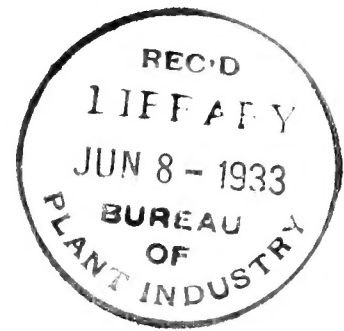


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DISEASES OF PLANTS IN THE UNITED STATES IN 1932

Compiled by

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INTRODUCTION

The unusual severity and wide distribution of bacterial wilt of sweet corn and downy mildew of tobacco outweigh in interest other developments in the realm of plant diseases in the United States during 1932. Collaborators and other pathologists gave much attention to these two diseases, and their spread was closely watched and recorded. For details see the 1932 Reporter. General reports on these two diseases were published in the American Year Book for 1932, pages 419-420, and in the International Bulletin of Plant Protection, November and December, 1932.

For reasons well known to most of the readers of this summary the extent of field work engaged in by American plant pathologists was materially less in 1932 than in any other recent year. This may have reduced somewhat the detail and volume of the reports sent in to the Survey, particularly as regards less important diseases. On the other hand, most State pathologists are so closely in touch with county agents and field workers that unusual developments come quickly to their attention.

Unquestionably the value of such coordination of information as is here attempted must be increased by the inability of individual workers to make extensive field observations for themselves and their appreciation of this is evidenced by the fact that reports have been surprisingly numerous.

Because of the necessity of keeping this summary within the briefest possible limit, information given in the current numbers of the Reporter have been given only incidentally to other discussions. Investigators interested in special diseases should consult the Index to the 1932 Reporter.

LIST OF COLLABORATORS FOR THE YEAR 1932

- ALABAMA, Agricultural Experiment Station, Auburn - W. A. Gardner, J. L. Seal.
- ARIZONA, Box 15, University Station, Tucson - J. G. Brown.
State Commission of Agriculture, Phoenix - D. C. George.
Agricultural Experiment Station, Tucson - J. J. Thornber.
- ARKANSAS, University of Arkansas, Fayetteville - V. H. Young.
Agricultural Experiment Station, Fayetteville - H. R. Rosen.
- CALIFORNIA, University of California, Berkeley - J. T. Barrett, M. W. Gardner, C. Emlen Scott.
Citrus Experiment Station, Riverside - W. T. Horne, E. T. Bartholomew.
Agricultural Experiment Station, Davis - J. B. Kendrick.
Southern Branch University of California, Los Angeles - O. A. Plunkett.
Department of Agriculture, Sacramento - D. G. Milbrath, G. L. Stout.
- COLORADO, Agricultural College, Fort Collins - L. W. Durrell, E. W. Bodine, E. J. Starkey.
- CONNECTICUT, Agricultural Experiment Station, New Haven - G. P. Clinton, E. M. Stoddard.
Tobacco Experiment Station, Windsor - P. J. Anderson.
- DELAWARE, Agricultural Experiment Station, Newark - J. F. Adams, T. F. Manns.
- FLORIDA, Agricultural Experiment Station, Gainesville - G. F. Weber, W. B. Tisdale, R. K. Voorhees.
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Quincy Tobacco Experiment Station - L. O. Gratz.
Citrus Elight Laboratory, Cocoa - A. S. Rhoads
- GEORGIA, State College of Agriculture, Athens - J. H. Miller, T. H. McHatton, H. M. McKay.
- IDAHO, Agricultural Experiment Station, Moscow - C. W. Hungerford.
- ILLINOIS, University of Illinois, Urbana - E. W. Anderson, G. H. Dungan, B. Koehler, J. W. Lloyd, F. L. Stevens.
State Natural History Survey, Urbana - L. R. Tehon, G. H. Boewe.
- INDIANA, Agricultural Experiment Station, Lafayette - J. A. McClintock, R. W. Samson.
Purdue University, Lafayette - C. L. Porter.
- IOWA, Agricultural Experiment Station, Ames - I. E. Melhus.
Iowa State College, Ames - J. C. Gilman, R. H. Porter, C. S. Reddy.
Iowa State Teachers' College, Cedar Falls - C. W. Lantz.
Upper Iowa University, Fayette - G. W. Wilson.

- KANSAS, State Agricultural College, Manhattan - O. H. Elmer, E. H. Leker,
L. E. Melchers.
- KENTUCKY, Agricultural Experiment Station, Lexington - W. D. Valleau,
University of Kentucky, Lexington - J. S. Gardner, R. Kenney.
College of Agriculture, Lexington - Russel A. Hunt, W. W. Magill.
- LOUISIANA, Agricultural Experiment Station, Baton Rouge - C. W. Edgerton,
L. H. Person, A. G. Plakidas, E. C. Tims.
- MAINE, Agricultural Experiment Station, Orono - D. Folsom, Florence L.
Markin
College of Agriculture, Orono - F. E. Steinmetz.
- MARYLAND, Maryland Agricultural College, College Park - R. A. Jehle.
Agricultural Experiment Station, College Park - J. B. S. Norton,
C. E. Temple.
- MASSACHUSETTS, Massachusetts Agricultural College, Amherst - W. H. Davis,
O. C. Boyd, W. L. Doran, A. V. Osmun.
Market Garden Field Station, Waltham - E. F. Guba.
- MICHIGAN, Michigan Agricultural College, East Lansing - J. H. Muncie, E. A.
Bessey, Donald Cation, R. Nelson, H. H. Wedgworth.
- MINNESOTA, University of Minnesota, St. Paul - J. G. Leach.
Agricultural Experiment Station, St. Paul - Louise Dordall, E. M.
Freeman, E. C. Stakman.
- MISSISSIPPI, Agricultural Experiment Station, A. & M. College - L. E.
Miles, J. M. Beal.
- MISSOURI, State Board of Agriculture, Jefferson City - I. T. Scott.
105 W. High Street, Jefferson City - A. C. Burrill.
University of Missouri, Columbia - W. E. Maneval, C. M. Tucker.
- MONTANA, Agricultural Experiment Station, Bozeman - P. A. Young, H. E.
Swingle, H. E. Morris.
- NEBRASKA, College of Agriculture, Lincoln - G. L. Peltier, R. W. Goss.
- NEVADA, Agricultural Experiment Station, Reno - P. A. Lehenbauer.
- NEW HAMPSHIRE, Agricultural Experiment Station, Durham - O. R. Butler.
Dartmouth College, Hanover - A. H. Chivers.
- NEW JERSEY, Agricultural Experiment Station, New Brunswick - W. H. Martin,
R. P. White.
Pemberton, New Jersey - Thompson J. Blisard.
Rutgers College, New Brunswick - C. M. Haenseler.
- NEW MEXICO, New Mexico Agricultural College, State College - R. F. Crawford.

- NEW YORK, Cornell University, Ithaca - M. F. Barrus, F. M. Blodgett,
C. Chupp, H. M. Fitzpatrick, L. M. Massey, H. H. Whetzel.
Agricultural Experiment Station, Geneva - W. H. Rankin.
- NORTH CAROLINA, Agricultural Experiment Station, Raleigh - R. F. Poole,
S. G. Lehman.
- NORTH DAKOTA, State College Station, Fargo - H. L. Bolley, W. E. Brentzel.
- OHIO, Agricultural Experiment Station, Wooster - H. C. Young, Fredericka
Detmers, Curtis May, R. C. Thomas, P. E. Tilford.
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University of Cincinnati, Cincinnati - O. T. Wilson.
- OKLAHOMA, Agricultural Experiment Station, Stillwater - F. M. Rolfs.
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A. & Mech. College, Stillwater - R. Stratton.
- OREGON, Oregon Agricultural College, Corvallis - H. P. Barss.
Hood River College, Hood River - LeRoy Childs.
Agricultural Experiment Station, Corvallis - S. M. Zeller.
- PENNSYLVANIA, Agricultural Experiment Station, State College - F. D. Kern,
E. L. Nixon.
Pennsylvania Field Laboratory, Rustleton - W. S. Beach.
Pennsylvania State College, State College - R. S. Kirby, L. O.
Overholts, H. W. Thurston, G. L. Zundel.
- RHOSE ISLAND, Rhode Island State College, Kingston - H. W. Browning, Walter
H. Snell.
- SOUTH CAROLINA, Agricultural Experiment Station, Clemson College - G. M.
Armstrong, H. W. Barre.
South Carolina Agricultural College, Clemson College - D. B.
Rosenkrans.
Wofford College, Spartanburg - C. B. Waller.
- SOUTH DAKOTA, South Dakota State College, Brookings - E. A. Walker.
Northville - J. F. Brenckle.
- TENNESSEE, Agricultural Experiment Station, Knoxville - C. D. Sherbakoff,
S. H. Essary.
University of Tennessee, Knoxville - J. O. Andes, J. L. Baskin,
L. R. Hesler.
Tennessee Horticultural Society, Knoxville - N. D. Peacock.
- TEXAS, Agricultural Experiment Station, College Station - J. J. Taubenhous,
W. N. Ezekiel, S. E. Wolff.
Sub-Station No. 15, Weslaco - W. J. Bach.
Temple Substation, Temple - Colonel Hoyt Rogers.
Prairie View Normal, Prairie View - G. H. Dickerson.

UTAH, Utah Agricultural College, Logan - B. L. Richards.

VERMONT, Agricultural Experiment Station, Burlington - B. F. Lutman.

VIRGINIA, Agricultural Experiment Station, Blacksburg - S. A. Wingard,
James Godkin, R. G. Henderson, A. B. Massey.

Virginia Truck Experiment Station, Norfolk - H. T. Cook.

Field Laboratory, Winchester - A. B. Groves.

Field Laboratory, Staunton - R. H. Hurt.

Hampton Institute, Hampton - T. W. Turner.

WASHINGTON, Agricultural Experiment Station, Pullman - F. D. Heald.

Long Beach - D. J. Crowley.

Washington State College, Pullman - L. K. Jones.

WEST VIRGINIA, West Virginia College of Agriculture, Morgantown - C. R. Orton.

Agricultural Experiment Station, Morgantown - Anthony Ferg, E. C.

Sherwood.

Agricultural Experiment Station, Inwood - F. J. Schneiderhan.

WISCONSIN, Agricultural Experiment Station, Madison - L. R. Jones.

University of Wisconsin, Madison - G. W. Keitt, A. J. Riker,

R. E. Vaughan.

WYOMING, Agricultural Experiment Station, Laramie - Aven Nelson.

HAITI, Port au Prince, Haiti - H. D. Barker.

HAWAII, Pineapple Experiment Station, Honolulu - M. B. Linford.

University of Hawaii, Honolulu - C. P. Sideris.

PHILLIPPINE ISLANDS, Bureau of Science, Manila - C. J. Humphrey.

PORTO RICO, Insular Exp. Station, Rio Piedras - M. T. Cook, J. A. B. Nolla.

METHOD OF PRESENTING WEATHER DATA

For convenience in reference, some of the available information regarding the weather conditions during 1932 are presented by means of graphs and maps. The method of presentation is essentially that used in 1931. (See Sup. 34: 6). The seasons have been considered arbitrarily as consisting of three calendar months, although the actual periods of growth and dormancy vary greatly in different parts of the United States. The climatic regions used by the Weather Bureau have, of course, been followed even though they are limited by State boundaries and often include widely different climatic areas. In most cases these conditions are well known to readers of this summary.

Mean temperature and total rainfall for the year are given in percentages of normal, regions approximately normal and above being further indicated by shading. Deviation from normal should furnish one means of correlating weather with unusual crop or disease conditions, since obviously "normal" indicates an average of the conditions to which the crops of the region have been subject during a series of years. In spite of admitted limitations of this method (see P. D. R. 17: p. 34) it seems to us the most convenient and practicable way of presenting in the small space available some of the most salient facts regarding the deviations from normal weather conditions during the year.

In addition a series of graphs have been prepared to show the temperature trend at Philadelphia for the past ten years, as compared with the fifty year normal.

THE WEATHER IN 1932

As shown by the maps, Figs. 1 - 8, precipitation was below normal during the spring months in most of the States east of the Rocky Mountains, and rainfall continued decidedly subnormal throughout the summer in the central Atlantic States. Nowhere, however, was there so severe a drought as that experienced during the summer of 1930 in this general region.

Spring and summer temperatures were, as indicated by the maps, close to normal over most of the country. Winter temperatures (December to February, inclusive) on the other hand were unusually high in practically all States east of the Rocky Mountains, particularly in the northeastern and northcentral States. The same thing is true, of course, of other recent winters. In fact so marked and long continued has been the prevalence of abnormally high winter temperatures in the central and eastern States that it may well influence, if indeed it has not already influenced, the abundance of some plant diseases.

The extent to which recent fall and winter temperatures have exceeded normal in the northeastern United States is shown by the Figs. 21 - 25 in which mean annual temperatures at Philadelphia for the seasons indicated for each of the past ten years are plotted against the fifty year normal. Only once during this period has the mean fall temperature been even one degree below normal, while since 1926 it has been consistently above normal culminating in a pronounced peak in 1931, just preceding the year now under review.

TEMPERATURE

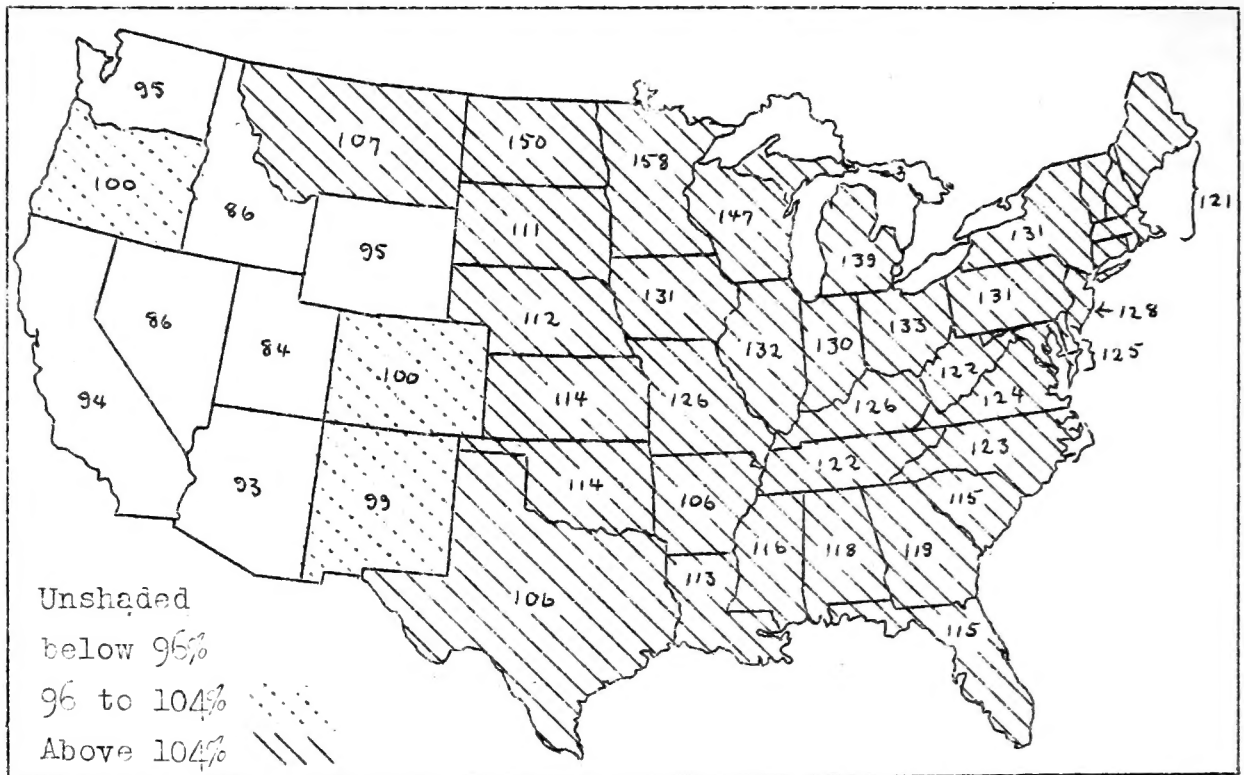


Fig. 1. Percentage of normal temperature for the winter (Dec. 1931, Jan. - Feb. 1932) 1932.

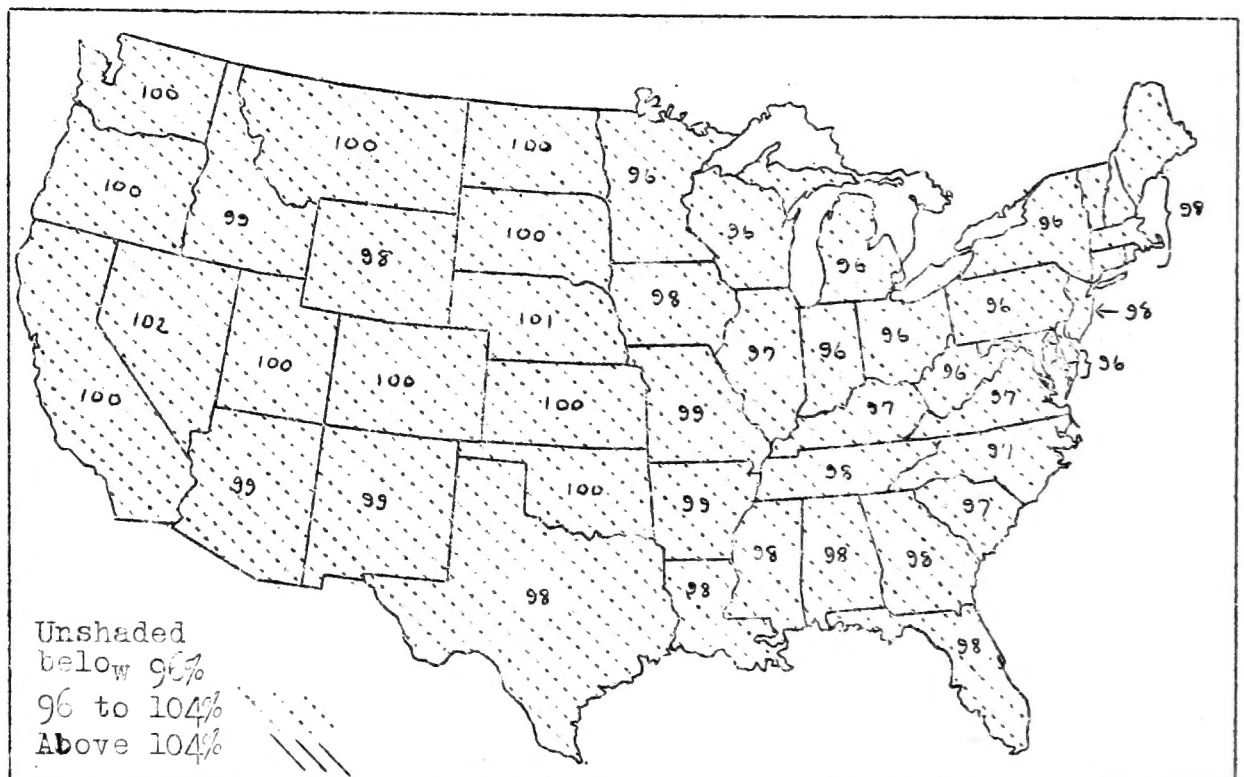


Fig. 2. Percentage of normal temperature for spring (Mar., April, May) 1932.

TEMPERATURE

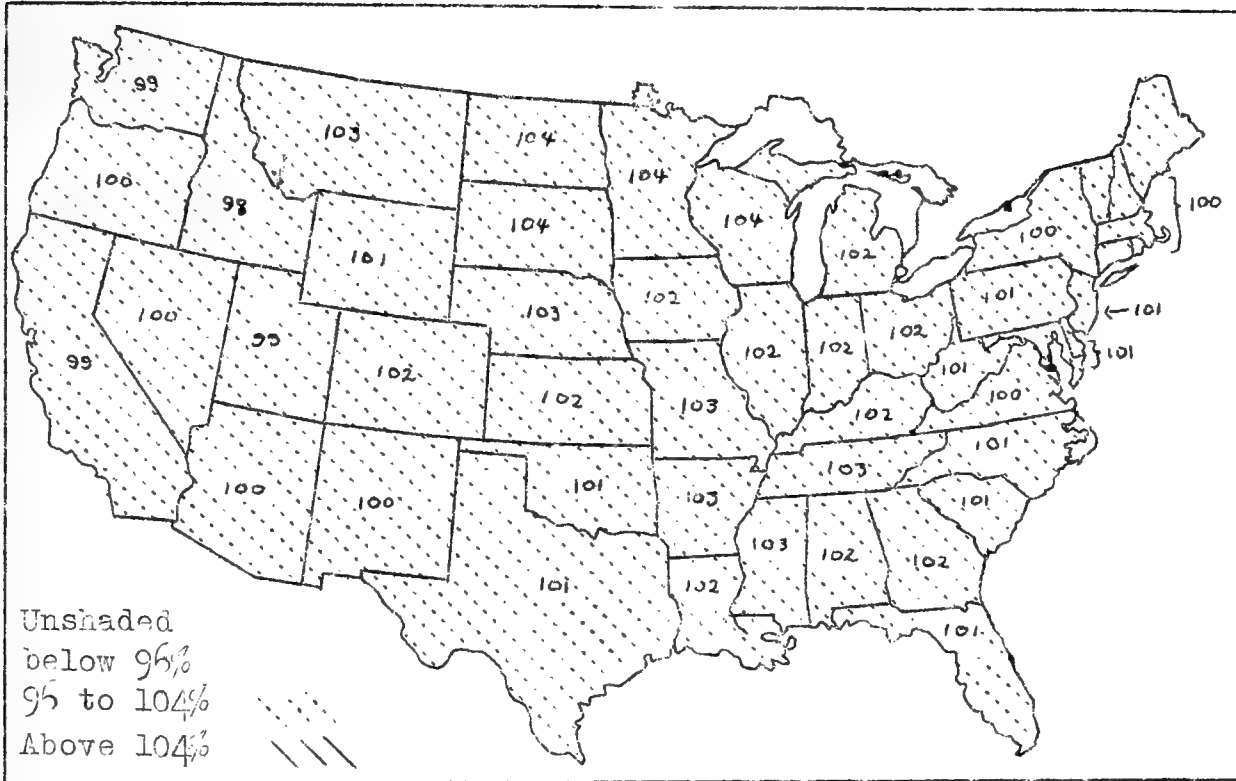


Fig. 3. Percentage of normal temperature for the summer (June, July, Aug.) 1932.

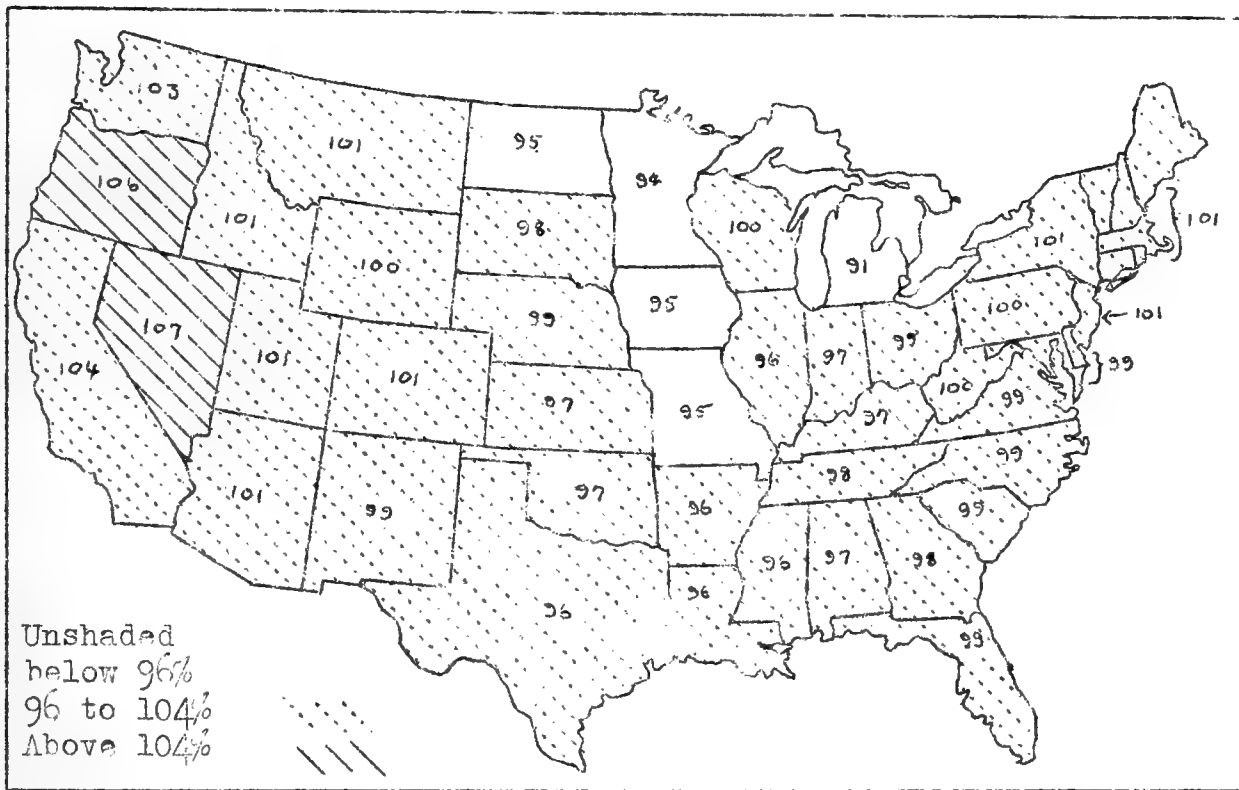


Fig. 4. Percentage of normal temperature for the fall (Sept., Oct., Nov.) 1932.

PRECIPITATION

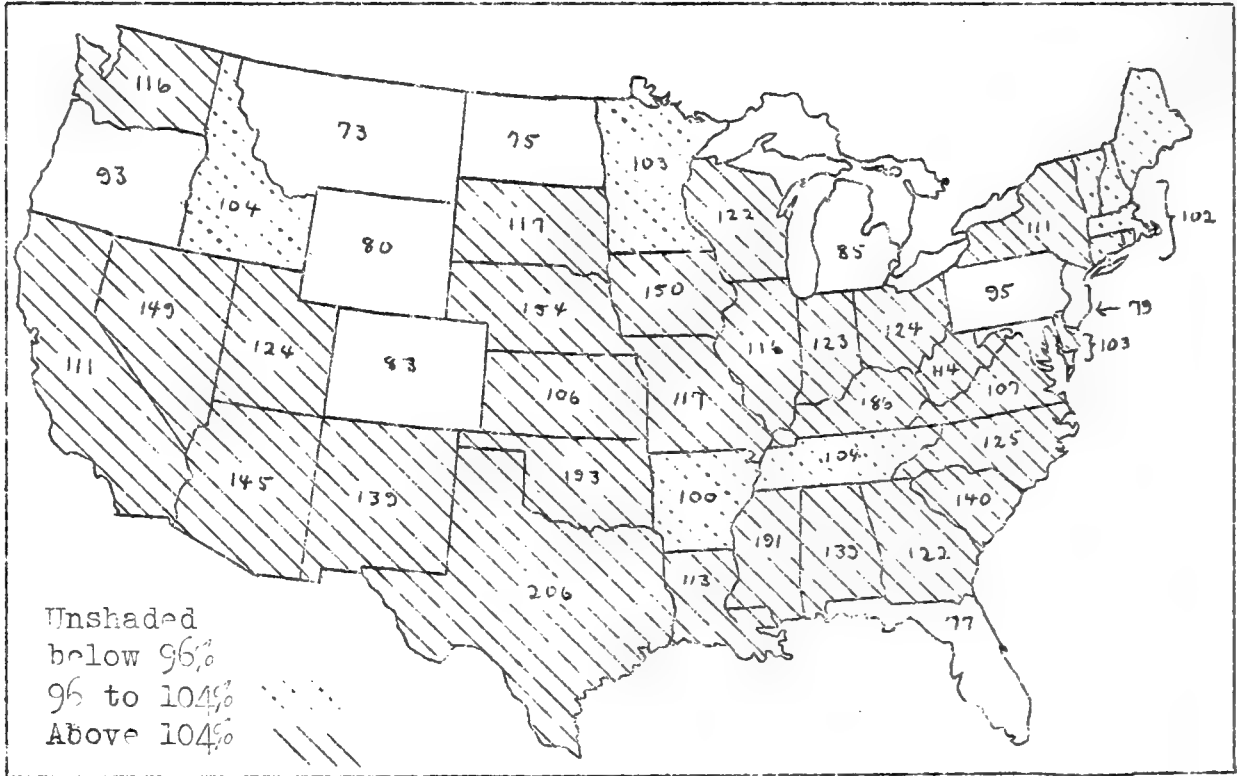


Fig. 5. Percentage of normal precipitation for the winter (Dec. 1931, Jan. - Feb. 1932) 1932.

