Proceedings

SEVENTH ANNUAL MEETING

of the

SOUTHERN WELDING CONFERENCE

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PREFACE

These Proceedings of the Seventh Annual Meeting of the Southern Weed Conference held January 11, 12, 13, 1954, in Memphis, Tennessee, include the formal papers, report of the Research Committee, minutes of the business meeting, and the lists of registrants and exhibitors.

Additional copies of these Proceedings are available at $2.00 per copy from the Conference Secretary, E. G. Rodgers, Floyd Hall, University of Florida, Gainesville, Florida. Copies of Proceedings of Conference meetings for the years 1950, 1952, and 1953 also are available at $2.00 por copy from the Secretary.

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W's of the Southern Weed Conference

W. B. Ennis, Jr. /1

My remarks will be centered primarily around three main questions relating to our Southern Weed Conference. The questions are (1) Where have we been? (2) Where are we now? and (3) Where are we going?

Why was our conference established? All of you associated with the Southern Weed Conference are keenly aware of the valuable contribution it is making each year to our storehouse of information on control of weeds. I doubt that anyone engaged in weed control research or anyone having a general interest in weed problems would question for one moment the desirability of a conference organized to hasten the day when our Southern farmers will have available to them materials, devices or techniques for controlling weeds more efficiently and economically than is possible by most present day practices. Our conference was organized in 1948 with such an ultimate goal in mind. More specifically, the Preamble to the Conference Constitution states that "The Conference is established to bring together representatives of the Southern States of the U. S., Puerto Rico, and other states and areas, and agencies, institutions and persons who are directly interested or engaged in weed control through research, education, regulation, manufacturing or merchandizing. The purpose is to exchange ideas, experiences, opinions and information, and discuss and plan means of securing more adequate weed control through more and better correlated and coordinated effort on weed research and control by Federal, State and local public or private agencies."

What has been the overall representation at our Conferences? Beginning with the organizational conference in Stoneville, Mississippi, in 1948, the total attendance at our Conference has been gradually increasing (Table 1). In 1948, a total of 73 persons was registered and our registration this year totals 303. An analysis of the registration list shows the number of persons representing state and Federal agencies decreased in 1950 and 1951 but is now on the upswing. On the other hand, the registration of industry people and other private groups has increased consistently each year. The increasing attendance by private agencies is a healthy sign because it signifies in part that manufacturers are interested in developing or improving herbicides, weed control devices, and other methods for controlling weeds. In addition, it shows that industry believes there is an adequate market for herbicides to justify considerable investments in research, production facilities, development and sales, or that such markets will soon be realized. The public agency representation at our Conference has been made up largely of persons engaged in research. Two large public agency groups concerned with weed control either through education or regulation have failed in the past to manifest sufficient interest in our

/1 Head, Department of Plant Pathology and Physiology, Mississippi Agricultural Experiment Station, State College, Mississippi

Conference to attend in proper numbers. A breakdown of the 1954 public agency registrants shows an improvement in the attendance of educational leaders. Public agencies were represented in 1954 as follows: research, 56; education 18; SCS, TVA, etc., 13.

Table 1. Number Persons Registering at Southern Weed Conferences

Year	Public Agencies	Private Agencies	Total
1948	56	17	73
1949	54	62	116
1950	42	64	106
1951	39	93	132
1952	42	144	186
1953	46	150	196
1954	87	216	303

What has been the representation of the various states? If we assume that attendance of public agency personnel at our Southern Weed Conference is a criterion of the respective states' interest in weed control, then I fear some of our Southern states either do not have weed problems or have failed to promote adequate effort in solving the problems they do have (Table 2). It would be unfair not to point out that weed workers in Kentucky and Oklahoma have affiliated with the NCWCC because they have weed problems common to the Northcentral area but a more probable explanation is that they developed ties with the NCWCC before the Southern Weed Conference was organized. We hope that weed workers in these states will see their way clear to become an integral part of our Conference.

Virtually every farmer has problems with weeds irrespective of the primary enterprise on his farm and undoubtedly more agricultural leaders engaged in education and regulation should attend our Conferences with a view to obtaining background information which should make their efforts more effective in aiding farmers in their battle against weeds.

We have considered the representatives that have constituted our Conferences. Now let us review what they have done.

Table 2. Representation at Southern Weed Conferences. Figures refer to number persons registering by states. Representatives of private agencies are in parentheses.

State	Year						Total
	1948	1949	1950	1951	1952	1953	
Alabama	1(2)	1(6)	2(5)	2(3)	1(9)	4(4)	11(29)
Arkansas	5(5)	1(2)	1(5)	2(9)	2(8)	2(5)	13(34)
Florida	0(0)	0(0)	2(2)	0(2)	4(6)	3(12)	9(22)
Georgia	6(0)	5(1)	2(0)	3(2)	7(20)	3(4)	26(27)
Kentucky	0(0)	0(1)	0(0)	0(0)	0(0)	0(0)	0(1)
Louisiana	7(1)	21(17)	10(9)	11(8)	8(8)	13(24)	70(67)
Mississippi	11(3)	9(2)	7(1)	3(2)	4(5)	8(9)	42(22)
North Carolina	3(0)	2(0)	0(0)	2(0)	1(12)	3(3)	11(15)
Oklahoma	2(0)	0(1)	1(1)	1(1)	0(1)	0(2)	4(6)
Puerto Rico	1(0)	2(0)	1(0)	1(0)	2(0)	0(0)	7(0)
South Carolina	2(0)	8(0)	3(0)	2(0)	3(5)	3(3)	21(8)
Tennessee	2(1)	3(3)	8(6)	5(8)	3(10)	3(7)	24(35)
Texas	9(2)	2(5)	1(4)	4(9)	3(7)	4(14)	23(41)
Virginia	4(0)	2(0)	1(0)	3(0)	3(5)	1(3)	14(8)
Others	3(3)	2(20)	5(29)	7(42)	4(45)	5(53)	26(192)

What herbicides have been dealt with at our Conferences? In 1948, eleven different herbicides /1 were dealt with in the Proceedings of the Conference. Of these primary attention was focused on 2,4-D (Table 3). The number of materials investigated and reported on at our Conference has increased steadily. For example, in 1953, 42 different materials were investigated and mentioned in our Proceedings. Judging from the frequency the materials were mentioned in different studies or research reports of the Conference the following herbicides have been investigated most intensively: 2,4-D, Dinitros, TCA, Oils, CMU, PCP, Chloro IPC, and 2,4,5-T. Of these no reports were made on CMU and Chloro IPC prior to 1952. It is significant that virtually all of these have found some agricultural use in our region (Table 3). Also, of interest is that considerable attention was given to newer materials in the 1953 Proceedings and some older herbicides such as MCP were studied more intensively. Perhaps the increased research studies on new herbicides (cf. miscellaneous, Table 3) reflects the stepped-up search by both research workers and industry for more effective materials possessing advantages in selectivity and economics over some of our present herbicides.

/1 Certain closely related materials are placed under a single general name for simplicity purposes.

Table 3. Herbicides studied by workers of Southern Weed Conference. Figures represent number times herbicides used in connection with a given study or research report as recorded in Proceedings of Conference.

