

Chapter 3

Depression, War, and Dr. Shull, 1931-1945

The fifteen years from 1930 to 1945 initiated dramatic changes in American life. The desperate poverty of the Depression, followed by the employment boom of the war years, relocated and reoriented regional populations, while the New Deal introduced liberal and lasting concepts of governmental participation in social and economic affairs. (Insensitive as the observation may seem, the suffering and heartaches of depression and war seem to have little lasting impact—they do not survive. Changes in attitudes and way of living do.) However, the sciences, as such, were affected only to the degree that demands were placed upon them, and these were quite variable. The New Deal recovery programs had no need for plant physiology, and there were only minor requirements for its services in World War II (e.g., hydroponic vegetable production, growth of guayule for rubber, control of fungal growth in the wet tropics). During the war some academic plant physiologists found themselves assigned to teach physics, chemistry, or mathematics as replacements for those colleagues who were in high demand.

But there were no challenges that thrust plant physiology ahead. In *Plant Physiology*, indications of depression or war are largely found in Shull's "Notes" referring to some major event, such as calling off the annual meeting or reducing the size of the journal. In contrast to individuals, the science and its Society seem to have been only mildly and indirectly affected during these momentous years. But then, plant life is indifferent to the problems of those who study it. This period ended for the Society with the retirement of Shull, who finished as editor (and councillor-director!) with volume 19, 1944.

Officers

Table 6 lists the officers for the Depression and war periods.

Offices were held for the fiscal year beginning July 1, Shull continuing to resist change to a calendar year. Shull had carefully revised the constitution (he was chairman of the committee, chapter 2) and was annoyed when officers and members of the Society were inattentive to its provisions. Gardner was guilty of this neglect in making up the 1931 ballot and received a mild lecture from Shull (1).

Last year the ballot held one name illegally (according to the Constitution)

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Table 6
Officers of the American Society of Plant Physiologists, 1930-1945

Year	President	Vice-President	Secretary-Treasurer
1930-31	H. R. Kraybill	W. E. Tottingham	W. A. Gardner
1931-32	W. E. Tottingham	R. B. Harvey	W. A. Gardner
1932-33	D. R. Hoagland	C. O. Appleman	W. A. Gardner
1933-34	C. O. Appleman	H. R. Kraybill	A. E. Murneek
1934-35	B. E. Livingston	J. P. Bennett	A. E. Murneek
1935-36	A. E. Murneek	D. R. Hoagland	W. F. Loehwing
1936-37	R. B. Harvey	O. F. Curtis	W. F. Loehwing
1937-38	O. F. Curtis	W. F. Loehwing	F. P. Cullinan
1938-39	W. F. Loehwing	G. W. Scarth	F. P. Cullinan
1939-40	J. W. Shive	F. P. Cullinan	W. E. Loomis
1940-41	F. P. Cullinan	B. S. Meyer	W. E. Loomis
1941-42	E. C. Miller	W. E. Loomis	P. J. Kramer
1942-43	W. E. Loomis	D. B. Anderson	P. J. Kramer
1943-44	B. S. Meyer	P. J. Kramer	E. S. Johnston
1944-45	H. A. Spoehr	F. W. Went	E. S. Johnston ^a

^aThe office of secretary-treasurer was reduced to secretary on July 1, 1944. Treasurer's duties were taken by J. F. Stanfield, who was appointed executive secretary-treasurer.

and this year two names. The provision for the nominations and making up ballots are very specific, and I believe very clear, but the provisions are not apparently thoroughly known by the various secretaries.

Whenever two names are run for different offices, it makes possible the election of one man for two offices. To prevent this, the constitution provides that the four highest names go on the ballot, but that if anyone is nominated thus for more than one office, he is to go on only once, for the highest office... That would leave the names of Loehwing and Bakke on the v.p. list, [but] leaving out Hoagland and Harvey, who are also running for the Presidency. It would be a pretty mess if Harvey's followers were to elect him for both offices. Ha! Ha! The reason for the constitutional provision is obvious.