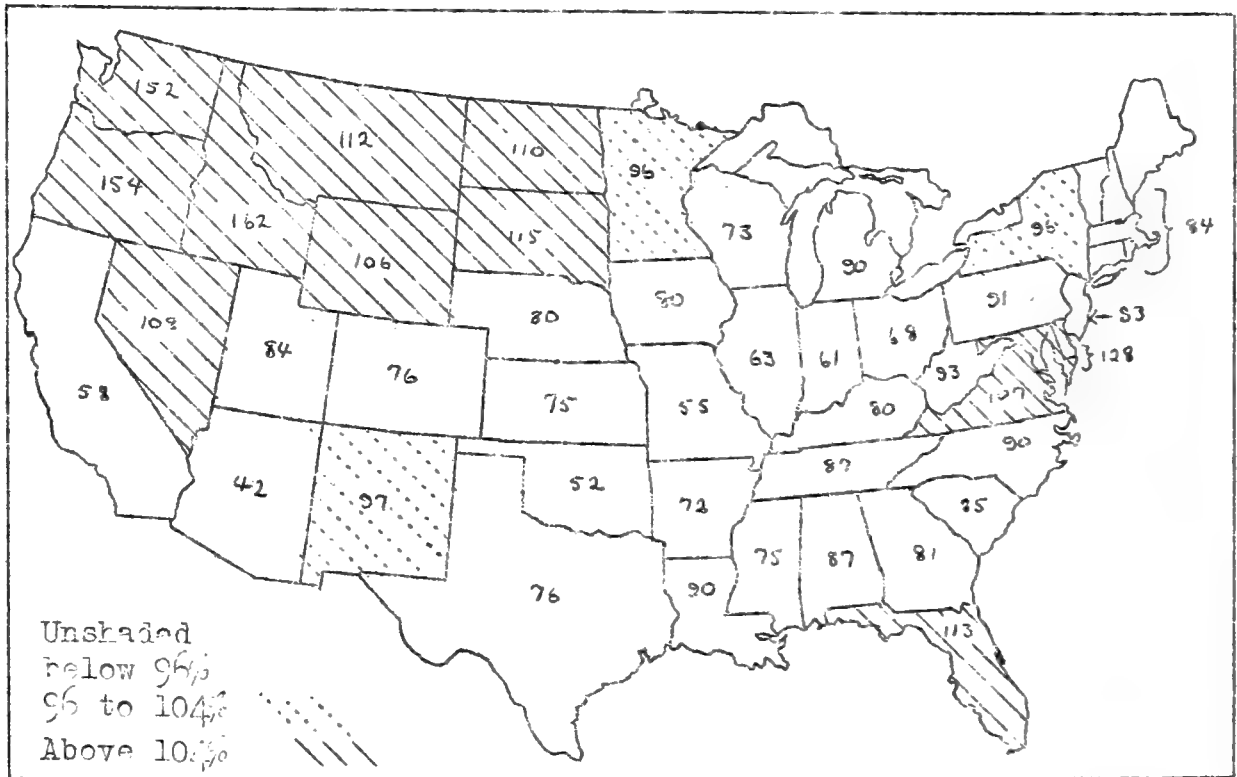


Fig. 6. Percentage of normal precipitation for the spring (Mar., Apr., May) 1932.

PRECIPITATION

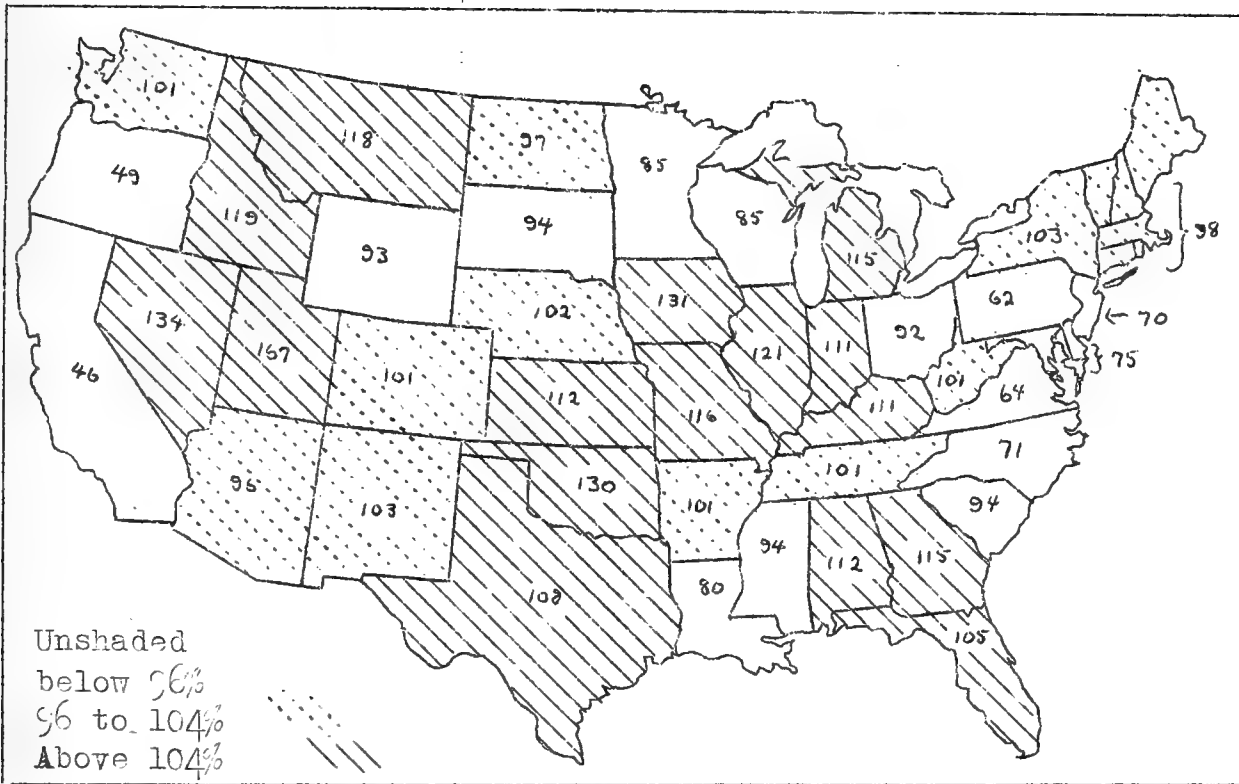


Fig. 7. Percentage of normal precipitation during summer (June, July, Aug.) 1932.

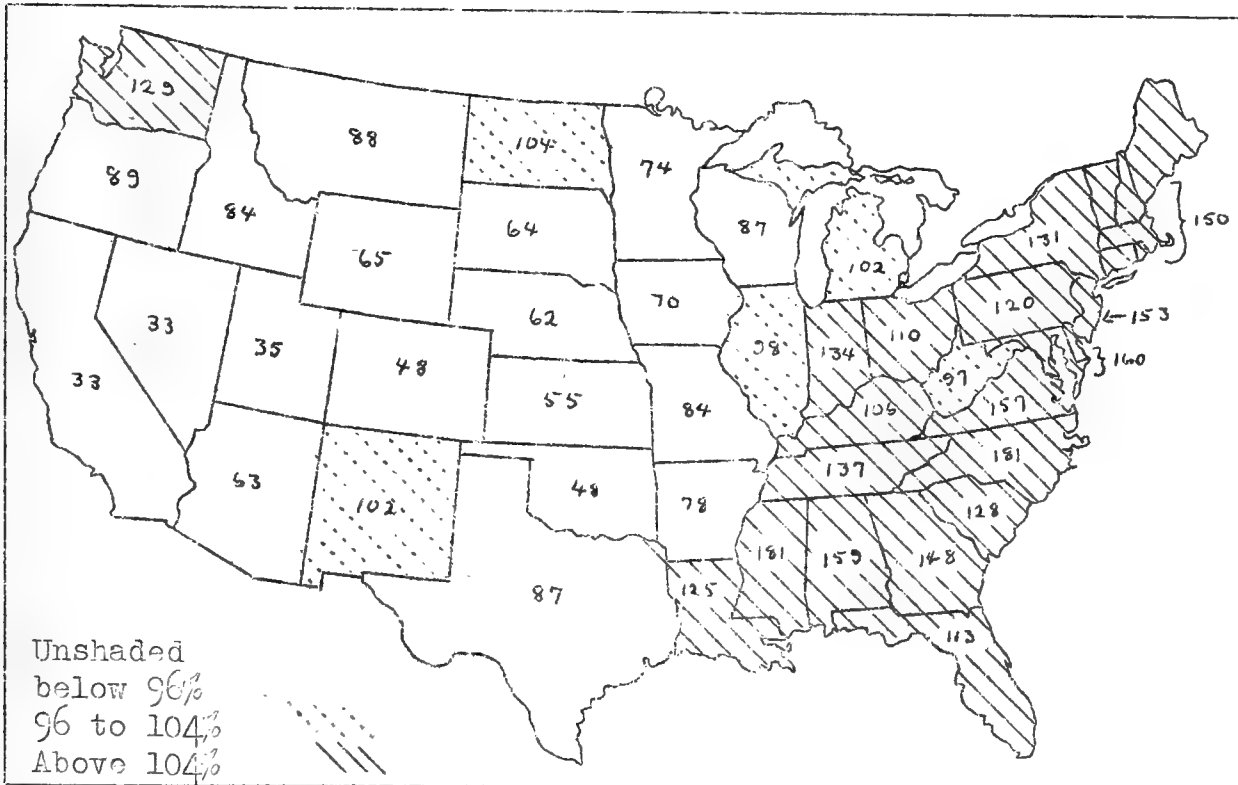


Fig. 8. Percentage of normal precipitation during fall (Sept., Oct., Nov.) 1932.

HARRISBURG, PENNSYLVANIA

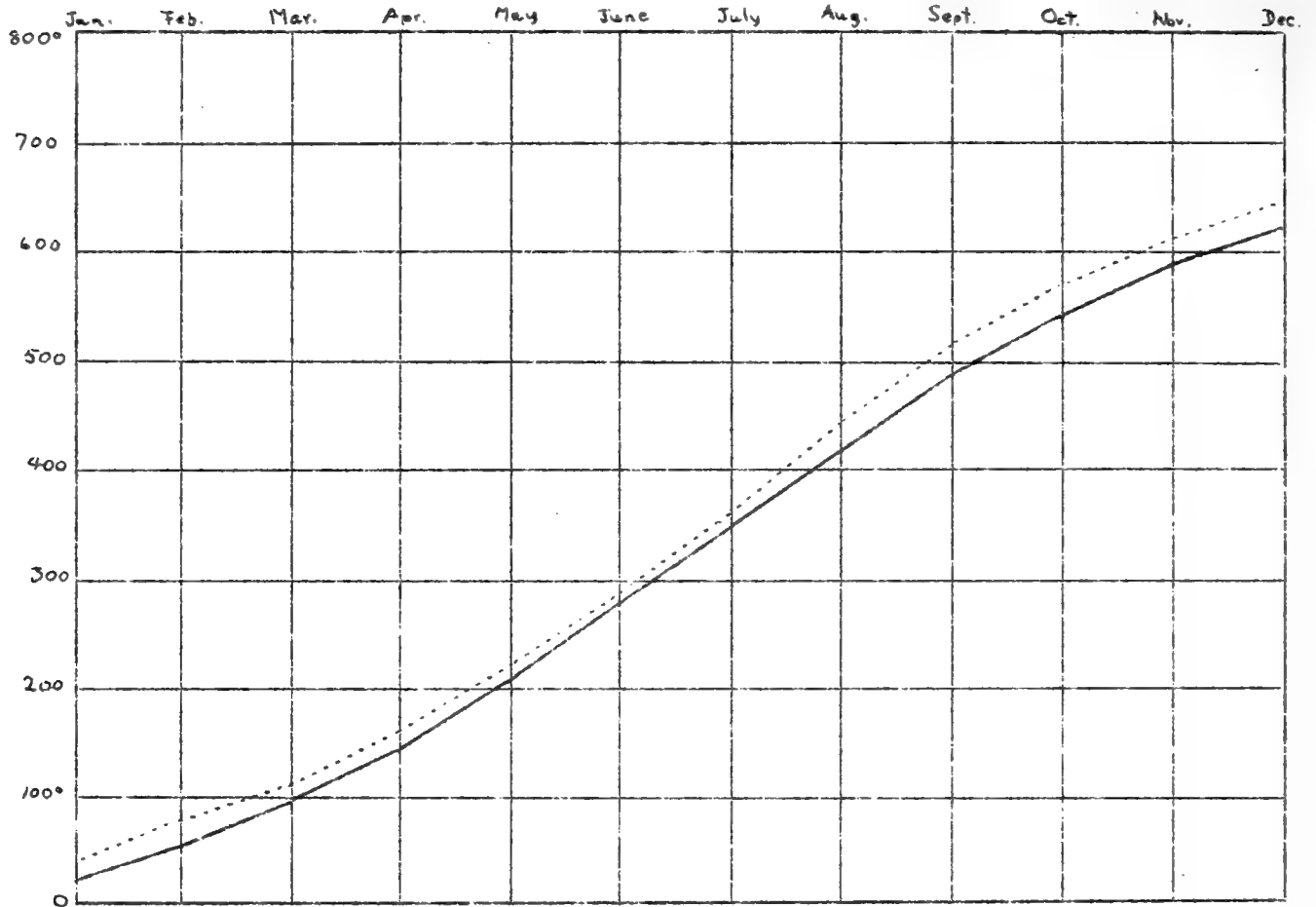


Fig. 9. Accumulated temperature in degrees F. for Harrisburg, Pennsylvania, 1932 (dotted line), compared with normal (solid line).

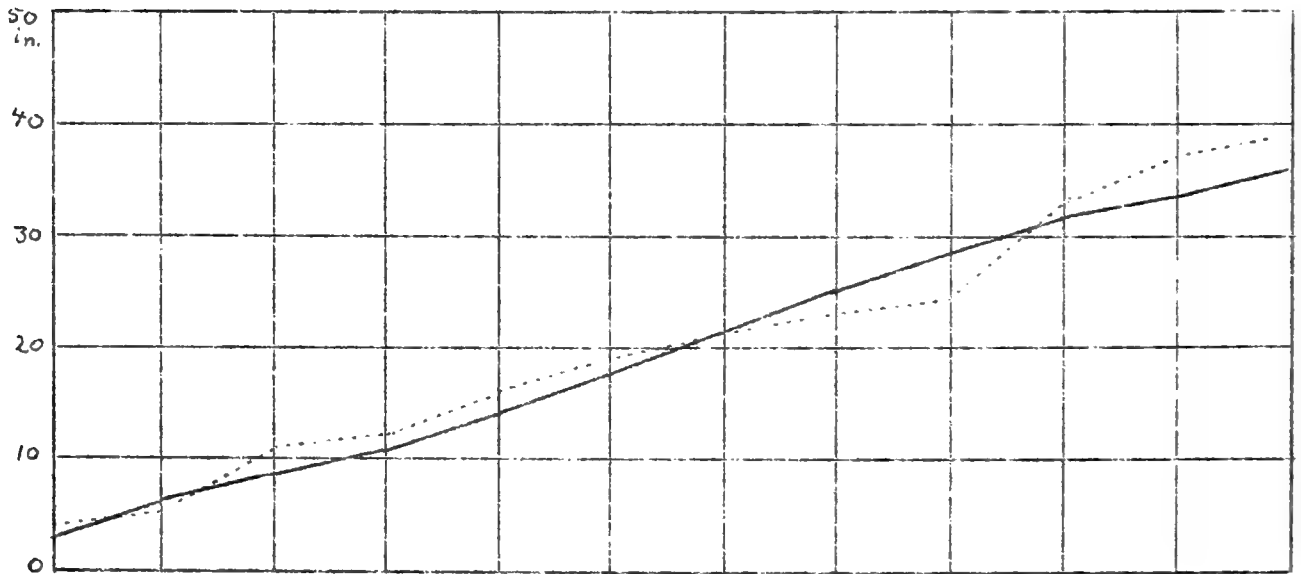


Fig. 10. Accumulated precipitation in inches for Harrisburg, Pennsylvania, 1932, (dotted line), compared with normal (solid line).

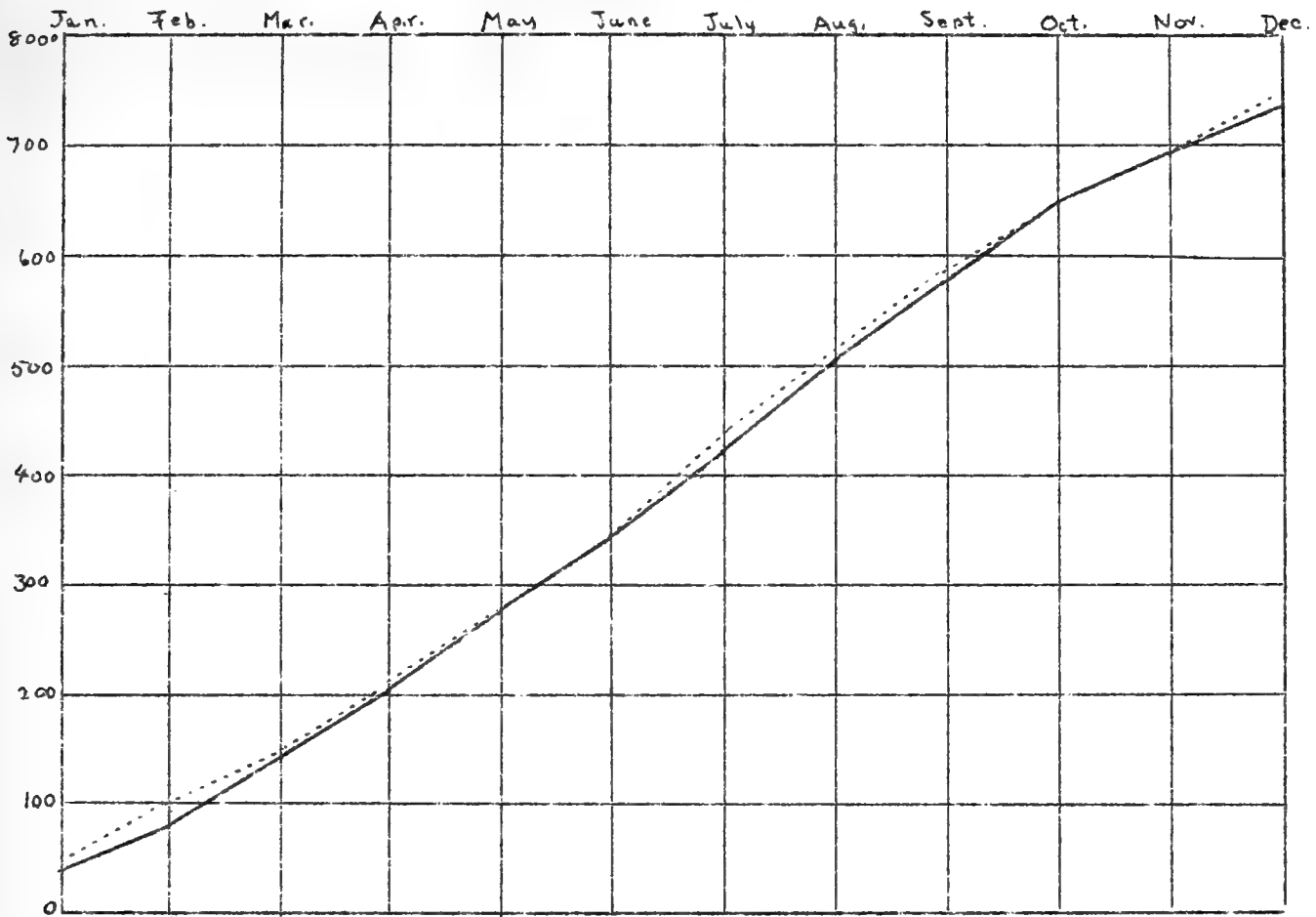


Fig. 11. Accumulated temperature in degrees F. for Atlanta, Georgia, 1932, (dotted line), compared with normal (solid line).

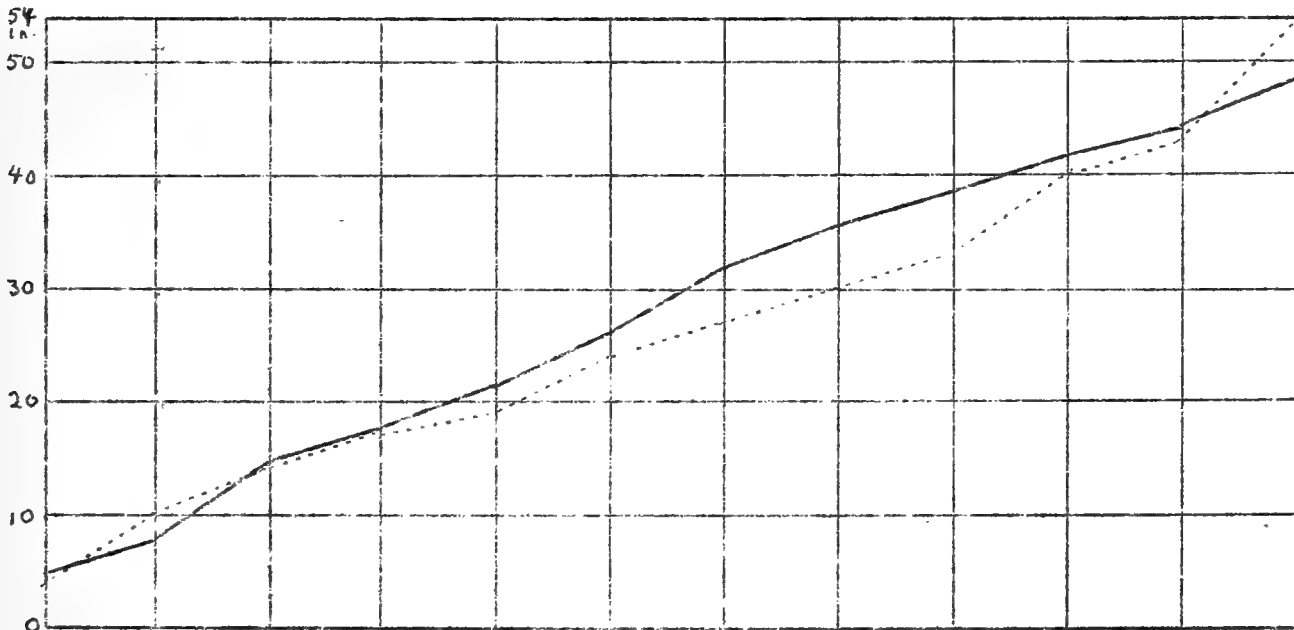


Fig. 12. Accumulated precipitation in inches for Atlanta, Georgia, 1932, (dotted line), compared with normal (solid line).

LITTLE ROCK, ARKANSAS

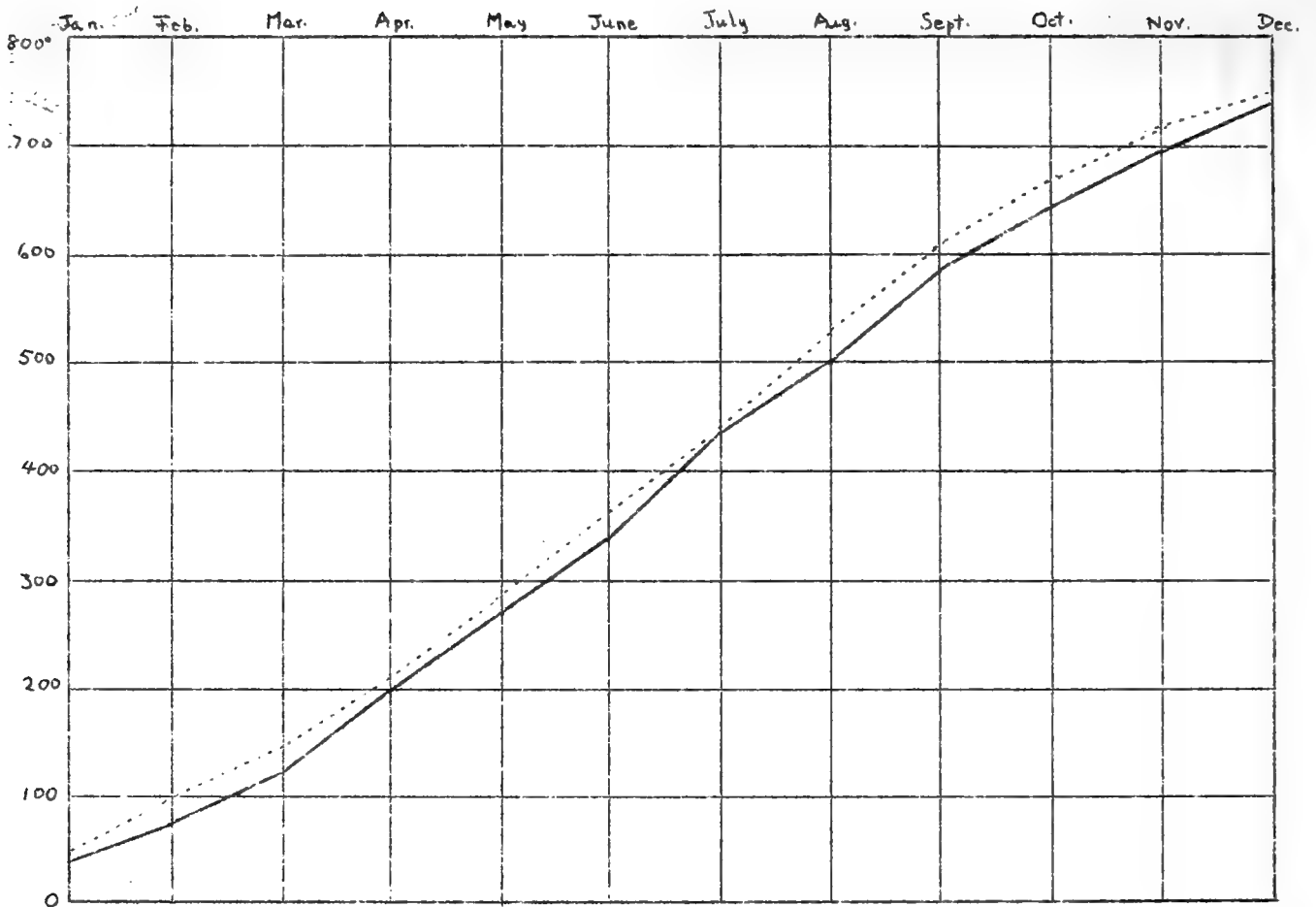


Fig. 13. Accumulated temperature in degrees F. for Little Rock, Arkansas, 1932, (dotted line), compared with normal (solid line).

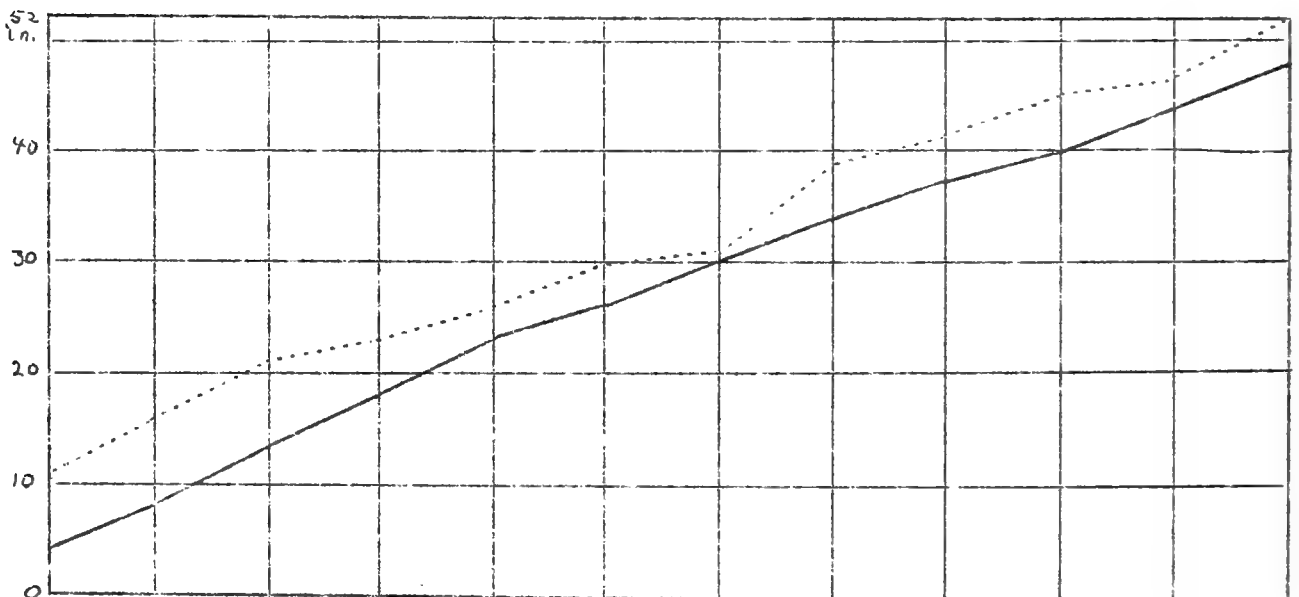


Fig. 14. Accumulated precipitation in inches for Little Rock, Arkansas, 1932, (dotted line), compared with normal (solid line).

