The NEWS LETTER

of the

ASSOCIATION OF OFFICIAL SEED ANALYSTS

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PRESIDENT, LOUISA KANIPE
Corvallis, Oregon
SECRETARY, W. C. PFAENDER
Beltsville, Maryland

VICE PRES., B. F. FORWARD
Toronto, Ontario
EDITOR, DUANE ISELY
Ames, Iowa

FROM THE PRESIDENT

Fall is the time for harvest and work. This is especially true in seed producing areas where seeds subject to price supports are grown. Seed laboratories in such areas are busy testing the new crop before it is turned to Uncle Sam, and farmers and seed processors are busy processing and marketing. In the consuming areas, seedsmen are receiving seeds by the car load and farmers are planting cover crops and pastures. These happenings are significant to the seed analysts program of public service and education because the producing farmer must submit a laboratory report to sell his seed to Commodity Credit Corporation and the planting farmer must submit a laboratory report to receive payment for what he plants. Some of the farmers are going to be curious enough to read their reports and become more conscious of seed testing and seed quality. The series of percentage requirements and discounts as set up by the government may not be called grades, but impresses the farmer with the quality he has grown. In fact it affects his most sensitive nerve--the pocketbook. Thus, regardless of our personal viewpoints, we as seed analysts, through long hours of toil are helping to give the agriculturalists both in industry and in farming, a harvest of a fullerappreciation of testing as a measure of seed quality.

COMMITTEE MEMBERS

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RESEARCH COMMITTEE and Sub-committees
being sent by W. D. Hay

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PROGRAM

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representing:

Association at Large
Chairman, Research Committee
U. S. Department of Agriculture
Chairman, Rules Committee
Commercial Seed Technologists Association
Canadian Department of Agriculture

COMMITTEE OBJECTIVES

Legislative:

A concerted effort will be made to secure acceptance and use of the Regional Uniform Noxious Weed Lists. Mr. Ulvin also states :

" A definition of lawn seed has also been proposed. Farmers exemption from the Seed Laws is also enforced in many states. A minimum standard of purity and germination may be desirable. A definition of the seizure, stop sale, and the "lot of seed" may also be desired. Some states have separate laws regarding the production and sale of hybrid seed corn. The method of determining tolerances and applying the same in the analysis of seed is also an important point. These are just a few of the ideas that are involved in legislation and administration of the Seed Laws, and we believe it desirable to crystalize these thoughts by the various states and enact them into law where desirable."

Public Service:

Dwight Forsyth reports as follows: "One project which I have under way is to supply material to the News Letter which will aid seed laboratories in developing publicity and news. A continuing feature of this project is a so-called Publicity Calender featuring ideas which are timely. These ideas are not necessarily from the committee members but must be gathered from the whole Association.

"Another idea which the committee is undertaking is to start a file of material on posters, displays and booths put up by various laboratories. This should be on display at the next annual meeting. If there should be a wind-fall of pictures, some of them might appear in the News Letter."

Rules and Regulations:

The committee plans to gather information through review of literature and acceptance of data from other analysts, that may suggest further rule changes. These will be circulated to all members of the committee for review and reported upon at the next annual meeting. Steps will also be taken to further cooperation with the Society of Commercial Seed Technologists in gathering data for rule changes.

Research:

Being sent by W. D. Hay.

Standardized Test:

Hope to have a satisfactory statement on spotted cotyledons on lettuce.

Rating of Laboratories:

Mr. Robertson says that the program reported to the Association this summer will be continued.

L. A. Kanipe
President

RESEARCH ON SEED PHYSIOLOGY AT THE BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH

One of the earliest and most productive projects to be established at the Boyce Thompson Institute for Plant Research was in seed physiology. Dr. Crocker had been interested in the subject while serving with the U.S.D.A. and at the University of Chicago so he continued and expanded his interests when he came to Yonkers, N.Y., to organize the Institute and serve as its first director from 1924 to 1949.

For more than a quarter of a century a regular staff of four to six people was affiliated with him in undertaking fundamental studies on seed problems. Special short-term seed projects were also undertaken by seventeen other staff members from time to time. From the combined research efforts of these scientists, some 147 publications, including three books, have been contributed. Most of these appeared in the first fifteen volumes of the CONTRIBUTIONS FROM BOYCE THOMPSON INSTITUTE (1925-1949). These data were summarized in 1948 by Barton and Crocker (3) in the book entitled Twenty Years of Seed Research with suitable reference to the original articles.

A complete card index to all published articles on seed problems was maintained and expanded over the years. During Dr. Crocker's last year of tenure, he and Dr. Barton began to compile the information available in this file and to draw upon their extensive experience in writing a book on seed physiology. The manuscript (6) was completed only three months before Dr. Crocker died, and it is at present in press with Chronica Botanica.

During the early years, workers in the seed laboratory set out to catalog the germination characteristics of as many seeds as possible. Since the Institute was organized for fundamental research the studies could be undertaken with great freedom, and irrespective of the economic use of the plants.

Normal, sound seed were soon found to fall into several classifications according to their ability to germinate. Many species germinate readily (1) as soon as they are provided with suitable conditions of moisture and temperature. Extensive studies were made on the conditions required for proper evaluation of vitality in such seed. Some seeds were found to require alternating temperatures. Low temperatures (less than 50°F.) were necessary for rock plants such as Camassia leichtlinii and Lewisia rediviva. High temperatures were also detrimental to wild columbine, tree of heaven and catalpa. The annual delphinium and lettuce failed to germinate at high temperatures unless they were pretreated at low temperatures while in a moist condition. Proper carbon dioxide-oxygen balance was required for germination of cocklebur, and light was found to be necessary for germination of trailing arbutus.

Many seeds were found to be incapable of normal germination (2,4) under favorable conditions for growth. Various types of dormancy were soon discovered. Impervious seed coats of the so-called "hard seeds" found commonly among legumes were studied. Hot water, sulfuric acid and abrasive treatments were developed to overcome imperviousness in seed of Melilotus alba and other species. Many seed require a period of low temperature

after-ripening to break dormancy. This led to a study of stratification and pregermination treatment of various evergreens, Massard cherry, Crataegus and other plants. Best temperatures for stratification of different species lie between 33° and 50° F. with 41° effective for most types.

Some seedlings will produce normal radicles but plumule development is blocked because of dormancy. Among the species with this characteristic were the "two-year" lilies, tree peony and Viburnum spp. Dormancy could be broken by cold (38° - 59° F.) pre-treatment for a period of one to three months after the radicles appeared.

The seeds of many rosaceous plants failed to produce normal, vigorous seedlings because of the inhibiting influence of dormancy. The seedlings of peach, apple, hawthorn and Japanese rose tree grown at 62° F. or above remain dwarfed. If exposed to 41° F. or lower for two months the dormancy may be overcome so plants make normal growth when placed at higher temperatures.

Methods were developed for determining the viability of these dormant and semi-dormant seeds within a reasonable period. If was found that viable embryos, when excised and placed in a germinator, would begin growth immediately or remain sound, thus permitting the completion of tests within three to ten days. Non-viable, excised embryos failed to swell and deteriorated rapidly under these conditions.

These highlights of the survey of seed germination cover only one aspect of the research on seed physiology. Extensive tests have been made on the effects of carbon dioxide and other gases on the germination and storage of seed. Experiments have also been conducted on the viability of seed under different storage conditions for the past 25 years. Some experiments are in progress where seed have been sealed in sufficient quantity, under different conditions of temperature and humidity, to provide data for 50 to 100 years. So far the data have shown that subfreezing temperatures are more effective for retaining vitality than higher temperatures.

Seeds have been tested for inhibiting agents and studies have been made on the respiration of seeds stored under different conditions and with different fungous flora. More recently studies have been made on the effect of oxygen, carbon dioxide and other gases in water on the vitality of bean and other seeds.

The Umbelliferae seed have been notoriously poor germinators. Recently it was shown that non-viable seed of certain species were embryoless and this condition arose as the result of feeding of Lygus plant bugs. Studies are in progress with radioactive tracers to determine whether the insect destroys the embryo by injecting toxic substances while feeding or merely by removing food reserves from the immature seed. Other studies in progress are on the characterization of varietal differences in the Gramineae and other crops.

These studies from the seed project are characteristic of the Institute's general program (5). Many practical problems have been solved while we have been searching for fundamental knowledge. Other projects, less germane to this report, that have been pursued at the Institute may be of general interest.

A search of the plant kingdom for new insecticides led to the development of the alkaloid, piperine. Syntheses of new organic insecticides such as the thiocyanates and synergists for them have been made by the organic chemists cooperating with the entomologist. The histological effect of nerve poisons and other insecticides was described thoroughly.

In the field of plant pathology studies have been made primarily on virus diseases and fungicides. It was shown that viruses could be precipitated and resuspended by chemical agents that affect proteins, and that viruses were antigenic in nature. The mechanism of fungitoxicity in the sulfur compounds was clarified, and new methods were developed for testing fungicides in the laboratory and greenhouse.

Outstanding success has attended the research on growth regulation and many of the modern concepts arose from the work on the effect of gases and other chemicals on plants. Although the discovery of 2,4-D in 1941 has been one of the most publicized achievements, the earlier studies on the indole derivatives, naphthaleneacetic acid, ethylene gas and ethylene chlorohydrin were basic discoveries. Long before the new trend in herbicides came into existence it had been shown that plant growth could be regulated by inducing or breaking dormancy of potato tubers, changing the growth habits by exposure to gases or by stimulating meristem activity. The effects of toxic industrial gases on plants were well catalogued long before America became aware of "smogs".

Extensive studies were made on cell membranes and the development of cotton fibers. New concepts were developed on the structure of cellulosic materials by X-ray diffraction studies. The microchemical detection of cell constituents was studied and methods for analyses formulated.

The effect of quantity and quality of light rays on the growth and differentation of plants was studied extensively. Other biochemical studies have been concerned with methods of altering plant B-glucosides by supplying different aglycogens to the plant. Genetical work is in progress with trees and ornamentals.

The Institute that has made such studies possible was conceived and established by William Boyce Thompson who made his fortune in mining developments. He made available real estate and endowment funds aggregating about ten million dollars with the expressed idea that, "I want to do something to get at the bottom of the phenomena of life processes and I think a good place to study them would be in the realm of plants. Any principles concerning the nature of life that you can establish for plants will help you understand man, in health and disease....."

The Institute operates a laboratory with some 90,000 square feet of floor space exclusive of service areas, about 20,000 square feet of greenhouses, a 25-acre experimental farm and almost 300 acres of arboretum. The Thompson mansion and 20-acre estate has recently been added to these holdings. All of these properties are in Westchester County about 20 miles north of New York City.