Last year Tottingham was elected v.p. for the second time, although the constitution providing ineligibility to hold the same office a second time had already been adopted. While no one made any disturbance over it, and the Society was well served, I hope errors will not in future be allowed to creep in.

Shall discreetly counseled newly elected secretaries on the duties of their office, and perhaps this held down election errors, for none appear subsequently. (Note the tendency for those who serve as secretary-treasurer or vice-president to move up to the presidency.)

There was a reduction in the duties of the secretary-treasurer in July 1941 with the creation of a Business Office, but the details are scanty. P. J. Kramer, newly elected secretary-treasurer, wrote to the printer (2), Science Press, introducing

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himself and adding, "You have doubtless heard that Dr. J. Fisher Stanfield, Science Department, Chicago Teachers College...has been appointed business manager of *Plant Physiology*. While all the details have not been worked out he is supposed to look after all non-member subscriptions and non-editorial business of the journal."

Stanfield was a student of Loehwing, who in turn was a student of Shull. He was conveniently located to assist Shull in the details of publishing, and he had gained Shull's confidence as his part-time editorial assistant starting in 1938. Upon Shull's retirement in 1944, Stanfield, then at Miami University, Oxford, Ohio, was appointed executive secretary-treasurer, leaving the elective office that of secretary only. This change resulted from a meeting of the executive committee on January 29-30, 1944, in Chicago where a number of delayed problems had to be resolved. As reported in *Plant Physiology* (3):

The constitutional amendments recommended are too numerous to list, but most of them are related to changes in the names and functions of the officers heretofore called secretary-treasurer and business manager. If the changes are adopted, the secretary-treasurer will become secretary, and the business manager will become executive secretary-treasurer. The latter will handle all moneys, dues, and subscriptions, sales of back volumes, etc., pay all bills, and become an appointive instead of an elective officer. All these important changes will appear on the ballot at the next annual election in May.

Copies of the minutes of the executive committee meeting and the ballot are missing. Stanfield's appointment was undoubtedly based on his experiences as business manager and on Shull's strong support.

Throughout this period, the editor and officers served without compensation, although by the late 1930s the expenses of the president and secretary-treasurer to the annual meetings were paid.

Incorporation

One of the early acts of the 1930s was to incorporate the Society. President H. R. Kraybill appointed B. E. Livingston, J. B. Overton, and W. Thomas (chairman) a committee to investigate how this should be done. They reported at the 1931 New Orleans meeting (4) that 15 of 22 scientific societies investigated were incorporated, eight of these in the District of Columbia. Incorporation would establish the Society as a legal entity with, "(a) freedom from financial responsibility in any lawsuit against the members on account of any action of the society, (b) the ability to hold property and to receive gifts and bequests...In practice, these advantages operate to give greater security to endowment and any surplus funds of a society..." They recommended incorporation in the District of Columbia or Wisconsin because the procedures were simple (three adult residents could incorporate), inexpensive (\$2 to \$3), and did not require a resident director or office. Meetings could be held anywhere without restriction. In the District of Columbia,

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after recording the articles of incorporation, three people could form a preliminary organization with a *pro tem* chairman and secretary, adopt the existing constitution and bylaws, elect the existing members to the corporation, and adjourn to the next meeting. These last acts would not be so simple in Wisconsin.

The recommendation was adopted, and on June 14, 1932, A. M. Hurd Karrer, C. F. Swingle, F. P. Cullinan, B. C. Brunstetter, and J. W. Roberts incorporated in the District of Columbia in perpetuity as the American Society of Plant Physiologists (5). "The particular business and objects of said corporation shall be to encourage the growth and development of plant physiology as a pure and applied phase of botanical science, to publish the results of meritorious research in plant physiology, and to promote the general welfare and good fellowship of plant physiologists. It shall remain a scientific organization, without the object of financial gain." The incorporators elected Cullinan temporary chairman and Roberts temporary secretary, then elected the present unincorporated members into the incorporated society, and adjourned to the next regular meeting.