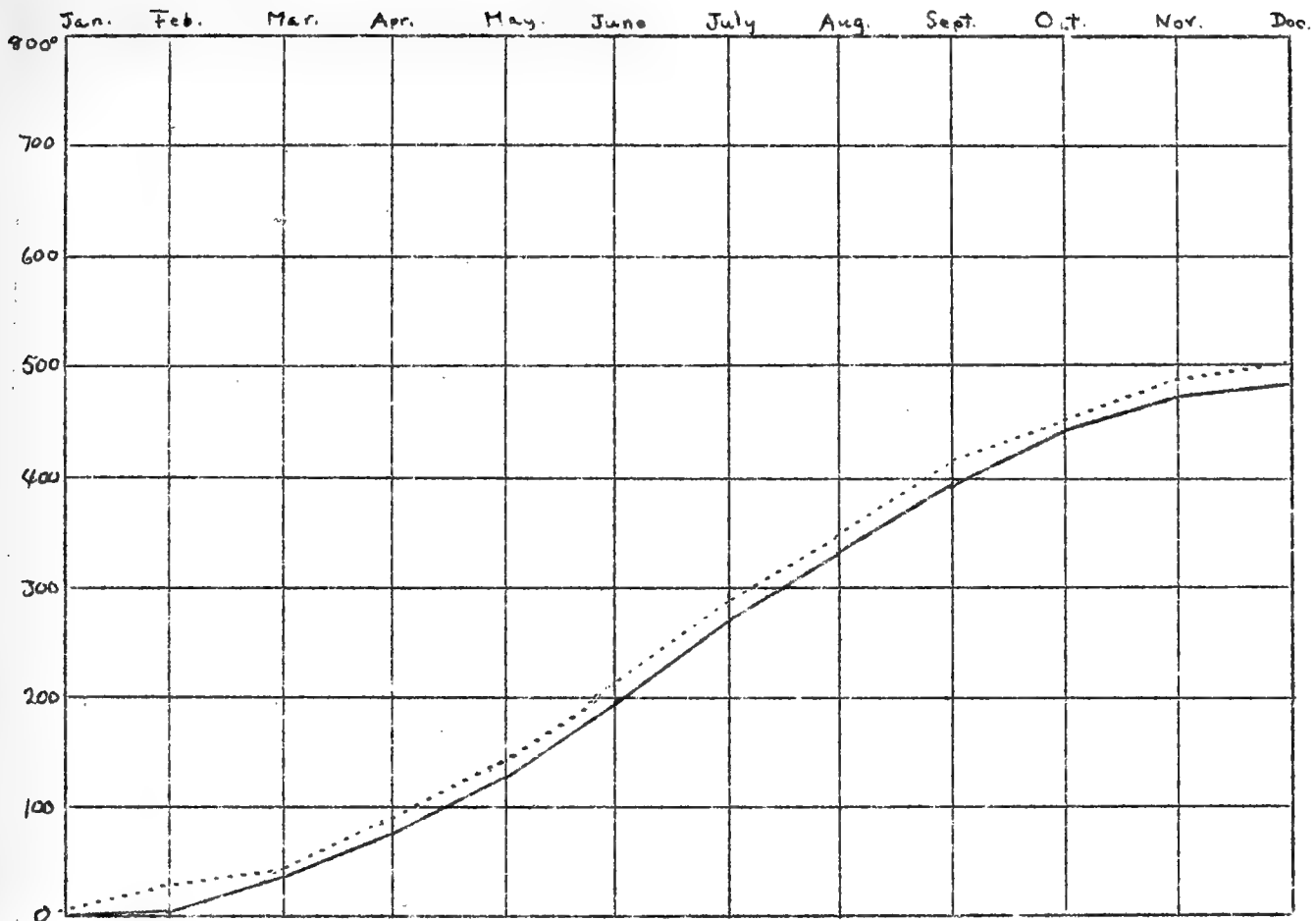


Fig. 15. Accumulated temperature in degrees F. for Bismarck, North Dakota, 1932, (dotted line), compared with normal (solid line).

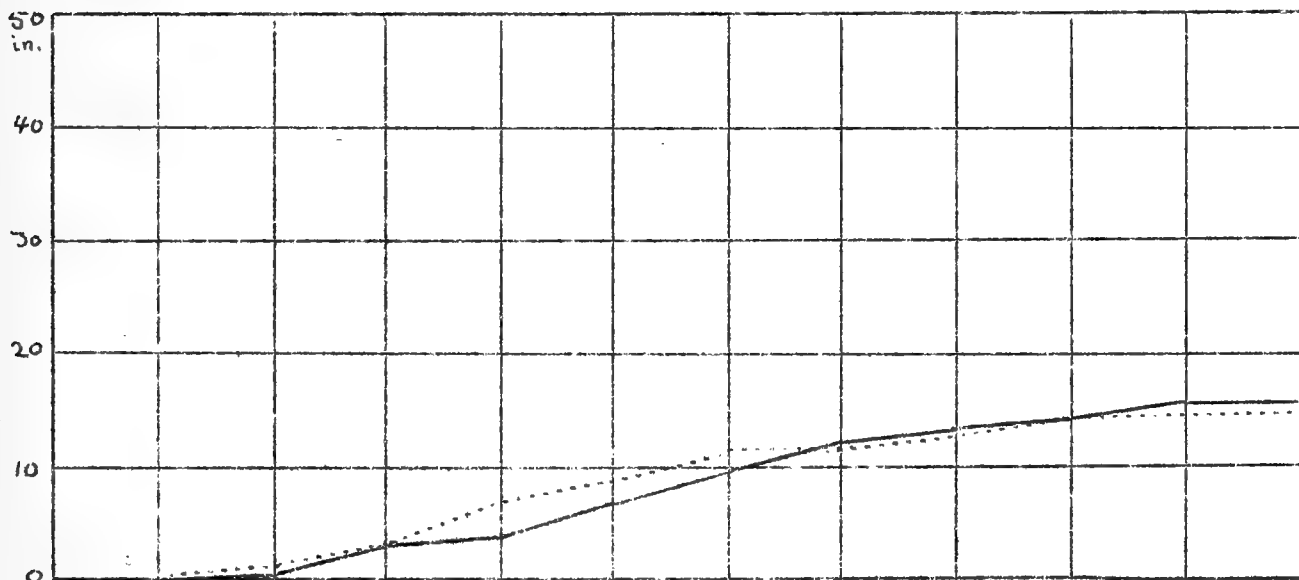


Fig. 16. Accumulated precipitation in inches for Bismarck, North Dakota, 1932, (dotted line), compared with normal (solid line).

PORTLAND, OREGON

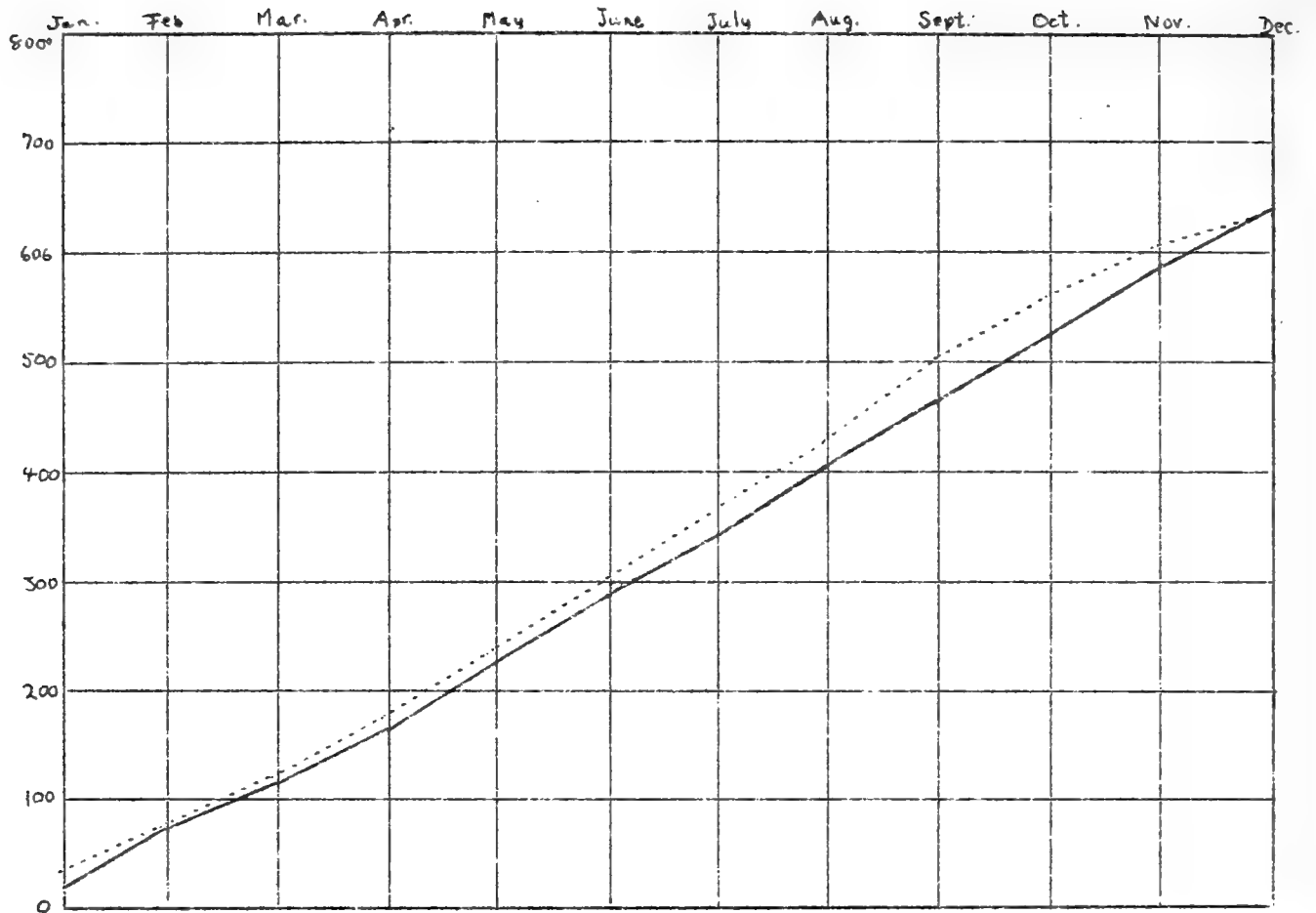


Fig. 17. Accumulated temperature in degrees F. for Portland, Oregon, 1932, (dotted line), compared with normal (solid line).

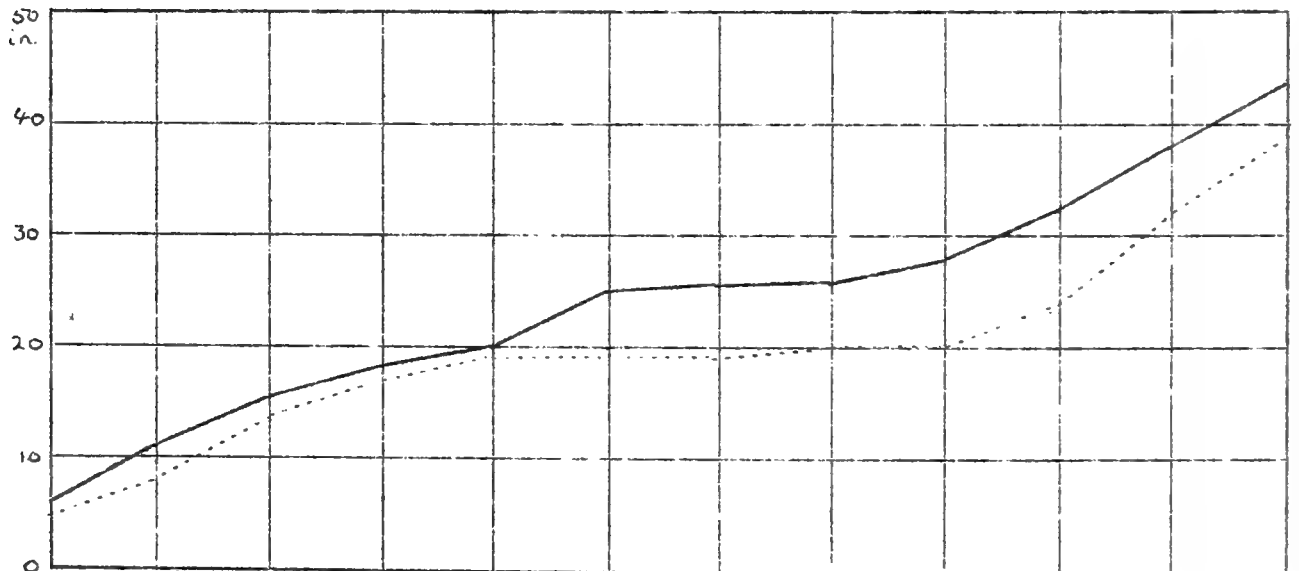


Fig. 18. Accumulated precipitation in inches for Portland, Oregon, 1932, (dotted line), compared with normal (solid line).

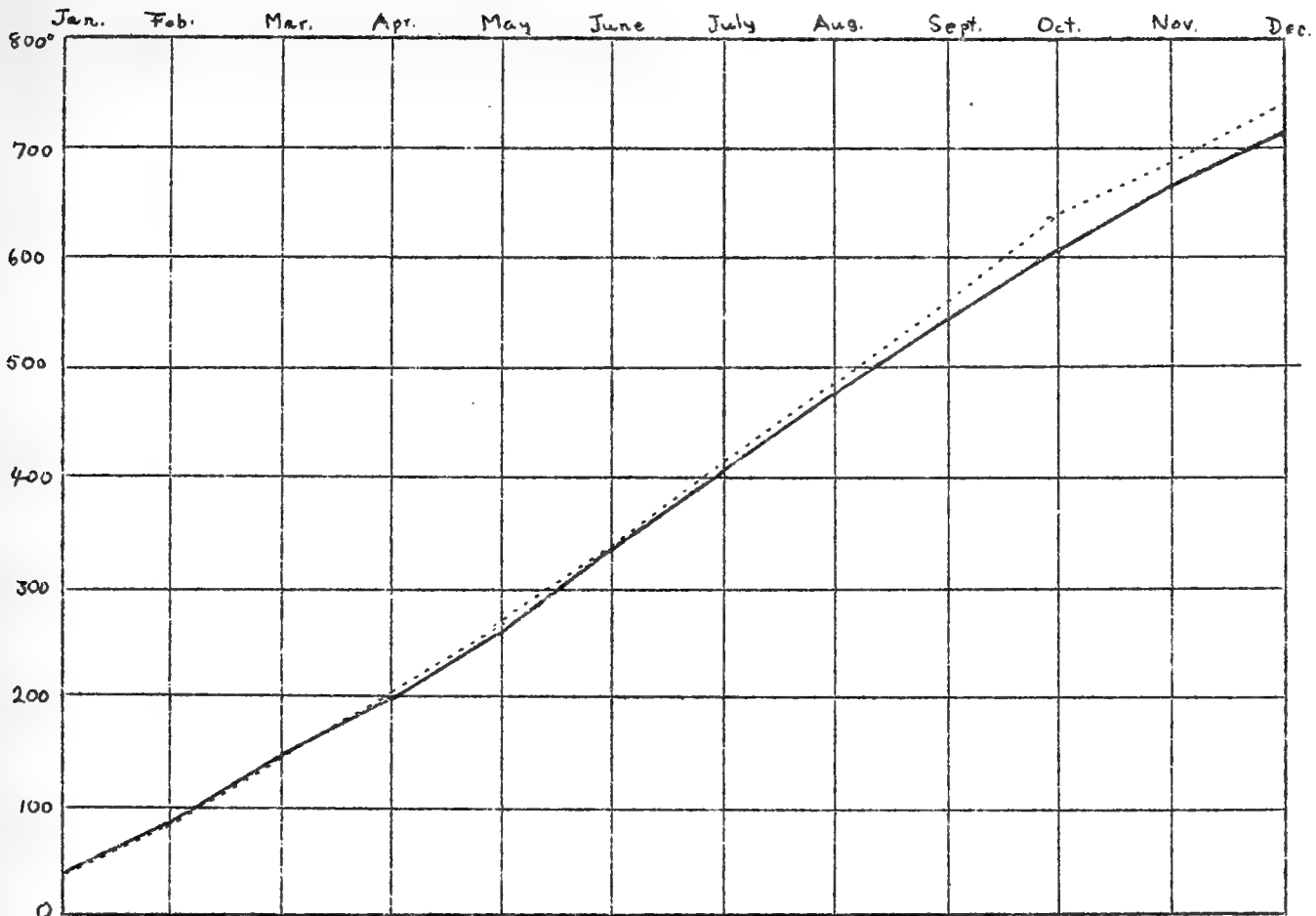


Fig. 19. Accumulated temperature in degrees F. for Sacramento, California, 1932, (dotted line), compared with normal (solid line).

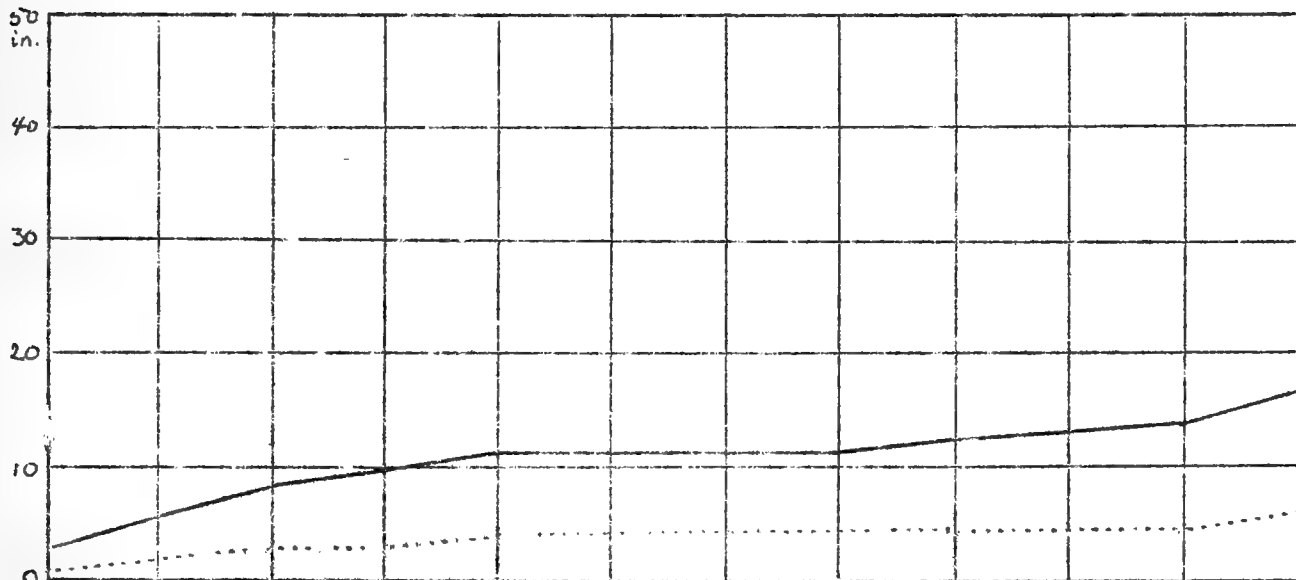
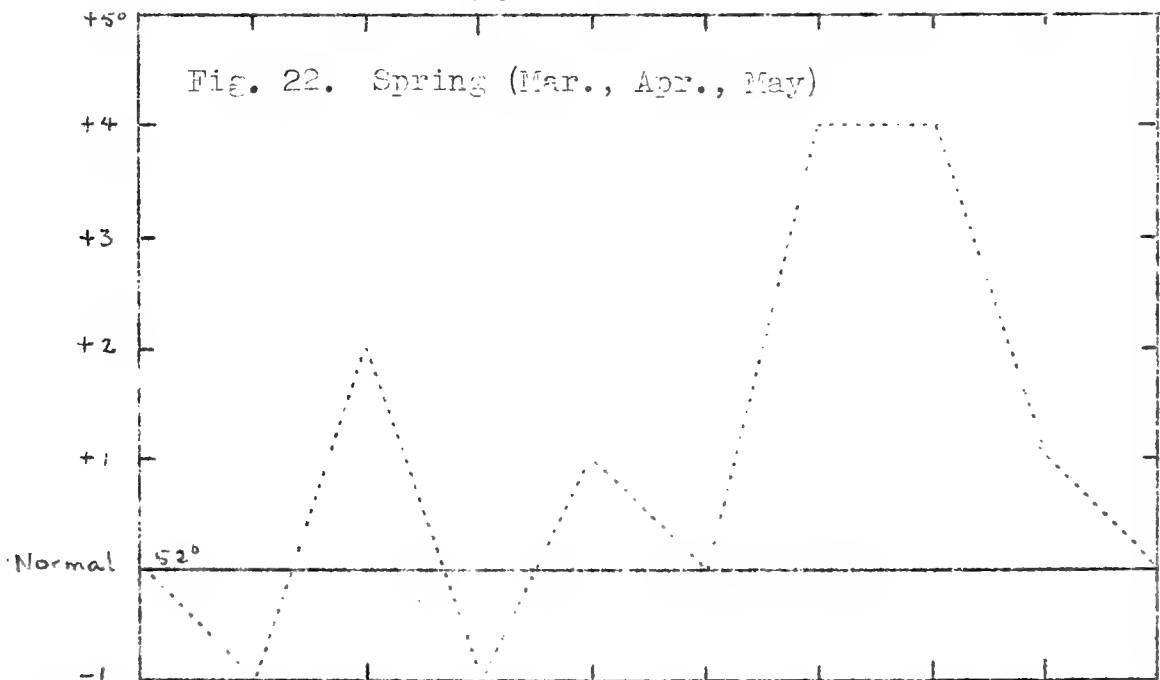
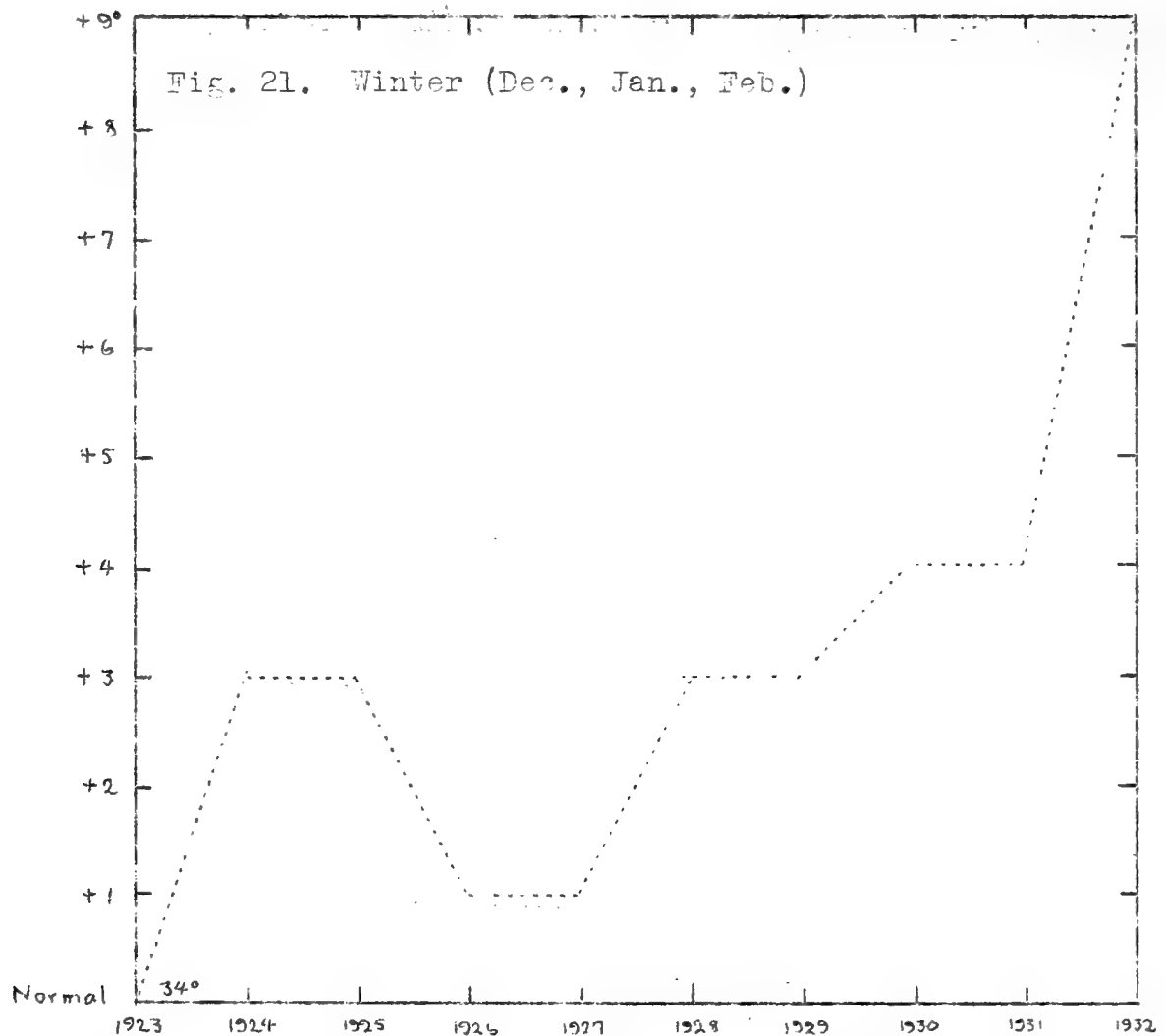
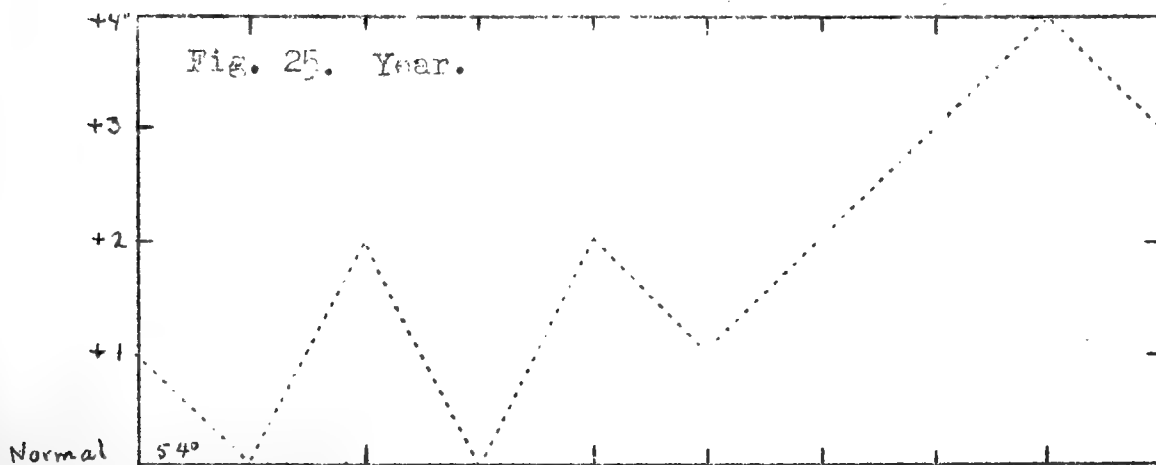
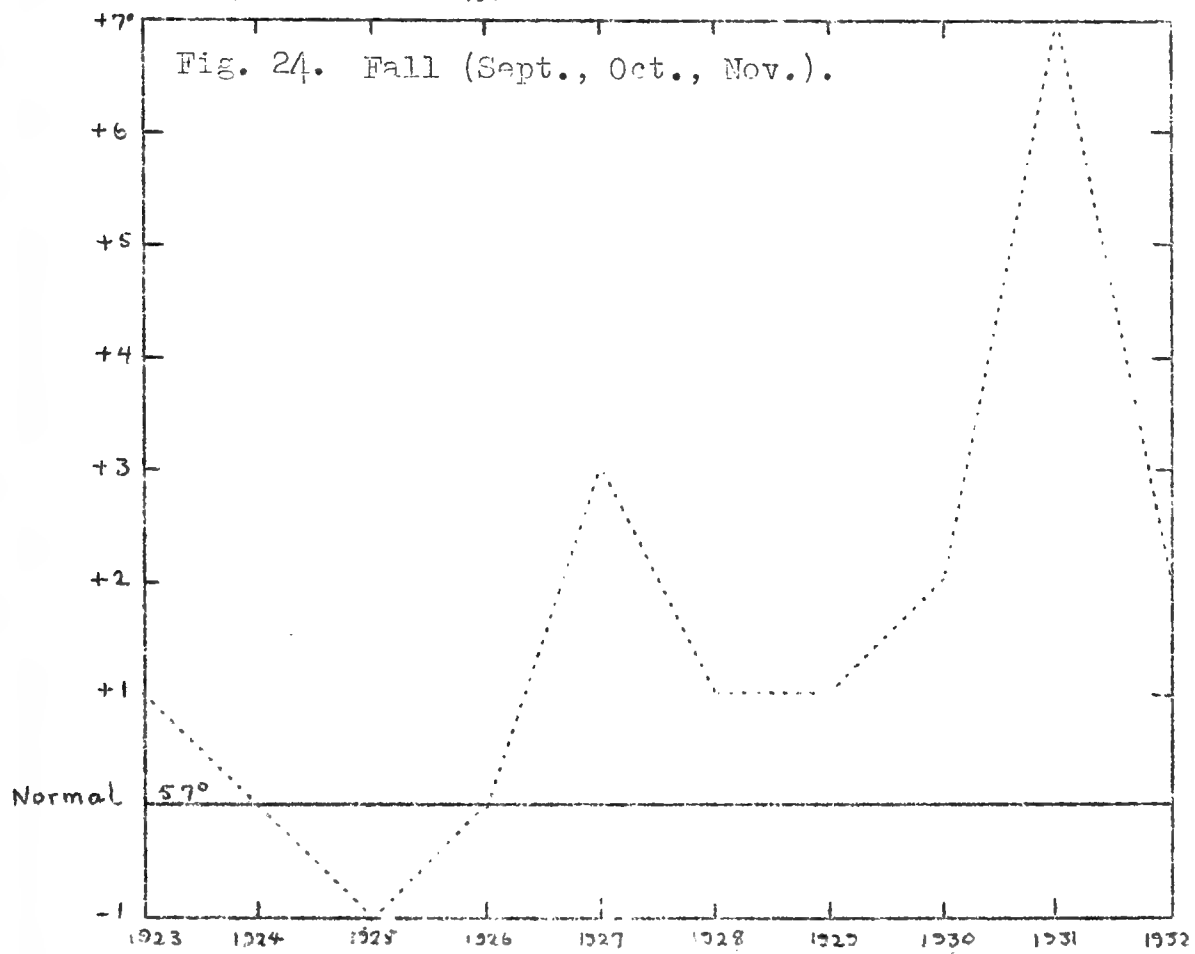
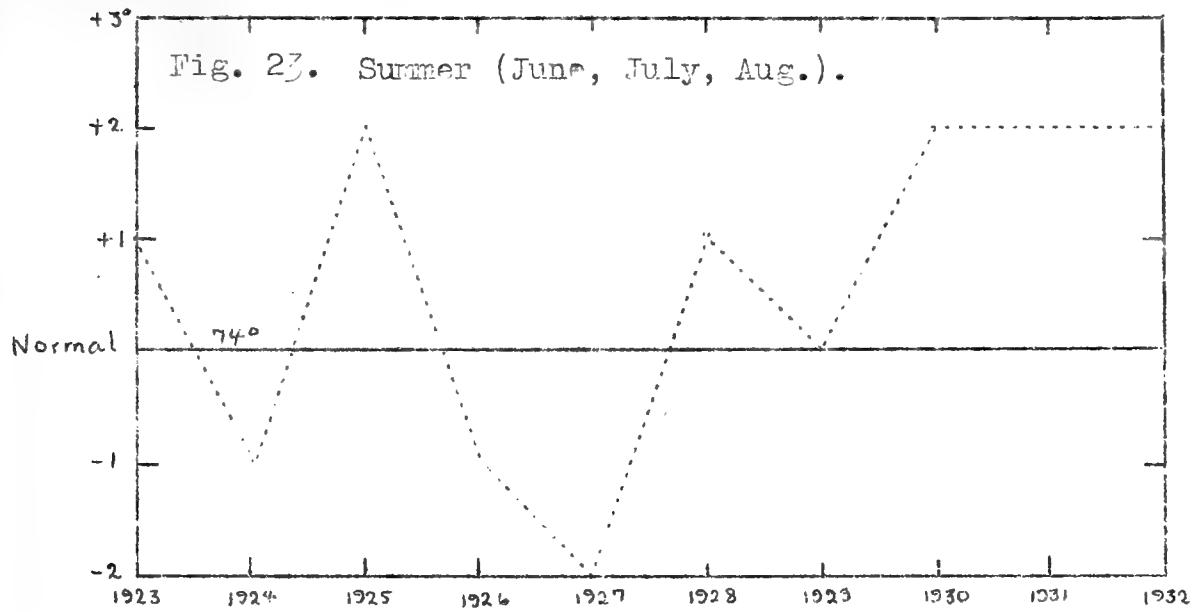


Fig. 20. Accumulated precipitation in inches for Sacramento, California, 1932, (dotted line), compared with normal (solid line).