Herbicide	Year						Total
	1948	1949	1950	1951	1952	1953	
2,4-D	13	31	15	21	25	27	132
Dinitros	8	7	7	17	20	32	91
Oils	4	4	8	14	19	20	69
TCA	4	8	9	10	10	10	51
CMU	0	0	0	0	13	32	45
PCP	4	9	4	7	12	9	45
Chloro IPC	0	0	0	0	12	25	37
2,4,5-T	1	2	6	6	11	9	35
2,4-D ethyl sulfate	0	0	0	4	8	15	27
Phthalamic acids	0	0	0	0	1	18	19
Dichloral Urea	0	0	2	2	1	10	15
Sodium Chlorate	1	2	3	2	2	4	14
IPC	4	2	2	1	2	2	13
MCP	0	0	0	0	1	12	13
Endothal	0	0	2	3	2	5	12
Maleic Hydrazide	0	0	0	8	3	1	12
Ca Cyanamid	0	3	1	2	3	2	11
Ammate	0	3	0	2	2	2	9
Potassium Cyanate	0	0	2	0	5	2	9
Sodium Arsenite	1	2	0	0	2	1	6
Phenyl mecuric acetate	0	0	0	0	4	1	5
Methyl Bromide	0	1	1	0	0	1	3
Miscellaneous	2	0	4	3	13	32	54

What types of problems have been reported on at our Conferences?

Some weed control studies have been made on all the major agronomic crops of the Southern Region (Table 4). It is no surprise that weeds in cotton have been the subject of most weed investigations in the Southern Region and as a result several states have developed recommendations for the limited use of herbicides in this crop. Weeds in the other important agronomic crops including soybean, corn and tobacco have received too little attention.

Table 4. Number papers presented at Southern Weed Conferences dealing with weed control in agronomic crops.

Crop	Year						Total
	1948	1949	1950	1951	1952	1953	
Corn	1	4	2(1)	2(1)	1(1)	2	12(3)
Cotton	1(1)*	2	5(1)	10	10	10(1)	38(3)
Oats	1	3	1	0	0(1)	0	5(1)
Peanut	0	1	0	1	1	4	7
Rice	0(1)	2	1	1	0(1)	0(1)	4(3)
Soybean	0	0(2)	0	0	2(2)	2	4(4)
Sugar Cane	1	0(3)	0(1)	0(3)	0(2)	0(1)	1(10)
Tobacco	0	1	0(1)	0	1	0	2(1)

* Papers also classified under another crop or specific weed.

The importance of controlling brush in the Southern Region is reflected in the number of papers presented on this subject at our Conference (Table 5). Progress is being made, but the diversity of the problems encountered as regards species, edaphic and climatic factors, physiological aspects, etc. render complexity to a solution of the overall brush problems. Consequently, even greater vigor of concentration is needed in this important area of weed investigations.

Table 5. Number papers presented at Southern Weed Conferences dealing with brush control and weed control in grasslands and horticultural crops.

Subject	Year						Total
	1948	1949	1950	1951	1952	1953	
Brush Control	1	2	4	4	10	4	25
Grasslands	2(1)*	2	0	1	3	3	11(1)
Horticultural Crops	1(3)	8	2	1	2	1	15(3)

* Papers also classified under specific crop or other subject.

Weeds in grasslands of the South are serious and should challenge weed workers to increase the tempo of research on these problems.

Certain vegetable crops and a variety of other horticultural crops are not produced profitably in some of the Southern states largely because of weed problems and plant diseases. Judging from the number of papers presented on weed control in horticultural crops (Table 5), there is great need for additional weed control studies in these crops.

More and more weed control workers are finding that in order to develop sound guiding principles and standards of reference relative to the employment of herbicides for selective weed control there is an appalling lack of fundamental knowledge on the mode of action of many herbicides, the general physiological effects of the materials, and the influence of environmental and soil factors upon the action and behavior of the materials. Some work is being done on these important aspects of herbicidal usage (Table 6) and greater research activity in this area undoubtedly will make for more effective prosecution of our over-all weed control programs.

Table 6. Number papers presented at Southern Weed Conferences dealing with physiological and other effects of herbicides.

Subject	Year						Total
	1948	1949	1950	1951	1952	1953	
Physiology (General)	0(1)*	0	2	4	2	3(1)	11(2)
Environmental Influences	0	0	0	0	0	3	3(0)
Mode of Action	0	0	0	1	0	2(1)	3(1)
Behavior in Soils	0	2	1	0(1)	0(1)	2	5(2)
Total	0(1)	2	3	5(1)	2(1)	10(2)	22(5)

*Papers also classified under specific crop or other subject.

Aquatic weeds, nutgrass, wild onion and garlic, and Johnson grass present problems to most of our farmers. The control of these and other weeds in specific crops and situations warrants more vigorous effort by weed workers in research, industry, education and regulation than has been manifest in the past (Table 7). It is true that all work on these problems is not represented in the papers presented at our Conferences. For example, there are workers in at least two or more states who are doing good work on aquatic weeds. In the future we hope that all persons interested in weed problems of the South will see their way clear to affiliate with our Conference because by so doing they will contribute much to our "clearing house" of weed knowledge and should at the same time take away information that should be helpful in their own work.

Table 7. Number papers presented at Southern Weed Conferences dealing with specific weeds.

Weed	Year						Total
	1948	1949	1950	1951	1952	1953	
Aquatics	0	2	0	0	0	0	2
Bermuda grass	0(1)*	0	1	0	0	0	1(1)
Johnson grass	1(2)	7	5	5	3	2	23(2)
Nutgrass	1(1)	1	2	1	1	1	7(1)
Wild onion & garlic	1	1	0	1(1)	1(1)	0(1)	4(3)

* Papers also classified under specific crop or other subject.

The availability of suitable equipment for applying herbicides accurately are essential to the development of sound weed control programs. There is an opportunity for both private and public agencies to develop new equipment and improve existing devices that not only should increase the simplicity and safety with which herbicides can be employed, but also add new possibilities for combining herbicidal usage with tillage operations and make feasible new application techniques.

It is apparent from the information in Table 8 that one of the main weaknesses in our conference programs has been the lack of participation by regulatory and educational personnel. It is gratifying to see extension personnel participating in our program this year for the first time and to have in attendance farmers, vocational agriculture representatives and other farm leaders. We hope this trend will develop more and more in the future and that all interests involved in weed control - production, research, regulation and education - will march harmoniously hand in hand to make for more effective pursuance of our over-all weed programs.

Table 8. Number papers presented at Southern Weed Conferences dealing with equipment, new herbicides, and other aspects of herbicidal usage.