In 1936, Loehwing, secretary-treasurer, wrote A. E. Murneek, president (6), that the Bureau of Internal Revenue (BIR) had approached him concerning taxes on dividends received by the Society. Loehwing filed the required not-for-profit affidavit under the above articles of incorporation and was told by BIR (7), "Based upon the facts presented, it is held that you are entitled to exemption under the provisions of section 101(7) of the Revenue Act of 1934 and section 103 (7) of the Revenue Act of 1932." The not-for-profit tax-exempt status was not again questioned.

A corporate seal was adopted (see *Plant Physiology*, "Notes," 1939, 14: 185).

Growth and Money Matters

Table 7 gives the available data on growth in membership, subscriptions, journal pages, and total resources (cash on hand plus investments at the close of the fiscal year, June 30). Figures for 1930 (Table 2) are repeated as a baseline and as the beginning of Gardner's second term as secretary-treasurer (July 1, 1930). Unfortunately there are gaps in the records (as indicated).

The overall trend shows continued growth except in journal size. There are, however, three perturbations: a decline in membership during the depth of the Depression, a decline in membership and subscriptions during World War II, and a surge of publication in 1937.

Initially, the Depression did not alter the Society's growth. Gardner's financial report of July 1931 showed increases in members, subscriptions, and resources, bringing him an exultant letter from Shull that began (8), "Hurrah for the condition of the Treasury!", and, after some questions on funding of the Barnes and Hales awards, continued, "I am glad to see the additional names for membership. It is a healthy growth, and the libraries are paying more than half of our printing bill.

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Table 7
Growth of the American Society of Plant Physiologists, 1930-1945

Year	Annual Meeting	Members	Subscriptions	Journal Pages	Resources \$
1930	Cleveland, OH	424	264 (128) ^a	636	7,182.99
1931	New Orleans, LA	452	296 (—)	748	8,489.70
1932	Atlantic City, NJ	430	299 (—)	765	8,638.08
1933	Boston, MA	397	319 (162)	580	8,348.10
1934	Pittsburgh, PA	414	336 (189)	876	9,693.52
1935	St. Louis, MO	444	377 (228)	841	11,034.21
1936	Atlantic City, NJ	492	416 (259)	900	10,910.65
1937	Indianapolis, IN	—	— (—)	1027	9,321.09
1938	Richmond, VA	610	458 (—)	893	—
1939	Columbus, OH	582	460 (277)	858	11,696.54
1940	Philadelphia, PA	602	403 (218)	785	11,863.16
1941	Dallas, TX	623	457 (254)	858	12,277.88
1942	(cancelled)	572	354 (151)	717	14,663.37
1943	(cancelled)	—	396 (180)	736	—
1944	Cleveland, OH	592	— (—)	732	17,125.79
1945	St. Louis, MO	632	502 (—)	708	18,031.84

^aFigure in parentheses is number of foreign subscriptions.

Do you ever get to feeling happy over the outcome of our struggle for a separate organization for physiologists? I do. I take more pleasure in seeing the growth here than I do in most anything else connected with Plant Physiology."

In a following letter (9), Shull estimated growth at 30 to 50 new members per year and an increase in library subscriptions up to a total of 350-400, after which growth would depend on creation of new libraries. "The income should finance a journal of about 1000 pages, and that is as large any single volume journal needs to be." However, this growth necessitates "assistance with the editorial work [which] is now nearly double what it was when we started...If I had nothing else to do it would be easy; but there is limit to the time I can devote to it [proof reading, checking literature lists, etc.] and I am not willing to actually neglect my University work..."

Shull had additional plans for the increased income of 1930-31, which he confided to Gardner (10):

As we have a surplus, there are two or three things I am interested in, though I can only suggest. It takes the Pres., Sec., and Exec. Com. to act.

(1) So far, I have given all the Charles Reid Barnes money [but] if the Society cared to do so, it could set aside \$1400 permanently, just as it did the \$1000 in a Texas Corp. bond [Hales fund], to go into the Barnes fund. Then the present \$600 [life memberships] would give us \$2000 to complete that fund. As long as the 6 life members are still alive, there would be a deficit of \$30...which

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I would still be glad to give. But it would lift part of that from my own resources.