PHILADELPHIA, PENNSYLVANIA



Figs. 21, 22, (and on next page) 23, 24, 25. Deviations of temperatures at Philadelphia, Pennsylvania, from the 50-year normal for the winter (Fig. 21), spring (Fig. 22), summer (Fig. 23), and fall (Fig. 24), and for the year (Fig. 25) during the past ten years, 1923 to 1932. Normal is indicated by a solid line, departures by a dotted line.



Winter temperatures have shown an even more marked and continued excess above normal. As shown by the curve for Philadelphia, since 1923, winter temperatures have been consistently higher than the fifty year normal. In seven of the ten years mean temperatures were three or more degrees above normal. In the winter of 1931 and 1932, just preceding the growing season reviewed in this summary, there was an excess of nine degrees.

Spring and summer temperatures show less marked and consistent deviations with the result that the mean annual temperatures remain at or above normal throughout the decade. In this connection the statement by J. B. Kincer, Chief of the Division of Agricultural Meteorology, Weather Bureau, Department of Agriculture, published in the Weekly Weather and Crop Bulletin for the week ending March 7, 1933, is informative:

Recent Temperature Trends

"Temperature trends in the central and eastern portions of the United States have been prevailingly high for a long time. When short-period fluctuations in the records are smoothed into long-time trends, the longer records covering more than 100 years in some cases, a primary depression in temperature is shown to have occurred for the eastern half of the United States about 70 years ago, since which time there has been an irregular, but rather definite trend, to warmer weather. For example, the mean annual temperature at St. Paul, Minnesota, for the 20 years ending with 1876 was some 2.5° lower than a like average for the 20 years ending with 1932. At Washington, D. C., the difference for the same period is about 2°.

"Records for New Haven, Connecticut, extending back to the time of the Revolutionary War, show three outstanding warm periods during the past 150 years. The first occurred early in the 19th century; the second about 75 years thereafter, and the third covers substantially the last quarter of a century. The present warm period is much more pronounced in point of time than its predecessors, as the smoothed curve came above the long time normal line about 25 years ago and no recession is yet in evidence.

"When records representing the mid-West and eastern portions of the country for the different seasons of the year are studied, it is found that trends for the winter are the most irregular, with the up-and-down fluctuations of greater frequency and shorter duration than for other seasons. For the spring and fall the trends have been more uniformly upward, with fewer interruptions by short cold spells. The curves for these seasons show a remarkably steady upward trend for more than half a century. The summer curve shows a slight recession from about 1875 to 1912, and thereafter a moderate rise. For the fall, winter, and spring seasons the averages in temperature for the past 20 years are from 2.5° to nearly 4° higher than similar averages up to 60 or 70 years ago. Temperature data for some other countries of the Northern Hemisphere show strikingly similar conditions.

"The records discussed above show unmistakably that the central and eastern United States are and have been for a number of years in the midst of a period of prevailing warm weather which has continued much longer than any other similar period of record, notwithstanding the occurrence of relatively short periods of subnormal temperatures, such as the winter 1917-1918."

WEATHER AND DISEASE

Perhaps partly as a result of the series of warm winters already discussed, both bacterial diseases and plant infesting nematodes were unusually abundant in the northeastern United States during the summer of 1932. The general situation was well described by Chupp as being characterized in New York State by the unusual destructiveness of "rare types of vegetable diseases."

TOBACCO DOWNY MILDEW. The outbreak of tobacco downy mildew (Peronospora hyoscyani) was both more widespread and more destructive in 1932 than in 1931. Losses in Georgia and the Carolinas were so serious as to materially reduce the crop, and the disease was found as far north as southern Pennsylvania. This outbreak, much worse than that of 1931, may well have been associated with the very mild winter which made possible the continued growth and sporulation of the fungus on volunteer plants in old tobacco beds in southern Georgia. P. D. R. 16: 50, 55, 94, 103.

POTATO LATE BLIGHT IN TEXAS. In sharp contrast to the conditions of the previous season in which blight was so severe in some fields in the Rio Grande Valley that the potatoes were not dug at all, it was, this year, neither common nor severe. According to Bach and Alsmeyer this is correlated with dry weather with abundant sunshine. P. D. R. 16: 21, 45.

CELERY EARLY BLIGHT IN FLORIDA. F. L. Wellman reports a very severe outbreak of celery early blight in the Sanford section during the winter 1931 and 1932 with destructive effects on the crop. This he attributes to ideal "blight" weather conditions which in the opinion of many experienced growers consist of bright warm days followed by slightly cooler nights, and dew so heavy that the plants did not dry off until noon. P. D. R. 16: 43, 44.

BACTERIAL WILT OF CORN. This disease was very destructive especially on the early "Yellow" varieties of sweet corn throughout the northcentral and northeastern United States. It was apparently more destructive in this region than at any time since the disease was described by Stewart in 1897. The disease has been increasing in importance for several years. This is believed to have been associated with the succession of unusually warm winters. In this connection, it should be noted that the early Yellow varieties of sweet corn were abandoned for canning in Maryland several years ago. P. D. R. 16: 104, 114, 134, 140, 143, 149, 151, 167, 179.

STRAWBERRY DWARF NEMATODE (Aphelenchoides fragariae). During the spring of 1932 it became evident that strawberry dwarf nematode had

wintered over at least one year on Cape Cod, Massachusetts, in sufficient abundance to cause apparent abnormalities on strawberry plants. It may well be in this case as in others that the warm winter of 1931 and 1932 was largely responsible for this condition. P. D. R. 16: 113.

TOMATO LATE BLIGHT IN MASSACHUSETTS. In September, tomato late blight was unusually destructive in Worcester and Bristol Counties as well as in the Connecticut Valley region of Massachusetts. This was attributed by O. C. Boyd to cool wet weather including clear nights with heavy dews. P. D. R. 16: 166.

LEAF BLIGHT OF ONIONS. An unusual outbreak of leaf blight of onions in Texas was reported by Taubenhaus. This is attributed by him to the severe freeze in early March followed by an attack of thrips which so weakened the foliage as to favor infection by *Macrosporium*. P. D. R. 16: 120.

EFFECTS OF DRY SUMMERS. The following notes by Dr. R. E. Poole on observed effects of the recent dry summers on crops in North Carolina are of such general interest that they are included at this point:

The effects of drought on plants in North Carolina was well marked during the past two seasons. Annual crops suffered severely but not more than many perennials. Crops such as corn and grasses were killed throughout the State. The blades parched on the stems and stalks before the crops were mature. The semi-parasites made excellent progress on these plants after sufficient moisture became available for their growth. *Fusarium moniliforme* and species of *Alternaria* and *Helminthosporium* were conspicuous on corn.

Leaves of agricultural crops blistered in the intercostal areas and on the margins. Shrubs and trees showed similar leaf symptoms. The red spider was very much more severe on *Retinospora*, arborvitae, and red cedar than in normal seasons. Tobacco, cotton, and many other crops showed prominent symptoms of nutritional deficiencies. Losses as a result of nematode infestations were worse, since the crops were delayed in growth so that the nematode had longer to work, and also the season was more favorable for the activities of the nematode.

Plants weakened as a result of the drought died in large numbers during the winter. Boxwood, red cedar, arborvitae and many transplanted ornamentals were quickly killed by the low temperatures of the past winter.

Roots of agricultural crops were partly girdled and failed to develop normally on hard soils resulting from the drought conditions.

Fertilizer injury on cantaloupes, watermelons, tobacco, cotton, sweet potatoes and other crops was very much more severe than in normal seasons.

GENERAL OBSERVATIONS IN NORTH CAROLINA

Interest in fertilizer injury and related problems is now so general as to make Poole's observations and opinions on conditions in North Carolina very timely. They are given in full below.

FERTILIZER INJURY TO PLANTS IN NORTH CAROLINA. There has been considerable complaint of fertilizer injury of crops in North Carolina. The injury is most prominent on young plants. Cotton, beans, potatoes, sweet potatoes, peppers, strawberries, and many other vegetable and field crops are affected. The symptoms are mostly alike. Stunting of the plant and even death results in instances where injury is severe. The plants frequently recover and make excellent growth but produce late crops. Leaves blister on the margins and in the intercostal areas, leaving the plant in a very ragged condition. The root system is sometimes destroyed, especially on young plants such as cotton and melons.

It is inevitable that large amounts of inorganic salts and acids, of which high grade fertilizers are composed, will cause plasmolysis of the cells in roots when brought into contact with them. Growers, under certain conditions have gradually increased the amounts of fertilizers to the acre. Agricultural chemists have also been interested in promoting concentrates, since it would be advantageous to the grower by lowering the cost of handling and the freight. But the farmer needs to be educated in the toxic properties of fertilizer ingredients. On heavy soils large amounts of fertilizers can be applied beneath the crop, as has been demonstrated in this State, but they cannot be applied in like amounts on sandy soils with any degree of safety. It is apparent that the agronomist would do well to study broken applications on sandy soils as a means of studying the injurious as well as yield effects on all agricultural crops.

ROOT KNOT IN NORTH CAROLINA IN 1932. Only recently was there any evidence that the nematode, Caconema radicum, may become a problem in the Piedmont and mountain areas. It was found to cause severe injury on the sandy soils of the coastal area, but even here it had not infested all areas. During the 1932 season heavy infestation of tobacco was observed in Stokes County, in the foothills of the mountains. A survey of the eastern part of the State showed infestation in more than 85 per cent of the tobacco fields. It was much worse on some areas than on others. Tobacco was killed in many areas before all of the crop could be harvested. Heavily infested plants developed hollow stalks, dead tips, and dead margins on the leaves. The serious damage to the leaves is rarely suspected by the growers. They have lost thousands of dollars from the prematured condition, since the leaves of infested stalks cure unevenly and are poor in quality. Heavy losses of other crops were due to heavily infested root systems.

Growers on many farms have noted the progress of the nematode infestation in their fields. Some report the spread by transplanting infested plants. Others have seen the spread as a result of plowing infected soils and dragging the soil into uninfested areas. Sweet potato, tobacco, and tomato plants have been an important means of dissemination.

The disease has been prominent on corn. It has been seen on rye, crimson clover, vetch, and Austrian winter peas. These plants were heavily infested although they are winter cover crops. Vetch was killed by the disease in some heavily infested areas. The character of infestation on vetch indicates that the nematodes did not cease to be active during the winter in the coastal areas.

(R. F. Poole).

D I S E A S E S O F C E R E A L C R O P S

W H E A T

STINKING SMUT (Tilletia levis and T. tritici). In Michigan the estimated loss from stinking smut jumped from 0.5 per cent in 1931 to 5 per cent in 1932. Somewhat greater losses were reported also from Pennsylvania, West Virginia, and North Dakota. In Minnesota and Montana, on the other hand, the disease caused less injury, and North Carolina reported much less than usual. Other States reported about the usual amount of loss. Estimates are 8 per cent in Maryland (3 per cent reduction in yield, 5 per cent in grade); 5, Michigan; 3.5 in winter wheat and 0.5 in spring wheat in Montana; 3, Pennsylvania, North Dakota, Washington; 2.5, Virginia; 2, Kansas; 1 to 2, West Virginia; 1.5 Ohio; 1 North Carolina, Wisconsin; 0.75, Minnesota; 0.5, Texas; 0.2, Iowa; traces in New York, South Carolina, Arkansas, Colorado. P. D. R. 16: 105, 181 (report of survey in Montana).

Inspection of 2,368 cars of Minnesota wheat arriving at Minneapolis from August 1 to November 1, 1932, showed 6.8 per cent grading smutty, while for the period August 1 to December 15, 1931, inspection of 4,300 cars showed 23.2 per cent smutty, according to a summary by R. C. Rose. In 1932, for the period stated, of the cars of durum wheat inspected 15.5 per cent were smutty, and of spring wheat, 7.2 per cent, while none of the cars of winter wheat graded smutty.

LOOSE SMUT (Ustilago tritici). Except in Pennsylvania, West Virginia, and Michigan, where they were considerably heavier, losses in States reporting did not vary greatly from the usual amounts. According to E. H. Leker, loose smut is becoming more prevalent and causing heavier losses each year in Kansas. Two collaborators mentioned possible effects of the weather on the disease. Muncie, in Michigan, remarked that "The mild winter allowed infected plants to survive and head." Brentzel, in North Dakota, said that "Dry weather in 1931 prevented infection somewhat." The percentages of loss reported are: 5, West Virginia; 3.5, Pennsylvania; 3, Michigan; 1, New York, Maryland, Virginia, North Carolina, South Carolina, Texas, Ohio, Wisconsin, Minnesota, Iowa; 0.5, North Dakota, Kansas; 0.3, Montana; trace, Arkansas, Colorado, Washington. P. D. R. 16: 70, 105.

FLAG SMUT (Urocystis tritici). The results of the flag smut survey conducted during May and June, 1932, in Illinois, Missouri, Kansas, and Oklahoma, are given in the Reporter (16: 99-103. July 1, 1932). No flag smut was found in Oklahoma. The disease was found in one field in one new county, Macon County, in Illinois. No new localities were found in Missouri. In Kansas four new locations were found in counties previously known to be infected. Although the number of new locations is not large it is evident that flag smut is increasing its range from year to year.

STEM RUST (Puccinia graminis) again caused abnormally low losses, although in a few States it was somewhat more injurious than last year. In 1932, as in 1931, collaborators mentioned dry weather, lack of infection on barberry, and late infection of wheat as possible explanations. In

Minnesota and North Dakota durum wheat was said to be more severely affected than common spring wheats. In Iowa there was no damage to winter wheat, whereas the loss in spring wheat was about 1 per cent. According to H. B. Humphrey a rather general epidemic in southwestern Virginia resulted from heavy infection of the wild barberry, Berberis canadensis. However, the wheat grown in that section is all winter wheat and it matured too early to suffer serious damage. Valteau in Kentucky reported that "Black stem rust was not found on the Station farm nor in the uniform rust nursery this year in spite of the open winter and the early spring. On one barberry bush on the Station farm about five infections were found." Losses estimated are as follows: 2 per cent, South Carolina, Texas; 1.5, Minnesota; 1.3, North Dakota; 1, Virginia, Michigan; 0.5, Ohio, Kansas; 0.1, Iowa; trace, New York, Pennsylvania, West Virginia, Arkansas, Wisconsin, Montana, Colorado, and Washington.

LEAF RUST (Puccinia triticina) caused heavy losses in several States, mostly on the Atlantic Coast, and was rather generally reported as more prevalent than usual. It is likely that the abnormally warm winter permitted an unusual amount of overwintering resulting in heavy infection wherever there was sufficient moisture. In North Carolina dry weather checked the disease before it caused much damage. Maximum infections of 60 to 90 per cent were observed often in Pennsylvania; 90 per cent in Minnesota; 50 per cent in North Dakota and Colorado; 100 per cent in South Dakota. P. A. Young reported that "Farmers in Cascade County, Montana, said they were colored red by spores in the wheat fields, according to county agents. There has been more rain in Montana than during the preceding three years." As quoted by E. A. Walker, Ray Bulger of Barberry Eradication reported the heaviest infection he had seen in ten years in South Dakota, and stated that winter wheat was more severely infected than spring wheat. In Minnesota there was said to be considerably more infection on Marquis and Marquillo than usual. Losses reported were 25 per cent in Pennsylvania; 10, West Virginia, South Carolina, Arkansas; 4, Virginia; 3, Maryland; 2, New York; 1.5, Kansas; 1, North Carolina, Texas, Minnesota; 0.5, Ohio, Michigan; trace to 0.2, Wisconsin, Iowa, North Dakota, Montana, Colorado, and Washington. P. D. R. 16: 70.

STRIPE RUST (Puccinia glumarum). According to W. M. Bever, in Charge of Stripe Rust Investigations, stripe rust occurred in severe epidemic form in the Flathead Valley, Montana, where many fields showed as much as 100 per cent infection prevalence and severity. Also reported from Washington and California.

SCAB (Gibberella saubinetii) was not important in 1932. Loss estimates of more than a trace are as follows: Maryland, 3 per cent (1.5 per cent reduction in yield), Iowa, 2 (1.5 per cent reduction in yield), North Carolina and Ohio, 1; Virginia, 0.5; and Wisconsin, 0.1.

GLUME BLOTCH (Septoria nodorum) and SPECKLED LEAF BLOTCH (S. tritici). The glume blotch caused a total loss of 5 per cent, of which 3.5 per cent was loss in grade, in Maryland. No other State reported more than a trace of loss from either disease.

BACTERIAL DISEASES. BASAL GLUME ROT (Bacterium atrofaciens) was said to be severe in eastern Kansas and around Manhattan. BLACK CHAFF

(Bacterium translucens undulosum) caused losses estimated at 3 to 5 per cent in West Virginia, and 0.5 per cent in Texas. Only traces were reported from other States.

ERGOT (Claviceps purpurea). Traces were reported from five States: Ohio, Michigan, Wisconsin, Minnesota, and North Dakota.

FOOT AND ROOT ROTS. Total losses from the various foot rots were estimated as follows: Montana, 10 per cent in winter wheat, 1 per cent in spring wheat; West Virginia, 5; Kansas, 4.5; Texas, 2; North Carolina and Minnesota, 1; North Dakota, 0.5; Ohio, 0.1; Pennsylvania, Arkansas, Michigan, Wisconsin, Colorado, and Washington, trace.

TAKE ALL (Ophiobolus graminis). According to Hurley Fellows, this disease occurs locally in Kansas where there is sufficient moisture and proper rotation is not practiced. High moisture over a considerable period favors the disease. The loss was estimated at 1.5 per cent. During the flag smut survey in Kansas and Oklahoma, take-all was found in many fields inspected in both States. Barrus reported less than usual in New York. P. D. R. 16: 116.

FOOT ROT (Helminthosporium sativum, Helminthosporium spp.). Due to late availability of seed loans, much spring wheat in Montana was planted between May 15 and June 1, so that it grew in warm weather and was severely damaged by foot-rot and drought, according to P. A. Young. This is the first report of serious injury to spring wheat in Montana. Most of the loss mentioned above for Montana was from this foot rot. Traces were reported from Ohio, Michigan, Wisconsin, North Dakota, and Colorado. Helminthosporium and Fusarium together caused 3 per cent loss in the dry land area of Kansas and 1 per cent loss in Minnesota. L. W. Boyle in Kansas states that the time of planting is an important factor in the prevalence and severity of the disease. P. D. R. 17: 7.

FOOT ROT (Fusarium sp.). Trace in Michigan, also occurred in Minnesota and Kansas (See above under Helminthosporium).

FOOT ROT (Cercospora herpotrichoides) Washington.

MOSAIC (virus). Kansas. P. D. R. 16: 115-116.

R Y E

STEM RUST (Puccinia graminis) caused losses of 1 per cent in Virginia and Texas. Other estimates were less than 1 per cent and in several cases no loss.

LEAF RUST (Puccinia dispersa). In December, 1931, Valleau reported, "On this date (Dec. 19) leaf rust is present and is causing extensive injury to rye in some fields in Kentucky. The weather has been warm and damp all fall. This is a very unusual condition." Loss estimates of 1 per cent or more from leaf rust include 10 per cent in Pennsylvania; 5, Florida; 2.5, West Virginia; and 1, Ohio. P. D. R. 16: 6, 70.

ERGOT (Claviceps purpurea) caused 1.5 per cent loss in Wisconsin. In other States only traces occurred.

SCAB (Gibberella saubinetii). Ohio, 1 per cent.

ANTHRACNOSE (Colletotrichum graminicolum). Kentucky, Wisconsin. P. D. R. 16: 50.

B A R L E Y

COVERED SMUT (Ustilago hordei). Losses of 1 per cent or more reported were 9 per cent in Maryland (7.5 per cent reduction in yield); 6, Pennsylvania; 5, West Virginia; 3, Virginia; 2, Montana; 1, North Carolina, Texas, Michigan, North Dakota, and Kansas. P. D. R. 16: 6, 70.

LOOSE SMUTS. Barrus reported that in New York "Ustilago nigra was found in several fields in the vicinity of Geneva by Mrs. M. Ruttle-Nebel and at Ithaca by Tapke. Mrs. Nebel also found several forms intermediate between U. nuda and U. hordei." Losses reported from U. nuda averaged somewhat higher than in 1931. Estimates of one per cent or more are 5 per cent in West Virginia and Kansas; 3, Pennsylvania, Virginia, Iowa; 2.5, Wisconsin; 1.5, Minnesota; 1, Maryland, North Carolina, Texas, Ohio, North Dakota, Montana, Colorado, Washington. Loose smut has become serious in Iowa since Velvet barley was introduced and farmers there are now abandoning the variety, according to Porter. P. D. R. 16: 6.

RUSTS. Texas reported 1 per cent loss from STEM RUST (Puccinia graminis). LEAF RUST (P. anomala) caused 4 per cent loss in Pennsylvania; 2, West Virginia; and 1.5, Ohio.

STRIPE (Helminthosporium gramineum). Maryland, Iowa, Kansas, and California reported more than last year. In other States there was about the same amount or less. Muncie stated that early spring temperatures in Michigan were too high for seedling infection. Vaughan reported more early leaf striping than usual in Wisconsin, even resistant strains showing traces, but the progress of the disease was apparently checked later by unfavorable weather. Increased use of the resistant variety, Wisconsin No. 38, has reduced the amount of stripe in Wisconsin. Losses of 1 per cent or more are 10 per cent in West Virginia; 7, Pennsylvania; 5, Iowa; 2, Virginia, Minnesota, Kansas; 1, North Carolina, Wisconsin, and Montana. P. D. R. 16: 89, 105.

SPOT BLOTCH AND FOOT ROT (Helminthosporium sativum) caused 3 per cent loss in Iowa. The disease was not important in other States reporting. In Michigan, according to Muncie, there was little seedling blight and leaf infection was too late to cause appreciable loss.

SCAB (Gibberella saubinetii) was prevalent in certain sections of the Middle West including southern Minnesota and parts of Illinois and Iowa. In southern Wisconsin it started out to be severe but failed to develop on account of drought. Percentage losses reported are 6 in Iowa (1 per cent loss in grade, 5 per cent reduction in yield), 5, Ohio; 0.5 reduction in yield and an equal loss in grade in Wisconsin. P. D. R. 16: 143.

BACTERIAL BLIGHT (Bacterium translucens) was more prevalent than usual in Iowa where it caused a loss of 2 per cent.

O A T S

SMUTS (Ustilago avenae and U. levis). Losses from smuts seemed to be somewhat larger than usual for the country as a whole. Half of the States estimating losses reported 5 per cent or more, while only two estimated less than 1 per cent. In Kansas, E. H. Leker reported that heavy losses were more general than for several years. New York, Maryland, Wisconsin, Iowa, and California also reported more than usual. In Iowa, according to Porter, "There was a decrease in the practice of seed treatment which increased smut losses. Farmers believe in treatment but lacked the money." Similar reports were received from Michigan and Wisconsin. Percentage loss estimates were 10 in Massachusetts, New York, and West Virginia; 7, Iowa and Kansas; 6.6, Virginia; 6.5, Pennsylvania; 6, Maryland, Montana; 5, South Carolina, Florida, and Arkansas; 4, Ohio, Wisconsin; 3, Texas; 2.5, Minnesota; 2, Michigan, Washington; 1.5, Connecticut; 1, North Carolina, Colorado; 0.5, New Hampshire, North Dakota. P. D. R. 16: 6, 70, 142, 185.

STEM RUST (Puccinia graminis) was not important, the highest loss reported being 2 per cent from Texas. Other estimates of 1 per cent or more were 1.5 in Minnesota; 1 per cent in Virginia, South Carolina, Michigan, and Iowa. Johnston and Leker reported that in Kansas stem rust became very heavy on Kanota, late in the season just as the crop was turning.

CROWN RUST (Puccinia coronata) caused considerable loss in New York, in some of the States from Virginia and West Virginia south to Florida, and in Texas and Arkansas. The losses reported in these areas are 20 per cent in Florida; 10, West Virginia, Arkansas; 8, Texas; 6, Virginia; 4, New York; 2, South Carolina. In other regions the disease was unimportant, only Iowa reporting as much as 1 per cent loss. P. D. R. 16: 70, 105.

HAIR BLIGHT (Bacterium coronafaciens) appeared earlier than usual in Iowa, according to Porter, who estimates 1 per cent loss. Melchers reported it as more abundant than usual in Kansas, but the loss was only a trace.

BLAST OR STERILITY (undetermined) was reported from New York, Arkansas, North Dakota, Kansas, and Montana. In Kansas 1.5 per cent loss was estimated, in Montana 3 per cent.

C O R N

SMUT (Ustilago zaeae). Most of the reports from the northern part of the country, i.e., north of the Ohio and Missouri Rivers, stated that smut was more prevalent than usual. In all of the States reporting south of this area, and in New York and Wisconsin, there was said to be the usual amount. Several States including Delaware, Maryland, Michigan, and North Dakota reported an increase over last year, while Wisconsin reported less and Minnesota much less. Sweet corn was, as usual, most severely

affected. In New York it was said to be worst on earliest varieties, and in North Carolina it was severe on early planted corn. Losses reported on sweet corn were 15 per cent in Iowa; 10, Massachusetts; and 2 to 3, New York. Total State losses estimated were 5 to 7 per cent in Colorado; 5, Massachusetts, West Virginia, South Carolina, Texas, Michigan, Minnesota, and Iowa; 4, Pennsylvania; 3, Virginia, Ohio, North Dakota; 1.5, Connecticut, Wisconsin; 1, Arkansas, Kansas; others less than 1. P. D. R. 16: 174, 185.

RUST (Puccinia sorghi) widespread but unimportant.

ROOT STALK AND EAR ROTS (various organisms). The losses caused by these diseases are reported as follows:

ROOT ROTS. 5 per cent in Massachusetts; 3, Pennsylvania; 2, South Carolina, Florida; 1, Ohio; others less than 1 per cent.