Subject	Year						Total
	1948	1949	1950	1951	1952	1953	
Equipment, Cultural Practices, etc.	0	2	2	2	2	1	9
New Herbicides	0	0	2	1	3	3	9
Recommendations, Research Programs	1	0	1	1	2	1	6
Herbicide Properties	1	0	2	0	1	3	7
Regulatory	0	1	2	0	0	0	3
Extension	0	0	0	0	1	0	1
Ecology	0	1	2	0	0	0	3
Miscellaneous	2	0	0	0	2	2	6

We have given attention to the types of problems that have been considered by the Conference and attempts have been made to point out some of the more obvious weaknesses. It is rather simple to point to unsolved problems; they have been recognized by others in our Conference who are involved in weed research. Why then have some problems apparently been neglected? In Table 1 it is shown that the number of public agency personnel interested in weeds has remained about the same over the past seven years, with the exception of the 1954 Conference. The lack of concentrated research on many weed problems no doubt is due to an inadequate number of personnel hired to work full-time on the problems. In other words, a few research men are obviously limited in the number of problems they can study. The data in Table 9 show a rather healthy attitude on the part of administrators in supporting weed research. Estimated total funds for weed investigations have increased over four-fold in the Southern Region since 1947. The monies placed in the Southern Region by some Federal agencies are not given in the table, but these funds plus those expended by industry on herbicides run the total investment in weed control research to a substantial figure. These increases in funds have been used largely in shifting part-time weed workers into categories where more time or full-time can be devoted to investigations on weed control. As new advances are made there is reason to believe the work will receive additional support and more individuals, including graduate students, will be charged with investigating many of our problems requiring further research. The soundness of increasing investments in weed control programs can be illustrated by citing one example of the potential savings to our farmers that may eventuate by the proper employment of herbicides to control weeds. There is good evidence that cost of weed control in cotton may be reduced $5.00 to $8.00 per acre through the use of appropriate herbicides; accordingly, the possible savings per year to the cotton farmers alone in any state growing 250,000 acres or more of the crop would justify the entire outlay for all weed control research for the past seven years in the entire Southern Region.

Table 9. Estimated total monies expended on weed control research in Southern Region.

Year	State Monies /1			U.S.D.A. Monies/2	Grand Total
	State Appro.	Federal Grant Funds	Total		
1947	$35,430	$11,000	$46,430	$17,712	$64,142
1948	43,340	20,499	63,839	22,580	86,419
1949	112,174	27,287	139,461	27,550	167,011
1950	106,282	32,795	139,077	37,850	176,927
1951	132,933	31,438	164,371	42,980	207,351
1952	182,062	32,498	214,560	42,680	257,240
1953	185,151	34,697	219,848	41,600	261,448
Total	797,372	190,214	987,586	232,952	1,220,538

/1 Excludes Oklahoma and Alabama
/2 Includes Puerto Rico

Some attempt has been made to inventory certain aspects of our Conference as regards where we have been and where are we now. Some of the weaknesses obvious to all of you have been pointed out and should challenge us in deciding on where are we going from here.

Many isolated findings on specific weed problems need to be consolidated and experimentation planned and prosecuted with great vigor of concentration in order to fill in the important missing links of information that currently prevent the formulation of recommendations for farmer usage. Other important weed problems that have not commanded the attention of weed investigators should be studied as soon as the problems on which we have partial solutions are pursued to a point that farmers can make use of them.

There would be few research men that would disagree with the statement that as yet there are no foolproof herbicides. They must be used in accordance with sound principles and good judgment. Accordingly, there is need for an informed and alert group to initiate strong educational programs in weed control. Too frequently the method of approaching a particular weed problem needs to be determined on the spot. The leaders in our farm communities need to have sufficient background information in the weed control field so they can offer sound advice to farmers on when, what and how to use herbicides in solving a particular problem.

Owing to the climatic conditions of the South we are faced with weed problems not encountered in many other areas of the U. S. We are frequently engulfed by weeds as we drive down our highways and roads and the weeds in many of our crops and grasslands are too obvious. The annual losses attributable to these weed problems are well known and need not be dealt with here. The ultimate solution to these many problems is dependent upon a combined effort not only by industry, research, education and regulation, but also by stimulating an awareness of the problems and an effort in their solutions at the county, town, community and home levels. Indeed, weeds present problems that rightfully should be the concern of all civic, private and public citizenry and the assistance of each group should be enlisted to assume an offensive on them. Within the framework of the objectives of our Southern Weed Conference there are challenging opportunities to get underway state-wide and region-wide programs to rid our area of many of its weed problems. Where research information indicates that herbicidal usage increases efficiency and is economically feasible, weed control programs should be initiated. The development of solutions to the many other of our weed problems should appeal to the highest aspiration of competent and aggressive leadership in public and private research, education and regulation. I have unbounded confidence that our Southern Weed Conference will meet these challenging problems and in doing so will create a bright and satisfying future.

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WEED RESEARCH COMES OF AGE IN THE SOUTH

A. H. Moseman
Director of Crops Research
U. S. Department of Agriculture

In December 1941 Mississippi State College issued bulletin No. 29 on "Weed Control and Cotton Tillage." Many of you are familiar with this publication and have used it as a reference. It is an excellent summary of a well-rounded study. It covers nearly 10 years on research on the control of weeds on Black-belt or Prairie soils through tillage practices.

Looking over a copy not long ago, I found the final section in the bulletin took up the subject of chemicals in weed control. The discussion was confined to one chemical--sodium chlorate-- and to tests in which it was used to eradicate Johnson grass in Houston clay soil.

I was impressed by the fact that only 14 lines--about one third of a page--in a 64-page bulletin were required for the section. I believe this is an accurate measure of our concern with chemicals as weed killers at that time.

The information in that bulletin was of enormous value through the South during the next few years. December 1941, as you recall, was a significant month in history. After Pearl Harbor there was little opportunity to devise improved methods for controlling weeds. Farmers had to use the knowledge at hand.

Even the discovery of the new chemical 2,4-D that seemed to hold great promise as a weed killer, didn't help us. In those days we couldn't get enough of it to carry on preliminary field tests.

But when World War II ended we began immediately to explore the possibilities of this plant growth regulator as a herbicide. One of the first studies was set up in the South. In 1945 the late Lewis S. Evans began the experiments that established the usefulness of 2,4-D in controlling weeds in canals and waterways.

To those of you who were not associated with the work then, it may seem strange that we began these southern investigations on weeds in waterways. Why didn't we tackle one of the many aggressive weed species that compete with crop plants?

The answer is that part of the money for this particular research came from the Army. The military was interested in the control of weeds in waterways from the standpoint of navigation. In Agriculture we were interested in the problem from the standpoint of drainage of farm lands.

Another reason for the choice was that we had very little information on the effects of 2,4-D on crop plants. We knew the compound as we were then applying it damaged most broadleaf plants.

In other words, our first research with the new herbicide was pretty much a hit or miss proposition. There was so much to learn, so much work to be done, that one of our chief difficulties was in deciding just where to begin. And it took a few years to get around this barrier.

Those of you who helped organize the Southern Weed Conference in 1948 may recall the session in which plans for regional studies were discussed. If you go back to the proceedings of that session you will find that the objectives were stated in the broadest terms.

In each instance the problem that claimed priority in a State was given in terms of specific weeds--wild garlic, bitterweed, coralberry, Burmuda grass, Johnson grass, nutgrass.

Some of you approached the problem from even broader view--weeds in particular crops: rice, cotton, corn, small grains. Several members of the group members of the group mentioned the need for better methods of controlling weeds in pasture.

Only one proposal for new research reflected a difficulty we were having with 2,4-D by that time--damage to crop plants. Someone suggested that we study ways of protecting susceptible crops from damage by chemicals.

I go back to these proposals of six years ago because it seems to me, they underscrore the relative limitations of our recent knowledge. The terrain was so new to us that we began by marking only boundaries. We were still rather uncertain about the best approach to the extensive weed control problem.