(2) If the Exec. Com. doesn't want the above, a thousand dollars might be put into the general endowment fund. At present we cannot publish papers with colored plates... The income from this gen. endowment should be kept for any unusual expenses on the Journal. A thousand added to the start given by Thomas & Hurd-Karrer would give us enough to get about \$55 a year, or a colored plate every five or 6 years if needed.

(3) When the society has other matters taken care of soundly, I want to see \$1000 set aside to pay a part of the Secretary's expenses to the annual meeting. It would provide \$50 a year, and that would be a help... Thomas thinks the honor is some pay, but I know it is a lot of hard work... Here are three ways in which surplus can be used to put financial bulwarks beneath our society while it is young. A thing like the Barnes Fund is a wonderful help, for in the long run of time it will add \$100 a year to the endowments, and at the death of life members after the first six, to complete the fund, it would go into the general endowment, to support the publication of colored plates, etc.

You can see why I believe in doing these things now, when we have a little more than we need. If we invest it wisely, we'll never be in the boat the other societies have been in. Our Journal can be a pace maker for all the rest...

So far as I am concerned, I made up my mind some years ago that if possible the science of Plant Physiology should be better off for my having been interested in it. That idea has been behind everything I have done for the society and its Journal since 1924. The plans upon which we started in 1924 did not pan out so far as my personal fortunes are concerned, but I kept on giving the money out of my own personal income when the real estate failed to pay. And I've enjoyed every bit of it—more than any other giving I ever did. It has meant more to me to see things grow and prosper, than anything else, and I have felt rewarded many times over by the results.

The comment that "real estate failed to pay" suggests that the Shulls may have invested their \$20,000 unwisely, but there are no details on this point.

In a follow-up letter (11) of December 19, 1930, Shull reiterated his argument for setting up a Barnes endowment and his willingness to cover personally any deficit until it grew to the point of producing \$100 annually for the award. Interest on this \$100 would pay the Barnes awardee's dues, but upon the awardee's death would revert to the general endowment. "Once it [Barnes fund] is established, it means a permanent addition of \$100 to the available funds of the Society, whether anyone ever gives anything to it or not." Shull also expressed some anxiety over a perceived response to his own giving (11):

I have the feeling at present that the various committees depend too much upon me for information, and feel too much urge to follow my advice about available candidates for the honor [Barnes award]. If the money came largely from other sources, I think a different attitude would prevail. I do not want any special influence with the committees, and the Stephen Hales prize fund is functioning as I think such funds should work—with absolute independence.

The total amount of funds I have put into the Society thus far, not counting the expenses on editorial work, is about \$1460. There is no real need of the

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continuance of it if the Society has funds it can use to do the same work. Some of our friendly enemies insist that it is only my support that keeps it going. That isn't true; but I am willing to let the Society demonstrate what it can do without so much help, and remove that favorite argument from them.

As mentioned in chapter 2, Shull did succeed in getting \$1400 from cash reserves transferred to initiate the Barnes endowment; and in 1931 he was authorized \$300 a year for editorial assistance (12). With the \$25 a month provided he hired Miss M. MacLeod, an editorial assistant on the *Botanical Gazette*, who by 1935 was emboldened to ask for \$35. Shull did not approve (13): "I have personally felt that she is paid as much as we can afford. Last year she tried to bluff by talking about letting some one else have it. As soon as she saw that I was taking her at her word she dropped it like a hot potato!" Shull carefully conserved the Society's funds in order to build the endowments, and Miss MacLeod must be remembered among those who contributed, albeit indirectly, to the Society's advancing investments.