STALK ROTS. 10, Pennsylvania, West Virginia; 3.5, Virginia; 2, Texas; 1, North Carolina, Louisiana, and Kansas.

EAR ROTS. 11, Florida; 10, West Virginia; 5.6, Iowa; 5, Louisiana; 4, Pennsylvania; 3, North and South Carolina; 2.5, Virginia; 2, Texas, Michigan, Kansas; 1, Ohio, North Dakota. P. D. R. 16: 180-181.

Gibberella saubinetii was reported as the cause of root rot in Maryland, Florida, Ohio, and Michigan; seedling blight in Wisconsin; dry rot in Iowa; ear rot in South Carolina. A loss of 5.5 per cent was estimated in Maryland.

Fusarium moniliforme caused root, stalk, and ear rot in North Carolina and Florida and ear rot in Arkansas, Michigan, and Southern Wisconsin. Poole reported "This disease was severe in eastern North Carolina despite the dry conditions. It was aided by the dry weather injury since the sources of entrance were widened." Five per cent loss was reported from Florida.

Fusarium spp. Root rot was reported from Michigan, Minnesota, Arizona; stalk rot from North Dakota; ear rot from Connecticut, Maryland, New Jersey, South Carolina, Minnesota, Iowa; kernel decay and seedling blight in Massachusetts.

Pythium sp. was reported as causing root rot in South Carolina.

Diplodia zeae was reported from Massachusetts, Maryland, South Carolina, Louisiana, Ohio, Michigan, Minnesota, and Iowa. Four per cent loss was reported from Iowa; 3, Florida; 1, Maryland. D. macrospora caused 3 per cent loss in Florida.

BLACK BUNDLE (Cephalosporium acremonium) was reported for the first time from Massachusetts and occurred also in Pennsylvania, where it caused 1 per cent loss, and in Virginia, Texas, and Arkansas.

STALK AND EAR ROT (Basisporium gallarum) was also reported from Massachusetts for the first time, and from Wisconsin and Iowa. In Iowa it caused a loss of 1.5 per cent.

KERNEL ROT (Penicillium sp.). Wisconsin.

SCUTELLUM ROT, caused by species of *Fusarium*, *Rhizopus*, *Penicillium*, *Aspergillus*, and *Pythium*, was reported from Massachusetts.

BACTERIAL STALK ROT (Bacterium dissolvens) was reported on sweet corn from West Virginia, where together with the bacterial wilt it has been epidemic for two or three years, and from Arkansas (P. D. R. 16: 142). An undetermined bacterial stalk rot occurred in South Carolina and on sweet corn in Michigan. In Michigan, Muncie reported that "It often accompanies bacterial wilt and sometimes follows corn root maggot work in the basal node." He estimated 10 per cent loss.

BACTERIAL WILT (Aplanobacter stewarti) of sweet corn. Although this disease had been observed to be increasing in importance in a number of States during the past two or three years, the widespread outbreak in 1932 was one of the outstanding disease events of the year. It was destructive as far north as the New England States and Ontario, Canada. Early planted and early varieties were attacked severely. Field and pop corn were affected in some cases but damage to them was usually not important. Details of the epidemic in New York and the New England States, Pennsylvania, West Virginia, New Jersey, Ohio, Indiana, Illinois, and Michigan have already been published in the Reporter, and only a few additional notes will be given here. In West Virginia, the wilt was accompanied by the stalk rot caused by Bacterium dissolvens; in Ohio by a browning and soft rot at the base of the stalk which may have been due to the wilt organism or at least was favored by it (P. D. R. 16: 104); in Michigan by an undetermined basal stalk rot (see above under bacterial stalk rot). In Illinois two kinds of leaf blight were associated with the wilt organism (P. D. R. 17: 6-7). In Kentucky, Valleau reported that "A stunting of field corn also occurred which may have been due to wilt but proof was not obtained." Chupp reported that the 12-spotted cucumber beetle was extremely abundant in New York. There is some evidence indicating that this insect is concerned in the transmission of the disease. The highest loss reported was 45 per cent in Pennsylvania (estimates given are for sweet corn). In Michigan the disease occurred as far north as the central part of the State and was general in the southern counties. The loss there was 15 per cent. In New York, Chupp estimated 10 per cent but stated that the loss was much higher in the southern part. Ohio also reported 10 per cent loss; Iowa, 5; Connecticut, 3; Massachusetts, 0.5; Maryland and Kansas, traces. The small loss in Maryland is due to the fact that varieties grown commercially are resistant. In Kansas the disease was very severe early in the season, especially in the eastern part of the State. Wilt is the limiting factor in early sweet corn production in New Jersey. Valleau reported it as severe in early varieties in Kentucky, and Poole stated that it seems to be increasing in importance in North Carolina. C. E. Scott in California reported that a specimen was received from Nevada City in that State. No wilt was found during a survey in Oregon, according to Barss. P. D. R. 16: 104, 114, 134, 140, 149, 167, 170, 174, 179; 17: 6-7.

BROWN SPOT (Physoderma zeae-maydis) caused a loss of 4 per cent in Florida, and was also reported from South Carolina, Louisiana, and Arkansas.

MOSAIC (virus) was reported from Louisiana.

R I C E

STEM ROT (Sclerotium oryzae) was less prevalent than usual in Arkansas due to cool weather. Cultural methods in rice growing result in water relations always favorable to this disease but partial control can be obtained through regulated flooding treatments (E. M. Cralley). Also reported from Louisiana.

OTHER DISEASES include LEAF SPOTS (Sclerotium sp., Helminthosporium oryzae), BLAST (Piricularia oryzae), and LEAF SHEATH SPOT (undet.) all reported from Louisiana, and STRAIGHTHEAD (non-par.) and ROOT KNOT (Caconema radicum) in Arkansas. Rice is a new host for the root knot nema. (P. D. R. 16: 146).

F L A X

WILT (Fusarium lini) was reported from Wisconsin, Minnesota, Iowa, and North Dakota. Early plantings of wilt resistant varieties in Minnesota and Iowa were free from wilt. Considerable wilt occurred in late plantings in Minnesota. In Iowa the late sown flax was so poor that wilt was negligible. Loss estimates were 4 per cent reduction in yield in Minnesota and North Dakota and an additional 2 per cent loss in grade in Minnesota.

RUST (Melampsora lini) was reported from Wisconsin, Minnesota, and North Dakota. None was observed in Iowa.

PASMO (Phlyctaena linicola) was reported from Wisconsin, Minnesota, Iowa, and North Dakota. In Minnesota it was only observed in experimental plots. In Iowa it caused 1 per cent loss.

HEAT CANKER (non-par.). All late sown flax was damaged considerably in Minnesota where the loss was 5 per cent. In North Dakota 2 per cent loss was reported. Canker was also reported from Kansas, where flax is just beginning to be grown.

D I S E A S E S O F F O R A G E C R O P S

A L F A L F A

BACTERIAL WILT (Aplanobacter insidiosum). Only a few States reported on the occurrence of bacterial wilt. Boyd reported that there was more during the dry season of 1932 than during the unusually wet one of 1931 in Massachusetts. He estimated the loss at 7 per cent. In Wisconsin, Vaughan reported the usual amount. Melchers reported less than usual in Kansas and remarked, "Apparently seasonal conditions were less favorable for the disease and more favorable for the alfalfa crop." The loss in Kansas was 10 per cent. Wilt caused serious damage again in certain parts of Idaho. In California it is general in the San Joaquin Valley and occurs in some other sections as well, according to C. E. Scott. (P. D. R. 16: 151; 17: 7.).

DOWNY MILDEW (Peronospora trifoliorum) was reported from Washington and California. In Yuba County, California, some fields showed 100 per cent infection.

LEAF SPOT (Pseudopeziza medicaginis) was of minor importance.

LEAF BLOTCH (Pyrenopeziza medicaginis) caused 3 per cent loss in Kansas, where it was said to be the most common and injurious leaf spot of this host, 2 per cent loss in Minnesota, and was also reported from Mississippi.

BACTERIAL BLIGHT (Bacterium medicaginis) formerly disappeared in mid-summer in Arizona but now is occasionally holding over until autumn. (J. G. Brown).

VIOLET ROOT ROT (Rhizoctonia crocorum) was reported from Texas and Kansas. (P. D. R. 16: 75).

STEM ROT (Sclerotinia trifoliorum). Fall-sown alfalfa in Kentucky was much reduced in stand, while older plantings were but little injured, according to Valteau. Also reported from Washington.

ROOT ROT (Phymatotrichum omnivorum) was reported from Texas, Arizona, and California. In Texas it caused 10 per cent loss. In California it was found in San Diego County where it had not previously been known to occur. (P. D. R. 17: 15).

"BLACK STEM, caused by Phoma sp., was responsible for severe reductions in stand in both young and old plantings, especially the latter. The abundant growth of winter weeds made a constant moist chamber about the young shoots which came out following the freeze in the spring. These shoots were frequently killed back to a point where no more buds could be developed and the plants died. This condition because of abundant winter weed growth could be traced to the mild winter." (Valteau) P. D. R. 16: 88.

ROOT ROT (undet.) reported from Minnesota. Fusaria were isolated but their pathogenicity is not yet proved.

WITCHES' BROOM (virus) and YELLOWS (virus), Washington. WHITE SPOT (non-par.), Connecticut. DWARF (undet.), southern California.

C L O V E R

POWDERY MILDEW (Erysiphe polygoni) was reported from several widely scattered States. Losses caused by a disease of this type are very difficult to estimate. Dr. E. A. Hollowell suggests, however, that it is probably more important than is generally believed.

ANTHRACNOSE. Valteau reported that in Kentucky "Colletotrichum trifolii was found in isolated small spots in some first year red clover and in larger spots in some second year clover, but not in all fields. Red clover came through the winter in the best condition in several years except for Sclerotinia injury. Kentucky adapted clovers are being grown

in rapidly increasing acreages and this year several thousand bushels of adapted seed were harvested. Adapted clovers came through the second year with a good and in some cases an excellent stand and will make good clover next year (third). Unadapted clovers had in many instances disappeared after the second cutting, due in part to anthracnose." The northern anthracnose, Gloeosporium caulivorum, also occurred in Kentucky, on red clover in its third year. There was less than usual in Wisconsin, due to dry weather. (P. D. R. 16: 89).

STEM ROT (Sclerotinia trifoliorum) was said to be more prevalent than usual in a number of States. In Delaware large areas in many plantings of crimson clover showed severe infection with numerous sclerotia, according to Adams. In Kentucky, Valteau reported that "The warm open winter was very favorable for its development on red clover. The varieties Kentucky 101 and Tennessee Anthracnose Resistant are very resistant while those from the North and far West are susceptible. Kentucky clover was reduced about 15 per cent in stand and some western clovers as much as 65 per cent. Apothecia were found this fall on nearly every square foot examined in some two-year-old fields, but became scarce early in December. Leaf spot due to S. trifoliorum was very abundant all fall, especially directly above the apothecia. It is practically certain that direct infection and not a saprophytic stage occurs from ascospores." In Ohio, the disease was unusually abundant on red clover early in the year. Damping off caused by this fungus was common in late winter and early spring on alsike clover in North Carolina. Stem rot was also reported from New Jersey and Washington. (P. D. R. 16: 24, 89).

STEM ROT (Corticium vagum). A specimen was received from Oregon.

CHARCOAL ROT (Rhizoctonia bataticola) was isolated from red clover rootlets and from crowns of dead plants and from plants with decayed root centers, in Kentucky. It seems to be a weak parasite. (L. Hinson).

ROOT ROT (undet.) caused a 2 per cent loss in Minnesota. It occurred in most parts of the State but was more abundant in the southern and southeastern sections.

FIRST SUMMER DYING of red clover, cause unknown, occurred extensively in a few fields in Kentucky. By late fall some unadapted clovers had nearly completely disappeared. Insect injuries, leaf spots, and drought were found to have caused much damage in some of the fields examined. Colletotrichum trifolii occurred in slight amounts but the dying could not be attributed to it except in an occasional plot. Some other factor appeared to be operating. (Valteau).

S W E E T C L O V E R

DOWNY MILDEW (Peronospora trifoliorum), on Melilotus officinalis in Montana. (P. D. R. 16: 152).

ROOT KNOT (Caconema radiciala), on Hubam clover in Arizona.

C O W P E A

WILT (Fusarium vasinfectum tracheiphilum) was reported from Mississippi and California.

ROOT ROT (Rhizoctonia bataticola), in California causes premature dying of Blackeye cowpeas, which are very susceptible when the plants reach maturity. (J. B. Kendrick).

SCAB (Cladosporium vignae), Mississippi.

ROOT KNOT (Caconema raditicola). California, only scattered cases of injury were noted. It seems to be restricted to definite areas in fields.

MOSAIC (unknown). New Jersey, Mississippi, Louisiana.

S O Y B E A N

PUSTULAR SPOT (Bacterium phaseoli sojense) was very severe along the coast of North Carolina, especially on dark soils. In Louisiana heavy infection occurred on most of the varieties and strains imported from China, Japan, and Manchuria. Also reported from Delaware and Mississippi.

BACTERIAL BLIGHT (Bacterium sojae) common in North Carolina.

LEAF SPOT (Cercospora cruenta) was common in North Carolina. C. daizu was reported from Delaware for the first time. Septoria glycines also occurred in Delaware.

DOWNY MILDEW (Peronospora manshurica) was reported from Delaware and Louisiana.

WILT (Fusarium vasinfectum tracheiphilum) was common throughout eastern North Carolina and caused total loss in some fields. (Poole).

STEM ROT (Sclerotium rolfsii) is becoming so severe throughout eastern North Carolina that it is causing growers much concern. It is worse on lands where tobacco, peanuts, and soybeans are rotated, and less severe on black lands. (Poole). Also reported from Mississippi.

ROOT ROT (undet.). Mississippi.

MOSAIC (virus). General in Louisiana.

A U S T R I A N W I N T E R P E A

LEAF SPOT (Ascochyta pisi), more than usual in Georgia and Mississippi (P. D. R. 16: 74). POWDERY MILDEW (Erysiphe polygoni), heavy infection in parts of Georgia, also reported from Mississippi. ROOT ROT (Fusarium sp.), Mississippi. ANTHRACNOSE (Gloeosporium sp.) Louisiana.

D I S E A S E S O F F R U I T A N D N U T C R O P S

A P P L E

SCAB (Venturia inaequalis) was considerably more prevalent than last year and did more damage than an average year as evidenced by the fact that of the fifteen States reporting its presence, 9 reported more, 3 less, and 3 the same, as compared with an average year. Those States reporting as much as 5 per cent loss were: Wisconsin, 12; Michigan, 10; Iowa, 7; Maryland, South Carolina, Ohio, and Minnesota, 5. Apparently the ascospores developed in most localities earlier than usual, and this together with a series of well distributed spring rains gave very favorable conditions for primary infection. New York and Massachusetts noted less than usual. P. D. R. 16: 10, 11, 22, 47, 71, 86, 94, 106, 185.

BLOTCH (Phyllosticta solitaria). Delaware reports much more of this disease than usual, with a maximum infection in one orchard of 30 per cent.

RUST (Gymnosporangium spp.). If the abundance of galls on the red cedar is an indication of the severity of apple rust (G. juniperi-virginianae), next year should be a bad rust year, as there is apparently an unusually large number this season in the territory I have observed (Indiana, Virginia, and West Virginia). Incidentally, the heaviest infection found was a limb 18 inches long and 7 1/2 inches wide, at the widest point and weighing one pound, bearing 3,450 galls. (Paul R. Miller). Massachusetts noted an unusual abundance of galls on juniper caused by G. juniperi-virginianae, G. globosum, and G. germinale. New Jersey and Mississippi recorded the presence of G. germinale. Texas, Connecticut, Kansas, New Jersey, and Wisconsin noted about the usual amount of G. juniperi-virginianae. P. D. R. 16: 11, 133, 158.

For the results of an apple rust survey of Virginia, West Virginia, North Carolina, Georgia, and Pennsylvania see P. D. R. 16: 158-162.

BLACK ROT (Physalospora malorum). This disease seemed to be unusually severe on the leaves (frog-eye) in Iowa, Kansas, Michigan, New York, and Massachusetts, but generally there appeared to be less than usual on the fruit in all localities reporting. According to M. B. Waite the leaf spot was not as bad as usual from New Jersey to Virginia. P. D. R. 16: 11.

BITTER ROT (Glomerella cingulata). Except in southern Ohio and in Arkansas this disease was practically negligible this season. Poole in North Carolina commented, "Not important. Absent from most orchards. The dry summer probably resulted in natural control."

BLIGHT (Bacillus amylovorus) generally did about the usual amount of damage, although it was severe in some localities. Of the 21 States reporting, nine (New York, Connecticut, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Iowa) reported more than usual; seven (Mississippi, Arkansas, Ohio, Michigan, Wisconsin, North Dakota, and Kansas) the usual amount; and five (Pennsylvania, West Virginia, Kentucky, Illinois, and Minnesota) less. Poole commented, "Very severe in North

Carolina for the past three years. Bordeaux mixture applied during blossom period showed encouraging evidence of control." P. D. R. 16: 87, 91, 105, 118, 154.

CROWN GALL (Bacterium tumefaciens). An unusual type of gall was observed on Rome Beauty in Georgia. P. D. R. 16: 133.

POWDERY MILDEW (Podosphaera leucotricha) was severe in some orchards in California. There was more than usual in the East. P. D. R. 16: 119.

BLUE MOLD (Penicillium expansum) was very common in storage in Washington.

MEASLES (unknown) was more prevalent than usual in Illinois, Michigan, and California.

P E A R

BLIGHT (Bacillus amylovorus). As usual this disease seemed to be sporadic in occurrence. New York, Virginia, and Maryland reported more than usual, and Pennsylvania and West Virginia less. In Kentucky nearly all pear trees were severely killed back when in the bud or bloom stage to the extent of killing all one, two, and three-year old wood. These partly recovered by sending out shoots from dormant buds on older wood.

BLOSSOM BLIGHT AND CANKER (Green fluorescent bacteria). In California as high as 90 per cent of the blossoms were killed in one orchard of the Winter Nelis variety.

SCAB (Venturia pyrina). With the exception of Maryland, New York, and Ohio, which had 5, 5, and 4.5 per cent losses, respectively, the losses were below normal. California reported good control with Bordeaux mixture but not with lime sulphur.

LEAF SPOT (Fabraea maculata). In Illinois, following freezing in March when all fruit buds and young shoots were killed, a new crop of leaves was produced. These leaves were severely attacked and defoliation resulted which will probably have an injurious effect on next year's crop.

GENERAL NUTRITIONAL DISTURBANCES. California reported three physiological diseases, namely, lime induced CHLOROSIS, EXANTHEMA, and LITTLE LEAF, which may be cured with iron, copper, and zinc, respectively.

P E A C H

LEAF CURL (Exoascus deformans). Generally there occurred an unusual abundance of this disease. Twelve of the 17 States reporting its presence indicated more than normal. In Michigan, where it was very dry during the month of April, there was much less curl than usual even on unsprayed trees. One of the striking features about this disease was the extensive late infection (June) in Alabama. P. D. R. 16: 87, 93, 109, 110, 171.

BROWN ROT (Sclerotinia fructicola). Massachusetts reported 10 per cent loss; Maryland, South Carolina, and Ohio 5 per cent; Michigan and Colorado 3 per cent. In New York severe damage followed curculio injury. Poole reported that in North Carolina it was "Of very little importance. Drought conditions probably prevented its development."

BACTERIAL SPOT (Bacterium pruni). New York and Pennsylvania reported considerable injury. In other States there was less than usual. P. D. R. 16: 87.

SCAB (Cladosporium carpophilum) was bad in unsprayed orchards in Massachusetts. P. D. R. 16: 155.

VERTICILLIUM WILT (Verticillium sp.). New York. P. D. R. 16: 132.

YELLOW, LITTLE PEACH, AND RED SUTURE (virus). Michigan reported about 5 per cent loss from all three. Yellow was the least important, while little peach and red suture were more prevalent than usual. Rosette was also present. The introduction of this disease was traced to Georgia nursery stock.

MOSAIC, A NEW VIRUS DISEASE OF PEACH, was reported by L. M. Hutchins from two counties in Texas. See Science, 76: 123. Aug. 5, 1932.

PHONY PEACH (virus). Extensive scouting by the Division of Phony Peach Eradication, Bureau of Plant Industry, during 1929, 1930, 1931, and 1932, have made available a very detailed picture of the distribution of this disease. While all trees showing clear phony infection have, of course, been eradicated, the map should be considered as giving the known distribution of the disease at the period indicated. It should be noted that because of the long incubation period before phony symptoms are apparent several years' inspection in a given region are necessary to accomplish complete eradication of this disease.

Table 1. Phony Peach Eradication. Summary of phony trees found during 1929, 1930, 1931, and 1932.

STATE	1929	1930	1931	1932	TOTAL
Alabama	289	3,383	5,100	136	8,908
Arkansas		5	285	278	568
Florida			321	2	323
Georgia	80,955	216,610	104,361	35,112	437,038
Illinois			2	12	14
Louisiana		36	741		777
Mississippi	159	376	633		1,168
Missouri				17	17
North Carolina		10	22	18	50
Oklahoma				3	3
South Carolina		89	47	60	196
Tennessee		5	35	19	59
Texas		16	204	413	633
Totals	81,403	220,530	111,751	36,070	449,754

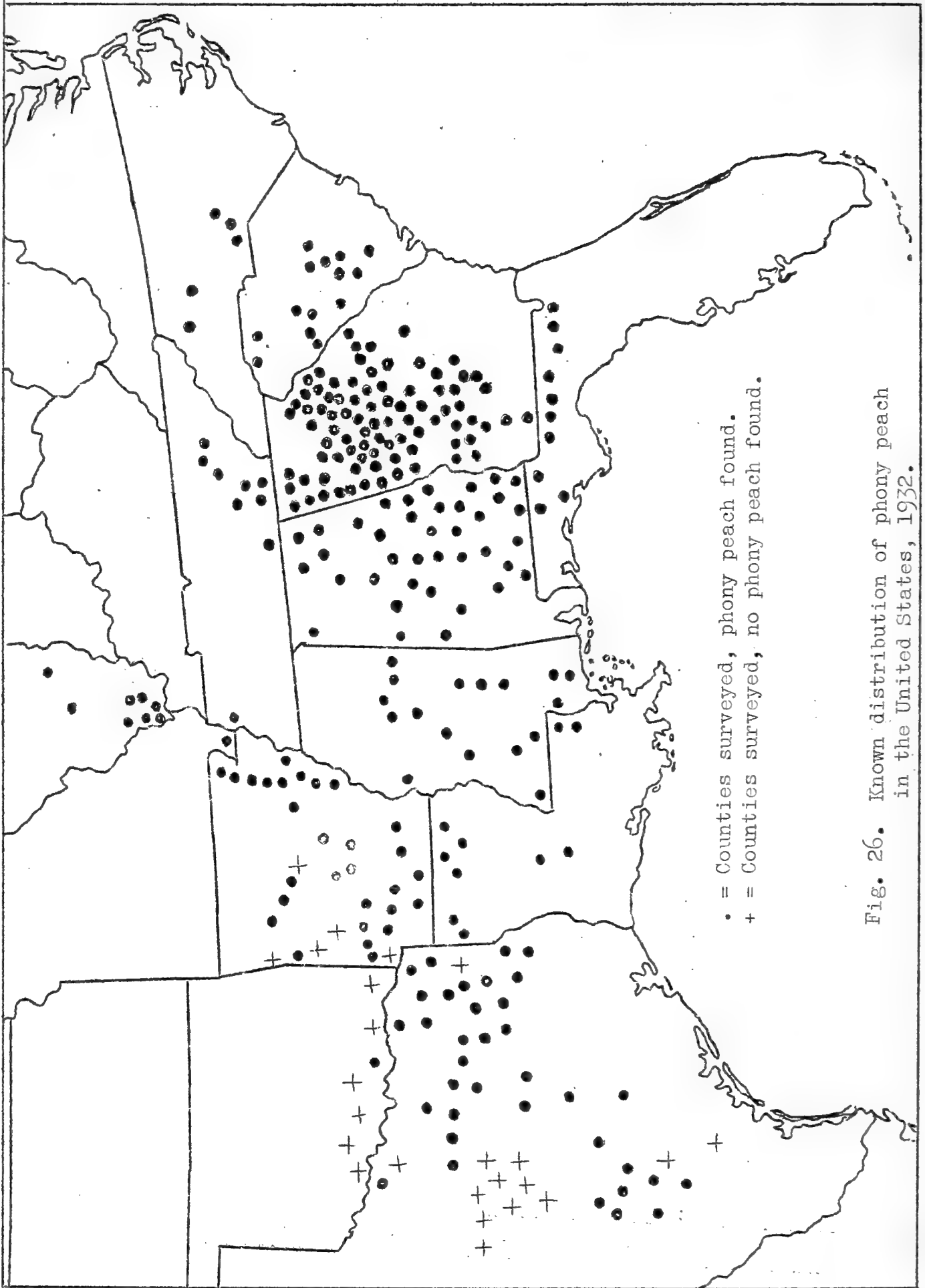


Fig. 26. Known distribution of phony peach in the United States, 1932.

The extent and thoroughness of the surveys is indicated by the fact that a total of 449,754 diseased trees distributed over 13 States have been detected and destroyed. See Table I and the map (Fig. 26). In addition extensive scouting was done during 1931 in many States where no indication of this disease was found. The number of trees inspected in these "disease-free States" is given in parentheses following the names of the States:

Connecticut (34,424), Delaware (86,260), Indiana (128,771), Kansas (19,363), Kentucky (98,899), Maryland (210,295), Michigan (313,256), New Jersey (194,015), New York (131,095), Ohio (141,961), Pennsylvania (326,850), Virginia (159,832), and West Virginia (96,333), a total of 1,993,358 trees.

ARSENICAL INJURY (Lead arsenate sprays). Michigan, Delaware and New York report considerable injury. In the majority of cases it seems to be due to too much lead and not enough hydrated lime and possibly the unusual weather conditions.

WINTER INJURY AND FROST INJURY. Illinois, Kentucky, Mississippi, Arkansas, New York, and Washington reported severe losses due to the freezing of the blooms. The extremely warm weather of February caused a decided advance in vegetation and in some cases caused the trees to bloom one month ahead of normal. Illinois estimated that 90 to 95 per cent of the buds of Elberta, which is the major variety of that State, were killed. In connection with the losses so generally reported as resulting from low temperatures in March, note should be made of Poole's report from North Carolina that peach trees affected with crown gall or root knot were much more readily killed by this freeze than healthy trees. According to M. B. Waite, in Southern Maryland peach buds were partly killed in the pink by frost in March. The majority escaped and bloomed in late March and early April, but were chilled by cold without freezing so that they did not set fruit.

CRACKED PITS. In Pennsylvania a peculiar condition occurred; the pits were split longitudinally and also cracked transversely. In addition to this the flesh of these peaches showed water-soaked areas which could be seen through the skin in some cases as dark green, slightly raised spots. Affected peaches dropped prematurely.

YELLOW LEAF, possibly due to weather conditions, Pennsylvania.
P. D. R. 16: 134.

P L U M

BROWN ROT (Sclerotinia fructicola) caused about normal losses. Those States reporting more than 1 per cent are: Ohio, 12; Maryland, 7; Massachusetts, 5; and Iowa, 2.

CROWN GALL (Bacterium tumefaciens). In Arizona more than 250 trees were killed in one orchard and about 150 in another. Crown gall was observed in Minnesota and Maryland.

BLACK KNOT (Plowrightia morbosa). Minnesota reported heavy infection on native plums. Also severe in Massachusetts and New York. P. D. R. 16: 120.

SHOT HOLE (Coccomyces prunophorae). In Minnesota a 2 per cent loss occurred and as high as 15 per cent infection was noted on trees at the University fruit farm.

C H E R R Y

LEAF SPOT (Coccomyces hiemalis). Michigan, Wisconsin, and New York noted severe losses in unsprayed orchards.

DECAY (Penicillium sp.). Pennsylvania noted heavy losses due to decay occurring on badly bruised fruit caused by heavy wind storms. A large proportion of the crop in some orchards was injured and with the prevailing prices the crop was not worth picking.

G R A P E

BLACK ROT (Guignardia bidwellii) was more severe than usual in Massachusetts, Florida, Virginia, Maryland, and Ohio, where 25, 15, 10, 5, and 4 per cent losses, respectively, occurred. North Carolina, Arkansas, Illinois, Wisconsin, and Kansas reported less than usual. P. D. R. 16: 13, 111.

DOWNY MILDEW (Plasmopara viticola). With the exception of Maryland, Iowa, and Massachusetts, downy mildew was much less prevalent than usual. Losses did not exceed a trace in any State.

ROOT KNOT (Caconema radicum). Arizona and California reported severe losses and apparent spreading of this pest.

BITTER ROT (Melanconium fuligineum). Florida reported 6 per cent loss with a maximum infection of 85 per cent.

S T R A W B E R R Y

LEAF SCORCH (Diplocarpon earliana) was much more prevalent in Louisiana where 8 per cent loss occurred. Florida reported good control of this disease with Bordeaux 4-4-50.

LEAF SPOT (Mycosphaerella fragariae) according to Zundel this year was the first time, at least in recent years, that leaf spot caused real damage to strawberry plantations in Pennsylvania. Louisiana noted 15 per cent loss which was considerably more than normal. Michigan reported it as being much more prevalent generally, and very severe in certain localities.