Although the Institute was organized for fundamental research, it has from its inception encouraged other organizations to bring their problems to the Institute staff for investigation. A series of applied problems have been studied for dozens of companies,

private agencies and government bureaus. These problems have ranged from study of the failure of aquatic plants useful as food for ducks on the Carolina Coast to investigation of the by-products of atomic fission. The charter of the Institute is so drawn that chemistry, physics, metallurgy and animal husbandry may be investigated as readily as botany. The study of plants has, however, been the central interest because Colonel Thompson was concerned with the eventual failure of the world food supply to sustain the rapidly growing population in face of the depletion of soil resources. Because of this, problems basic to agriculture such as seed physiology will continue to receive emphasis in the years ahead.

REVIEW ARTICLES

1. Barton, Lela V. Experiments at Boyce Thompson Institute on germination and dormancy in seeds. Sci. Hort. 7: 186-193. 1939.

2. _____ Problems in seed germination. Plants & Gardens 1: 174-181. 1945.

3. Barton, Lela V., and William Crocker. Twenty years of seed research. 148 pp., 21 plates. Faber & Faber, Ltd., London. 1948.

4. Crocker, William. Studies with seeds and germination. Hort. Soc. New York Monthly Bull. p. 4-7. Mar.-Apr. 1938.

5. _____ Growth of plants. 459 pp. 171 illus. Reinhold Publ. Corp., New York. 1948.

6. Crocker, William, and Lela V. Barton. Physiology of seeds. Chronica Botanica, Waltham, Mass. (In press).

REPRINTS ON SEED PHYSIOLOGY AVAILABLE AT BOYCE THOMPSON INSTITUTE

Prof.Pap.v.1. #2 The use of catalase as a means of determining the viability of seeds — W. E. Davis

#9 Hastening the germination of southern pine seeds — L. V. Barton

26 Germination and storage of delphinium seed — L. V. Barton

29 Studies with seeds and germination — William Crocker

Prof.Pap.v.2. #6 Storage of seeds of the regal lily — L. V. Barton. Experiences in late spring transplanting of lilies to a new plastic cloth cage; Experiments on forcing Easter lilies a second year — N. E. Pfeiffer.

Reprint #33 A double maximum in the rate of absorption of water by Indian lotus seeds — I. Ohga.

50 Growing bittersweet (Celastrus scandens) from seed — H. C. Joseph.

84 Primary dormancy, after-ripening, and the development of secondary dormancy in embryos of Ambrosia trifida — W. E. Davis.

85 The development of dormancy in seeds of cocklebur (Xanthium) — W. E. Davis.

130 After-ripening, germination, and storage of certain rosaceous seeds — W. Crocker and L. V. Barton.

132 After-ripening, germination, and vitality of seeds of Sorbus aucuparia L. — F. Flemion.

140 Germination of bayberry seeds — L. V. Barton.

141 Germination of seeds of the silver bell, Halesia carolina — J. Giersbach and L. V. Barton.

142 Germination and storage of wild plum seeds — J. Giersbach and W. Crocker.

153 Effect of storage on the vitality of delphinium seeds — L. V. Barton.

156 Statistical analysis of seed germination data through the use of the

of the Chi-square test —W. J. Youden.

Reprint #180 Physiological and chemical studies of after-ripening of Rhodotypos kerrioides seeds — F. Flemion.

181 Dwarf seedlings from non-after-ripened embryos of Rhodotypos kerrioides — F. Flemion.

210 Dormancy in Tilia seeds — L. V. Barton.

211 Physiological and chemical changes preceding and during the after-ripening of Symphoricarpos racemosus seeds — F. Flemion.

231 After-ripening and germination of Cotoneaster seeds — J. Giersbach.

261 Propagation of Lycopodium. I. Spores, cuttings, and bulbils — F. L. Barrows.

262 Propagation of Lycopodium. II. Endophytic fungus in gametophyte and sporophyte — F. L. Barrows.

264 Storage of vegetable seeds —L. V. Barton.

269 Storage of some coniferous seeds — L. V. Barton.

270 Germination of delphinium seeds — L. V. Barton.

271 Dormancy in seeds of Benzoin aestivale L. — E. M. Schroeder.

276 Factors influencing germination and development of dormancy in cocklebur seeds — N. C. Thornton.

279 Seedling production in Carya ovata (Mill.) K. Koch, Juglans cinerea L., and Juglans nigra L. — L. V. Barton.

280 Germination of some desert seeds — L. V. Barton.

282 Carbon dioxide storage. IX. Germination of lettuce seeds at high temperatures in both light and darkness — N. C. Thornton.

Reprint #285 Propagation of Epigaea repens L. I. Cuttings and seeds — F. L. Barrows.

299 Propagation of Lycopodium. III. Spore germination — F. L. Barrows.

300 Moisture and temperature requirements for yarovization of winter wheat — M. Lojkin.

305 Germination and seedling production in Lilium sp. — L. V. Barton.

312 Germination of fruits of Ptelea species — E. M. Schroeder.

326 After-ripening at 5° C. favors germination of grape seeds — F. Flemion.

331 Germination and seedling production of Arctostaphylos Uva-ursi — Johanna Giersbach.

332 Germination and seedling production of species of Viburnum — J. Giersbach.

333 Some factors affecting germination and growth of Gentian — J. Giersbach.

341 Viability of stored Lilium pollen — N. E. Pfeiffer.

350 Life span of seeds — W. Crocker.

355 Observations on the germination of lettuce seed — A. E. Griffiths.

356 A rapid method for determining the viability of dormant seeds — F. Flemion.

364 Breaking the dormancy of seeds of Crataegus species — F. Flemion.

383 Club mosses from cuttings — F. L. Barrows.

395 A further report on the storage of vegetable seeds — L. V. Barton.

396 Storage of elm seeds — L. V. Barton.

Reprint #397 Germination and growth of some rock garden plants — E. M. Schroeder and L. V. Barton.

413 Storage of some flower seeds — L. V. Barton.

414 Life of Gladiolus pollen prolonged by controlled conditions of storage — N. E. Pfeiffer.

440 Some effects of treatment of non-dormant seeds with certain growth substances — L. V. Barton.

443 Some effects of treatment of seeds with growth substances on dormancy —L. V. Barton.

468 Further studies on the rapid determination of the germinative capacity of seeds — F. Flemion.

484 Relation of certain air temperatures and humidities to viability of seeds — L. V. Barton.

490 Embryoless dill seeds — F. Flemion and E. Waterbury.

497 Dormancy in seeds of Impatiens balsamina L. — G. S. Kroeger.

500 Seed production in trailing arbutus — F. L. Barrows.

504 Dormancy in seeds of Convallaria majalis L. and Smilacina racemosa (L.) Desf. — L. V. Barton and E. M. Schroeder.

505 Germination studies of seeds of Symphoricarpos orbiculatus — F. Flemion and E. Parker.

525 Effect of the addition of nitrogen upon germination of seeds of Symphoricarpos racemosus — F. Flemion.

533 Effect of moisture fluctuations on the viability of seeds in storage — L. V. Barton.

534 The storage of citrus seeds — L. V. Barton.

Reprint #552 Some seeds showing special dormancy — L. V. Barton.

560 Carbon dioxide storage. XII. Germination of seeds in the presence of carbon dioxide — N. C. Thornton.

565 Longevity of seeds — W. Crocker.

567 Will Buffalo grass be useful in eastern United States? — W. Crocker.

568 Further studies with dwarf seedlings of non-after-ripened peach seeds — F. Flemion and E. Waterbury.

569 A note on the viability of seeds of maga, Montezuma speciosissima — L. V. Barton.

570 Viability of seeds of Fraxinus after storage — L. V. Barton.

582 Respiration and germination studies of seeds in moist storage — L. V. Barton.

594 Germination of seeds of Panicum anceps Michx. — H. R. Garman and L. V. Barton.

599 Internal pressure necessary to break shells of nuts and the role of the shells in delayed germination — W. Crocker, N. C. Thornton, and E. M. Schroeder.

603 Response of lettuce seeds to thiourea treatments as affected by variety and age — H. R. Garman and L. V. Barton.

604 Effect of age and storage condition of seeds on the yields of certain plants — L. V. Barton and H. R. Garman.

607 Further studies of embryoless seeds in the Umbelliferae — F. Flemion and G. Uhlmann.

616 Special studies on seed coat impermeability — L. V. Barton.

620 Storage and germination of delphinium seeds — L. V. Barton.

Reprint #624 Germination and sex population studies of Ilex opaca Ait. — L. V. Barton and N. C. Thornton.

631 Effect of different storage conditions on the germination of seeds of Cinchona ledgeriana Moens. — L. V. Barton.

652 The role of the surface micro-flora in measurements of the respiration rate of germinating seeds — F. E. Denny.

653 Reliability of the excised embryo method as a rapid test for determining the germinative capacity of dormant seeds — F. Flemion.

654 Seed viability tests with 2,3-5,triphenyltetrazolium chloride — F. Flemion and H. Poole.

655 Growth inhibitors in seeds — L. V. Barton and M. L. Solt.

657 Stomatal behavior as influenced by treatment with B-naphthoxyacetic acid — M. G. Ferri and A. Lex.

659 Further studies on the occurrence of embryoless seeds and immature embryos in the Umbelliferae — F. Flemion and E. T. Henrickson.

660 Relation of Lygus bugs to embryoless seeds in dill — F. Flemion, H. Poole, and J. Olson.

661 Effects of some surface-active agents on the growth of wheat roots in solutions — E. A. Prill, L. V. Barton, and M. L. Solt.

665 Lygus bugs in relation to the occurrence of embryoless seeds in the Umbelliferae (abstract) — F. Flemion.

667 Seed packets and onion seed viability — L. V. Barton.

673 Effects of some organic acids on the growth of wheat roots in solutions — E. A. Prill, L. V. Barton, and M. L. Solt.

Reprint #683 Lygus bugs in relation to seed production and occurrence of embryoless seeds in various umbelliferous species — F. Flemion and J. Olson.

685 Relation of different gases to the soaking injury of seeds — L. V. Barton.

George L. McNew, Director
Boyce Thompson Institute for
Plant Research
Yonkers, New York

Note — The above article, which Dr. McNew was good enough to prepare for the News Letter should give analysts a general concept of the tremendous impact of the Institute in the field of seed physiology. Although most of the species investigated are not those which analysts ordinarily handle, the principles elucidated are applicable to many analytical germination problems. Note particularly the extensive list of publications available for distribution, and the book on seed physiology which is in press at the present time. Ed.

