	.....	.....	8	4	29	.....	.....	2	2	.....	2	.....	13	6	3	5	.....	.....	7	88
Yale	4	2	2	.....	.....	4	1	16	1	.....	2	.....	.....	2	.....	1	7	.....	4	1	.....	10	57
Totals	31	16	6	3	8	46	79	420	47	5	45	75	8	7	2	43	113	46	104	8	2	127	1241

titles of the theses, will be found in Reprint and Circular Series No. 104. Earlier numbers of this series, containing such data for earlier years, are 26, 42, 75, 80, 86, 91, 95, 101. Copies of these may be obtained from the Publication Office, National Research Council, Washington, D. C.

CLARENCE J. WEST
CALLIE HULL

SCIENTIFIC APPARATUS AND LABORATORY METHODS

RELATION OF ANATOMY AND METHOD OF EXTRACTION TO QUALITY OF SATSUMA ORANGE JUICE[1]

RECENT research carried out jointly by the Division of Horticultural Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture and the Florida Agricultural Experiment Station, has yielded some preliminary results of immediate value to those interested in the subject of the quality of expressed citrus juices, as affected principally by the physiological anatomy, type, variety and maturity of citrus fruits.

A definite correlation was first established, while working with ripe Kawano Wase Satsuma oranges, between certain methods of preparation and the development of a bitter taste in the prepared juice on aging.

In Method No. 1 the juice was pressed from juice sacs only between porcelain plates. Result: Pleasantly tart taste, no bitter taste developed after 24 hours at room temperature; retained good quality in refrigerator for several days; deep chrome color, no change.

In Method No. 2 the juice was pressed from the halved unpeeled fruits between an inverted cup and a form fitting over it. Result: Pleasantly tart taste with added flavor of citrus oil, no bitter taste developed after 24 hours; color changed from deep chrome to light yellow within an hour.

In Method No. 3 the juice was pressed from the whole peeled fruit by means of a conical worm in a fluted housing. Result: Developed bitter taste in 2 hours and became exceedingly bitter after 4 hours; deep chrome color, no change.

In Method No. 4 the pulp was reamed out by means of a revolving cone. Result: Developed bitter taste in 2 hours and became exceedingly bitter after 4 hours; deep chrome color, no change.

Supplementing the technique indicated, specific methods were employed to separate the fruit into eight complex tissue fractions: (1) Outer peel; (2) inner peel and veins; (3) locular walls; (4) central axis; (5) seed coat; (6) cotyledons and germ; (7) empty juice sacs and (8) juice pressed from juice sacs only. The process was in some cases carried one step further—oil was pressed from outer peel, glucosides and pectins were extracted from the inner peel and veins, etc. The possible effect of the various com-

[1] Cooperative research between Bureau of Plant Industry, U. S. Department of Agriculture, and Florida Agricultural Experiment Station.