ROOT ROT (unknown) reduced stands as much as 50 per cent in some fields in Virginia. New York, Maryland, Michigan, Wisconsin, Minnesota, and California noted considerable damage. The cause has not been determined.

DWARF (Aphelenchoides fragariae). Florida noted an increase in 1932 in the number of dwarfed plants sent in from Arkansas over that for 1931. California reported this disease on plants coming from Tennessee and Arkansas, especially on the variety Klondike. Very little local spread was observed in California. P. D. R. 16: 113.

ANTHRACNOSE (Colletotrichum fragariae). In Florida this disease not only kills young plants in the nurseries but is also the cause of a sudden wilt of plants set in the fields in the fall, causing a rot of the crowns.

SCLEROTIUM ROT (Sclerotium rolfsii). In Florida this disease is fairly widespread during the summer and causes the death of plants in nursery beds and on higher drier land.

B L A C K B E R R Y

BLUE STEM (Verticillium sp., reported as V. ovatum) was recognized in Connecticut for the first time on dewberry and blackberry.

R A S P B E R R Y

ANTHRACNOSE (Plectodiscella veneta) was generally more severe than usual in Maryland, Kentucky, Arkansas, Illinois, and Michigan. It was about normal in occurrence in Wisconsin, Minnesota, Iowa, and Kansas.

LEAF SPOT (Mycosphaerella rubi) was very severe in Illinois, Massachusetts, and Kentucky where it caused from 50 to 100 per cent defoliation, and sometimes apparently the death of plants.

D E W B E R R Y

LEAF SPOT (Cercospora rubi) occurred late in the season in North Carolina, and thus had little effect on new cane growth.

ANTHRACNOSE (Plectodiscella veneta) caused a 25 per cent loss in North Carolina, which was an increase over the two previous seasons. Also reported from Arizona.

CANE BLIGHT (Leptosphaeria coniothyrium) is common in North Carolina. Satisfactory control is being obtained where vines are cut to soil level immediately after the fruit is harvested. (R. F. Poole).

BLUE STEM (Verticillium sp., reported as V. ovatum). Connecticut. (See under blackberry).

C R A N B E R R Y

According to reports, the Massachusetts cranberry crop, somewhat reduced in size compared with recent years, was generally of good keeping quality, but there were individual bogs which produced the poorest keeping berries of their history. Cultures from berries sent in by Dr. Bergman showed that Glomerella cingulata vaccinii was responsible for an extraordinarily large portion of the STORAGE ROT. Wisconsin produced one of

the largest crops of record. The season was exceptionally favorable in all respects, there being very little damage from frosts, insects, or diseases. The berries were of good keeping quality. FALSE BLOSSOM is being watched closely but with less apprehension than formerly; control measures for the leaf-hopper carrier are being taken where required. Reports from the Pacific Coast indicate that FROST DAMAGE materially reduced the crop in that section. P. D. R. 16: 25, 13.

B L U E B E R R Y

CROWN GALL (Bacterium tumefaciens) was reported from Massachusetts. This disease has only been reported once before on this host. See Barker and Neal, Quart. Bul. Miss. State. Pl. Bd. 3: 13-34. 1924.

C I T R U S

SCAB (Sphaceloma fawcettii) was more prevalent on grapefruit in Florida than usual. This may be explained by the fact that the drought during spring months retarded both the host and fungus. Rains occurred generally during May and June, while the fruit was still susceptible.

MELANOSE (Phomopsis citri) was very abundant in Puerto Rico.

B A N A N A

WILT (Fusarium cubense) was well distributed throughout Puerto Rico.

F I G

LEAF SPOT (Cercospora fici) caused defoliation of plants in North Carolina, but the disease occurred so late in the season that the damage was probably insignificant.

RUST (Cerotelium fici). Most trees in southern Louisiana are generally defoliated by the middle of August.

BLIGHT (Stilbum cinnabarinum) was observed for the first time in Louisiana.

P E C A N

SCAB (Cladosporium effusum). Poole reported for North Carolina, "On the increase. Although many growers spray more generally than in the past, others take chances, which usually results in heavy losses in plantings where infection is heavy and susceptible varieties are grown."

DIEBACK (probably Botryosphaeria berengeriana) was reported for the first time from Arizona.

W A L N U T

BACTERIOSIS (Bacterium juglandis). As high as 75 per cent infection was reported in California plantings.

A L M O N D

CROWN GALL (Bacterium tumefaciens).. Practically 100 per cent infection occurred in one-year old plantings on 3 ranches in California.

D I S E A S E S O F V E G E T A B L E C R O P SP O T A T O

Davis and Boyd summarize the potato disease situation in Massachusetts as follows: "In general, the diseases observed and losses were similar to those reported for 1931." This statement applies with slight modifications to most of the potato growing States from which reports were received. The most important exceptions are noted below.

LATE BLIGHT (Phytophthora infestans) was very locally distributed in some States. For example, in New Hampshire it occurred only in Coos County. Garrett County in western Maryland suffered 12 per cent loss although there was practically no loss in other parts of the State. In Michigan it was "Found only in the vicinity of Sault Sainte Marie, Chippewa County, on new land from imported tubers. The loss in small acreages was total in many cases." New York, Ohio, Wisconsin, Minnesota, and California reported only slight losses this year, a condition attributed to hot dry weather. In North Carolina there was very slight infection in the mountain areas where it causes severe damage nearly every year. For reports from Florida, Texas, Maine, and other States see P. D. R. 16: 14, 21, 45, 121, 145, 176.

EARLY BLIGHT (Alternaria solani) was much less prevalent and destructive than usual, which can probably be attributed to the dry and hot weather. Butler reported from New Hampshire, "Early blight, which was prevalent and destructive throughout the State in 1931, caused but slight injury in 1932." In North Carolina it was general and especially severe in some fields in the eastern part of the State. Michigan reported "Especially prevalent in northern counties," and New Mexico, "Serious in the higher altitudes where potatoes are grown." New York, Maryland, South Carolina, Virginia, Florida, Wisconsin, Ohio, Minnesota, Arkansas, and North Dakota all reported slight losses. P. D. R. 16: 45, 121, 136.

SCAB (Actinomyces scabies) was generally much more prevalent than in an average year. Nine of the twelve States reporting indicated more than usual. Wisconsin estimated 12 per cent loss for the State with a maximum infection of 100 per cent. In a detailed report on potato scab in New York State, Blodgett gives the following list of counties with the percentage of tubers affected in fields surveyed: St. Lawrence 47, Monroe 38.4, Clinton 28.5, Ontario 21.7, Genesee 19.7, Wyoming 11.3, Allegany 10.6, Erie 10.5, Oswego 10.2, Oneida 10.1, Franklin 9.8, Onondaga 9.5, Suffolk 9.4, Nassau 5.6, and Stauben 3.3. He summarizes his observations as follows: "Loss slight on Long Island. Average of 189 records in 15 counties in western, central and northern New York, 14.2 per cent. Very important due to dry weather and high temperatures." Poole in North

Carolina said that scab was "Common in soils where lime has been applied in large amounts." Other States noting over a trace of loss include Maryland, 3 per cent; Kansas, 1.5; Michigan and Iowa, 1; Florida and Ohio, 0.5. P. D. R. 16: 121, 136.

STEM ROT AND SCURF (Corticium vagum). The losses from this disease were more severe than those occurring during an average year. Barrus summarizes the losses from Rhizoctonia solani in New York State as follows: "Sprout rot occurred to about the same extent as last year. The amount of scurf on tubers in 109 fields in 15 counties was as follows: Oswego 52.8 per cent, Monroe 38.3, Suffolk 34.4, Wyoming 33.6, Genesee 27.2, Allegany 26.4, Steuben 26.2, Ontario 25.9, Nassau 23.2, Franklin 20.6, Onondaga 17.5, Oneida 17.1, St. Lawrence 8.0, Erie 7.9, and Clinton 6.6." Florida reported a stand reduction of 10 per cent and a loss of 25 per cent. Other losses were: Kansas, 6; Maryland and Iowa, 5; Colorado, 3; California and Ohio, 2. Wisconsin reported good control with corrosive sublimate and acid mercury. In North Carolina it was noted that the disease occurred in isolated wet spots.

POWDERY SCAB (Spongospora subterranea). In the potato tuber defect survey made in Franklin County, New York, on September 21, visits were made to ten fields. Powdery scab was found in five fields in amounts ranging from 1 to 67 per cent of tubers affected. This trouble has not been found in the central and southern counties of the State. (F. M. Blodgett).

BLACK LEG (Bacillus phytophthorus). Except in Arkansas, which reported more, this disease was generally less prevalent than usual. No loss estimates were above 1 per cent.

WILT (Fusarium sp.). Poole reported it as "Very abundant throughout the eastern part of North Carolina". Minnesota reported that three successive years of hot dry weather have increased the prevalence of this disease. P. D. R. 16: 135.

BACTERIAL WILT (Bacterium solanacearum). A severe outbreak occurred on the Red Bliss Triumph variety in Puerto Rico.

MOSAIC (virus), as usual, was widespread. Those States reporting more than one per cent were: Iowa, 7; Massachusetts and New York, 5; Maryland, 3; and Colorado, 2. New Jersey noted a decrease due to the use of certified seed and possibly to extensive plantings of Irish Cobbler.

LEAF ROLL (virus). Black sent the following report for New York. "Occurs throughout the State. Eighteen fields were rejected for certification in 1932 as compared with 11 in 1931. Loss 6 per cent." Other States reporting more than a trace of loss from this disease were: Ohio, 5; Maryland, 3; California, 2; and Michigan, 1.

TIP BURN AND HOPPER BURN (drought and leaf hopper). New York reported as follows: "The disease is much more important in western New York than in other sections. Where optimum results were obtained from spraying experiments there was a 35 per cent increase in yield with hopper burn the most important disease or pest and without complete control. Total

loss 15 per cent." Ohio reported a loss of 8 per cent; Michigan and Minnesota, 5; and North Dakota, 2.

T O M A T O

LEAF SPOT (Septoria lycopersici). In New Jersey there was a 30 per cent reduction in yield, but the severity was localized where rains and subsequent foggy humid weather favored infection. It was more prevalent than for several years in Maryland, where it was not observed at all in 1931, and there was only a trace in 1930. New York, Kansas, Michigan, and Wisconsin reported less than usual due to weather conditions. P. D. R. 16: 174.

FUSARIUM WILT (Fusarium lycopersici) was generally a little more prevalent and severe than normal. Maryland noted it as being more destructive this year than for many years. Even the resistant variety Marglobe was appreciably affected. The major State losses reported were: Virginia, 10 per cent; South Carolina, 5; Michigan, 3; and Kansas, 2. P. D. R. 16: 153.

BACTERIAL CANKER (Aplanobacter michiganense). In Kansas some fields were abandoned as total losses and actual losses were easily 75 per cent. New Jersey noted 100 per cent infection in some fields. The infection evidently came from diseased seedlings, and not from field infection. The disease was widely distributed in southeastern North Carolina. New York reported only a trace and Massachusetts 1 per cent. P. D. R. 16: 121, 144, 174, 175.

EARLY BLIGHT (Alternaria solani). In Massachusetts this disease was common and destructive in certain fields. Its seriousness was attributed to attacks of flea beetles. The loss for the State was estimated at 5 per cent. In New York it was "Always present to some extent in the field crop." (A. G. Newhall). The principal loss was caused by early defoliation and consequent sun scald of fruit.

LATE BLIGHT OR DOWNY MILDEW (Phytophthora infestans). In Connecticut and Massachusetts, where this disease has rarely been seen since 1890, it caused this year serious losses. It was the most important disease in Connecticut where it was general and serious on late tomato fruits, especially Marglobe. Hundreds of bushels were destroyed in Massachusetts. New York also reported much more than usual. P. D. R. 16: 166, 176, 184.

BACTERIAL SPOT (Bacterium vesicatorium) was observed for the first time in Arkansas. In Maryland it was general and caused considerable damage.

ANTHRACNOSE (Colletotrichum phomoides) was found for the first time in two sections of Iowa where a one per cent loss was estimated. It was also noted in Connecticut, New York, Kansas, and Puerto Rico.

ROOT-KNOT (Caconema radicum) caused 7 per cent loss in South Carolina and was severe also in Mississippi, Arkansas, and Wisconsin.

MOSAIC (virus). In Massachusetts it was widely distributed and severe in dry weather, loss 20 per cent. Both in the green house (where it united with the potato virus to cause streak) and in the field, mosaic has been much reduced in New York in recent years by destroying weed hosts in the vicinity of the plant bed. P. D. R. 16: 174, 185.

BLOSSOM-END ROT (non-par.). Ohio, Maryland, and New York estimate 5, 4, and 2 to 3 per cent loss, respectively. There was more loss than usual in North Dakota where the water relations were disturbed in many instances by dry weather and attempts at artificial watering. P. D. R. 16: 144, 174.

CLOUDY SPOT (undet.). In several canning districts in western Ohio, what appeared to be tomato cloudy spot was present in epidemic form. This trouble was manifest by a white cloudy appearance, visible through the epidermis. When the fruit was peeled these whitish islands of glistening cells adhere to the epidermis, or when they are removed with a knife, leave the fruit pitted and unfit for the first grade. This seems to be the first appearance of this disease in Ohio. P. D. R. 16: 167.

B E A N

BACTERIAL BLIGHT (Bacterium phaseoli) generally caused about the normal amount of damage. The following losses were estimated by collaborators: Iowa, 3 per cent; Wisconsin, Michigan, and Ohio, 5; Maryland, 3; New York, 2 to 3; Colorado, 2 to 4; and Virginia, 1. Maryland and Colorado noted more injury from pod and stem infection than usual. In some fields in Maryland 100 per cent infection occurred. P. D. R. 16: 165, 173, 185.

HALO BLIGHT (Bacterium medicaginis phaseolicola) has become so serious in Red Kidney beans in Michigan that some farmers are discontinuing their culture. The acreage was greatly reduced this year, due largely to the destructiveness of halo blight in 1931. The loss in 1932 was estimated at 40 per cent, with a maximum infection of 100 per cent in some fields. P. D. R. 16: 88, 165.

ANTHRACNOSE (Colletotrichum lindemuthianum) was considerably less prevalent than usual as evidenced by the fact that 9 of the 13 States observing its presence noted less or much less. The majority of the collaborators attributed this to dry hot weather. It was severe in various localities in New York. P. D. R. 16: 165, 173.

ANGULAR LEAF SPOT (Isariopsis griseola) was reported from two counties in New York. P. D. R. 16: 165.

MOSAIC (virus). New York reported 10 per cent loss in the canning crop, and 1 per cent loss in garden beans, while only a trace occurred in the dry bean crop. Mosaic has become so severe in New York on the canner strains of Refugee that the canners have made strenuous objections to the seed companies. Promising results have been obtained from the first year's work under a fellowship financed by the seed companies to work on this problem. In Michigan also mosaic was serious on Refugee snap bean,

30 per cent loss being estimated while in field beans of which the resistant variety Robust is the principal one grown, there was only a trace. Colorado noted this disease as being prevalent on all susceptible varieties, some fields having as much as 40 to 50 per cent infection. In Maryland the disease is usually masked later in the season but this year it was apparent throughout the season, according to H. A. Hunter. In the Norfolk truck region of Virginia both spring and fall crops were affected. Fields with 100 per cent infection were observed in New York, Michigan, and California.

CURLY TOP (virus) was reported from Washington.

POWDERY MILDEW (Erysiphe polygoni) caused losses estimated at 5 per cent in the fall crop in South Carolina, and 2 per cent in Florida. It also occurred in Virginia and California.

ROOT AND STEM ROTS, (various fungi), were generally of about the usual importance. Louisiana reported 5 per cent loss, Maryland, 2.5 per cent. The dry root rot, Fusarium martii phaseoli, caused 5 per cent loss in New York and was also reported from Mississippi. Fusarium spp. were reported from Maryland, Virginia, South Carolina, and Louisiana. Sclerotinia sclerotiorum caused stem rot in Massachusetts and Washington. The ashy stem blight, Macrophomina phaseoli, was reported from North Carolina. Rhizoctonia bataticola caused serious losses in the seedling stage and to mature plants in the Sacramento and San Joaquin Valleys in California. Rhizoctonia sp. was reported from Maryland and Louisiana. Corticium vagum was reported from New York and New Jersey, and the Rhizoctonia solani stage from Mississippi and Michigan. In Michigan favorable growing conditions for the host were not conducive to infection by this organism. Southern blight, Sclerotium rolfsii, caused from 10 to 20 per cent loss in some fields in the Sutter basin in California. It was also reported from Virginia, Mississippi, Louisiana, and Puerto Rico. Black root rot, Thielavia basicola, was observed on beans in New York but is said to be rare on this host. Pythium sp. was reported from Louisiana.

HOPPERBURN, due to leafhoppers, was said to be very abundant in southern New Jersey. Affected leaves lack chlorophyll.

BLACK PITTING OF SEEDS, non-parasitic, was reported from New York. The centers of the seeds were black. It seems to be found only in varieties the seeds of which do not become hard when dry. (Chupp).

L I M A B E A N

BACTERIAL BLIGHT (Bacterium vignae) was reported from New York, Maryland, Virginia, Ohio, and Puerto Rico. In Maryland the most serious injury noted was in a field from home-grown seed, while an adjacent field planted with western seed was not injured.

ROOT ROT (Rhizoctonia bataticola) was observed occasionally in California. Lima beans appear to be more resistant to the early stages of this disease than ordinary beans. (J. B. Kendrick).

O N I O N

MILDREW (Peronospora schleideni) was very severe in New York, after being almost negligible for two years. The frequent showers in late June probably explain its early occurrence. The loss was estimated to be 20 per cent. Massachusetts reports much more than usual with losses ranging from 5 to 40 per cent. In California, on the other hand, there was less than usual in 1932, due probably to dry cool weather. L. D. Leach has compiled some data as to its fluctuating importance in that State:

	<u>Percentage loss</u>
1920: Moderately severe; localized; Maximum loss 30%	2
1921: Same as last year; seed crop, Santa Clara Valley	2
1922, 1923, 1924: No reports.	
1925: Very severe; general; both seed and bulb crops	60-80
1926: Severe in central California coastal section; Maximum	50
seed crop	40
1927: Localized on seed crop	3
1928: Widely distributed on seed crop	5
1929: Little or no loss	0
1930: Severe in localized areas	20-30
1931: Severe and general during March; little spread during April and May; severe in localized areas during June.	Approximately 10
1932: Practically no mildew on seed onions; early infection on bulb onions at Sacramento and light infection in June on McDonald Island. Loss less than	1

PINK ROOT (Fusarium sp) caused 4 per cent loss in Ohio, which is attributed to the low soil moisture in July and August.

RUST (Puccinia asparagi) was reported for the first time from California.

ROT (Sclerotium rolfsii). In California 100 per cent infection was observed in a field of white onions, adjacent to a field of yellow onions where none occurred.

YELLOW DWARF (virus) was found in two small plantings in California.

SUN SCALD (weather conditions). New York. It was extremely warm the last few days of August and the first days of September. Onions harvested at this time, and left lying in the sun for even a short period, later showed typical collapsing of the tissue, accompanied by flattening of the bulb on one side. A similar effect was produced in fields where rather large weeds were pulled up and the dirt removed so that one side of the onion was exposed to the sunlight. It was severe in seven fields visited in Genesee County.

SWEET POTATO

The results of cooperative surveys of the diseases of sweet potatoes in storage in Virginia and Maryland in February and of field surveys during the growing season in the same localities, conducted by pathologists of the United States Department of Agriculture and the States of Virginia and Maryland, are summarized in the Reporter, volume 16, pages 19 to 20, 182, 183.

BLACK ROT (Ceratostomella fimbriata) was about average in prevalence in most States. In North Carolina, according to Poole, "It was especially severe in storage banks where losses up to 100 per cent were observed. Sweet potatoes were harvested later than usual. Laboratory studies have shown formaldehyde treatments of no control value." Losses reported are 10 per cent in Texas; 8, Iowa; 5, Arkansas; 4, Florida, Kansas; 3, North Carolina and South Carolina.

STEM ROT AND WILT (Fusarium batatatis and F. hyperoxysporum) was important in most sweet potato growing States, as usual. Maximum field losses of 80, 75, and 65 per cent were reported from Virginia, New Jersey, and North Carolina, respectively. In Louisiana the disease is said to be very destructive in a few places but is not very generally distributed. In Arkansas it is rather serious in many sections. Wilt caused a reduction in stand of probably 25 per cent in Merced and Stanislaus Counties, which comprise the main sweet potato area of California. It was also reported from Colorado. The variety Priestley is said to be tolerant of this disease in Iowa. Losses estimated are 15 per cent in eastern Virginia and in Iowa; 8, North Carolina; 5, Arkansas, Kansas; 2, Maryland, Florida; and 1, South Carolina.

POX (Actinomyces sp.) was reported from a number of States but the only appreciable loss estimate was 5 per cent in storage in Maryland where the disease is said to be increasing rapidly in prevalence and destructiveness.

STORAGE ROTTS (various organisms including Ceratostomella, Rhizopus, Fusarium, Pythium, etc.) were reported as causing 40 per cent loss in South Carolina; 20, North Carolina; 15, Maryland, Arkansas; 12, Florida; and 8, Kansas.

ROOTLET ROT, RING ROT (Pythium ultimum) was reported from North Carolina and Mississippi. In North Carolina early harvested sweet potatoes were not affected but in late harvested crops there was as much as 5 per cent loss in the field and an equal loss in storage.

VIOLET ROOT ROT (Rhizoctonia crocorum) was reported from Texas, Kansas, and New Mexico. In New Mexico it was rather important in a few fields in one district. This disease is not common on sweet potato.
P. D. R. 16: 74; 17: 9.

CHARCOAL ROT (Rhizoctonia bataticola) was reported from Maryland and California.

ROOT KNOT (Cacconema radicum) was reported from Mississippi, Arkansas, and California.

MOSAIC (undet.) was of slight importance in Arkansas and Kansas.

C A B B A G E

YELLOWS (Fusarium conglutinans) in general was probably a little more prevalent than usual. In New York it was very severe within a two mile radius of Phelps, Ontario County. In Michigan the disease continues to increase in importance. North Carolina noted a total loss in some gardens. It was much more prevalent in Minnesota than normal due to several successive seasons of hot dry weather. It was reported for the first time from Arizona. Maryland reported 7.5 per cent loss which was less than usual.

DOWNY MILDEW (Peronospora parasitica) caused a 50 per cent loss in Virginia. This disease was reported for the first time from Montana.

BLACK LEG (Phoma lingam). Much less in New York because of rather general seed treatment with hot water.

R A P E

CLUB ROOT (Plasmodiophora brassicae). New Jersey noted less during the past five years. The repeated heavy applications of lime seems to be the explanation.

C U C U M B E R

BACTERIAL WILT (Bacillus tracheiphilus) generally was about normal in occurrence and severity, although there was a severe outbreak in eastern Michigan which practically ruined the pickle crop, causing a 30 per cent reduction in yield for the State. Other loss estimates were: Massachusetts, 20 per cent; Iowa, 8; and New York, 7. Colorado noted good control in the greenhouse from fumigation with naphthalene. It was very severe on cucumbers at Arlington, Virginia, where it caused 50 per cent loss.

DOWNY MILDEW (Pseudoperonospora cubensis). The following losses which were more than usual for these States, were estimated: Florida, 19 per cent; Virginia, 15; Massachusetts, 10; Ohio and Maryland, 1. The disease was also observed in Connecticut, Mississippi, and Wisconsin. Puerto Rico reported good control with Bordeaux. P. D. R. 16: 152, 177.

POWDERY MILDEW (Erysiphe cichoracearum) was very common and destructive in greenhouses in Massachusetts. Much damage is done by fungicides used to control it.

C A N T A L O U P F

BACTERIAL WILT (Bacillus tracheiphilus) was much more severe in Iowa than usual, causing a 6 per cent loss. This was thought to be due

to the heavy carryover of stiped beetles from 1931 due to the mild winter. Massachusetts reported 10 per cent loss and New York 3 to 4 per cent. It was also present in Connecticut and Kansas.

ANTHRACNOSE (Colletotrichum lagenarium) was more severe in Iowa, Ohio, and Maryland, where 0, 1, and 0.5 per cent losses, respectively, occurred. North Carolina noted severe blighting toward the end of the season, more severe than any of the past three seasons. Connecticut, Wisconsin, and Kansas reported less than normal. It was unusually severe at Arlington, Virginia, during the latter part of the season (30 per cent loss).

LEAF SPOT (Macrosporium cucumerinum) was somewhat more prevalent than usual. Those States estimating losses were: Florida, 14 per cent; Iowa, 5; Maryland, 3; and Ohio, 2. P. D. R. 16: 136.

CHLOROSIS (cause unknown). In New York, in the counties along Lake Ontario, a trouble has appeared, which each year is increasing in virulence. The leaves between the vines are uniformly yellowish with a very dark green margin bordering each side of the principal veins, and sometimes even along the smaller veins. The plant is stunted in growth, the yield reduced and the taste of the melon made insipid. It has proved impossible to transmit the trouble by manipulating the plants as though they had been infested with mosaic. There is some circumstantial evidence that the trouble is seed-borne.

GUMMY STEM BLIGHT (Mycosphaerella citrullina) was much more prevalent than usual in New York causing 100 per cent loss in some fields.

DOWNY MILDEW (Pseudoperonospora cubensis) caused an unusual amount of premature defoliation of late maturing varieties and plantings in Massachusetts. The loss was estimated at 10 per cent.

W A T E R M E L O N

ANTHRACNOSE (Colletotrichum lagenarium) seemed to be much more severe in some localities and much less in others, e. g., Massachusetts noted it as being the most common and damaging disease of the crop this season. It caused severe defoliation as well as poxed fruit. Iowa reported much more, estimating 15 per cent for the State loss, and some fields with a maximum infection of 75 per cent. Arkansas, Florida, New Jersey, and North Carolina noted much less due to the unfavorable season for its development. Connecticut, Maryland, Colorado, and New York reported about the normal amount. P. D. R. 16: 22, 177.

FRUIT ROT (Phytophthora spp.). In Arizona this disease, which is new for the State, caused as high as 40 per cent loss in some fields.

MOSAIC (unknown) was reported for the first time as a field disease in Florida.

WILT (Fusarium niveum) caused heavy losses throughout North Carolina.

C E L E R Y

EARLY BLIGHT (Cercospora apii) was generally prevalent and about normal in occurrence. It was much more severe than usual in Michigan, where it was said to be "The most destructive disease of the crop this year. It was present in all sections and everywhere reported as difficult to check. Many fields in the Kalamazoo section were a total loss. High night temperatures and fogs provided ideal conditions." The total reduction in yield in Michigan was estimated at 20 per cent, and there was another 10 per cent loss in grade. A very severe outbreak occurred also in the Sanford section of Florida favored by somewhat similar weather conditions. The loss in Florida was estimated at 15 per cent. In Massachusetts, where the loss was 5 per cent, the disease was unusually scarce on early celery but spread rapidly in the late crop. New York noted a 5 to 7 per cent loss which was more than usual. P. D. R. 16: 43, 170.

LATE BLIGHT (Septoria apii and S. apii-graveolentis) seemed to be somewhat less prevalent than usual, although it became rather severe late in the season in some States. Due to the economic depression and low prices, growers omitted the usual spraying or dusting, and late rains brought on a heavy outbreak. In New York it has been very scarce during the past two years. Evidently it has not been so abundant on the seed. One county in Oregon lost 50 car loads of celery on account of blight. Both species were reported from Massachusetts, New York, and Michigan. The small-spotted form (S. apii-graveolentis) was said to be killing umbels in the seed crop in Monterey County, California. It occurred also in Santa Clara County. P. D. R. 16: 177.

PINK ROT (Sclerotinia sclerotiorum) caused as much as 60 per cent loss in stored celery in Colorado. It was also reported from New York, Michigan, and California.

ROOT ROT (Phoma apicola). In New York this disease caused as high as 50 per cent loss in two or three lots in cold storage.

YELLOW S (Fusarium sp.) was reported from New York, Ohio, Michigan, Wisconsin, Minnesota, and Colorado, in practically all cases as more prevalent than usual. Both New York and Minnesota mentioned successive hot dry summers as having favored the spread and development of the disease. In Minnesota it had been observed previously on only one or two bogs, while in 1932 it was found on a dozen or more farms. In New York it became more severe after a very warm spell in late August. In Michigan, on the other hand, moisture and temperature after July were not favorable and losses were confined to the summer crop at Kalamazoo. The report for Wisconsin was the first for the State. Losses estimated were 5 per cent in Michigan, 4 per cent in Colorado, and 1 per cent in Minnesota and Ohio. P. D. R. 16: 13.

YELLOW S (virus) was reported from Wisconsin and California. The disease in California has been found to be due to the California aster yellows virus which is distinct from the eastern form. It occurred in Yolo, Sacramento, Santa Clara, and Monterey Counties and caused severe losses in some instances.

MOSAIC (virus) was more severe in Florida than it had been during the past two years, according to S. P. Doolittle.

L E T T U C E

BOTTOM ROT (Corticium vagum) caused a loss of 27 per cent in New York, and 35 per cent loss in Orange and Oswego Counties. Newhall reported excellent control on 400 acres dusted by growers using a commercial brand of 2 per cent ethyl mercury phosphate. The disease was also severe in some New Jersey fields.