OREGON NEWS NOTES

As usual, the fall issue of the News Letter finds us up to our necks in grass and cover crop samples, and anticipating a large volume of Ladino clover samples.

Growing and harvesting conditions were excellent with warm, dry weather prevailing throughout July and August. Alta fescue and ryegrass has been of good quality although the dormancy has been a little more persistent on the early samples than in former years. This has necessitated prolonging the germination period to obtain a complete test. We have been taking moisture readings in an effort to correlate dormancy with moisture percentage, but the severe dormancy has already subsided, and samples are now responding in the prescribed germination period.

We have had several personnel changes during the past month. Miss Caroline Koberstein, who has been employed by this laboratory for several years, resigned to accept a position as analyst with the Northrup King Company, Boise, Idaho. Two former analysts, Mrs. Merle Pierpoint, and Mrs. Peggy Hayes have been recalled to help us through the rush season. Ten new employees have been added. Mrs. Mabel Hadley, Miss Helen Trent, Miss Jean Suttle, and Miss Ruth Miller have been assigned to purity analyses, while Miss Beth Merrill and Mrs. Mabel Trent were added to the germination staff. All of these new employees have completed our 3 weeks seed school. Two analysts with former training have also joined the staff. Miss Maribel Gammon who was formerly in the Ransom Seed Laboratory at Los Angeles, and Mrs. Dolores Davis who has been employed by Mrs. Ryman in the E. F. Burlingham laboratory have both been assigned to purity analyses. Mrs. LaVon Cole and Miss Betty Cook have been added to the office force.

With a large testing volume, filing of samples for a three year period has been somewhat of a problem. Rodent proof shelving will soon be installed in our present quarters to handle the current year's receipts. Two and three year old samples will be stored in an adjacent utility building.

Recent visitors to the laboratory include Miss Bess Cowley, recently retired from the Sacramento, California laboratory, and Mrs. Norma Wadell Cardinell of East Lansing, Michigan. Mrs. Cardinell was the second analyst in charge of the seed laboratory here at Oregon State.

Charles E. Allen
Corvallis, Oregon

NEWS NOTES FROM CALIFORNIA SEED LABORATORY

Two weed and seed technicians (junior seed analysts) were added to the staff of the California State Seed Laboratory August 1, 1950. They are Henry Schierenberg and Herman Schierenberg, twins. Both are graduates of Chico State College with major in botany.

Germinators at the California State Seed Laboratory are to become completely automatic. An electrical control system with clock to turn the germinators on and off night and morning is being installed. We hope the installation will be completed before our busiest season arrives.

The California Seed Council will hold its fall meeting September 28 at the Hotel California in Fresno. In addition to the regular business meeting the following topics will be discussed by two able speakers.

"California Range Reseeding Program" by Professor B. A. Madson, Director of Field Station, Agricultural Experiment Station, Davis, California.

"Price Support Program on Field Seeds" by Mr. Evan Berg, California Production and Marketing Administration, Berkeley, California.

W. D. Hay
Sacramento, California

RESEARCH COMMITTEE

President Kanipe recently submitted a plan for organization of the Research Committee of the Association of Official Seed Analysts to the members of the Executive Committee for consideration. The Executive Committee approved the general plan with criticisms and suggestions regarding its implementation. With these in mind, your Research Committee chairman hopes to organize and execute the functions of the Research Committee according to the following outline which is substantially the same as that suggested by Mrs. Kanipe:

SUGGESTED ORGANIZATION AND FUNCTIONS OF THE RESEARCH COMMITTEE OF A.O.S.A.

Organization will include:

1. General chairman
2. Regional chairman
3. Sub-chairman

Functions will include:

1. General chairman - To act as coordinator within AOSA and with SCST, USDA, Canada Department of Agriculture, and others in encouraging both individual and group research.

   (A) To receive notice of seed testing problems from individual seed analysts, committees and others.

   (B) To bring problems to the attention of the proper group by

   (a) sending suggestions and/or data to an existing committee such as Standardized Test, Rules and Regulations, etc.

   (b) appointing sub-committees if needed to solve a specific problem.

   (c) submitting notices to analysts through the News Letter of proposed problems in order that anyone who may be interested can participate in the solution.

   (d) send suggestions to State colleges for graduate research problems in cooperation with individual seed laboratories or committees.

2. Regional chairmen

   (A) To forward notice of any specific regional problem to the General chairman

   (B) To coordinate regional material and send out samples for testing, illustrating

   (a) new Rule changes.

   (b) problems that are new or that need solution.

3. Sub-Committee Chairmen

   (A) To organize and gather data on the specific research problem assigned by the General chairman.

(B) To submit pertinent data to the General chairman for the use of the appropriate committee, such as Rules & Regulations, Public Service, Standardized Test, Legislation, etc.

When the work on the specific problem has been completed, the sub-committee will be automatically dissolved.

It has been suggested that referee testing be turned over to the Committee on Standardized Tests and the Committee on Rating of Laboratories. The by-laws of the Association of Official Seed Analysts expressly provide that referee samples shall be sent out by the Research Committee. Therefore, the regional chairmen will continue to send out referee samples as outlined above and as they have already planned for the coming year. This does not prohibit any Committee from sending out referee or research samples, nor does it prohibit the Committee on Standardized Tests or the Committee on Rating of Laboratories from enlisting the aid of the regional chairmen in sending out referee samples expressly designed to assist those committees.

The readers of this News Letter should consider this an invitation to notify the general chairman or regional chairmen of any seed testing problems which need attention. Do not hesitate to notify the general chairman of these problems for fear that someone else will make use of the idea without your having a chance to cooperate in its solution. No problem will be turned over to a committee or other research organization without permission of the individual or group who suggested it and without giving the suggestor an opportunity to cooperate in the research, if desired.

W. D. Hay
Chairman, Research Committee

SUMMARY OF 1950 A.O.S.A. MEETINGS*

Second Annual Progress Report on Research Conducted under Research and Marketing Act Project 355

This is a cooperative project conducted by the Grain Branch and the Iowa State College. The principal objective is to make it possible for different seed testing laboratories to obtain similar results on the same sample. Thus far, the work has consisted of surveys and detailed methods of testing. During the fiscal year a Federal representative worked in 3 Western States bringing the total number of States in which he has worked to 12. The purpose of this field work was to observe procedures which seed inspectors follow in sampling seed and to secure samples for laboratory study to determine whether seed lots are generally uniform in content. The following conclusions are drawn from the field and laboratory studies: (a) in general, seed inspectors carried out their duties conscientiously and attempted to obtain representative samples; (b) inspectors were quite

* Refer to .. July issue of News Letter for abstracts of other papers presented at meetings. Ed.

familiar with the rules governing the sampling of seeds but in many instances did not adhere to these rules; (c) analysis of individual-bag samples revealed that only 20 percent of the seed lots tested were uniform for pure seed; (d) results of the study suggests that many so-called seed lots cannot be expected to be uniform and laboratory tests on such samples cannot be expected to be in agreement.

Ten official seed testing laboratories were visited by Federal analysts in an attempt to find the factors causing variations in results of laboratory tests of seeds. Twelve additional laboratories had been visited prior to July 1, 1949. It is concluded from this study that the principal causes of variation insofar as laboratories are concerned are as follows: (a) insufficient personnel with adequate training and experience; (b) failure to adhere to the rules for testing seed; (c) deficiencies in equipment and supplies; (d) heavy work loads; and (e) influences outside the laboratory affecting personnel, salaries and laboratory policy.

Research aimed at finding specific lines of demarcation between normal and abnormal seedlings has been conducted on cereals. This work has resulted in a recommendation for the classification of so-called frosted seedlings of cereals. Seeds of suckling clover (Trifolium dubium) frequently imbibe water and swell up but fail to germinate. This offers a serious problem in seed testing as the seeds cannot be classified as either germinated or hard seed. A study of the effect of germination temperatures upon the swollen seeds of suckling clover has resulted in a practical method of testing. The procedure for conducting purity analyses on Sweet Sudan grass seed has been revised on the basis of experimental work conducted under this project. This work has shown the necessity of revising the procedure, provided a sound basis for its adoption in seed testing work, and clarified several points of interpretation.

Extensive research has been carried out at the Iowa State College to determine whether the so-called staining of seeds with tetrazolium dyes, has any practical use in evaluating the germination of seeds and to study the fundamental nature of action of this dye in living plant cells. The work has not confirmed claims made by European investigators that the method can be substituted for germination testing although the test is known to have value under certain special conditions. Difficulty has been experienced in getting the stain to penetrate bluegrass seed. Other work being conducted at the Iowa State College includes compilation of literature for use by seed technologists with respect to the effects of fungi and bacteria upon germination tests and a study aimed at differentiating between certain noxious-weed seeds. Papers have been prepared for publication, covering the different phases of work carried out under this project.

O. L. Justice

Report of Committee on Rules and Regulations

The Rules for Testing Seeds were revised at the annual meeting of the Association in 1949. They have subsequently been published in the Proceedings of the Association and a supply of reprints was obtained for distribution. During the past year the committee received a few suggestions for change in the rules. In addition, a few suggestions,

which were offered too late for inclusion in the 1949 revision, have been carried over for future consideration.

In developing the 1949 revision the committee has worked closely with representatives of the United States Department of Agriculture in an effort to make the rules of the Association and those of the Department of Agriculture uniform in all essential respects. Consequently, the two sets of rules will become effective July 1, 1950, and are alike or essentially so, in details.

The committee was requested to give consideration to clarification of the existing definitions of pure seed, other crop seed, and inert matter as they relate to insect-injured seed and possibly to recommend a rule change to this end. The committee is of the opinion that it is not in a position to recommend a change in the rules at this time but suggests that the committee on Standardized Tests include in its report a statement which will make it clear that all pieces of insect-damaged seed one-half or less the original size shall be classified as inert material. Included with inert matter shall be so-called shells of seeds consisting principally of the seed coat of which the contents have been eaten away even though there is no visible hole in the seed coat. The Rules Committee will assume the responsibility of preparing, or having prepared, a detailed procedure for classifying insect-damaged seed which will be published as a contribution to the Handbook or in the News Letter.

Owing to the amount of time required to completely revise the rules as well as cost of publication, and in order to make the rules more stable, the Committee is of the opinion that the rules should not be revised more often than approximately every five years. The Association may wish to adopt tentative rules in the meantime, especially for new crops so the proposed methods may be given a trial before incorporating them in the official rules. The committee recommends that each laboratory keep a record of suggested changes and additions to the rules so these will be readily available for future revision.