In this same period, however, Gardner had several indications that the Society's prosperity was nested in a troubled copse. There was a decline in renewal of memberships beginning in the fall of 1931. A sharp reminder of the depressed economy was given by the default of the Forman (spelled "Foreman" by Shull) real estate bonds (see later). Gardner lost his own position at the Alabama Polytechnic Institute, Auburn, and wrote Shull (14) on June 20, 1931, "I think I have followed up every prospective opening. Times are very dull. Schools do not want old men [he was 53]...Can live without starving for a while. I plan to continue looking for a place, but do not intend to let it hurt me if I do not get one at once." In October 1932 he added a personal note in letter to Shull (15): "I am out of college work, entirely. The institution is doing nothing for me...I am busy as a bee operating a farm, a dairy, and a purebred herd of Jersey cattle [the dairy had originated as a project for his sons to earn their college money (16)]. How the boys do grow up. I thought of your son as in High School [he was at MIT]. Of course mine are out on their own and drawing good salaries."

Gardner never returned to academic life and felt obliged to resign his office halfway through his third term as secretary-treasurer, June 30, 1933. After 1935 he dropped his membership. His loyal service during the Society's most difficult days is forgotten. (As an aside, Gardner seems to have been the rare associate unafraid to speak bluntly to Shull: "It is nearly time to nominate new officers. I believe some thought should be given to elect either president or vice president outside the 'gang' [Chicago men]" [17]. Again, "I think your editorial board should require some of the long-winded scientists to cut down their papers" [14].)

Gardner could thus empathize with the discouraging letters from people who were having trouble finding \$5 for annual dues. E. C. Miller (18), who had just published a well-received textbook of plant physiology, responded to Gardner's invitation to join the Society as follows:

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I have thought for some time that I would join the Society but there are one or two things about which I should like to enquire. At present I am a member of the physiological section and I wondered if joining the Society automatically dropped one from the section...

I have been a rather passive member of the section and did not join with the society since I was unable to understand the charges and counter charges that were hurled back and forth between the two factions when the society originated. I am isolated here [Kansas State College of Agriculture] and had no means of judging who was right and who was wrong so I became completely disgusted with both sides and kept quiet...I have felt keenly the loss that has come to the science of Plant Physiology in this country due to the bitterness engendered by the split. I hope in time it will be healed and that we will again all work together...

I will be glad to receive an application blank from you. My finances are such however that I can not remit \$5.00 at the present time. If it is necessary to forward the money at this time, I will withhold my application until Feb 1 when I will be financially able to remit the desired amount...

Gardner assured Miller that Society membership did not affect Section membership, and Miller sent in his application and \$5 on March 3, 1932, saying (19), "I trust that it is not too late to get in on this year's subscription to *Plant Physiology*. I did not send in my remittance sooner for the plain fact that I did not have the cash until now."

By December 1932, Shull was also feeling the pinch, and he wrote Gardner (20) from the University of Illinois (where he was on self-funded leave for a quarter—he had failed to find outside support) yet another letter expressing his anxiety over the default of the bonds purchased to support the award endowments:

I personally object to averaging all our good bonds with the defaulted bonds. I think the Hales fund should be backed by sound securities and allowed to have whatever it makes, and similarly the Barnes fund \$1405. It is all appropriated and invested since we got our fingers burnt, and I need the relief personally that giving it its own income would provide. I can stand it still to give \$30 a year, but I don't feel able to give more.

Livingston says he won't give any more money because we made mistakes. I've put into this venture a total of \$1524 that I know of [\$1350 were given initially, chapter 2, ref. 24], more than 10 times what anyone else has put in, and if anyone has a right to feel sore about the defaults, I have...

The action at Cleveland was taken specifically to relieve me of payments that grew burdensome—not because I was tired of meeting them—but because the investments upon which they were based in 1925 ceased to yield income. Then I made it up out of salary until that was cut a total of \$1600 every 3rd year. That took away much of my ability to give, and all I'm asking is a square deal in interpreting principal and income on the \$1405 Barnes principal. I'll see that the available fund gets enough for annual award if that is done...The Society could still award one every two years without me. But the annual award suits me better. Barnes was very kind to me as an undergraduate student, and it means more to me than it does to anyone else...I told Livingston that the annual amount

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now required is the penalty I pay for having started something that no one else is interested in.