WHERE WE STAND TODAY

You are all familiar with the rapid developments of weed research over the past few years. Many of you have had a hand in compiling material for some of the dramatic chapters in this brief history.

Each step forward has been achieved through the combined efforts of many scientists. Federal and State research staff members have enjoyed the close teamwork with agronomists and others in industry who have worked so energetically in the investigations. It has been a cooperative program from the start. No one man, agency, or commercial firm can take full credit for a single gain.

Here in the South the chapter in the weed research story that we turn to with greatest satisfaction deals with new controls for weeds in cotton. It covers the tentative recommendations for seedbed preparation, treatments with pre-emergence chemicals, the precise application of herbicidal oils after the plants are up, the use of flame cultivation, hand hoeing and some tillage. Now, for the first time the cotton grower has methods of keeping weeds under control with a minimum of spot hoeing. As little as four per acre, according to one report. That is not quite one-tenth of the labor formerly required. Moreover with these new techniques, the grower can cut the cost of weed control in cotton by one-half--from around $20 per acre by the traditional time-consuming methods to about $10 per acre.

Those of us in the administration of research have a special interest in the work. We consider it an outstanding example of integration. It demonstrates how the efforts of scientists in public service can be teamed effectively with those in the chemical and equipment industries. The research cuts across a number of lines in agronomy, chemistry, plant physiology, and agricultural engineering. The findings have been fitted together with great skill. The results represent a notable achievement.

We can point with pride to another advance in the war on weeds in the South. This is the control of Johnson grass in sugarcane through a combination of 2,4-D and TCA. The treatment and technique of application were developed in research at Louisiana State University.

We can cite still other gains from weed research in the South. We're making some headway in the control of weeds in corn. Chemicals can be used for controlling annual weeds and grasses in peanuts. We have evidence that certain chemical measures may be practical for the control of weeds in soybeans during early stages of growth. Recommendations have also been agreed upon for the most effective rates and time to apply the phenoxy compounds for controlling broadleaf weeds in wheat, oats, barley, and rice.

We have made some progress in the control of woody plants on range land with chemicals. Our information has been expanded on the tolerance of both cotton and corn to the herbicides now most extensively used. In recent years we have been steadily building a backlog of knowledge on the comparative efficiency of the chemicals coming into use as herbicides.

These advances have not been uniform. We have made only a beginning in our search for materials and techniques to bring a few of the most aggressive and persistent perennial species under control. And we are still far behind in the basic research which is needed as a foundation for an expanded weed control program in coming years.

But the groundwork has been well laid for weed investigations in the South. We have the basic cooperative mechanism for an enduring program. It has begun to pay off in results. These will increase as the work expands.

We still have many more problems than we have answers, so one of our most pressing concerns is direction. Which paths shall we persue? Opportunities for intriguing lines of study have now opened up in every segment of the work. Each of you can think of many problems you would like very much to tackle.

How can we sort these projects out to make the most fruitful use of the time, the skill, the funds, and equipment that are available? To which shall we give higher priority? Which ones can be deferred for the time being? Which ones must be continued? Are there some studies that might be dropped until we have more basic information to support them.

From an administrative view these are some of the questions that are constantly before us. Another point we must think about is coordination of the efforts of the many state, federal and industry research workers. How can we weave these activities together to achieve advances of the highest order?

Fortunately in federal-state research we have a good pattern for setting up guide lines. The regional approach to agricultural problems is a most satisfactory means for pooling ideas, skills and facilities. It gives each participating scientist an opportunity to contribute both to the planning and review of the program. It offers an excellent means for keeping participants well informed of progress throughout the region and for preventing duplication of effort.

After a careful review of cooperative activities in weed investigations--in which we discussed the plan with many of you--we have decided to appoint a Department representative in this region. We believe he can provide assistance and certain general services in coordinating weed research in the South.

The job calls for a man who has had sound training in the disciplines on which present-day research is based, including agronomy, plant physiology, and chemistry. It requires a man who is familiar with weed problems and research on weed control in the South. The man should have already demonstrated high qualities in research and in scientific relationships.

We have been fortunate in finding a man who meets these qualifications. It is a real pleasure to advise you of the appointment of Dr. William B. Ennis as our regional representative for weed investigations in the South. He will assume his new responsibilities on February 1 with headquarters at State College, Mississippi.

Dr. Ennis is a native of Tennessee and did his undergraduate work in agricultural science at the University of Tennessee. He followed this with a year as a graduate fellow in corn breeding at the University of Maine. He had begun work on his doctorate at the University of Wisconsin in 1942 when he was called into military service. While in service he was assigned to a unit in chemical warfare, and from 1944 to 1946 he conducted research on the effects of plant growth regulators on various plant species. His findings, reported in botanical and agronomic journals, served as a valuable base for some of the early work on the herbicidal properties of 2,4-D, the carbamates and other chemicals. After he completed requirements for his Ph.D. in 1947 he went back to research in plant growth regulators and related chemicals for the Department of Defense. In 1951 he returned to the South to become head of the Department of Plant Pathology and Physiology at Mississippi State College. During his tenure at State College he has taken an active part in the Southern Weed Conference. Last year he served as chairman of your research committee.

In his new position Dr. Ennis will coordinate the research of scientists from the Department of Agriculture who are assigned to cooperative weed work in the South. At this time the group includes--Dr. Donald E. Moreland at Raleigh, N.C.; Dr. E. W. Hauser at Experiment, Ga.; Mr. Vernon Harris at State College, Miss.; and Dr. Richard Behrens at College Station, Texas.

Dr. Ennis will represent the Department in meetings with state experiment station officials to draw up plans for new cooperative studies and in making a continuing review of projects now underway. He will work closely with representatives of the chemical and equipment industries in this region. Dr. Ennis will continue his fundamental factors on herbicidal activity.

THE ROAD AHEAD

And now I'd like to discuss with you certain aspects of weed research in the South that have a special claim on our attention.

High on our list is the work on brush control. And the thought that comes immediately to mind is what an excellent job has been done. A handful of men have devised economical and effective controls for certain of the most aggressive woody species in the Southwest. They have done the work in a relatively short time. And with strong support from private industry the work has not required a large investment of public research funds.

Farmers throughout the South have watched with great interest the results in controlling sandsage and mesquite through aerial sprays. And now growers from the Arkansas Ozarks through the Piedmont region further East are pressing for similar recommendations. They need an effective, low-cost method for bringing the woody species in cut-over timber lands under control. This is an important spet toward building a more productive grassland agriculture in this region.

We see the problem as an urgent. But we know that materials and techniques for solving it will not come quickly. On the contrary it may take considerable time and effort to do the fundamental research out of which economical controls can be developed. And we are all fully aware of the need for emphasis on the "economical".

Progress in research, like progress anywhere, is achieved most effectively, and most efficiently, by putting first things first. In spite of the remarkable advances in developing practical methods for chemical weed control in many crops in recent years we still have too many gaps in our basic understanding of the action of herbicides. We must fill these gaps before we can expect to move ahead vigorously on practical problems.

I am thinking of questions like those listed in the report of the research committee at the Southern Weed Conference for 1953. Such questions as these: How are chemicals absorbed and translocated in woody species? How is the mechanism of chemical toxicity related to plant structures? What chemicals can we use that are suited for the higher temperatures and other environmental conditions in the South? What measure of kill should we aim for? To what extent can we control re-infestation? How can this be done? Will other woody species enter the picture and become range pests when susceptible plants are brought under control? It seems to me these questions give a good idea of the complexity of the problem. You can think of many others.