O. L. Justice
Chairman

Abstract of a Paper Entitled Variety Determinations of Sudan Grass Seed

Research on variety determinations of Sudan grass seed was conducted at the Federal Seed Laboratory, Beltsville, Maryland. The following conclusions were reached:

(a) Seeds with black glumes are Common Sudan or hybrids
(b) Seeds with red, chocolate, or mahogany do not definitely identify either variety and are considered interhybrids
(c) Seeds with sienna-colored glumes shall be regarded as Sweet Sudan
(d) Seeds with straw-colored glumes may be either Common or Sweet Sudan

It was found that sienna color can be a developmental stage in red, chocolate, reddish chocolate and black glumes.

Accurate Kodachromes, Munsell color chips and representative seeds are available for distribution as guides for testing Sweet Sudan for varietal purity.

Frieda L. Wertman and O. L. Justice

The Swollen-seed Problem in Suckling Clover, Trifolium dubium Sibth.

The average 14-day germination results obtained from 57 lots of suckling clover seed imported from New Zealand in March 1949 were 9 percent higher at 15° C. (91.35 percent) than at 20° (82 percent).

Thirty-three of the above lots of seed contained many swollen seed when tested at 20° C. These lots were tested at 11 different temperatures. The highest average germination result (about 92 percent) was obtained at (a) 15° C., (b) 10° for 5 days then 15° for the remaining 14 days, and (c) 10° and 20° alternating temperatures. The lowest average germination result of about 77 percent was obtained at (d) 20° (official method). Results intermediate between the 2 results just stated were obtained at the remaining temperatures (e) 10°, (f) 10° for 7 days then 15° for 7 days (g) 10° for 7 days then 20° for 7 days (h) 10° for 3 days then 15° for 11 days (i) 10° for 3 days then 20° for 11 days, (j) 10° for 5 days, then 20° for 9 days (k) 10° and 30° alternating temperatures.

The tests from the 33 lots of seed indicated that on the average the speed of germination in 7 days and the final germination result were as great at 15° C. as those obtained from any temperature used. Although the age of the seed was unknown it is presumed that the seed was freshly harvested. These tests confirm the change in rules for testing seeds under the Federal Seed Act and the Association of Official Seed Analysts to be effective July 1, 1950, which provide for the testing of dormant seed of suckling clover at 15°.

Alice M. Anderson

NEWS FROM ILLINOIS

On September 14, 1950, the Illinois Production and Marketing Committee released information to the county committees concerning the 1950 crop, hay and pasture seed price support program. This price support program will undoubtedly benefit many of our Illinois farmers.

An exceptionally large amount of hay and pasture seed has been harvested this year. The number of samples received by the Illinois laboratory on September 15 this year equalled the number received on December 1st last year, even though we have not received any samples from the PMA Committee for loan purposes to date.

We are anticipating a substantial increase due to the agreement with the PMA Commit-

tee for analyzing all samples drawn by their inspectors for loan purposes. We have been notified that these samples will begin to arrive within the next few days. This indicates a very busy season ahead.

H. H. Chamberlain
Springfield, Illinois

PROCEDURE FOR TESTING SUDAN GRASS SEED REVISED

In 1946 the Seed Act Division, Grain Branch, Production and Marketing Administration, United States Department of Agriculture, adopted a procedure for testing Sudan grass seed for varietal purity and it has been followed by seed analysts throughout the United States. Soon after adoption, however, it became apparent that the procedure had certain objectionable features.

During the period 1948-1950, work was conducted under the Research and Marketing Act of 1946 by the Seed Act Division to determine the nature of any required revision. As a result of this investigation the procedure has been revised considerably, and the revised procedure will be followed in the administration of the Federal Seed Act. It is likely that State and commercial analysts also will wish to follow this revised procedure as it is known that the original procedure has been generally accepted by seed analysts.

Copies of the revised procedure are being sent to seed testing laboratories, but it is possible that a few laboratories may not be included on the mailing list. Laboratories and individuals not receiving the procedure may obtain it from the Seed Act Division, Grain Branch, Production and Marketing Administration, United States Department of Agriculture, Washington 25, D. C. by asking for Instruction 959 (Federal Seed Act) -1.

As a part of the research project a color chart and color photographs were developed to assist analysts in classifying Sudan grass seed. The procedure mentioned gives complete instructions for ordering the color chart and photographs, and points out that authentic seed samples may be obtained from the Seed Act Division.

U.S.D.A., Seed Act Division
Beltsville, Maryland

DEBATABLE

I believe that extension education to farmers is highly desirable. The best method to achieve this end is somewhat debatable. My opinion is that education of the middleman, "the dealer", is the most practical and easiest approach. It is practical because there are fewer dealers to contact than farmers. The dealers handle the commodity as a part of their business; they sell the equipment for the purpose. The farmer in a small town knows the dealer and the dealer knows the farmer.

There are many ways to reach the farmer. Radio talks are good if they are heard but can you get the right spot for the purpose? Bulletins are fine if they reach the public, although they are expensive. To be able to use them you must know about them. Do those who should be benefited know the County Agricultural Agent or where to send for the bulletins desired? Will they do it? Why not place our information on seed with the small businessman who serves the public well? An educated dealer will serve his community with pride and satisfaction to this end.

I have suggested that the wholesale seed dealers group develop a central thought or display for the retailers, as publicity to the buyer, placing great emphasis on the quality of seed, the adapted varieties, reading of labels, using some nice cuts of fields and crops; this would be a good psychological approach. (The name might appear somewhere on the display. Each dealer should stay within his own territory to avoid duplication of services.) I have suggested closer association of the Seed Improvement Association and Extension Agronomists with dealer organizations.

Education is 99.99 percent of seed law administration. Get to the man who gets to the man you want to get.

C. N. McIntyre
Columbus, Ohio

ULTRAVIOLET LAMPS USED IN TESTING RYEGRASS FOR FLUORESCENCE

Results of a study of a comparison of several ultraviolet lamps were reported by the writer at the Corvallis meeting of the Association of Official Seed Analysts in 1949. 1/ It was pointed out that one type of lamp which was being used in many laboratories was found to be unsatisfactory as a source of ultraviolet illumination. During the past several months, members of the Federal seed laboratories have had an opportunity to visit many of the State laboratories and some commercial seed testing laboratories and have found that this unsatisfactory type of lamp is still being used. This fact has prompted the writer to prepare an abstract of the article referred to above so that analysts will be familiar with the lamps found to be outstanding and those found to be inferior.

The kind of ultraviolet lamp which a laboratory should install or have on hand will depend to a great extent on the number of samples to be tested. A good lamp permanently mounted in a dark room, closet, or chamber is desirable in a laboratory that tests a relatively large number of samples. On the other hand, if only a few samples are tested, a small portable unit will fulfill the requirements quite adequately. In either instance it is necessary to have access to a dark room, closet, or chamber. Some laboratories may not have sufficient space to allow permanent mounting of a lamp and in some instances this would hardly be justified on the basis of the number of samples tested.

The report made in 1949 covered several lamps but in the present summary reference

1/ Justice, O. L. A Comparison of Some Ultraviolet Lamps in Testing Ryegrass for Fluorescence, Assoc. Offic. Seed Anal. Proc. 1949:89-92. 1949

will be made only to the types of ultraviolet lamps used in the study. Only one factory-built unit in type I was used. This consisted of a transformer mounted on a metal box containing a mercury bulb, reflector and filter. The mercury bulb provides a good source of ultraviolet rays and the visible light is filtered out by a heat resistant filter giving a background color of reddish purple on white filter paper. This lamp can be suspended in the corner of a dark room or closet or it may be mounted in a dark chamber designed especially for this purpose.

Several units classified as type II were used. These were portable units consisting of light-weight frames with black, fluorescent mercury-filled tubes, and starting ballasts. Of the several samples falling within this type, one stood out as being superior in regard to activating the weak fluorescent lines and ease of manipulation. The plastic frame has a handle on top for holding and metal reflector below. It is approximately 7 inches long, 4 inches wide, 2 inches deep and contains 2 five-inch ultraviolet tubes. Extensive use of this lamp has indicated that it is quite adequate in testing for fluorescence and gives almost, but not quite, the intensity of illumination as the lamp described under type I.

Type III lamps consist of the so-called "black lights" which resemble an ordinary incandescent light bulb in shape. The bulb is made of black filter glass and the filament appears similar to that of an ordinary incandescent light bulb. Extensive use of a lamp representing this type, in comparison with others, showed that it did not produce sufficient illumination in the ultraviolet to activate the weak fluorescent lines. Unfortunately, many seed testing laboratories are still using this type of lamp.

Persons desiring additional information should read the original article which is cited in footnote 1. The names and addresses of firms handling ultraviolet lamps and units can be obtained by writing to the Seed Act Division, Grain Branch, Production and Marketing Administration, United States Department of Agriculture, Washington 25, D. C.

O. L. Justice
Beltsville, Maryland

PUBLICITY IDEAS FOR THE FALL MONTHS

1. Read the seed label. This may seem early to talk about this in the fall, but peddlers and agents are making the rounds from farm to farm even as early as August in our northern states. The seed label is the buyers protection because it is based on seed laboratory tests.

   What quality of seed does a farmer expect to find when he goes to buy seed? Some information on expected purity and germination of the common crops in your state might help the seed buyers. Refer to Proceedings of A.O.S.A. 1949, page 13, for accurate information on some common crops.

   What can the seed laboratory tell the farmer about the quality of seed being sold in the state? (If farmers knew what to expect as to purity, germination, and freedom from weed seeds, perhaps the service samples received from farmers might be of

better quality.) Seed laboratory record files and annual reports will have information of interest to farmers.

2. Help out the Seed Inspector. Seed inspection is a necessary part of seed law enforcement. Mention that the seller must have the tag on the sack and not in a desk drawer. This is for the protection of the dealer as well as the buyer. If the local dealer sold his community on buying only tested and labeled seed and buying on the basis of the label, then he would not lose so many sales to agents, peddlers and truckers.

3. Carry-over seed must be retested. There is considerable variation among state laws on the time limit on the date-of-test. Some states require retesting within 6 months, some within 12 months, with 9 months as the main time limit. Some states have no time limit. Out-dated seed is a problem for inspectors and seed dealers but we can suggest a good remedy.