DROP (Sclerotinia sclerotiorum). Florida noted a 15 per cent loss with a maximum infection of 100 per cent. In New York this disease caused a 1 per cent loss with a 10 per cent loss in Orange County. In Arizona three large fields grown without crop rotation showed losses from a trace to 50 per cent or more. The disease occurred in California and Ohio also.

ROOT ROT (Sclerotium rolfsii) destroyed 50 to 75 per cent of mature seed plants in one area in California. There was a trace also on fall-planted seedling lettuce.

TIP BURN (non-par.) caused from 10 to 20 per cent loss in New York. It also occurred in New Jersey, Wisconsin, and California.

WHITE HEART (non-par., due to unproductive muck soil) is gradually being reduced in amount in New York by the use of copper sulfate and lime.

VIRUS DISEASES. MOSAIC caused a loss estimated at 4 per cent in New York. YELLOWS caused 5 per cent loss in New York and was also reported from California.

P E A

SEED DECAY (various microorganisms). In New York there was 40 per cent reduction in yield. Peas are usually planted early and most of them were in the ground by May 1, but a few were up. Incessant rain during early May permitted rot organisms to operate so that stands were reduced 40 to 60 per cent, and the pea crop was the poorest in many years. Fields up before May 1 were little affected. (Horsfall).

BACTERIAL BLIGHT (Bacterium pisi). With the exception of Maryland and Virginia, which reported much more, this disease caused about the normal amount of loss. The following States reported its presence: New Jersey, New York, Maryland, Virginia, Wisconsin, Colorado, Washington, and California.

ROOT ROT (Aphanomyces euteiches) generally caused about the usual amount of damage. In New Jersey there was less than usual but the pea crop was so poor due to unfavorable weather conditions, that diseases were of secondary importance. Maryland noted 5 per cent loss. In Wisconsin damage from this disease is confused in the field with injury from wilt, aphid, and hot weather. Horsfall stated that he has not seen many cases

of this root rot in New York. The disease is common in sandy soils on the coastal plain of North Carolina.

ROOT ROT (Pythium spp.) was an important factor in reducing stands in New York. Together with Fusarium it caused heavy losses in two fields in California, where high temperatures and high moisture from irrigation favored its development.

ROOT ROT (Fusarium martii pisi) was reported from Connecticut, New York, New Jersey, North Carolina, Ohio, Wisconsin, Colorado, and California. Losses generally were not important. In New Jersey it was severe where peas were grown without rotation. In Colorado it occurred in practically all fields and caused losses varying from 5 to 30 per cent. According to W. C. Snyder it is general throughout the pea growing areas of California but is usually not of economic importance. A severe outbreak occurred in two fields in Contra Costa County, grown out of the usual season so as to mature in late summer (see Pythium). Horsfall reported that in New York "It is relatively rare but shows up early in the season and may open the way for later developing fungi."

ROOT ROT (Fusarium moniliforme) was reported on English peas in Mississippi.

WILT (Fusarium orthoceras pisi) was reported from Maryland where the loss was estimated at 1.5 per cent, and from Wisconsin.

ROOT ROT (Thielavia basicola) was reported from New Jersey.

STEM ROT (Corticium vagum). Horsfall reported that this seemed to be the most serious offender in killing pea roots in New York, where several severe outbreaks occurred. It caused heavy losses of garden peas in North Carolina. It was also reported from New Jersey and Washington (Rhizoctonia sp.).

BLIGHT, POD SPOT, FOOT ROT (Ascochyta spp. and Mycosphaerella pinodes). Because of the much greater care in selecting the source of the seed, blight has been reduced to a very low percentage in New York, according to Chupp. In Maryland the disease is general but not serious. Ascochyta pisi was reported from New Jersey, Colorado, Washington, and California; Mycosphaerella pinodes from North Carolina, Wisconsin, and California. Mycosphaerella on the stems was said to be very destructive to the early spring crop in Alameda County, California. When it was found on fall peas it was in coastal areas where heavy fogs provided sufficient moisture.

POD SCAB AND LEAF-BLIGHT (Cladosporium sp). In California a leaf, stem, and pod disease of market peas, due to a species of Cladosporium, was observed for the first time during the past season. The disease so far has been found only in the coastal area in the vicinity of Salinas, Monterey County, where the fields are frequently subject to heavy fogs in the summer months. Lesions upon the leaves are often marginal, causing leaf distortion, but also occur over the leaf surface as light straw colored spots well defined by a brown border, and on the stems

as long narrow scars. Most conspicuous are the symptoms of infected pods, manifest by prominent scabbing, making the appearance of the product unfit for market use. The scabs are raised, black, and irregular in shape and under proper moisture conditions are tufted with olive-grey conidiophores and spores. That the disease is seed-borne is suggested by the fact that the fungus has frequently been isolated from the seed coats of pea seed originating beneath pod lesions. The amount of loss resulting from this pod scab seems to be dependent on environmental conditions.

POD DISEASE (Oospores in pea pods (undet.)). Pea growers in the Salinas region, Monterey County, California, were visited by a severe outbreak of a pod disease characterized by a profuse development of oospores within the pod wall and upon the lining of the pod cavity. Infected pods evidenced no consistent external symptom except where the fungus was developed extensively in the wall tissue. In such cases a yellowish blotch was apparent on the unopened pod, but even in such instances there was no macroscopic evidence of fungal growth upon the outer surface nor of a break in the surface. Upon opening a diseased pod there is viewed a soft mealy substance which may involve the entire surface of the pod cavity, either white or tan colored, depending upon the maturity of the fungus. Microscopic examination has shown the coating to be almost entirely made up of oospores, and likewise infested tissues of the pod wall. The flare-up of the disease appeared to be directly associated with a spell of very foggy weather in early fall, as it practically disappeared during a warm sunny period which followed.

MOSAIC (virus) was reported from New Jersey, Washington, and California. As high as 90 per cent diseased vines was observed in some fields in California. Plants infected late in growth were not damaged very much but an appreciable percentage of the pods became distorted and unfit for market.

STREAK (virus) was reported from California.

SCORCH (high temperature, low rainfall). Wisconsin reported 50 per cent loss.

A S P A R A G U S

RUST (Puccinia asparagi) was noted as causing some injury in Massachusetts, New Jersey, Connecticut, Maryland, Wisconsin, and North Dakota. Chupp reported that it "Could not be found in New York this season."

B E E T

SCAB (Actinomyces scabies). Five per cent loss occurred in Massachusetts which was more than usual. The disease was also reported from New Jersey and New York. LEAF SPOT (Cercospora beticola) occurred widely but was reported as unimportant except under glass on beet greens in New Jersey. DAMPING OFF (Pythium, Rhizoctonia, et. al) caused a loss of 70 per cent in New York. In New Jersey, Rhizoctonia was severe during

high temperatures in a few houses on beets grown for greens. The Pythium was also severe on untreated plots. DOWNY MILDEW (Peronospora schachtii) occurred on garden beets grown for seed in California. LEAF SPOT (Phoma betae) is controlled under greenhouse conditions in New Jersey by seed treatment with hot water at 55° C. for 30 minutes. RUST (Uromyces betae) was abundant in garden beet seed fields in the Sacramento Delta region in California. ROOT KNOT (Caconema radicum) was reported from Long Island, New York. CURLY TOP (virus) was severe on garden beet seedlings near Sacramento, California.

C A R R O T

LEAF BLIGHT (Macrosporium carotae) generally was more destructive than usual. Florida, Massachusetts, New York, and Ohio reported 10, 5, 2, and 1 per cent losses, respectively. It was present in Connecticut and New Jersey.

WATERY SOFT ROT (Sclerotinia sclerotiorum). California and New York each reported 5 per cent loss.

E G G P L A N T

FRUIT ROT (Phomopsis vexans) generally did about the normal amount of damage. Florida and Virginia noted 10 and 3 per cent loss, respectively. It was observed also in Connecticut, New Jersey, Mississippi, and Puerto Rico.

WILT (Verticillium albo-atrum). New York. Chupp reported "Have in late years not seen a field that did not contain some wilt. A big percentage of the crop is lost because of this disease. Besides, the acreage has been reduced to almost nothing because of the difficulty in keeping away from wilt." In New Jersey it was found that the application of calcium cyanide in the hill failed to give any control. Many varieties and selections tested showed only slight differences in susceptibility. Certain species of Solanum are very resistant and one hybrid has been obtained.

J E R U S A L E M A R T I C H O K E

RUST (Puccinia helianthi) was very severe in one large planting in Massachusetts.

O K R A

WILT (Verticillium albo-atrum) is a limiting factor in okra production in New Jersey.

P E P P E R

MOSAIC (virus) generally was much more destructive than usual. Florida noted 20 per cent loss with total infection in some fields. Massachusetts recorded 10 per cent loss and New York, 2 to 3 per cent. It was also noted as severe in New Jersey, Kansas, Colorado, and Puerto Rico.

R H U B A R B

ROOT ROT (Armillaria mellea) was observed in California in an area which had previously been in pears, which were taken out because of Armillaria root rot.

S P I N A C H

DOWNY MILDEW (Peronospora effusa) was very severe in limited localities. Virginia and Michigan noted 5 and 15 per cent losses respectively. Considerable loss occurred in California, Ohio, Maryland, New Jersey, New York, and Connecticut.

D I S E A S E S O F S P E C I A L C R O P ST O B A C C O

Due to the unusual interest shown in tobacco diseases during 1932 extensive reports were received, of which the majority were printed in the Reporter (See P. D. R. 16: 6, 7, 8, 9, 16, 25, 27, 50, 55, 69, 90, 94, 103, 122, 145). A brief summary of downy mildew (Peronospora hyoscyami) is given on page 20 of this Supplement.

Through the courtesy of T. G. Major, Tobacco Specialist of the Central Experimental Farm, Ottawa, Canada, it is possible to present a summary of the tobacco diseases in Canada for 1932 compiled by R. A. Boothroyd.

TOBACCO DISEASES IN CANADA IN 1932

R. A. Boothroyd

SEED-BED.

DAMPING-OFF (Pythium de Baryanum Hesse). Much damage was reported in the Farnham district, and in the l'Assomption area where the seedbeds were sown too thickly. Very few cases were reported in southwestern Ontario.

BLACK ROOT-ROT (Thielavia basicola Zopf.). A few isolated cases were reported from the Farnham district, but in l'Assomption-Montcalm 40 to 50 per cent of the plant beds were affected to a greater or lesser degree. The disease was general on Burley tobacco in the Ontario district with most damage occurring in Malden, around Chatham and east of Plenheim.

SEEDBED MOULD (Pyronema confluens (Pers.) Tul.). One or two cases reported in the Farnham district. Formaldehyde (1:1,000) used as seedbed control.

FIELD.

BLACK ROOT-ROT (Thielavia basicola Zopf.). Numerous cases reported in the Quebec districts, and considerable damage caused by the disease in southwestern Ontario. In this area the varieties Judy's Pride and Kelly were most adversely affected, but due to the hot spell after planting, a remarkable recovery was noticed in other varieties.

WILDFIRE (Pseudomonas tabacum (Wolf and Foster) Stev.). A number of plants, notably of the Belge varieties, were affected with this disease at the Central Experimental Farm. In the commercial districts a case at Farnham was the only one reported. This crop was ploughed under.

ANGULAR LEAF-SPOT (Pseudomonas angulata (Fromme & Murray)). No cases reported from the Farnham district, and less damage than usual from this disease in the l'Assomption-Montcalm area. In the New Belt of southwestern Ontario many mature crops were infected, one case at Teeterville showing 75 per cent infection. A correlation appeared to exist between the severity of infection and the amount of precipitation and wind.

MOSAIC (virus). Heavy infections reported from l'Assomption, Quebec, and southwestern Ontario; less mosaic observed in the Farnham area than usual. The mature leaves of infected plants showed severe damage, though there were signs of recovery in many cases following topping. In a number of fields in the l'Assomption district infestations ran as high as 60 per cent. At the Central Experimental Farm the percentage of infection was very low.

FRENCHING (Nitrogen deficiency). In the Old Belt of Ontario sections subjected to temporary restricted drainage showed considerable frenching, notably in the Windham district.

PHYSIOLOGICAL LEAF SPOTS. A few fields in the New Belt of Ontario, particularly in the vicinity of Vittoria and Teeterville, showed considerable spotting.

WIND AND HAIL. Hail damaged a strip of about 200 acres of Burley tobacco in the vicinity of Cedar Springs and Blenheim, Ontario. High winds did slight damage around Albana and Blythwood, Ontario, during the second week of August.

IMMATURE SUN-YELLOWING AND FIRING. This condition was prevalent in the Old Belt of Ontario, especially on the variety Standup Resistant when grown on light, gravelly soils and spring-ploughed fields.

CURING BARN.

POLE BURN. Slight damage was reported in some localities in the province of Quebec.

C O T T O N

WILT (Fusarium vasinfectum) was generally reported, mostly in about the usual amounts. In North Carolina, however, Poole stated that it was more severe than it had been in the past three years. Selections from Mexican Big Boll showed higher resistance than many other varieties planted throughout the State. In Arkansas the planting of resistant and semi-resistant varieties and the use of potash fertilizers are giving considerable control, according to V. H. Young.

ROOT ROT (Phymatotrichum omnivorum) caused a loss estimated at 12 per cent in Texas. It was serious in a limited area in Little River County, Arkansas, according to V. H. Young.

SEEDLING INJURY, STEM ROT (Corticium vagum). There was less complaint of seedling damage than was noted the two previous years in North Carolina. Where damage occurred it was on plants developing from seed sown while the soil temperatures were still low (Poole). Stem rot was of little importance in Arkansas. Sore shin was reported from Mississippi and Texas.

SEEDLING INJURY due to Rhizoctonia, Fusarium, nemas, etc., caused a loss estimated at 4 per cent in South Carolina, which was less than usual.

MALNUTRITION, usually referred to as Rust (non-par.) always presents a serious problem in Mississippi, Louisiana, and Arkansas in certain poor soils.

BLACK LEAF SPOT (potash deficiency and Macrosporium nigricantium) was very severe in North Carolina, resulting in complete defoliation and premature maturing in many fields. (Poole).

LEAF SPOT (Alternaria sp.). J. G. Brown reported that this was so bad in 1931 on Pima cotton in the Eloy-Coolidge district in Arizona, in conjunction with rust (Aecidium gossypii=Puccinia hibisciata) that dusting was tried as a preventive this season.

RUST (Puccinia hibisciata), Arizona (see Alternaria) and Texas. In Supplement 84, page 41, the report from Arkansas should read Arizona instead.

ANTHRACNOSE (Glomerella gossypii) was unimportant in all States reporting its occurrence.

BOLL ROT due to Diplodia gossypina was severe in Louisiana where rains came late in the fall. It was also reported from Mississippi and Texas. Olpitrichum carpophilum occurred in Louisiana.

ANGULAR LEAF SPOT (Bacterium malvacearum) was generally reported. LEAF SPOT (Phyllosticta gossypina) and BLIGHT (Ascochyta gossypii) were reported from North Carolina. LEAF SPOT (Helminthosporium gossypii), Puerto Rico. WILT (Verticillium albo-atrum), California. ROOT KNOT

(Caconema raditicola) of considerable importance in Arkansas; also reported from South Carolina.

P E A N U T

Peanut diseases have been the subject of several special surveys, the data of which were published in the Reporter, Volume 16: 24, 163, 164.

S U G A R B E E T

LEAF SPOT (Cercospora beticola) was about normal in occurrence, the losses being less than one per cent with the exception of Iowa which reported 10 per cent.

SEEDLING DISEASES AND ROOT ROT (Rhizoctonia spp., Phoma betae, Pythium spp.). Wisconsin, Michigan and Ohio noted less than usual, while Iowa recorded much more with a loss of 8 per cent. Phoma betae occurs in the Sacramento Valley in California, where dry conditions throughout the growing season favor infection, but is not very important.

ROOT ROT (Fusarium conglutinans var. betae) was reported from southern Colorado as doing extensive damage in a few fields in the area from which it was first reported. This is the first indication of extension of this pathogen, its outbreaks previously having been occasional in fields. (G. H. Coons).

SOUTHERN ROOT ROT (Sclerotium rolfsii). California estimated a loss of 6,000 tons, valued to the grower at \$40,000. Severely infested fields were not replanted but the disease appeared in several new areas. The peak of the damage came a few weeks later than in 1931, probably accounted for by high temperature coming later. (Stout and Leach).

ROOT ROT (Rhizoctonia bataticola) also occurred in California in the Sacramento Valley, where it caused greatest damage in the Sutter Basin. It has been noted in fields infested with Sclerotium rolfsii and probably some of the losses were incorrectly attributed in the past to the latter fungus. (C. M. Tompkins).

ROOT ROT (Phytophthora spp.) occurred in the Sacramento Valley in California. A late root rot, of a decidedly wet type, was especially severe in certain parts of the Delta region. Some fields were not harvested. (C. M. Tompkins).

CURLY TOP (virus). W. C. Cook estimated the loss in the Sacramento Delta section of California at 15 per cent (total acreage 15,000) and in the region north of the Delta at 1 per cent (total acreage 45,000). In July he reported crop damage in the worst areas as follows: Union Island, 25 to 30 per cent; Victoria Island, 35 to 40; and Bates Tract, 15 to 20. The virus was of a very severe type (H. H. P. Severin). Curly top losses in Idaho, Utah, and western Colorado areas were much smaller than usual, causing less than 5 per cent crop reduction. (G. H. Coons).

MOSAIC (virus). Mosaic in sugar beets occurred in western beet areas about as in other years. Specimens definitely shown to be a mosaic were collected in Ohio by J. E. Kotila, making the first report of mosaic from eastern beet growing districts. (G. H. Coons).

SUGAR CANE

MOSAIC (virus) in Puerto Rico is very common and abundant, but can be controlled by planting resistant varieties. Lutken reported that in South Carolina 90 per cent of the cane he observed in three counties was affected. In Louisiana, according to Tims, mosaic is becoming much more prevalent on CO 281 which remained practically free for two or three years.

RED ROT (Colletotrichum falcatum) was very severe in some sections in Louisiana. Infection almost always follows borer damage in susceptible varieties. POJ 234 showed much heavier infection than usual. (Tims). It was reported in Puerto Rico and Mississippi also.

ROOT ROT (various organisms). Most of the new varieties now used exclusively in the sugar belt in Louisiana are fairly resistant to root disease. POJ 213 is failing badly due to red rot infection and some root disease. (Tims).

POKKAH-BONG (undet.) is not important on commercial varieties in Louisiana, with the possible exception of POJ 234. (Tims). It was also reported from Puerto Rico, where Fusarium moniliforme was said to be the cause.

BROWN SPOT (Cercospora longipes) was reported from Florida.
P. D. R. 17: 8.

RED STRIPE (Phytomonas rubrilineans) is prevalent on some new seedlings being introduced into Louisiana for testing. It is of little importance on commercial varieties (Tims). Cook reported it as unimportant in Puerto Rico. MOTTLED STRIPE (Phytomonas rubrisubalbicans) was said to be unimportant in Louisiana and Puerto Rico.

OTHER DISEASES include EYESPOT (Helminthosporium sacchari), Mississippi, Puerto Rico. BROWN STRIPE (Helminthosporium stenospilum) confined almost entirely to scattered plantings of D 74 and Purple in Louisiana; unimportant in Puerto Rico. Numerous diseases were reported from Puerto Rico, of which the most important were GUMMOSIS (Bacterium vascularum), a severe outbreak on Vieques Island and small outbreaks on the mainland; SEEDLING DISEASE (Rhizoctonia grisea) occasionally severe on seedlings and ratoon plants; ROT OF SEED CUTTINGS (Thielaviopsis paradoxa) severe in cold, wet soil; SHEATH BINDING (Marasmius sacchari) undoubtedly a parasite under favorable conditions.

D I S E A S E S O F T R E E S

EPIDEMIC TREE DISEASES

The following summary is furnished by R. Kent Beattie and G. F. Gravatt of the Division of Forest Pathology.

DUTCH ELM DISEASE (Graphium ulmi). No new cases of this disease were found in America during 1932. Intensive search was made in 1932 around the two spot infections at Cleveland and Cincinnati, which had been eradicated in 1930, and very limited scouting was carried on in Ohio and adjoining States by O. N. Liming. All specimens suspected of having this disease were cultured and studied at the Dutch Elm Disease Laboratory at Wooster, Ohio, which is being conducted jointly by the Ohio Agricultural Experiment Station and the Division of Forest Pathology of the Bureau of Plant Industry under the direction of Curtis May. An extensive survey of the elm States is needed before we can be sure the country has been freed of this disease.

The study of specimens suspected of having the Dutch elm disease has shown that the wilt disease due to Verticillium is widely distributed.

The wilt disease of elms described by Curtis May as due to Cephalosporium sp. is also found widely distributed over the Lake States and eastern States, and a few cases in the middle western States. This seems to be a rather serious disease, as most of the trees found infected in 1931 were progressively worse in 1932.

EUROPEAN LARCH CANKER (Dasyscypha willkommii). No new infections of this disease were found during 1932 and the two original spot infections have been eradicated. Much inspection work remains to be done before there is definite assurance of the successful eradication of this disease. G. G. Hahn, of the New Haven, Connecticut, Office of the Division of Forest Pathology, is doing the laboratory work on this disease and M. A. McKenzie the survey work.

WILLOW SCAB (Fusicladium saliciperdum and Physalospora miyabeana). These imported diseases, which occur in the eastern Canadian Provinces and New England, were noted in various places in the New England States in 1932. The Fusicladium occurs as far west as Ithaca, New York, and probably careful scouting would show it to be very widely distributed. In some areas it has caused the death of a large part of the willows. This death of the willows in parts of the United States may result in increased stream erosion since willows have a valuable place in holding stream banks.

WOODGATE RUST (Peridermium sp.). This disease, which is destructive to the Scotch pine, (Pinus sylvestris), is now widely distributed in the Adirondack Mountains in New York State and has been reported from Nova Scotia, Quebec, and Ontario. Dr. H. H. York is still in doubt as to the identity of the fungus causing this trouble. A number of species of pine have been found by inoculation to be susceptible to this gall rust. There is some danger that it may cause very extensive losses, if it were to obtain a foothold in the southern States.

BEECH DISEASE (Nectria sp.). This disease is caused by an undetermined species of Nectria. According to the researches of Mr. Ehrlich, of Harvard University, the Nectria fungus obtains entrance into bark through injuries caused by the Cryptococcus insect, a European pest which first came to attention on this continent at Halifax, Nova Scotia, in 1914. The insect and fungus are widely distributed over Nova Scotia and New Brunswick, and in Nova Scotia over 40 per cent of the stand of beech already has been killed. The insect has been found in Massachusetts, New Hampshire, and Maine in this country. The fungus has been found in Maine only. T. T. Ayers, of the New Haven Office, is doing laboratory work on this disease.

PINE CANKER (Atropellis pinicola). This disease of Scotch and Corsican pine (Pinus sylvestris and P. nigra poiretiana) was found to be causing severe losses in forest plantings in one place in Ohio by May and Liming. The trouble has also been reported in plantings from Delaware, Pennsylvania, and New Hampshire, and on native pitch pine (P. rigida) in Ohio and near Greenwood Furnace, Pennsylvania. The causal organism appears identical with Atropellis pinicola, which Zeller and Gooding have described as causing a canker of various pine trees on the Pacific Coast.

CHESTNUT BLIGHT (Endothia parasitica). This disease continued to spread over the southern Appalachians during 1932. Infections were noted in northern Alabama and Mississippi by Clapper. The disease is prevalent in the western half of Tennessee and a large part of the stand has been killed in eastern Tennessee. On the Pacific Coast no new infections were found around the spot at Gunther, Oregon, where the disease was eradicated in 1929. Hotson reports five trees of American chestnut infected with the blight at Seattle, Washington, and he is eradicating this infection. Chestnut is being planted in increasing quantity on the Pacific Coast, and the inspection of nursery trees and plantings needs to be intensified if the blight is to be kept from becoming established.

NECTRIA CANKERS IN THE SOUTHERN APPALACHIANS

G. F. Gravatt contributes the following statement:

During 1932 Nectria cankers on forest trees were brought to the attention of pathologists by the report by Faull and Ehrlich of a Nectria disease on beech in the Maritime Provinces of Canada and Maine and by reports from forest pathologists and foresters of increasing damage from Nectria cankers on maple, birch, and black walnut. The beech Nectria is considered elsewhere in this report (see above). At the December 1932 meetings of the Phytopathological Society, D. S. Welch reported Nectria on Acer rubrum, A. spicatum, Fraxinus nigra, Populus grandidentata, Prunus serotina, Rhus typhina, and Tilia americana in New York State. In view of the increasing economic importance of these Nectrias, it seems advisable to record some collections made in 1932 and in previous years.

The earliest specimen of a Nectria canker on black walnut (Juglans nigra) in the collections of the Division of Forest Pathology was collected

by Dr. Arthur H. Graves near Balsam, North Carolina, in 1910. In 1924, F. E. Brooks reported the disease as very serious on black walnut near French Creek, West Virginia, and Gravatt and Baxter, in the course of their chestnut-blight inspection work, examined this infection. This *Nectria* canker was found to be prevalent on young walnut trees over an area of 40 to 50 acres. Most of the trees seemed to be more or less seriously damaged, and insects and decay were entering the open wounds. Fruiting bodies of the *Nectria* were present on many of the cankers but there were also a large number of cankers which showed no fruiting bodies. In the course of the chestnut-blight inspection in 1924 Gravatt noted and collected the disease at different points in West Virginia, Virginia, North Carolina, Georgia, and Tennessee.

The most severe infection of the black walnuts other than that at French Creek, West Virginia, was found on the National Forest near Sarah, Georgia. The disease had evidently been there for many years. There were indications that where the black walnuts were making vigorous growth on rich land the canker showed a greater tendency to heal over.

Sassafras (*Sassafras variifolium*) is severely affected by a canker disease very similar to the canker of black walnut, and *Nectria* pustules have been found on some of these cankers. The cankers on sassafras are more irregular than those on black walnut. Frequently the sassafras and black walnut cankers occur in the same vicinity.

Tulip poplar (*Liriodendron tulipifera*) is also affected by the *Nectria* canker in West Virginia and Georgia. Several collections were made in 1924 in the immediate vicinity of the heavily infected black walnut planting. A marked characteristic of the cankers on tulip poplar was the abundance of fruiting bodies. Recently Bedwell and Hartley found a *Nectria* canker on this host near Asheville, North Carolina.

At Sarah, Georgia, in the immediate vicinity of the cankers on black walnuts, some spreading cat-face cankers were also found on several species of oaks and on the sour gum (*Nyssa sylvatica*). However, no fruiting bodies of *Nectria* were found. The trouble on these hosts was not sufficiently frequent to be of material economic importance. Cankers collected by Gravatt and Baxter on sumach and sourwood (*Oxydendron arboreum*) in the immediate vicinity of the heavy infection of *Nectria* on walnuts at French Creek, West Virginia, are suspected of being caused by the same fungus.

Nectria fruiting bodies have also been observed on one tree each of magnolia and beech in the District of Columbia.

The above data are from observation only, as no cultural or experimental work has been conducted with the cankers on sassafras, black walnut, and tulip poplar. Orton and Ashcroft, who have found the *Nectria* canker of walnut prevalent in most parts of West Virginia, have demonstrated by inoculation that this canker is caused by *Nectria* sp.

These *Nectria* cankers are undoubtedly of very great practical importance on the black walnut. They are so infrequent on tulip poplar as not to be considered a menace to this species at the present time.

The sassafras tree is undoubtedly being very seriously injured by this canker trouble, but sassafras is of no importance from the forestry standpoint.

DISTRIBUTION OF WHITE PINE BLISTER RUST IN 1932

The following statement on the distribution of the white pine blister rust (Cronartium ribicola) and the map (fig. 27) were furnished by Roy G. Pierce of the Division of Blister Rust Control:

The northeastern section of the country is generally infested with blister rust. However, the rust situation in this region is being rapidly brought under control by the general and systematic eradication of Ribes on valuable pine areas. These control measures have been applied to about 9,000,000 acres. This figure includes both the acreage of white pine and of the protective zones.

In the Appalachian region the rust was again found on Ribes near Frostburg, Maryland. It was also located on Ribes for the first time near Luray in Page County, Virginia. This marks the advance edges of the southward spread of the disease.

In the Lake States region there was considerable spread of the rust. In Michigan the counties of Antrim, Benzie, Leelanaw, Mason, and Mainstee in the Lower Peninsula, and Houghton and Ontonagan in the Upper Peninsula, were found infected for the first time. In Wisconsin the newly infected counties are Portage, Vernon, and Wood where the rust was found on white pines and Ribes, and Ashland, Brown, Door, Grant, Kewaunee, La Crosse, Lincoln and Marinette where it was found only on Ribes.

In the West the disease is rapidly intensifying in the western white pine region. Fifteen new pine infection centers were located in Idaho: four on the Clearwater National Forest, five on the Coeur d'Alene National Forest, two on the Clearwater Timber Protective Association, three on the Middle Fork of the St. Maries River, and one on the Upper Ruby Creek near Niva Springs. While many of the new centers consist of one or two diseased trees, some of them cover several square chains in area.