The shift toward grassland agriculture in the South is also creating increased pressure for better weed control in permanent pastures. You are familiar with the progress that has been made on this problem. We now have tentative recommendations for controlling broadleaf annual weeds with very little injury to pasture crops.

Weed control is one in a series of practices for pasture improvement being developed concurrently in federal-state research. We have made some headway

in teaming up productive grasses and legumes for different geographic areas. We have devised new methods of mowing and grazing that provide maximum yields and at the same time maintain the stand. We are beginning to investigate some of the factors in the efficient use of supplemental irrigation. We are expanding the research in rates and methods of placing fertilizer for optimum returns.

We see these concurrent developments as another opportunity to demonstrate our belief that the value of each improved practice is considerably enhanced when used in combination with other improved production practices.

A good example can be seen in the results of pasture establishment studies now in progress at several locations in the Southeast. We have observed striking results in plots where the soils give a high response to fertilizer. When the seed was drilled at a one-fourth inch depth and the fertilizer banded one inch below, there was good germination of seed. The seedlings grew rapidly and became the dominant plants. They were well established by cold weather and showed a high rate of survival in the spring. Practically no weeds were in evidence. This was in marked contrast to the plots where either the seed or the fertilizer was broadcast. There the weeds benefited and flourished. In plots with low rates of seeding and fertilization they became a serious problem.

It appears that we can do a much better job in keeping weeds down in pastures if we place the fertilizer so that only the crop plants gain the fullest benefit from the nutrient elements.

We have by no means reached the end of our resources for controlling weeds through improvements in farm practices. We shall continue to find many of our most satisfactory solutions to weed problems through this route.

But today the spotlight is on chemicals. And I'd like to go over briefly some of the developments on this area of research with which we are concerned.

Most of you are familiar with the studies in which we are evaluating compounds of potential use as herbicides. In the three years since this work was initiated, Dr. Warren Shaw and his co-workers have studied the effects of more than 400 compounds for the control of weeds in 30 different crops. The research has begun to pay off in knowledge that certain of the compounds have toxicity and remarkable selectivity.

In choosing chemicals for our evaluation work we are faced with an embarrassment of riches. "New organic chemicals," says Dr. C. R. Wagner, president of the Synthetic Organic Chemical Manufacturers Association of the United States, "have been made at the rate of 10,000 a year."

The output continues. We cannot even estimate the number of new compounds that may hold value as weed killers. Industry is carrying the heavy load in screening new chemicals for this purpose. But the task is so great--and the need for new materials so urgent--that public research must take a hand in the work too.

by face the same pressure to do far wider testing than limited resources ll permit. They are mutually concerned with gaining full and specific in- mation on the compounds submitted for testing. They have a common problem devising ways to report findings of great value to the public and at the ne time to protect the patent rights of industrial research.

The work in evaluating chemicals for pest control follows the same pattern ther the pests are insects, diseases, nematodes, or weeds. And because of s, some representatives of the chemical industry have urged the Department Agriculture to set up the research on pesticides in one closely-knit admin- ative unit.

The recent reorganization of the Department of Agriculture provides an ortunity to develop a better coordinated approach to the evaluation of pest trol chemicals. The insecticide investigations of the former Bureau of omology and Plant Quarantine are combined in the new organizational unit Crops Research together with the studies on fungicides, nematocides, and bicides from the former Bureau of Plant Industry.

The new arrangement will unable us to make a thorough review of all of the mical evaluation studies now in progress. It will permit us to take advan- e of the long and valuable experience in the evaluation of chemicals for ect, disease, and nematode control, and the new, dynamic approach that has n developed in the research on herbicides.

The new organization plan should, in time, simplify the relationships of Department of Agriculture and industry concerned with pest control chemicals. are expecting to have Dr. H.L. Haller, former assistant chief of the Bureau Entomology and Plant Quarantine, review the Department's programs of research pest control chemicals. He will provide leadership in developing improve- ts in this broad field of research. He will serve as a principal contact h the representatives of the chemical industry in this problem field.

Of this we can be sure. There will be no let up in the pressure for new ormation on the control of weeds and other crop pests. Instead it will rease. It will continue to be stimulated by the stream of new chemicals wing to market. It will reflect the appearance of pest species that are erant to presently known compounds.

One other point on which we are doing a great deal of thinking at this e. There will be added pressure for information on the effects of new pest- des on public health and safety. This is an area of knowledge of first ortance to those of us in public service research. We must explore it roughly.

And finally, we are well organized to carry on the search for new knowledge pest control. We have an effectively coordinated group of workers in re- rch, distribution, regulatory activities, and extension. Our course has been d out for the next few years. We are all set to move ahead in our mutual of serving the farmers of the South.

When the present herbicide evaluation project was set up, it seemed advi able to concentrate federal-state resources on one group of compounds at one time. This has a number of advantages. It permits intensive study of speci groups of compounds known to possess herbicidal properties.

The most intensive studies have been conducted with the carbamates. Thi group of compounds was chosen first for evaluation because their action on plants is generally converse to that of the phenoxy compounds. The type of selectivity exhibited by the carbamates is greatly needed for weed control i some of our most important dicotyledonous crops such as cotton, soybeans, peanuts, lima beans and other large and small seeded legume species.

We believe that the evaluation of the herbicidal properties of closely related derivatives of any chemical is a sound starting point for building a fundamental research program. This permits a basic evaluation on the effect of chemicals on plants as influenced by environmental factors.

The primary objective of the evaluation project--as we see it--is to st the relationships between chemical structure, mode of chemical action, selec ity, vapor activity, and herbicidal activity.

A second objective has been to study evaluation techniques and equipmen in an effort to develop new, more uniform and better herbicide evaluation methods.

Public research can render a wide service--both to industry and to farm by aiding in the development of the basic information out of which industria formulations may result.

The chemical industry has given wholehearted support to the evaluation studies. As you know, all of the chemicals for evaluation have been supplie by industry. Eight companies have synthesized the compounds used in these studies. Representatives from industry are keeping close tab on the result of the research. It will be up to the chemical companies, of course, to mak this material available to the public if the information warrants such actio We can look to industry to develop the refinements that must be added before material can be marketed and used on the farm.

The work in evaluation of herbicidal material is new. But scientists i the federal-state network have been evaluating chemicals for pest control mo than 30 years. The systematic search for new materials of potential value a insecticides and nematocides was begun in 1922.

The men who pioneered this work did an excellent job of spelling out th responsibilities of public research. They stressed the importance of colle information on toxic chemicals and their effects on public health, farm anim soils, vegetation, beneficial insects. It is true that most of the chemical which are useful for killing weeds are of no value as insecticides, fungici or nematocides. But there are a great many common problems in the research on chemicals for control of diseases, insects, nematodes and weeds.

The leaders of our state and federal research programs in each of these fields deal with the same manufacturers. They have similar problems in dec ing the area for intensive research and in working out uniform testing progr

THE CHEMICAL INDUSTRY AND AGRICULTURAL RESEARCH

M. T. Goebel*

First of all, I should like to take this opportunity to express the deep appreciation of my associates and myself for the opportunity to take part in this great meeting. As time goes on, there is an ever increasing need in all fields of research for interchange of ideas in order to attain a better understanding of the other fellow's problems.