4. Stress care in winter storage of seed. This means an occasional look at the seed, if in bins or sacks, to be sure that conditions have not changed. Temperature, moisture, insects and mold are items to check at this time of year. Some crops spoil during storage because of some condition which should have been noticed during harvest. Insects in grain at time of harvest or in the bin, too high a moisture content, or mechanical damage in elevators are conditions to look for. Now is the time to suggest remedies for next year.

Public Service Committee

THE RULES AND INTERPRETATIONS FOR TESTING SEEDS

During the last 2 years extensive laboratory studies have been made under Research and Marketing Act Project 355 in order to ascertain the factors causing variation in test results among official seed laboratories. It was found that failure to adhere to the rules and interpretations for testing seeds was of highly significant importance, ranking next to personnel as the chief cause of variation. It was surprising to find that not all analysts had copies of the rules for testing seeds readily accessible for use, that some analysts were unaware of important changes in procedure in the 1947 and in the 1950 revisions, and that local or unofficial methods were used extensively with little regard to the rules.

It is not the purpose of this discussion to criticize or go into the varied and complex reasons for this existing situation, but to point out to the analysts the existence of certain rules, regulations, and interpretations and the necessity that they be followed. Intelligent use of these established procedures predicates a familiarity of the analyst with pertinent literature relating to all phases of seed analysis, such an handbook material, seed plates, proceedings, and a background of scientific and practical training and experience enabling the analyst to properly interpret the printed instructions.

The basic information needed by all seed analysts is incorporated in the rules for testing seeds as adopted by the Association of Official Seed Analysts. The latest revision became effective on July 1, 1950. The rules which have been reprinted from the proceedings

of the Association of Official Seed Analysts represent a compilation of suggestions received from analysts throughout the United States. They contain essential information on the following procedures:

a. Sampling (such as general procedure, size of sample, and forwarding and receipt of official sample).

b. Analysis of the seed (details of obtaining the working samples, weights for working samples, and the detailed procedure in making the pure seed separations).

c. Examinations (noxious-weed seeds, identification and varietal determinations, origin, and the fluorescence test on ryegrass).

d. Germination tests (detailed procedures such as source of seed, number of seed for test, evaluating seedlings, and moisture and aeration). The explicit directions for moisture and aeration as applied to artificial substrata and soil or sand tests are interrupted by germination table 2 in the 1950 rules, making it necessary to refer to the bottom of page 33 and to the top of page 46 for the complete instructions.

e. Methods for germination (definite rules are outlined, including those concerning substrata, temperatures, first and final counts, remarks, and footnotes).

f. Tolerances (application, formulae, and detailed tolerance tables as applied to test results).

In addition to the above reprint, there is available a Contribution to the Handbook on Seed Testing, issued by the Association of Official Seed Analysts under the title "A Summary of Recommendations Made from Time to Time by the Standardized Test Committee" from 1940 to 1949. This was prepared by Dr. C. W. Leggatt of the Association. Every analyst should be familiar with this publication, since it contains valuable recommendations for everyday laboratory use which have not been included in the rules for seed testing. In it are interpretations on the handling of such analytical problems as blind disease fungus in ryegrass, detailed procedure to follow in making purity separations of Agrostis species, interpretation of normal and abnormal seedlings, disposition of moldy seeds, spacing of seeds, use of the slant towel method, light requirements, temperature control of germinators, and moisture requirements of substrata.

Familiarity of seed analysts with the entire contents of both of the foregoing publications is a "must" if laboratories are to test seeds uniformly, and it might help to overcome unintentional violations of many basic provisions of the rules for testing and the recommendations in the handbook.

In conducting germination tests the following deviations from the existing rules and procedures were found most frequently: the use of less than 400 seeds for test, lack of control of correct temperatures in the germinators, inadequate moisture, light and perhaps aeration on tests, inattention to the preliminary and final counts, inadequate (too crowded) spacing of seeds, lack of provision for sand or soil check tests, incorrect in-

terpretations of normal and abnormal seedlings, and treatment of seeds with fungicides prior to placing them for germination, with no check made on untreated seed. In the purity analyses, perhaps the most frequent deviations from the rules were the use of less than the amount of seed specified for purity, inattention to specific details on method and interpretation of separations as to pure, crop, inert and weed seeds, and the use of short-cut methods, such as used in testing orchard grass seed for purity.

Many of the local or unofficial methods in use may be worthy of incorporation into the rules and recommendations and it is urged that analysts cooperate by bringing these to the attention of the Committee on Rules and Regulations, as the existing procedures cannot be improved without the support of and data offered by all analysts. Meanwhile it cannot be emphasized too strongly that at the present time there is a need of attention and adherence to every detail of the present rules if laboratories are to achieve a high degree of uniformity in testing.

The two previously mentioned publications, necessary for effective seed analysis, are listed below according to name, source of supply, and the cost of the first one:

1. Rules for Testing Seeds adopted by the Association of Official Seed Analysts, 1949. Effective July 1, 1950.

   W. C. Pfaender
   Secretary-Treasurer, AOSA
   PMA, Grain Branch, Seed Act Division
   Beltsville, Md.- 25 cents

2. Summary of Recommendations Made from Time to Time by the Standardized Test Committee, 1940-1949. Contribution to the Handbook on Seed Testing, Association of Official Seed Analysts, 1949.

   W. H. Wright
   Chief, Laboratory Services
   Department of Agriculture
   Ottawa, Canada - Free

Vera C. Drake
Beltsville, Maryland

NEWS FROM CONNECTICUT

The past year has seen some innovations in our laboratory. We now have mechanical seed counters using a vacuum cleaner as a source of power. We use both ends of the vacuum cleaner in the seed work. The "sucking end" for the counter and the "blowing end" with blower and needle valve that has marked settings for different separations. The vacuum cleaner is the cartridge type on wheels and can be easily rolled around the laboratory to whichever piece of apparatus we want to use.

We have the usual sieve sets for purity work with one added feature that I have personally not seen anywhere else. That is, sets are mounted on an old microtome so that the sample is placed at the top layer and shaken up and down and separated mechanically, the small seed sifting to the bottom.

This year sees us with a new germinator which is still in the process of being refined. Actually, it is a refrigerator that has been converted with neon tubing installed for light. There is automatic temperature and light control, and it has proven very satisfactory for grass seed germination.

Frances W. Meyer
New Haven, Connecticut

THE JUNE MEETING

Taxes are going up, but we hope that you are still able to do a little saving for the meeting at Guelph in June. The Department of Public Relations, Ontario Agricultural College, plans to make your visit a pleasant one. Accommodation will be provided in the dormitories. Do not expect rugs on the floors, fancy china or private telephones. Meals will be served in Creelman Hall and the meetings held in Memorial Hall.

B. F. Forward
Toronto, Ontario

NOTES FROM THE TORONTO LABORATORY

A three-week course was held for seed buyers in June. A one-week course on weed seed identification was held for seed inspectors.

Due to excessive rain this fall, many samples of winter wheat sprouted in the stock. If these sprouts enlarged only to break the coat of the embryo, the vitality of the seed was not affected but if sprouts were $\frac{1}{4}$" to $\frac{1}{2}$" long, abnormal seedlings resulted.

Early receipts of timothy samples showed marked signs of dormancy. Samples prechilled at 10°C for 7 days rather than the customary 2 day prechilling period gave maximum response.

Revised copies of the Seeds Act 1937 have been received. Copies of the little booklet may be obtained by writing to Mr. A. Dumais, Plant Products Division, Canadian Department of Agriculture, Confederation Building, Ottawa.

The continuous pounding of the pile driver on Canada's first transportation subway development can be heard in the distance. Eight houses at the end of the block have been demolished preparatory to construction.

A tea was held on September 8 in honour of Mr. W. H. Wright, Chief, Laboratory Services, who was enroute to visit Western laboratories.

B. F. Forward received the degree of Doctor of Philosophy at the University of Toronto Convocation, June 9, 1950.

B. F. Forward
Toronto, Ontario

MICHIGAN NEWS

At this late date here in the Michigan State Seed Laboratory we still find ourselves struggling with several hundred official samples of field and grass seed which were collected in the Spring by the inspectors. We are fortunate, however, that all the official samples of vegetable seeds have been tested and our regular annual report covering that item should be before the public in a few weeks.

We are getting an increasing number of service samples representing new crop seed and the newest thing on our program at this time is just what are we going to do about the testing of the anticipated large volume of samples representing seed that the farmers will try to obtain the Federal loan under the price support program now being put into effect.

If the volume of seed from this project is as large as some of our production experts claim, not only this laboratory but many other laboratories will be casting about for additional analysts to get out the samples.

Every effort is being made here in this office to get the program behind us as rapidly as possible so that it will not interfere with the regular seed testing work that we always get after the first of the year.

Chas. A. Stahl
Lansing, Michigan

CLASSIFICATION OF INSECT-INFESTED SEEDS OF LEGUMES

Introduction

At its Washington meeting the Association instructed the Committee on Rules and Regulations to prepare a uniform procedure to be followed in the classification of insect-damaged legume seed. The Association adopted the following recommendation offered by the Committee on Standardized Tests: "Insect-infested and insect-damaged 'seeds' of legumes shall be classified as crop seeds if more than one-half or less the original content of a seed is present. So-called shells, consisting primarily of seed coats, are to be classified in accordance with this definition."

In an effort to comply with the instruction of the Association the following procedure which is based on the one followed in the Federal laboratories has been developed. An early draft of this procedure was sent to the following for review and suggestions: Officers of the Association, Members of the Committee on Rules and Regulations, Members of the Committee on Standardized Tests, Officers of the Society of Commercial Seed Technologists, and a few other workers. Suggestions of those commenting upon the procedure were carefully considered in the final revision.

Procedure

There appears to be no uniform procedure followed among seed testing laboratories in the United States for classification of insect-damaged seeds when making purity analyses. Greatest differences seem to exist in the classification of those seeds from which the insects have not emerged. The original draft of this article was prepared in 1949 in response to the numerous inquires addressed to the Federal seed laboratories regarding the proper classification of insect-infested seeds of alfalfa, red clover, white clover, vetches, field peas, and cowpeas.

The rules for testing seed followed in the United States provide that "pieces of seeds that are larger than one-half the original size whether broken, insect-damaged or diseased" shall be considered as pure seed and that pieces one-half or less the original size shall be regarded as inert matter. If the insect has emerged from the seed it may be comparatively easy to decide whether half of the seed has been removed, but if the insect is still in the seed with the seed coat intact the problem is somewhat different. Almost all kinds of seed are subject to attack by some pest and each seed, regardless of kind, must be considered with respect to its proportion of the original size whether it is a legume, crucifer, grass, cucurbit, or some other kind. Badly infested seed samples require much time for making purity separations. A method by which accurate and uniform results can be obtained in less time and with less effort would be a real contribution to seed testing.