A study has been made of the blister rust in Mt. Rainier National Park in Washington. On Fish Creek, where it is estimated that many trees have 1,000 cankers each, the infection covers approximately 1,000 acres, while on the Muddy Fork of the Cowlitz, infection is generally distributed over an area of 1,700 acres.

In Oregon a new pine infection center was found at Government Camp above Rhododendron in Clackamas County, on Pinus monticola and P. albicaulis. The southernmost pine infection in the State is located near Minto Creek on the Santiam River in Linn County. The infected pines are Pinus monticola. Blister rust was found for the first time in Coos County, a fairly heavy concentration of the rust being located on Ribes 7 miles north of Marshfield. Scouting in Curry County, which lies between Coos County and California, failed to reveal the rust at the two

original locations where it was found in 1929. Though considerable scouting was carried on in California during the year, particularly in the northern section of the State, no blister rust was found.

DROUGHT INJURY AND SUN SCORCH

Clinton reported sun scorch in Connecticut on the following: Picea sp., Prunus sp., Ulmus americana, Acer platanoides, Acer saccharum, Aesculus hippocastanum, Cornus florida, and drought injury on Tsuga canadensis, Ulmus americana, and Thuja occidentalis.

C Y P R E S S (CUPRESSUS SP.)

BLIGHT (Macrophoma cupressi) was reported from Florida with the comment, "More specimens than usual were sent in for identification with reports of injury."

J U N I P E R (JUNIPERUS SPP.)

RUST (Gymnosporangium spp.). For notes on the cedar rusts see page 34.

BLIGHT (Phomopsis juniperovora) is said to be destructive in seedling beds of juniper in Kansas though somewhat less prevalent than usual. Winter injury, probably as a result of a March cold spell was much more prevalent than usual. New York and New Jersey both reported blight of J. virginiana present though rather scattered. In Williamstown, Massachusetts, severe dying out of densely planted beds of prostrate junipers was caused by this disease. The species affected with Phomopsis twig blight in Massachusetts were J. sabina tamariscifolia, J. japonica (J. chinensis procumbens), and J. horizontalis.

S P R U C E (PICEA SPP.)

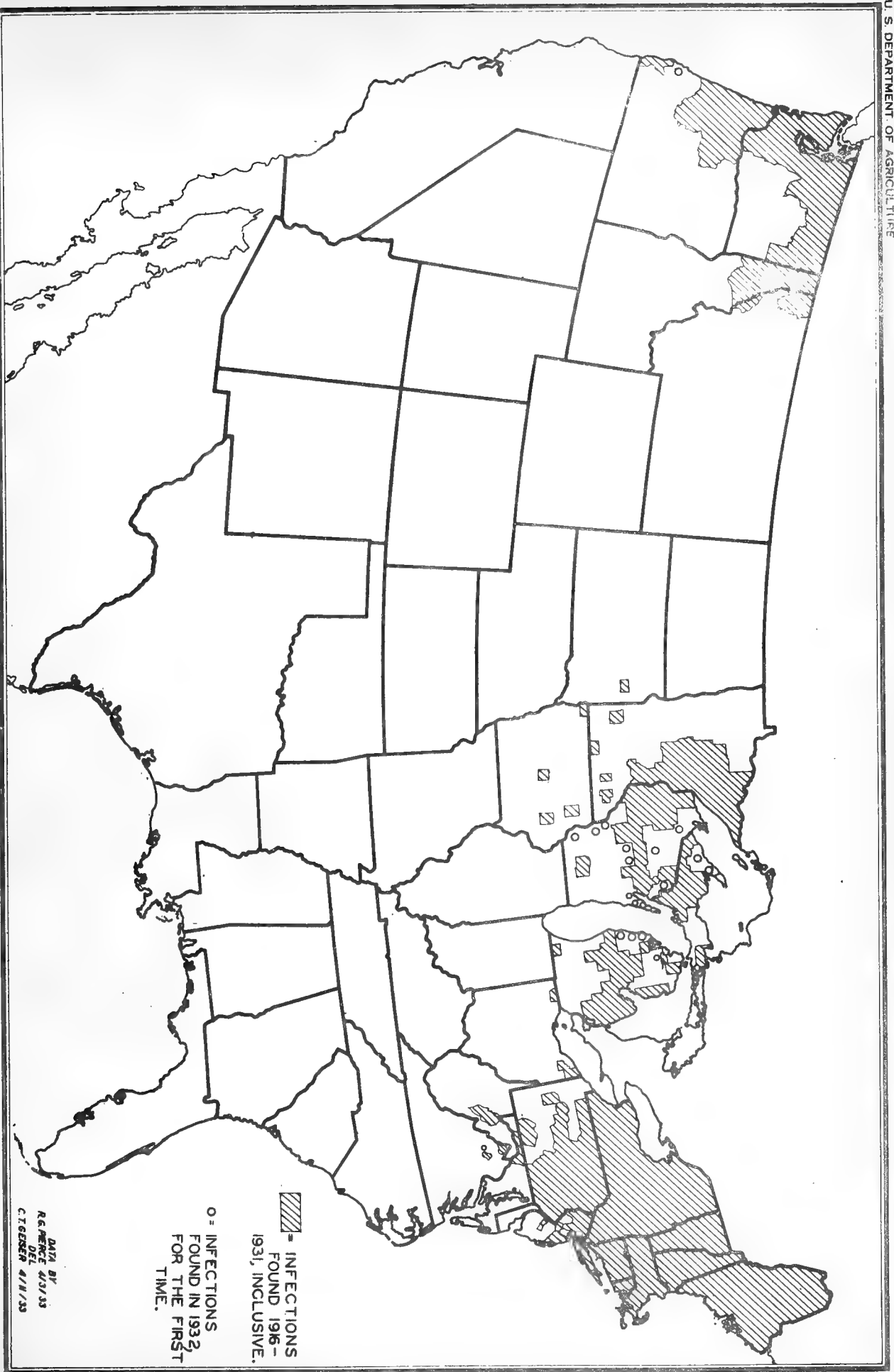
CANKER (Cytospora sp.?) of blue spruce (Picea pungens glauca). May wrote that in Ohio "Many single trees and hedges in the northern part of the State continue to die of this disease." In Massachusetts, according to Boyd, "The disease is scattered over the State. Marked damage occurred this year due no doubt to copious infections that took place during the wet spring of 1931."

P I N E (PINUS SPP.)

BLISTER RUST (Cronartium ribicola). See page 64.

LEAF SPOT (Septoria acicola) was reported from Mississippi and Ohio. In the latter State it was "Very severe in one nursery on Scotch pine (P. sylvestris) this year."

CANKER (Dasyscypha fusco-sanguinea) of white pine (P. strobus) was reported from Michigan as follows: "Occurs in several small areas in the Keeweenaw Peninsula from Mohawk to Fort Wilkins, some just south of Calumet. It appears to be an aggressive parasite especially on shaded, understory-trees."



▨ = INFECTIONS
FOUND 1916-
1931, INCLUSIVE.

○ = INFECTIONS
FOUND IN 1932
FOR THE FIRST
TIME.

DATA BY
REFERENCE 4/1/33
DEL
CTGESSER 4/1/33

Fig. 27. Distribution of white pine blister rust (*Cronartium ribicola*) in the United States in 1932.



CANKER (Diplodia megalospora) on Scotch pine (Pinus sylvestris). Boyd reported "Some of the Scotch pines on the campus of the Massachusetts State College at Amherst show marked dying of the twigs and limbs this year. Cankers occur on both the 1931 and 1932 wood. Both 1932 and 1931 cankers show an abundance of pycnidia." (The fungus on the cankers appears to be Diplodia megalospora B. & C. N.E.S.)

M A P L E (ACER SPP.)

VERTICILLIUM WILT (Verticillium sp.) was reported by Gravatt and Clapper (P. D. R. 16: 96-98) in June as being unusually prevalent in Rhode Island, New Jersey, and Virginia.

R. P. White summarized his observations in New Jersey during the past year as follows:

"The third disease which has appeared in severe form is the group of Verticillium wilt diseases, particularly on maple. I conservatively estimate over 100 trees having been lost in 1932. In one town 32 trees were showing definite symptoms in midsummer. This same organism, which I take to be Verticillium dahliae Kleb., due to the production of microsclerotia, has also been isolated from the following hosts in 1932: Berberis thunbergii, Dahlia variabilis, Chrysanthemum sp., Antirrhinum sp., and Lathyrus odoratus, the latter being a rather unusual occurrence."

Guba noted that a planting in eastern Massachusetts known to be infected at least six years was completely killed in 1932. Strong reported that Norway maple (A. platanoides) appears to be the most susceptible in Michigan, and estimated that less than 2 per cent of Norway and 1 per cent of other species of maple are infected.

WINTER KILLING. Vaughan reported winter injury as much more common than usual in Wisconsin: "More than 50 trees were killed in Milwaukee County by low March temperatures following a winter so warm that cut trees would bleed all winter."

H O R S E C H E S T N U T (AESCULUS HIPPOCASTANUM)

LEAF BLOTCH (Guignardia aesculi). This disease, which was very important in Massachusetts and New York in 1931 causing 50 per cent defoliation in some places, was very much less important in these States during 1932. Davis and Boyd noted that trees partly defoliated in (recent) previous years in Massachusetts hardly showed the disease this year.

T U N G O I L (ALEURITES FORDI)

A ROOT ROT apparently caused by certain fungi following injury was reported as becoming increasingly prevalent in Mississippi.

TUNG OIL DISEASES IN FLORIDA: According to R. J. Haskell and Erdman West, specimens and records in the herbarium of the Department of Plant Pathology, Agricultural Experiment Station, Gainesville, Florida, show the occurrence of the following diseases on tung oil in Florida:

MUSHROOM ROOT ROT, Clitocybe tabescens, the most serious disease; THREAD BLIGHT, Corticium stevensii; LEAF SPOT, Phyllosticta sp., the most common leaf spot; and Cercospora sp.; Colletotrichum sp. on twigs and fruit; Bacterium sp.; ROOT KNOT, Caconema radicum; and BRONZING due to soil conditions.

H A W T H O R N (CRATAEGUS SPP.)

BLIGHT (Bacillus amylovorus) is reported as more common than usual on this host in Connecticut and as generally distributed in New Jersey. (See page 68).

P L A N E T R E E (PLATANUS SP.)

ANTHRACNOSE (Gnomonia veneta or other fungi) reported from Connecticut, New Jersey, Kansas, and Michigan as less prevalent than usual but from Delaware as much more.

P O P L A R A N D C O T T O N W O O D (POPULUS SPP.)

ROOT ROT (Phymatotrichum omnivorum) was found on cottonwood in California, near Jacumba, in San Diego County (see P. D. R. 17: p. 17).

CANKER (Dothichiza populea). The report from Massachusetts indicated that this disease was much more prevalent than usual in that State, Davis and Boyd's comment being "Worst year known. P. alba var. colleana is highly susceptible. On most of the trees one-third of the twigs are killed." It was also reported from Connecticut, New Jersey, Delaware, Mississippi, and Wisconsin.

CANKER (Cytospora chrysosperma) was reported from New Jersey and Massachusetts.

O A K (QUERCUS SPP.)

TWIG BLIGHT. Boyd reported a heavy infection of twig blight on roadside trees of Quercus rubra in Norfolk County, Massachusetts, and lighter infections on Q. rubra, Q. nigra, and Q. prinus at Amherst. (The fungus apparently causing this canker is the Sphaeropsis quercina of Cke. & Ell. though there are undoubtedly older names for this fungus. A synonymy will be published at a later date. N. E. S.).

ANTHRACNOSE (Gnomonia veneta) was reported as less severe than usual in New Jersey, Michigan, and Wisconsin.

DROUGHT INJURY to oaks is reported from Connecticut. In Wisconsin it was said to be important in association with Armillaria root rot and winter injury.

D I S E A S E S O F O R N A M E N T A L S

NOTEWORTHY DISEASES OF ORNAMENTALS IN NEW JERSEY

The following statement was contributed by R. P. White:

Three diseases have been outstanding in 1932 on ornamentals. The organism Sclerotium delphinii Welch seemed to take everything within reach in annual and perennial gardens during August, when it reached its peak of destructiveness. We have reported this year the following hosts: Aconitum napellus, Ageratum, Campanula medium, Eupatorium, Iris germanica, Delphinium and Phlox. Some of our correspondents, however, who forwarded specimens of a single species which was attacked, would state that their annuals and perennials in general were all "going the same way."

Fire blight (Bacillus amylovorus) has also been severe in New Jersey on various ornamental hosts which usually escape. For example, we have reported this year various species of Cotoneaster, Sorbus americana, Malus floribunda, Pyracantha coccinea, Crataegus oxyacantha, Mespilus germanica, and Stranvaesia davidiana, the latter being a new host, I believe.

The third disease which has appeared in severe form is the group of Verticillium wilt diseases. (This is quoted under maple; see page 66).

HOSTS OF CURLY TOP AND YELLOWS IN CALIFORNIA

Lists of ornamental plants naturally and experimentally infected with the virus diseases, curly top and yellows, compiled by Henry H. P. Severin and Julius Freitag, have been published in the Reporter (17:1-5. Jan. 15, 1933).

A S T E R (CALLISTEPHUS CHINENSIS)

RUST (Coleosporium solidaginis) was generally not very important. In Massachusetts it caused severe defoliation in some cases late in the season in the Connecticut Valley. In Michigan it occurred in abundance on plants grown in cloth houses. Other States reporting its occurrence were California, Wisconsin, Minnesota, and New Jersey.

WILT (Fusarium conglutinans var. callistephi). With the exception of Colorado, which noted much more, this disease was about normal in prevalence and severity. In Michigan late summer and fall rains decreased the amount of wilt below that in 1931. It was observed also in Ohio, New Jersey, Mississippi, Wisconsin, North Dakota, Washington, California, and Minnesota.

STEM CANKER (Phomopsis callistephi). Wisconsin.

YELLOWS (Virus) generally seemed to be as prevalent and destructive as usual. Massachusetts noted 30 per cent loss. Cloth houses to prevent infection are used with success by some growers in Michigan and in Wisconsin.

several new commercial cloth covered gardens have been established. Besides the States mentioned, yellows was reported from Connecticut, New Jersey, Pennsylvania, Delaware, Ohio, Minnesota, and California. The disease in California has been shown to be due to a different virus from that causing the eastern yellows.

A Z A L E A

FLOWER SPOT (undet.). The 1932 status of this disease is reported by Freeman Weiss of the Division of Horticultural Crops and Diseases as follows:

This exceedingly destructive flower spot, apparently of fungous origin, appeared again in the famous gardens of the Charleston, South Carolina, district. The flowers of evergreen azaleas (Azalea indica Hort.) become spotted and blighted very generally in affected plantings and wither or drop off prematurely. The foliage and stems are not affected.

ROSE BLOOM (Exobasidium azaleae) was reported from Washington. GALL (E. ozycocci) on A. hinodegiri in New Jersey; on A. indica in New Jersey, also reported as severe in one house on Long Island on Mme. Petrick variety of this species.

LEAF SPOT (Cercospora sp.), Mississippi. LEAF SCORCH (Septoria azaleae), New Jersey. POWDERY MILDEW (Microsphaera alni), New Jersey. DODDER (Cuscuta gronovii), New Jersey. CHLOROSIS (undet.) was reported from New Jersey. It can be corrected by spraying with 1/2 per cent ferrous sulfate. BURNING due to excess fertilizing with manure was reported from Washington.

B A R B E R R Y (BERBERIS SPP.)

FRUIT BLIGHT (Phoma berberina Sacc.) occurred generally in Japanese barberry (Berberis thunbergii) plantings in Massachusetts. The organism forms cankers on the stem and turns the fruits black. The maximum infection observed was 40 per cent, and the average for the State 20 per cent. This is the first record of this disease in Massachusetts.

B O X (BUXUS SEMPERVIRENS)

CANKER (Volutella buxi) caused injury in Connecticut, New Jersey (on B. sempervirens suffruticosa), the District of Columbia, and Georgia. This is the first record of its occurrence in Connecticut. Freeman Weiss of the Division of Horticultural Crops and Diseases reported a destructive occurrence on the Bliss Estate, Washington, D. C., where box plantings valued at several hundred thousand dollars are threatened.

C A L L A L I L L Y (ZANTHEDESCHIA SPP.)

ROOT ROT (Phytophthora richardiae). Numerous specimens and reports of heavy damage have been received from greenhouse men in New York, New Jersey, Pennsylvania, Ohio, and Illinois. (Freeman Weiss). In one planting of Z. aethiopica near Santa Cruz, California, there was

10 per cent infection of the bulbs. A near-by planting of about two acres in low, poorly drained soil was entirely destroyed (L. M. Massey). The disease is becoming serious in New Jersey.

SOFT ROT (Bacillus aroideae) was serious in a planting of yellow callas, Z. elliotiana, near Santa Cruz, California.

CANTERBURY BELLS (CAMPANULA MEDIUM)

STEM ROT (Sclerotium delphinii). In New Jersey a severe infestation occurred in one locality, killing 200 plants.

CARNATION (DIANTHUS CARYOPHYLLUS)

LEAF SPOT (Alternaria dianthi) was very destructive on susceptible varieties in Massachusetts. It is a limiting factor in the production of light colored varieties grown under lath near Los Angeles, California. Other States noting its presence are Michigan, New York, New Jersey, and Connecticut.

RUST (Uromyces caryophyllinus) was reported from Connecticut, New Jersey, and Wisconsin. For list of susceptible varieties for Massachusetts see P. D. R. 16: 184.

BACTERIAL SPOT (Bacterium woodsii) was reported for the first time from Massachusetts where it was observed in several greenhouses. (Davis and Boyd).

ROOT ROT, WILT (Fusarium sp.) was reported by Guba as very destructive in certain ranges in eastern Massachusetts and was also reported from Connecticut, New Jersey, and Colorado. In Colorado it is an important disease, but in 1932 there was much less than usual.

CHRYSANTHEMUM

LEAF SPOT (Septoria chrysanthemella) was reported by Guba as common in greenhouses in eastern Massachusetts, especially where growth is dense and too frequent watering is practiced. It was also reported in New Jersey. S. chrysanthemi occurred in Connecticut and Texas.

POWDERY MILDEW (Erysiphe cichoracearum) was more prevalent than usual in Delaware. It was also noted in New Jersey and Connecticut.

RAY BLIGHT. Ascochyta chrysanthemi was said to be more prevalent than usual in Mississippi. Cladosporium sp. occurred in a damp house in Lowell, Massachusetts, according to Guba.

RUST (Puccinia chrysanthemi) was reported from California.

ROOT ROT (Phymatotrichum omnivorum) was reported from Arizona and Texas.

MOSAIC (Virus). About 10 per cent infection occurred in November in plantings under cloth in San Mateo County, California. (L. M. Massey).

DWARF ORANGE (CITRUS TAITENSIS)

ANTHRACNOSE (Colletotrichum gloeosporioides). This is the dwarf orange commonly grown by florists for pot plants. A rather severe outbreak in one field occurred in New Jersey. The fungus was forwarded to Dr. H. S. Fawcett who verified our diagnosis. This particular grower has not imported any stock from California for many years and has not been troubled with the disease for several years. He states, however, that while he was importing stock from the West, he had observed the same trouble. (R. P. White).

COTONEASTER

BLIGHT (Bacillus amylovorus) was reported in 1932 from a number of eastern States, including Pennsylvania, New Jersey, Mississippi, Texas, and Arkansas, and a report from Illinois stated that it had been found there in 1931. Previously it had not been reported east of the Rocky Mountains. Species affected were C. pannosa in Arkansas and California, C. racemiflora in Illinois, and C. salicifolia and C. horizontalis in Pennsylvania. P. D. R. 16: 129, 140.

CREPE MYRTLE (LAGERSTROEMIA SP.)

POWDERY MILDEW (Oidium sp.) was more prevalent than usual in Florida and Mississippi. It was also noted in Texas and Virginia.

DELPHINIUM

POWDERY MILDEW (Erysiphe polygoni). Mature perithecia with differentiated spores were observed in California. The disease occurred also in Connecticut, Delaware, and Minnesota.

CROWN ROT. Sclerotium delphinii was reported from Connecticut and New Jersey. Sclerotinia sp. was destructive in Michigan during wet periods in May.

FIRETHORN (PYRACANTHA SPP.)

BLIGHT (Bacillus amylovorus) was reported from California on P. angustifolia, P. crenulata, and P. formosiana; from New Jersey on P. coccinea and P. gibbsii yunnanensis; and from Delaware.

SCAB (Fusicladium sp.) was reported from California on P. formosiana.

FLOWERING QUINCE (CYDONIA JAPONICA)

BLIGHT (Bacillus amylovorus) was reported from New Jersey and California.

GLADIOLUS

SCAB (Bacterium marginatum) with the exception of Michigan, which reported much more (7 per cent loss and some fields 100 per cent infected),

this disease was about normal in occurrence and severity. It was reported for the first time from Connecticut. Other States noting its occurrence were Massachusetts, Minnesota, Kansas, New Jersey, Ohio, and California.

H O L L Y H O C K (ALTHAEA ROSEA)

RUST (Puccinia malvacearum) was much more prevalent than usual in Connecticut, Minnesota, Michigan, and Massachusetts. Nelson reported it as "Widespread and extremely destructive in Michigan this year." Massachusetts noted 30 per cent loss. Wisconsin recorded good control with sulfur dust and sanitation.

LEAF SPOT. Cercospora althaeina occurred in Connecticut and Michigan. In the latter State it is said to be the most common leaf spot of hollyhock. Colletotrichum sp. and Phyllosticta althaeina were reported from New Jersey. Septoria fairmani was observed in numerous plantings in Michigan.

I R I S

LEAF SPOT (Didymellina iridis). In Massachusetts this disease was very prevalent and destructive after July 15. It was severe locally near Berkeley, California. It was also very common and destructive in Michigan. Other States noting its presence were Connecticut, Mississippi, Wisconsin, and Pennsylvania.

SOFT ROT (Bacillus carotovorus) was more severe than usual in Massachusetts and Minnesota. The weather was probably too dry for its development in California, Wisconsin, and Mississippi.

CROWN ROT (Sclerotium rolfsii) occurred on bulbous iris in southern Oregon. (F. Weiss).

BLIGHT (Alternaria and Mystrosporium) was exceptionally destructive to the bulbous iris, Yellow Queen, in southwestern Oregon. (F. Weiss).

MOSAIC (virus) was found in one planting of German iris in Berkeley, California, where it was apparently doing little damage. (L. M. Massey).

L I L Y (LILIUM SPP.)

BLIGHT (Botrytis elliptica) caused very serious damage in many plantings in Michigan. However, it was controlled where Bordeaux plus soap was used properly. It was second in importance to mosaic in Wisconsin. It was reported from New Jersey and Washington.

BULB AND STEM ROT (Phytophthora sp.) was reported from New Jersey. In Michigan Phytophthora is associated with a neck canker of L. regale, causing breaking over of the stem just below the flower buds.

BASAL ROT (undet.) is a serious trouble of Lilium candidum on poorly drained soil in Michigan.

MOSAIC (virus) was reported from Florida, Mississippi, Wisconsin, and California.

N A R C I S S U S

BULB NEMATODE (Tylenchus dipsaci) was reported on narcissus from New York, New Jersey, Maryland, Virginia, Tennessee, North Carolina, South Carolina, Georgia, Florida, Ohio, Michigan, Wisconsin, Missouri, Washington, Oregon, and California. It was found in many new sites in Virginia and North Carolina according to Weiss. Similar symptoms are caused by Aphelenchus and other nematodes.

ROOT ROT (Sclerotium rolfsii), California. BASAL ROT (Fusarium sp.), New Jersey, Mississippi, Wisconsin, California. MOSAIC (virus), California.

N A S T U R T I U M (TROPAEOLUM MAJUS)

BACTERIAL LEAF SPOT (Bacterium aptatum). Maine, Pennsylvania. P. D. R. 16: 125, 169.

P E O N Y (PAEONIA SP.)

BLIGHT (Botrytis paeoniae) was widely reported. Botrytis and Phytophthora caused damage in Minnesota.

ROOT KNOT (Caenema radicum). According to Nelson, root knot is increasing yearly in commercial plantings in Michigan. Much early fall infection was noted in 1932. Vaughan reported that there is need for research work on this problem in Wisconsin. Root knot was also reported from New Jersey.

STEM ROT (Sclerotinia sclerotiorum) was reported from New Jersey.

LEAF SPOT. Cladosporium paeoniae caused serious spotting in some varieties and also affected the stems severely in some cases in Michigan. It was also reported from New Jersey and Wisconsin. Septoria paeoniae was reported from Washington.

MILDEW (Microsphaera alni), New Jersey. DODDER (Cuscuta gronovii), New Jersey. CHLOROSIS (undet.) was reported from New Jersey. It can be corrected by spraying with 1/2 per cent ferrous sulfate. BURNING due to excess fertilizing with manure was reported from Washington.

P H L O X

NEMATODES. Aphelenchoides fragariae was found on Phlox decussata in the District of Columbia, and Tylenchus dipsaci on the same species at Baltimore, Maryland. P. D. R. 16: 137.

STEM ROT (Sclerotium delphinii) was reported from New Jersey. P. D. R. 16: 148.

R H O D O D E N D R O N

CANKER AND DIEBACK (Phytophthora cactorum) was severe in one block of hybrids on Long Island, New York, and was also reported from New Jersey. WILT (Phytophthora cinnamomi). A very severe case was noted on two year old hybrid plants on Long Island. It was reported from New Jersey on R. ponticum. (R. P. White).

CANKER (Phomopsis sp.) was reported from New Jersey and Pennsylvania. (R. P. White).

BASAL CANKER (Rhizoctonia solani). Plants of R. carolinianum shipped from Tennessee showed individual branches dead and dying. Isolations from the wood gave Rhizoctonia in pure culture. (R. P. White).

BUD BLAST (Sporocybe azaleae) on R. maximum in Pennsylvania. (R. P. White).

LEAF SPOT. Cercospora rhododendri, on R. ponticum in New Jersey; also on Long Island, New York, Pestalozzia macrotricha, New Jersey. Phyllosticta maxima, on R. maximum in Connecticut; also in New Jersey. Phyllosticta saccardoi, New Jersey.

LEAF SPOT (Exobasidium vaccinii), New Jersey. GALL (E. oxycocci), Pennsylvania. RUST (Pucciniastrum minimum) on R. ponticum in New Jersey.

R O S E (ROSA SPP.)

BLACK SPOT (Diplocarpon rosae) was widespread. It caused severe defoliation in some places in California while none was found in other sections. Abundant late summer and fall rains provided conditions for a general outbreak in Michigan. In Louisiana this disease occurs the entire year.

BACTERIAL LEAF SPOT (Bacterium sp.) occurred on greenhouse roses in New Jersey. The pathogenicity of the organism has been proved. It was also reported to me from New York on Talisman and Souvenir. (R. P. White).

RUST (Phragmidium sp.). In Michigan wild roses were heavily infected in many cases, and many specimens were received on both hybrid tea and perpetual varieties. (R. Nelson). Also reported from Wisconsin and on wild roses from Kansas. P. disciflorum was severe in all plantings in the vicinity of San Diego, California. (L. M. Massey). P. rosae-californicae was reported from Washington.

ANTHRACNOSE. From three varieties of climbers outdoors and also from greenhouse roses, what appears to be Halsted's Cloeosporium rosae has come to light again in New Jersey. (R. P. White). Heavy infection of Sphaceloma rosae occurred on the variety Silver Moon at San Diego, California. (L. M. Massey).

POWDERY MILDEW (Sphaerotheca pannosa) was generally present. Nelson stated that in Michigan it was the most frequently reported disease

of all plants in 1932. According to Massey it was severe in all plantings in California where, along with rust, it is said by growers to be the worst disease of rose.

CANKERS. Coniothyrium fuckelii was reported from New York, New Jersey, and California. CROWN CANKER (Cylindrosporium scoparium). In association with another organism, plants have been killed in large numbers, particularly on own rooted stock, in New Jersey. (R. P. White). BROWN CANKER (Diaporthe umbrina), New Jersey, California. DIE-BACK and STEM GIRDLE (undet.), again observed this year, as last, on the climber Albertine in Arkansas. (H. R. Rosen).

MOSAIC; INFECTIOUS CHLOROSIS (virus). New Jersey, California.

S N A P D R A G O N (ANTIRRHINUM MAJUS)

RUST (Puccinia antirrhini) generally caused about the usual amount of damage. A severe outbreak occurred in Texas. Connecticut and Louisiana noted more than usual, while California, Colorado, Kansas, Minnesota, Wisconsin, Mississippi, New Jersey, and Massachusetts reported about normal amounts. Michigan observed less than usual due to night temperatures being too high for summer infection. P. D. R. 16: 125.

T U L I P (TULIPA SPP.)

BLIGHT (Botrytis tulipae) is very destructive in old plantings but is seldom important in new beds in Michigan and Wisconsin. It was also reported from New Jersey, Mississippi, Ohio, and Washington.

BULB ROT. Penicillium ochraceum was reported from New Jersey. Rhizoctonia tuliparum occurred in Connecticut.

Z I N N I A (ZINNIA ELEGANS)

STEM ROT. Sclerotinia sclerotiorum was reported from Washington and Oregon. P. D. R. 16: 163. Rhizoctonia solani occurred in New Jersey.

LEAF SPOT (Cercospora zinniae and C. atricincta) occurred in Florida.

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Prepared by Nellie W. Nance

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