The year 1954 is a particularly interesting point in time to review the overall picture of agricultural research. Approximately ten years have now passed since the time when the newer organic agricultural chemicals, including the chlorinated insecticides, the dithiocarbamate fungicides, and the hormone type weed killers began to make agricultural chemical history. These years have been a time of great activity and of many further discoveries They have also been a period of ups and downs from a commercial standpoint. A great deal has been written and said about the impact of these new chemicals on agricultural methods and on the nation's food supply. However, not so much has been said about their impact on industrial chemical research itself, and on the thinking and planning that has to go into it. If we in the chemical industry look back upon this busy and exciting period, there are many lessons for the future to be drawn from the successes and also from some of the disappointments of these past ten years For one thing, the true responsibilities of the chemical industry in the overall agricultural research picture are becoming more clearly defined. While the thought we in du Pont have given to this type of review has not led to any startlingly new concepts, it occurred to us that your meeting might be interested in how we feel today about some of these responsibilities, so that is what I would like to try and cover in the next few minutes.

One fact that stands out clearly is that, to succeed in the agricultural chemical field, industrial research must make a real vitally needed contribution to agricultural practices. There is of course nothing new about this fact. It merely confirms a lesson which the chemical industry, like other industries, has learned long ago in many areas of research activity. However, whenever a research field acquires sudden glamour, as the agricultural chemicals field has done over the past ten years, there is always some temptation to be swept along for a while on a wave of enthusiasm for ever more wonderful new products, regardless of whether or not they clearly meet a vital need. Fortunately, the attitude of all those concerned with agricultural research has, by and large, remained fairly realistic during these last ten years of rapid development, so that, we believe, the farmer has amply gotten his money's worth from the new products which have been commercially introduced in such rapid succession. However, with

*Technical Director, Grasselli Chemicals Dept.
E. I. du Pont de Nemours & Co.

farm prices and agricultural surpluses again becoming a real problem on a national scale, it is particularly important for the chemical industry at this time to think clearly, in planning its agricultural chemical research programs, about the most vital needs of the individual farmer.

Without using charts or graphs, we can visualize pretty clearly one of his greatest needs today. Barring catastrophes such as a general, long continued drought, it appears likely that, for the next few years, American agriculture can easily supply the food requirements of our people. While this is a very comforting thought from the standpoint of the population at large, it brings with it the spectre of lower prices for agricultural products and consequent loss of financial return from the individual farmer's investment in land, equipment, and labor. Facing this situation, one of the farmer's most vital needs is help in cutting the cost of production of his crops, livestock, and animal products such as milk and eggs. Therefore, if we in the chemical industry really are to render a service to the farmer, we should give maximum attention to pushing hard on those of our programs which show promise of providing the farmer, over the next five or ten years, with new products which will lower his cost of production. This is a very appropriate thing to say at the present meeting, since perhaps the most spectacular type of product in the cost-reducing category which has yet resulted from agricultural chemical research is the chemical weed control agent. The interesting statement has been made that one man manufacturing certain types of weed killers is equivalent to 800 people wielding hoes. This comparison summarizes vividly a type of contribution, resulting from the cooperation of agricultural and industrial research workers, which is already widely appreciated by the farmer. Whether he thinks in terms of dollars saved through the elimination of hired labor, or whether he thinks in terms of greater leisure which he can employ productively in other directions, here he can see a very direct saving through the use of chemicals regardless of the state of the market for his product. We can also think of other fields where the industrial research objective has been to find chemicals which will save the farmer money. The feed supplements which have been helping to decrease the per pound cost of raising poultry and certain types of livestock fall into this category. The recent interesting work, in a number of laboratories, directed toward utilization of surplus inedible fats as a source of energy in livestock feeds is a strong indication that American ingenuity and self-reliance are not on the downgrade. Continuing work on chemical defoliants and desiccants to facilitate mechanical harvesting is also directed toward cost reduction. In view of the farmer's individual need for the lowest possible expenditures in producing his crops, the research men in the chemical industry must accept as a major responsibility the search for developments which will save the farmer money. This is also an area in which agricultural research workers will undoubtedly concentrate a great deal of development activity over the next few years. We should like to urge that these research workers, with their broad

background of field experience, give thought to entirely new money saving objectives which might be approached through chemicals still undiscovered, and advise the chemical industry of such objectives so that new types of testing programs can be set up in industrial laboratories.

Meanwhile, what of the older fields of agricultural chemical research directed toward what used to be grouped together as pest control products? These include fungicides, insecticides, seed treating agents, certain animal medicines, and the like. I think we have all occasionally heard someone argue, perhaps over a cocktail or a pleasant lunch, that, since the use of insecticides, fungicides, and similar products have contributed toward increasing the productiveness of American agriculture over the past 20 or 30 years, these developments are in some measure to be blamed for bringing about the surpluses which plague our agricultural economy from time to time. However, I am sure that all of us in this meeting could easily refute this argument and show that these chemicals, which we may group together as crop insurance chemicals have reduced the problem of surpluses rather than accentuated it, by enabling American agriculture to plan its planting and stock raising programs on a far more rational basis than would otherwise be possible. Also, the arguments advanced by my lunch table friend would have little weight with a cotton farmer who had seen his own crop ruined by weevil or bollworm, or by a poultry raiser who had lost his flock through disease. Thus, if the chemical industry is to accept the responsibility of aiming toward the greatest possible service to the individual farmer, it must continue a reasonable effort directed toward ever more effective, economical, and reliable pest control and disease control agents. Certainly the fact that agriculture can now supply the food requirements of our people should not cause the chemical industry to let up in its effort to provide the agricultural research worker with new and better insurance chemicals for the individual farmer. The occasional appearance of entirely new pests, and the ingenuity of the existing pests in acquiring resistance to the present chemicals, or acquiring the ability to attack hitherto resistant plants, merely underline the problem.

Now, what of very long range, basic research in agricultural chemicals? As we all know, the long range market forecast for American agriculture looks much different from the short range forecast. You are all familiar with the recent phenomenal growth in population which has now made us a nation of 160 millions. You are also familiar with the projections into the future which indicate that our farmers may have to fill what has been termed a "fifth plate" by 1975. State and federal laboratories are well aware of this possibility and are gearing agricultural research programs toward meeting the future problems which it implies. In the same way, the chemical industry, in considering its very long range agricultural research programs, must take into account a possible need for considerably increased food supplies in 25 years. Of course, in this world one can never be certain that any forecast will actually materialize. I myself believe that

population trends are very intimately tied in with such human factors as confidence in the future and the prospect of general economic security. However, whether or not we believe that continued rapid growth of our population is inevitable, I do not believe we can argue with the conclusion that, from the standpoint of this country's welfare, research is the cheapest and most flexible safeguard against shortages in the future. Now, 1975 seems a long way off to us in 1954. However, there is one thing the industrial research man learns - sometimes by bitter experience - that is, that it takes a long, long time, after an exploratory or fundamental program is started, before leads are developed, explored, and converted into new products. For example, our Company made a survey of a number of its developments some time ago and came up with an estimate that 9-19 years have elapsed between its initiation of exploratory work in a new field and the eventual development of a new major commercial product growing out of that research. As a well known example, we might cite the fact that 12 years elapsed between the beginning of Carothers' fundamental research on linear polymers and the opening of the first nylon plant.