The separation of insect-infested and insect-damaged seeds from noninfested seeds can often be facilitated by use of a seed blower. The blower should be set to remove the infested seeds and only the smaller and lighter of the noninfested seeds. The "blowings" must then be examined in accordance with the procedures outlined for each species as indicated below. In the procedures for testing individual kinds of seeds reference is made to pressing with forceps those "seeds" from which the contents, or a part of the contents, have been eaten from within leaving the seed coats intact over the resultant cavities. The amount of pressure necessary to break through the seed coats over these cavities is slight. It is somewhat comparable to the amount of pressure needed to force a pair of sharp pointed forceps through a sheet of bond paper. Caution must be exercised when testing samples representing "unclean, farmer-run seed lots" to avoid removing the immature seeds as inert matter. The analyst must also avoid removing seeds which show evidence that insect eggs have been deposited in them but which show no evidence that there has been further development of the eggs.

Detailed procedures for classifying insect-infested and insect-damaged seeds of some of the kinds of legumes are given below.

Chalcis-fly Infested Alfalfa and Red Clover Seed:

1. If the insect has made an opening in the seed coat, that "seed" is to be regarded as inert matter regardless of whether or not the insect is present. It is considered that at least one-half the original content of the seed has been destroyed if the insect has developed to a stage at which it was able to eat its way through the seed coat.

2. Seeds with the seed coats intact but with most of the contents destroyed by the insect can usually be distinguished from the non-infested seeds and should be removed as inert matter although the use of a hand lens is usually necessary to detect the infested seeds. Infested seeds are somewhat swollen, darker and duller in appearance than non-infested seeds. There is an oily appearance to the seed coats of infested seeds and dust particles often cling to them, while normal seeds remain bright and clean. Inexperienced analysts who cannot definitely determine the presence of chalcis-fly infested seeds by their appearance can check their work by pressing questionable seeds slightly with forceps or by rubbing them firmly between the fingers. Infested seeds will shatter readily if a slight pressure is applied. The analyst will gain confidence with experience so that he will need to resort to the "pressure method" only rarely.

White and Alsike Clover:

1. The infestation in these seeds is usually manifested by open holes. The determination of the relative amount of destruction can be made by careful visual examination, being sure that both faces of the seeds are examined for holes made by insects.

Vetches:

1. If the insect has made an opening in the seed coat the analyst can, by visual examination, determine whether the major or minor portion of the seed has been destroyed. This may require careful study of individual seeds including "feeling" with pointed forceps to determine the extent of the damage.

2. If the insect has made no opening in the seed coat, the infested seeds can usually be detected by their decayed and oily appearance and by the dust particles which often cling to them. It is necessary to use pressure to determine the relative extent of the destruction of each seed. The infested seeds with the major portion destroyed crumble easily when rolled between the thumb and forefinger. When broken at the points of infestation by pressing slightly with a pair of sharp pointed forceps the relative amount of destruction can be determined.

Peas, Beans, and Cowpeas:

1. These kinds of seeds present a somewhat different type of problem from the kinds mentioned above since often more than one insect has attacked a single seed. For those seeds in which the insects have broken the coats the analyst can see the holes and determine the relative extent of destruction by rotating the seeds.

2. If the insects have not broken through the coats the infested areas will look

as if they were decayed and oily, often having dust particles clinging to the spots, or the entire seed may have the decayed and oily appearance. As with the infested vetches the amount of infestation or destruction can be determined by rolling the seed between the thumb and forefinger or by piercing the coat with sharp-pointed forceps at each point of infestation, thus determining the relative amount of destruction at each point.

Harriet Cull and O. L. Justice
Beltsville, Maryland

NEWS FROM WISCONSIN

Wisconsin has had the coldest summer since 1915. (Perhaps Mother Nature is letting us know that we are not in the Corn Belt.) This weather has been hard on the corn crop. It is still doubtful by the middle of September if much of the seed corn will ripen before being frozen. Some places in the state have reported white frosts every month of this year.

The small grains did very well in the cool weather. Lodging reduced yields to some extent, but not seriously. Alfalfa and Red Clover seed crops will be small due to winter-killing and poor seed setting.

The State Seed Laboratory is receiving as many samples as usual for this time of year. More Reed Canary Grass samples are coming in because many farmers have harvested seed of this crop which was so high priced last spring. Many lots are low in germination because of spoilage during harvesting and storage. Reed Canary Grass seed seems to be a tricky crop to harvest.

The Wisconsin Seed Dealers Association held their summer meeting at the Ashland Experiment Station in northern Wisconsin on July 28. A fall meeting of the Association is being held in Madison on October 9.

Wisconsin will be host to the North Central States Seed Control Officials who will meet in Milwaukee, Wisconsin on October 2, 3, and 4 at the Hotel Wisconsin. The North Central States Weed Control Conference will meet in the same city on December 12, 13, and 14 at the Milwaukee Auditorium.

Dwight D. Forsyth
Madison, Wisconsin

NEWS NOTES FROM INDIANA

Mary Ellen Schmidt resigned from the Indiana Seed Laboratory and accepted a position with the J. Chas. McCullough Seed Company, Cincinnati, Ohio.

Rosemarie Veyl was appointed Assistant Seed Analyst September 5, 1950. Miss Veyl was born in Herrenberg, Germany. She worked for two years on a plant breeding farm at Domain Hohe-

buck where breeding work was done with wheat, flax and red clover. She attended Hohenheim Agricultural College for three years. One of her instructors at Hohenheim was Prof. Georg Lakon whom many of us met at the recent meetings of the International Seed Testing Association in Washington. Miss Veyl was brought to this country Sept. 1949 by relatives living in Michigan City, Indiana.

Work on the new wing of the Agricultural Chemistry building designed to house the new Indiana Seed Laboratory is at a standstill and has been for sometime. The delay is the result of a labor dispute last spring in which the common laborers struck just as the bricklaying was scheduled to start. Brick masons who had been hired could not work because there was no one to handle the bricks, mortar etc. Thus, even though the common laborers strike was quickly settled, the bricklayers found other jobs in nearby towns and no bricks have been laid to date. We are hopeful that walls and roof can be completed before winter.

Indiana has a bumper crop of clover and grass seeds and we are getting more service samples than usual for this season of the year.

A. S. Carter
Lafayette, Indiana

ERRATA IN RULES FOR TESTING

Two errors have been found in the listing of photographic negatives under the column "Remarks," page 39 or the Rules for Testing Seeds, Association of Official Seed Analysts. Photographic negative numbers now following Sudan grass (Nos. 2371, 2372, 2378) should refer to Soybean. Negative numbers now following Sunflower (Nos. 2449 through 2452) should refer to Sudan grass. There should be no photographs listed for Sunflower. Please make these corrections in your copies of the rules.

O. L. Justice, Chairman
Committee on Rules and
Regulations.

BIBLIOGRAPHER'S PAGE

Weed Seeds in Agricultural Seed is the title of Bulletin No. 316 of the New Zealand Department of Agriculture, Palmerston North, and written by E. O. C. Hyde, seed research officer. It contains 172 plates of weed seeds found in New Zealand seeds. Only a few of these are unfamiliar to American seed analysts; they are the ones which are found in white clover, brown top, and fescue seed from New Zealand. The illustrations are not too clear because of the quality of paper used. The bulletin probably came to every State College or Experiment Station.

The subepidermal fungi of cereal grains as investigated by M. B. Hyde, (Ann. Appl. Biol. 37.2, 179-186. 1950) is one of the chief causes of damage to stored wheat. Sample showed that a subepidermal mycelium occurred in normal wheat grains from almost all

the wheat-growing areas of the world. The amount of mycelium varied widely and there were indications that the degree of infection is dependent on the atmospheric humidity during the ripening of the grain.

Viability of bromegrass seed as affected by dehulling and by storage in fertilizer as investigated by G. H. Ahlgren et. al. (Agron. Jour. 42.7, 336-337, 1950).showed that a swing-hammer type mill does not appear to be practical for removing the hulls from bromegrass seed to facilitate seeding since cracking and fragmentation occurred and the germinability was severly reduced. When the seed was mixed with mixed fertilizer as a carrier the germination was decreased; however, the 18% superphosphate did not have any measurable effect. It seemed safe to mix such seed with fertilizer in advance of planting and to store the mixture for short periods if necessary.

Difference in the rate of germination of seeds in the same spike of wheat is the subject of an article by H. Devaux entitled "La diversite des durees de germination des graines d'un meme epi de Ble." Compt. Rend. Acad. Sci. (Paris) 228: 145-147. 1949. He found that the endosperm of wheat undergoes rapid destruction in rapidly germinating kernels but that it remains nearly unaffected in slowly germinating kernels. He suggested that the speed of germination is determined by the ease with which the gluten layer is broken down.

A comparison of the performance of seeds from rust infected wheat plants with that of seeds from healthy plants was made by R. S. Vasudena and K. M. Dutt. Seeds from the affected plants were much lighter in weight than those from the healthy plants and their germination was from 9 to 50 percent lower. Plants produced by the rust affected seeds, however, performed about as well in the field as plants produced by healthy seeds. These results were reported in an article entitled, "Some observations on the performance of seed from rust-infected wheat plants," Indiana Farming 10 (1): 16-18. 1949.

The pelleting of vegetable seeds with an inert powder cemented on by methycel retards germination on most kinds and has a variable effect on the total percentage germination. Including superphosphate or some fungicide, on the other hand, often increases field germination. This is particularly true in the case of sweetcorn, tomato, cucumber, and muskmelon according to R. L. Carolus in an article in the Proc. Ann. Meet. Ohio Veg. and Potato Growers Assoc. 34: 56-62. 1949 entitled "Possibilities with the use of pelleted seeds."

Seeds of Vaccaria pyramidata and certain other species can be made to germinate at 20°C in the presence of soil or active carbon whereas on moist blotters, they will germinate only at 15°C. It is suggested that the soil and carbon adsorb materials which otherwise inhibit germination. Borris, Heinrich. "Uber die inneren Vorgange bei der Samenkeimung und ihre Beeinflussing durch Aussenfaktoren." (The influences of environmental factors on the internal processes of germination) Jahr. Wiss. Bot. 89: 254-339. 1941.

Germination of seeds of several varieties of lettuce was studied by N. Koleff. At 20° to 22°C in the dark none of the varieties had a rest period. Above 25°C, varieties differed considerably in their ability to germinate. Some varieties were actually re-

tarded rather than stimulated in their germination by exposure to light. In continuous light many irregularities occurred. These results are reported in the article "Untersuchungen uber die Keimruhe bei Salatsamen I." (Investigations of seed dormancy in lettuce) Gartenbauwiss. 17: 263-272. 1942.

Germination of seeds of 114 different species of weeds was studied in Japan by Montaro Kondo and Yasua Kasahara. Seeds of most of the species germinated best under diffused light with temperatures alternating between 25°C. and 15°-20°C. for 5-10 days. Some seeds which did not germinate well on filter paper germinated easily on river sand. This paper (Studies on the germination of weed seeds) is printed in Japanese in the Rept. Agric. Inst. (Japan) 52: 357-408. 1941.

Hard-seededness in lupine, according to K. Zimmerman, is caused by the precipitation of seed colloids which makes the seed coat impermeable. Drying lupine seeds for 16 days at 35°C greatly increased the percentage of hard seeds. Some of these hard seeds required 450 days to swell in the presence of water. "Einige Versuche zum Problem der Hartshaligkeit bei Lupinus angustifolius." (Experiments with hard-seededness in Lupinus angustifolius) Zuchter 14: 182-185. 1942.

Experiments with pellet reseeding by airplane on Indian reservations indicate that this type of seeding is not successful. Pelleting lowered the viability of the seed from 81% to 15% and the use of dry lime sulfur was not effective in preventing rodent distruction of the seeds. Broadcasting of loose seed from an airplane gave good results - under certain conditions. "Airplane pellet reseeding." Nation. Wool Grower 39 (10): 21. 1949.

Methods of determining the viability of seeds with tellurites, methylene blue, and catalase activity and by the presence of soluble sugars were studied by L. Toniolo. Of these methods, the use of tellurites was considered to be the most reliable. "Limpiego dei telluriti nella determinaxione precoce della vitalita dei semi." (The use of tellurites in the rapid determination of the vitality of seeds.) Ricerca Sci.e Ricostruzione 19 (10): 1173-1177. 1949.

If blackberry seeds are treated with concentrated sulfuric acid previous to stratification, germination of the seeds during the first year in the seed beds will be considerably improved according to C. E. Heit and G. L. Slate. In their experiments, seeds treated for one hour, sown in flats during August, and placed in a cold frame until the following March produced 39-48% seedlings, whereas untreated seeds produced only 1-4%. "Treatment of Blackberry seed to secure first year germination." Proc. Amer. Soc. Hort. Sci. 55: 297-301. 1950.

Work of E. S. Haber has shown that seed of sweet corn inbreds and hybrids differs considerably in its ability to maintain viability over a period of years in common storage. Some inbreds and hybrids showed considerably reduced viability after three years in storage whereas others maintained their viability quite well for as long as 5 years. Crosses among strains indicated that the ability to maintain viability is a dominant genetic factor. "Longevity of the seed of sweet corn inbreds and hybrids." Proc. Amer. Soc. Hort. Sci. 55: 410-412. 1950.

If the moisture content of parsnip seed is reduced to 4% or less, the seeds can be kept without loss of germination capacity or seedling vigor for as long as 6 years at temperatures of 20 or 40°F according to James H. Beattie and Everett C. Tatman in an article entitled "Long-Term Storage of Parsnip Seed." Proc. Amer. Soc. Hort. Sci. 55: 435-437. 1950.

The annual report from the New Mexico seed laboratory even though in mimeograph form presents much useful information. One page in particular presents the seed law on a label in such a manner as to fully inform any seller of seeds. Some seed standards, size of sample required and fees for testing are stated, and finally a record or rating of seedsmen are given.

M. T. Munn
Geneva, N. Y.

NEWS FROM WASHINGTON LABORATORY

We are again carrying on germination testing of various species of Agropyron, a project which was begun last summer. The source of our seed is kept fairly constant by using only seed from the Soil Conservation Nursery here in Pullman.

New equipment in the laboratory is our South Dakota Seed Blower with which we are very pleased.

Last semester of the school year we graduated 6 students in elementary seed testing, one of whom placed 4th in the Crop Judging Contest sponsered by the Crop Improvement Association.

Recently we enjoyed a visit with Mr. R. Z. Kahn from Pakistan who is touring the various Agricultural experiment stations throughout the country, and who is sponsored by the United Nations. At present we have Dr. Tayse and Dr. Tosum visiting from the University of Ankara. These gentlemen are also on an extensive tour of the United States.

From the look of the fields here in the Palouse farming area we should soon be into our annual rush of wheat and pea testing.

Outside of the laboratory as we look across the street we can see the new Holland Library which has been completed ready for occupation in September. Just next to this impressive looking structure the bulldozers are working day and night excavating in preparation for the new Student Union Building.

Washington State College Seed
Laboratory, Pullman, Washington

FROM PENNSYLVANIA

The Pennsylvania laboratory has been quite busy since Mr. Abbott left us in August for Seaboard Seed Company in Philadelphia. He has taken over the job as seed analyst.

The bulk of our work has been with wheat and barley under our state certification program. The number of samples has been just about doubled over last year, and this will also be true of oats, soybeans and corn this year.

Barley and wheat samples came in at the same time because of a wet period before the barley was cut. Thus, with this and one analyst leaving, we have been behind. Also, the number of timothy samples for purity and germination tests has been more than doubled over last year.

Wendell P. Ditmer
Harrisburg, Pennsylvania

SOME NOTES ON WOODY-PLANT SEEDS

After the first gasp of awe at the magnificence of the slick paper in Forest Service's Woody-Plant Seed Manual (USDA Misc. Pub. No. 654, 1948), I wanted to compare the results of the germination tests given therein with the few tests of woody-plant species made in the New Mexico seed laboratory.

Before getting down to species, however, I learned that the results could not be exactly compared since the Forest Service had used its own modification of the stronger method in selecting seeds for the tests. Not, of course, that the authors did anything so recondite as to call a method by a name used by other seed analysts. When they mention that at the Lake States Station "a temperature range comparable to that of the summer months--a daily alternation of from 68° to 86°F (20° to 30°C)-- has given good results," one feels that the reader should admire the originality of the idea. When they say that "artificial media" are commonly used by European seed testing agencies but are less common in this country, readers who don't skip around as I do probably can accept the fact that "this country" comprises the experiment stations contributing to the volume.

After I skipped back to the "Acknowledgement" some of my sarcasm lost its edge, for the book was ready for publication in 1941; and it is true that before that date there were very few publications by analysts referring directly to woody-plant seeds, which no doubt made it easy for the authors to overlook the Proceedings and so on when making out their bibliography on more general aspects of seed analysis.

Here are some New Mexico comparisons and addenda. All sour grapes aside, since these are species on which few tests have been reported, it is thought that perhaps even a little additional information may be of interest. Perhaps other analysts will be willing to share their knowledge of infrequently tested seeds.

In most cases, several temperatures were tried, though the tests were not exhaustive, and the method giving the highest results is reported for the New Mexico laboratory. The results from the Forest Service manual are those given under the heading "Germination" for the respective species.

Species	Number Samples	Method	% Germination Average	Range
Atriplex canescens (Chamisa)				
Forest Service	12	50-77°F, sand	18	4-47
New Mexico	10	20°C, blotters	27	6-74
Note: The samples we tested looked like *A. canescens*, not like *A. semibaccata* (usually herbaceous) illustrated in the text.				
A. confertifolia (Shadscale)				
New Mexico	1	15°C, petri dish	48	
Cercocarpus breviflorus (Mountain Mahogany)				
New Mexico	1	20-30°C, blotters	15	
Cercocarpus spp. (3 others)				
Forest Service	9	" , sand	62	1-89
Eurotia lanata (Winterfat)				
Forest Service	29	50-77°F, sand	58	5-99
New Mexico	5	20°C, blotters	97	95-99
Garrya Fremonti (Silktassel)				
Forest Service	1	stratify 6 months	88	
G. wrighti				
New Mexico	1	several methods, including prechill 2 wks.	0	
Larrea divaricata (Creosotebush)				
New Mexico	3	20°, blotters	28	0-48
Note: The sample with 0 germination was gathered two weeks earlier than the others. This is a southwestern shrub full of chemicals--you'll probably be hearing about it some day.				
Mendora laevis (Menodora)				
New Mexico	1	20-30°C, blotters, prechill 2 wks.	3	
M. scabra				
Forest Service	2	not stated	84	70-99
M. scoparia				
New Mexico	1	as for *M. laevis*	11	
Pinus halepensis				
Forest Service	43	68-71°F	73	61-92
New Mexico	1	20° C (among others)	0	
Note: That time I really needed this book to prove that I hadn't simply ruined the seeds. Published results on any kind of seeds may be valuable in such emergencies.				
Prosopis juliflora (Mesquite)				
Forest Service	11	scarify with acid or hot water; 68-86°F, sand	89	86-90

Species	Number Samples	Method	% Germination Average	% Germination Range
New Mexico	3	scarify by cutting; 20-30°C, blotters	86	78-96
Purshia tridentata (Antelope bitterbush)				
Forest Service	1	stratify 2-3 months,	69	
New Mexico	3	prechill 2 weeks, then 20-30°C, blotters	33	2-78
Simmondsia chinensis (Jojoba)				
Forest Service	6	?	90	60-100
New Mexico	1	20-30°C, Kimpak	94	

Elizabeth McSwain
State College, New Mexico

ONE WAY TO SOLVE THE PROBLEM

From a good source there came the suggestion that there is a place in the News Letter for a question and answer page. As a trial this page has been prepared from the various laboratory files. If you feel that the idea is worth a cent to you then drop a postcard to the chairman of the editorial committee, or better still for the next issue, send your question, and also the answer if it has been solved. If there are no replies, then the page will be omitted.

What is the first thing you do with a bent grass seed sample? When it is opened and mixed, observations are made as to its general color, whether light straw color or over toward the amber color of much redtop. Then, when the purity analysis separations are finished, the purified portion is critically viewed under the proper binocular magnification always using the same degree of lighting and from the same direction since one soon becomes familiar with the characteristic color and sheen of the various varieties of bent grass seed when seen in bulk. To use different degrees of light is often confusing and brings doubt. At the same time or during this viewing of the pure seed, one can easily look for seeds of other strains or varieties, not simply among 400 seeds but among thousands and if not seen then there is no real point in subsequently examining 400 seeds.