There are exceptions, and sometimes under the stress of necessity the seemingly impossible can be accomplished in telescoping the time schedule. The effort on atomic energy during the war and the synthetic rubber program during the same period are outstanding examples of such accomplishments. However, from the standpoint of prudence, we should not count on such near miracles. Industry in general, and certainly we in du Pont, are thinking very seriously about the need for long range research directed toward ways of radically increasing crop production from our existing acreage. As you are aware, there is great interest in entirely new departures in growing food, such as the hydroponic culture of certain forms of algae. The prudent research planner will also consider more conventional means of reaching the food goals of 25 years from now.

The supply of plant nutrients, including the major and the trace elements needed for plant growth, will continue to be of critical importance. New application techniques for more efficient utilization of these elements will be important. Improved animal nutrition must play a part in increasing the future food supply. New sources of feed may have to be tapped. As an example of what can be done in this direction, one might cite the development of synthetic urea as a building-block for proteins in feeding ruminant livestock such as cattle and sheep.

Other less obvious needs must also be anticipated by the research men. When they look into the crystal ball and think about chemicals which might remove bottlenecks from the agricultural plant of this country, the research people see so many fascinating possibilities that the difficulty is to choose those which hold out the greatest hope of practical success. To name only a few there is the whole question of the rate of growth of plants. There is the question of drought resistance and frost

resistance which might open new areas for crop production. On the animal side, there are certain types of diseases which now bar the stock raiser from important pasture areas. This may be more important on a world-wide scale than in America, but it certainly has its implications for our own agriculture.

To sum up, the long range forecast indicates that the chemical industry should be bold in its attack on new lines of long range research which hold out hope of some day greatly increasing agricultural production from our existing acreage. It looks as though there will be a real need for such research developments by the time they are likely to become available in adequate measure.

I should like to turn now to a second responsibility of the chemical industry, as we in du Pont see it. We are convinced that our chemical research should be coupled with thorough and conscientious biological evaluation of the leads we turn up. This is a heavy responsibility because such evaluation, which we call "use research", is expensive. However, we and I am sure other industrial research organizations, feel that this is the only right way to do our job for agriculture. If we were to flood federal, state, and university investigators with essentially untried leads, we would simply confuse the whole agricultural research picture. We should not multiply their already heavy burden by asking them to evaluate new products and techniques until we have convinced ourselves that they are sound.

Our typical procedure in du Pont runs something like this. When a new agricultural chemical candidate is uncovered, we subject it first to a thorough evaluation in the laboratory or greenhouse. In the following spring, we take it to the field if it has continued to look good. We maintain a force of field men located in the west, in the east in the south, and in the midlands. Outstanding results and great promise are necessary if we are to be content with one year's testing under our own steam. More often good results over at least a two-year period are required before we ourselves are convinced that we have something worthy of investigator attention. At that time, we notify all investigators concerned with the general field in which we believe the chemical will have value, summarize our data for them, and make samples available to those who wish to test it. Even then, we may find that we are wrong and when the results come in from the first year in the hands of agricultural research people, we may find that our earlier field sample had not been sufficient and that broader evaluation has uncovered important weaknesses, such as failure to work under certain important climatic conditions. Damage to plants may be encountered despite meticulous attention to this important aspect of our biological research in the early investigations. At that point it is certainly our responsibility to inform all of the investigators very frankly regarding our disappointment. If the disappointment is serious enough so that we can decide at the end of one season that we

probably will not proceed to commercialization, it is our responsibility to inform investigators just as soon as that decision is reached. Only in this way can we contribute toward economies in the costly business of agricultural research.

A third major responsibility is to assure ourselves that a new product can be used safely. There are, as you know, many aspects to this problem. The use of proper label precautions is only one step in a very important and often very complex research operation. We must consider the hazard to the user, the hazard to his equipment, the hazard to the neighbor's crops. Finally, and most important of all, we must consider with great care any possible hazard to the consumer of the farmer's product. We must not feel that we can leave this responsibility entirely to a government agency. We must, if we possibly can, anticipate every question that may be asked and have the answer, or be able to give assurance that the answer will be forthcoming at the proper time. I believe that I echo the sentiments of the whole agricultural chemical industry when I say that it has everything to gain and nothing to lose from a very vigorous and vigilant national program on the part of the Department of Agriculture and the Food and Drug Administration. In our contacts with the responsible officials of these agencies, we have found them at all times eminently reasonable and entirely fair. We have no fears for the future in this respect.

What are the most important things that the industrial research planner must do in order to cooperate properly with these government agencies? First of all, he must know the properties of his product thoroughly. He must measure its physical properties with care and consider their significance from every standpoint. Second, he must see to it that workable analytical methods, within the reach of any well equipped laboratory, are made available by which even minute traces can be detected. Almost always, this job can be done if we roll up our sleeves and go to work. In one recent case, we were able to develop methods which were significant down to one part in 100 million, and in one special application of major importance we were able to carry the detection level down to one part in one billion. I do not say that we can do as well as this in every case, but I confess quite frankly that the results which our analytical research men produced when we turned them loose on this particular problem were really astonishing. And, believe me, when you have such methods, you can sleep better at night. Next, of course, we must see to it that thorough studies of acute and chronic toxicity are carried out. We do not need to dwell on this point because the importance of such tests is universally recognized. Rather, I would like to leave with you the thought that the microanalytical method, which may serve as a guide toward techniques for completely eliminating any hazard by complete or substantially complete elimination of residues, is an equally powerful weapon in the fight to eliminate hazard.

We should think through very carefully, in the chemical industry, various ways in which a new agricultural chemical may be used, and carry on our analytical programs in such a way that we trace the farmer's product through its processing steps, and we should not neglect the byproducts. For example, in evaluating chemicals to be used on cotton, we should not only examine their possible effects on the quality of the cotton itself, but also on the palatability and safety of the byproduct cottonseed oil and meal. Effect on succeeding crops should be determined as well. This may seem elementary, but it is always amazing to me to see how easy it is, under the constant pressure of the day by day research job, to develop blind spots on subjects like this. This is an area where regulatory agencies, with their long and varied experience in assessing the safety of many candidate products submitted to them by the chemical industry, can be particularly helpful through their suggestions.

In bringing this discussion to a close, I should like to emphasize the appreciation of the chemical industry for the exchange of information which has developed so splendidly in the field of agricultural research. We recognize that, without the tremendous job which federal, state, and university investigators are doing in assessing the practical value of new agricultural chemicals, and in uncovering new applications for existing materials, agricultural research could never have become the efficient, fast moving, yet logical and responsible field of activity which it has become. I should like to emphasize that these same investigators can greatly assist the chemical industry, and, by assisting the chemical industry, assist the farmer, by bringing to its attention new problems which have never before been considered possible of chemical solution. If we can continue to foster this type of partnership and cooperation, I think we can look forward with confidence toward future achievements which will make the past decade seem very tame by comparison.

MINUTES OF THE BUSINESS MEETING

SOUTHERN WEED CONFERENCE

Hotel Peabody, Memphis, Tennessee
January 11, 1954

Dr. W. B. Ennis, Jr., President, presiding.