Do you always treat every lot of large seeds when starting the germination test? No, not every lot because many are bright in color and probably will not need the aid of a protectant under the artificial germination test conditions. When a lot of seed has a dull color, or appears soiled and dirty we always use a seed disinfestant such as one of the dips made up of Ceresan, etc., or a dust such as Arasan or Spergon. A parallel test of the untreated seed usually reveals the condition of the seed. It most certainly is unfair to seedstocks to crowd them into the artificial and often too unfavorable conditions in some germinators and expect a normal response as would be expected in soil where the attendant conditions were favorable for seed but unfavorable for the fungus involved.

When the free-test provisions were cancelled in your state did you experience any objection on the part of farmer senders? Ans. We were very agreeably surprised to find that there was but little if any real opposition to the charging of a reasonable fee to cover cost of the work done. Also, we have very good reason to believe that the system of service testing has done much to eliminate most of the over-the-fence trading or loose seed bartering since it brings consideration of the analysis and test as a value indicating service. It most certainly eliminated the practice some growers have of sending in a sample from every bag in a lot. Previously sample senders thought of a free test as a cheap something to be given away as a sort of favor or advertising venture.

M. T. Munn
Geneva, New York

FOUR YEARS OF WORK AND TRAVEL IN SOUTH AMERICA

At the request of my friend and former associate in Seed Technology, Dr. Duane Isely, I have prepared a short article dealing with my work in South America the past four years.

In June of 1946 I left Iowa State College for Paraguay where I spent 13 months as agriculturalist for the Food Supply Division of the Institute of Inter-American Affairs. In that capacity I served as director of the "Institute Agronomico Nacional" where the research program was reorganized and a seed production, storage and testing program was initiated. Those field crops which produce seed well in that climate were multiplied by the "Institute" using superior and adapted varieties. When I arrived in Paraguay, seed was being sold without testing the viability and in a number of cases the viability was almost zero.

Certain varieties of vegetable crops were found to produce seed well in that climate, whereas other types such as cabbage, cauliflower, broccoli, carrots and beets did not seed and maintain themselves. A program was initiated for the annual introduction of seed of adapted varieties where necessary, and for the multiplication in Paraguay of those types which could be maintained locally. Among the latter are cucumber, cantaloupe, watermelon, egg plant, pepper and sweet corn. Prior to 1946, sweet corn was not grown in Paraguay, in fact no South American country except Chile and Argentina has ever used sweet corn. Tests with a tropical sweet corn (U.S. 34) developed in Puerto Rico showed it to be well adapted and a multiplication program was undertaken.

Field crops that were multiplied at the "Institute" included field corn, sorghum, rye, beans, peanuts, peas and lupines (for winter green manure).

A seed laboratory and storage building was designed for cleaning, grading, testing, fumigating and storing seeds. Construction of the building was initiated last year and it is probably in use now. For the first time in Paraguayan history a seed laboratory was established in Asuncion and all seed produced or imported is tested and labeled before sale. This marks an important step forward in Paraguayan agriculture. The entire program of research, seed production and seed distribution is being continued, largely under the direction of Paraguayans who worked with me.

In August of 1947, I returned to the United States for one month, then went to Brazil as Agriculturalist for the International Basic Economy Corporation and the American International Association. Both organizations were founded by Nelson Rockerfeller.

My work in Brazil consisted of experimental testing of varieties of vegetables, winter and summer legumes, wheat, oats, rye, barley, potatoes and grasses. The purpose was to determine what varieties should be used for seed multiplication and where each could best be grown. I was able to initiate a program for the multiplication of potatoes, certain crucifers, some winter legumes such as field peas and vetches and most interesting of all, two varieties of oats were introduced which are highly resistant to crown rust. This makes it possible to grow oats for feed and for the manufacture of oat meal in Brazil.

For over 2 years, I worked intensively with hybrid corn using North American lines and hybrids as well as Brazilian. Several North American hybrids from the southern part of the United States showed good adaptation in Rio Grande do Sul (the southernmost state of Brazil) and one Brazilian hybrid also is well adapted. In April and May of 1950 we produced in Rio Grande do Sul about 120 metric tons (4800 bushels) of hybrid seed corn for distribution in that area. Brazil needs more corn and at present its total annual production is about 1/3 that of the state of Iowa. The development and use of hybrid seed corn will help to increase corn production in Brazil.

In December of 1949, I returned to the United States for a short vacation. Then went back to Brazil to supervise the harvesting of hybrid seed corn and of the experimental plantings. On the return trip to Brazil I spent a short time in Mexico, Guatemala, Venezuela and Trinidad. In 1946, I was able to visit some experiment stations in Uruguay and Argentina.

In early June of this year, I returned to the United States via Peru, Equador, Panama and Cuba. Mrs. Porter's health was not satisfactory in South America and after spending a total of 16 months there as a bachelor I decided to return permanently to the United States. I am now located at the Colorado A. & M College in the Department of Botany where I am teaching Botany and doing some research in the field of plant pathology. I extend greetings to my seed technological friends and shall be glad to have any of you stop at Botany Hall in case you pass through Fort Collins.

Those of you who knew our children may be interested to know that Harriet and Dorothy are married and Dorothy has a daughter 4½ years old. Harriet sang with James Melton in Des Moines in April on "The Harvest of Stars" program. Phyllis graduated this summer in music with a voice major and has started teaching vocal music in an Iowa High School. Lois and Eugene are with us here in Colorado. Lois is a senior and Eugene a sophomore in high school.

R. H. Porter
Fort Collins, Colorado

NEWS FROM IOWA STATE COLLEGE SEED LABORATORY

Leroy Everson passed the cigars and candy bars recently. Reason: he had survived the ordeal of his final examination-thus completing the long grind necessary to obtain his Ph.D. degree. Congratulations "Doc."

We have added two new graduate students to our staff this fall. Mr. James C. Delouche of Cloutierville, Louisiana graduated from South-western Louisiana Institute, LaFayette, Louisiana in August. This is his first experience in seed technology.

Mr. Dale Kern of Toledo, Ohio, graduated from Toledo University, Toledo, Ohio in February and has spent about six months working with Fred Emmet at National Seed Testing Laboratory in Toledo, Ohio.

We have three boys in the laboratory taking training to become seed analysts. They will complete their training in about a year.

The laboratory has a new coat of paint and new fluorescent lights throughout. Our analysts all have new steelcase metal office chairs, which the girls like very much. Each analyst also has a Dazor floating fluorescent desk lamp. Other major new equipment includes an Erickson portable seed counter and a Gamet divider. The Gamet divider saves considerable time in dividing bromegrass and other large seeded grasses. A new sand bin, scales, offices, and dictaphone-transcriber have also been added.

The course in weed and weed seed identification taught by Dr. Isely, and other members of the Seed Laboratory staff has an enrollment of over 100 this year, largest of any year so far.

Instate testing in Iowa may show a decided increase this year because of unfavorable harvesting conditions and possible P.M.A. agreements. Rain during small grain harvesting may have caused heating and lower germination. Early local frosts when soybeans were still immature may cause lower germinating beans to be used for seed next spring. Thus, testing, to determine viability will be very important this year.

Louis N. Bass
Ames, Iowa

NORTH-CENTRAL STATES CONTROL OFFICIALS MEET

As announced in the last issue of the News Letter, the Control Officials of the North-Central States held a three day conference at Milwaukee. Representatives of all states except Maine were present. The first day of the meeting was exclusively for Control Officials. Reports of various committees were heard and various subjects such as administrative procedure of seed law enforcement, farmer exemptions, uniform noxious weed labeling and applicable tolerances were discussed. The second day was a joint meeting with representatives of the State Seed Associations of the respective states, who discussed their various problems concerning many of the same topics discussed by officials.

The seedsmen were host to a superb dinner at the Wisconsin Athletic Club. The last day was devoted to subjects under consideration and to the business routine.

Mr. C. N. McIntyre was elected president with Mr. Irvin Hagen of North Dakota and Mr. R. G. Colburn of Nebraska as Vice President and Secretary respectively. The association accepted the invitation of Mr. Clyde Spry of Iowa to meet in Des Moines in 1951.

C. N. McIntyre
Columbus, Ohio

DORMANCY IN REDTOP

Prechilling does not completely break the dormancy of some lots of the 1950 crop of redtop. This fact was observed by retesting some low germinating samples, the seeds of which looked good at the end of the original test. The retests were made using 0.2% KNO_3 as moistening agent and resulted in an increased germination of as much as 18%.

When it was found that 0.2% KNO_3 gave an increased germination for these few samples, it was decided to run several tests (planted at the same time) for comparison of methods. To date of writing this note, 22 redtop samples have been tested by the regular, prechill and 0.2% KNO_3 methods with the following average germinations: regular 75.9, prechill 79.3, and 0.2% KNO_3 84.3.

Statistics do not appear necessary to show that the use of 0.2% KNO_3 is beneficial in obtaining maximum germination of redtop this year. Included in the above group of samples is one which germinated 4% lower with 0.2% KNO_3 than by the prechill method and the one that germinated 20% higher with 0.2% KNO_3 than by the prechill method.

Perhaps the use of 0.2 KNO_3 for redtop should be included in the rules as it is for timothy. As the rules now stand, higher results obtained by use of 0.2% KNO_3 are not official.

Louis N. Bass
Ames, Iowa

THIS AND THAT

The County Noxious Weed Control Board used the following idea at the 1949 Idaho State Fair. Large numbered, mounted specimens of Idaho's noxious weeds were arranged around the walls of the exhibit booth. This was handled along the lines of a quiz program, small prizes being awarded to those who correctly identified the weeds.

Eleanor Lee Ball

Dr. Elliott of our Agronomy Department is undertaking a cytological project on Anthoxanthum odoratum and A. aristatum. We are quite anxious to obtain some viable seed of both of these species, neither of which occurs in this area. Mary Haferkamp

A new book now being published is "North Dakota Plants" by Dr. O. A. Stevens. It contains twenty-eight photos, seventy drawings and two-hundred sketches and will appear early in September. I am sure it will be a valuable addition to the library of our seed laboratories as authoritative on flora of this region.

The price of the book will depend on the number of books printed, but will be approximately $5.00.

Edith C. Higgins,
Fargo, North Dakota

A thirty-three page mimeographed "Official Report on the United States Delegation" of the 9th Congress, International Seed Testing Association has recently come across the editors desk. Report of the Association of Official Seed Analysts delegation has already been published in the June News Letter. The U. S. report is considerably the more detailed of the two and contains abstracts of papers presented as well as a report on the agenda for the general assembly. The editor has no information as to the distribution of this document, but presumes it has been sent to official laboratories. If there are those who do not have copies, it is possible that information concerning their availability can be obtained from Mr. W. A. Davidson who was alternate U. S. delegate. Ed.