President Ennis acknowledged the excellent work of the program committee.

Dr. Ennis stated that the minutes of the 1953 meetings of the Conference as recorded in the SixthProceedings should receive official action. W. B. Albert moved that these minutes be approved as recorded. Seconded by Hoyt Nation. Motion carried.

The president recalled that the Conference agreed at the 1953 business meeting to send an official delegate to the First National Weed Control Conference. He announced that Dr. G. C. Klingman had acted in that capacity and asked for a report on the trip. G. C. Klingman reported that he attended the First National Weed Control Conference in Kansas City, Missouri, December 8 and 9, 1953. He stated that from 700 to 800 persons were in attendance from all parts of the United States and several foreign countries. Other basic points of the national meetings were briefly enumerated by Dr. Klingman after which he expressed his appreciation to the Southern Weed Conference for making this trip possible.

President Ennis discussed the Association of Regional Weed Control Conferences as consisting of eight members, two from each of the four conferences now in existence. He stated that possibly the formation of a National Weed Society as thecentralized organization would enable a much larger membership and thereby make it more democratic. G. C. Klingman was invited to read a resolution regarding this point proposed by the Executive Committee. The resolution is as follows:

> "It is resolved that the Southern Weed Conference go on record as favoring a National Weed Society; that dues include membership in the Society and subscription to WEEDS. Further, that the National Weed Society meet every second year with one of the Regional Conferences on a rotational basis."

G. C. Klingman moved adoption of this resolution. Seconded by L. E. Cowart. Motion carried.

The floor was opened for nomination of delegates to the Association of Regional Weed Control Conferences during 1954 from which two would be elected. W. B. Ennis, Jr., and E. G. Rodgers were nominated. L. E. Cowart moved that nominations close. Seconded by V. S. Searcy. Motion carried. For lack of further nominations, the two nominees were elected unanimously.

The president stated that election of one person from the Southern Weed Conference to serve during 1954 as a member of the Editorial Board of WEEDS Journal was in order. W. B. Ennis, Jr., was nominated. V. S.

Searcy moved that nominations be closed. Seconded by H. E. Rea. Motion carried and W. B. Ennis, Jr. was thereby elected unanimously.

In calling the attention of members to the commercial exhibits on display, President Ennis stated that for an exhibit to be desirable it must be educational to Conference members and also be beneficial to the exhibitor. A report was then heard by Leonard Lett who stated that 19 companies put on exhibits, and that he worked with Hotel Peabody personnel in making arrangements for the exhibits and that O. B. Wooten, Jr. worked directly with the respective companies.

Barrett Collier moved that the incoming president appoint a committee to contact industry regarding exhibits and determine the desirability of exhibits or sustaining memberships for Conference support at future meetings. Seconded by Hoyt Nation. V. C. Harris moved to amend the original motion to the extent that this function be assigned to the Program Committee for the coming year. Seconded by L. E. Cowart. Amendment carried. Motion as amended carried.

President Ennis stated that the Executive Committee has selected The Soreno Hotel in St. Petersburg, Florida, and January 17, 18, 19, 1955, as the place and time of the next annual meeting of the Southern Weed Conference.

Leonard Lett, Chairman of Public Relations, discussed the problem of obtaining advance information of subject matter of papers for release to the press. He suggested that future Public Relation Committees be given this advance information in summarized form by respective authors.

Mark Weed, speaking for the Legislative Committee, stated that information on 2,4-D legislation was furnished to the Texas Commissioner of Agriculture including copies of the Louisiana and Arkansas acts and regulations covering the use of 2,4-D and related compounds. Copies of the legislation from the three states were delivered to the Conference secretary.

W. C. Shaw, Chairman of the Research Committee, was commended by the president for an excellent report distributed earlier to Conference members.

L. E. Cowart, Chairman of the Nomenclature and Terminology Committee, stated that the National Committee met at New York at the NEWCC and attempted to define its duties and responsibilities. The following resolutions were made at the National Committee meeting:

1. That the Committee be named as follows: "The Terminology Committee of the Association of Regional Weed Control Conferences".

2. That the Committee serve as a group to coordinate the terminology in the field of weed control, including the selection of common names for herbicides.

3. That the name of the herbicide be the responsibility of the originator of the compound, except when the originator fails to provide a suitable common name. In most cases a suitable non-commercial organization which is interested in the utilization of the chemical will provide the name.

4. That the terms, definitions and names of herbicides used in the field of weed control be continuously reviewed and revised as needed.

5. That the Committee cooperate and coordinate its efforts with other terminology committees with similar objectives.

The Committee further recommended that the immediate procedure be as follows:

1. To publish the terms, names, and definitions which the Committee agrees upon in the first quarter of this year.

2. To submit the names which are not agreed upon to the association of weed control conferences for consideration and suggestions for suitable terminology.

3. To provide, in the first publication, comments regarding names, codes, etc., relating to chemical compounds and publications.

4. That the organ for such publications be the Journal of Weeds.

Cowart recommended that this report be accepted by the conference and that he be authorized as Chairman to continue to represent the Southern Weed Conference in the National Committee.

G. C. Klingman gave the following report as Secretary-Treasurer:

FINANCIAL STATEMENT
Southern Weed Conference
January 11, 1954

ASSETS

Cash carried forward from 1953	$462.41	
Total receipts 1953 conference	416.00	
Cash from sale of Proceedings after 1953 Conference	288.65	
Total Assets		$1167.06

EXPENDITURES

1.	Cost of Producing 6th Proceedings (Stenographic, stencils, paper, running and assembling, covers, envelopes).	$441.90	
2.	Stenographic assistance besides producing Proceedings	75.00	
3.	Postage	47.42	
4.	Dr. Ennis (1952 Research Reports, correspondence, etc.)	32.08	
5.	Plastic identification badges	11.93	
6.	Delegate (G. C. Klingman) to National Weed Conference	142.60	
	Plane fare $114.00		
	Taxi (2 fares in K.C.) 1.30		
	Hotel 15.30		
	Registration 2.00		
	Meals 10.00		
7.	Dr. Paul Talley--Programs and postage	72.29	
Total expenditures			$823.22
Total cash on hand			343.84

Audited and approved by:

/s/ V. S. Searcy
/s/ W. B. Albert
/s/ E. G. Rodgers

Respectfully submitted,

/s/ Glenn C. Klingman
Glenn C. Klingman
Secretary-Treasurer

V. S. Searcy moved that the report of the Secretary-Treasurer be accepted as presented. Seconded by E. R. Stamper. Motion carried.

H. E. Rea, Chairman of the Nominating Committee, nominated the following persons for the respective offices:

President	W. C. Shaw
Vice-President	G. C. Klingman
Members at large to Executive Council	E. R. Stamper
	Hoyt Nation
	V. C. Harris

Nominations opened to the floor.

L. E. Cowart moved that the slate of officers as presented by the Nominating Committee be elected by acclamation. Seconded by Barrett Collier. Motion carried.

Dr. Ennis expressed appreciation for support he has received during the past year from all areas of the Conference, and extended best wishes to W. C. Shaw as incoming president. President Ennis then called Dr. W. C. Shaw to the speaker's table who then officially accepted the position as President for the coming year.

Meeting adjourned.

Respectfully submitted,

Earl G. Rodgers
Secretary-Treasurer