As the Depression deepened, more and more plant physiologists were unable to pay dues. Even institutions had trouble. On February 29, 1932, Gardner had to write the Director of the Experiment Station at College Station, Texas (21), "The check which came in payment for your subscription to Plant Physiology has been returned on account of no funds in the Treasury" (it was honored later). By 1933, at the nadir of the Depression, the decline in membership had reduced income below that required to publish a 750-page journal. Although the Society had a reserve fund of \$1000, defaulted bonds had been substituted for \$900 of this amount (22). Shull was reluctant to use up funds in the reduced cash accounts (\$1728 on June 30, 1933 [22]), and decided to limit the number of papers published. He had support from Gardner in this, who wrote Shull (23) in March, "I am pleased to note that you have taken steps to reduce the size and expense of the journal during 1933. I think it is very unfortunate that this is necessary, but the failure of about 100 to pay dues so far indicates very strongly the desirability of this cut down...I think it is highly desirable to maintain our reserves as completely as possible. I cannot quite agree with Dr. Livingston [member with Shull and Thomas on the Finance Committee] that all of it should be turned into the maintenance of the journal and of the Society." (Livingston had written Gardner [24], "Why couldn't the general fund be used [for any expense including] printing the journal, as well as for being put aside in savings or securities?...My general idea is that we should keep going as strong as possible, planning to come out without any excess funds after 2 or 3 more years." Shull's view was that going as strong as possible would weaken the treasury, and thereby the Society.)

After C. O. Appleman took office as president in July 1933, Shull unloaded the problem on him (25):

There are matters of policy to be decided with reference to Plant Physiology, and the Executive Committee should go into the matter...and tell the Editorial Board what policies should be utilized to cure the overproduction of papers, the delay in publication, and the inadequate revenues to handle the papers as rapidly as received. The oversupply of Mss. has had two years duration, beginning in 1931. Our members have been quite cooperative in regard to Mss. although one or two Mss. have been entirely too expensive. We are learning how to detect these and eliminate them. The surplus might be looked upon as due entirely to our acceptance of papers from non-members. Certainly, if we had not accepted papers from non-members, we would either not have a surplus now, or we would have had a larger membership list and somewhat more income all along.

Can we, in view of the fact that 27 non-members enjoyed the privileges of publications in one year, impose a fee upon non-members to have papers published? If that is a good policy, how much should they pay? It ought to be enough to help materially in publishing...Or should we ask the institutions out of

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which these non-membership papers arise to pay a percentage of the cost?...I know the physicists charge \$3.00 per page for every paper published...

As our treasury will be pretty empty after the July number is paid for, I would like advice on the size of the October number. We will have to use reserves for it. It is my thought that only a few short papers, say six or eight all told, should be the limit. There must be an index, of course, to the volume. [He published 9 papers totaling 80 pages.]

To give you a bird's eye picture of the cause of the difficulties, I may say that without any very serious warning, 90 members failed to renew January 1, 1933, because of depressed conditions. About 60 libraries also did not renew. The total lost in these items, almost \$800, would be enough to print a good sized October number...The size of our numbers has been reduced...Last year we averaged about 190 pages per issue. In January we stopped with 176 pages, in April with 146 (24 pages were paid by outside interests) and the July number will be about 138 pages...

The Science Press Printing Company is willing to carry us along until the income can again be put on the up-grade. But it might be wise for the Executive Committee to set temporary limits on the size of papers, number of tables allowed, number of cuts, etc., and impose charges on non-members or their institutions...The budget must be balanced. Naturally we want to keep the volume as large as possible, so that it will be worth the membership price. If we cut too far, then we might lose members because we gave too little.

It is my impression that the Membership Committee has done about all that can be done, and that the expense of unlimited campaigns for membership is likely to cost more than the treasury receives...

I have recently received a complete file of PLANT PHYSIOLOGY for the first 7 years. It is for sale at \$55.00 for the set. If you should know of any institution that needs a complete file, this is an unusual opportunity. The money received for the set will be given to the Society to replace a part of the money lost on one bond which defaulted, and which was sold by the "protective committee" at \$20.00. Poor protection, that, but there was nothing else for Gardner to do but to accept it. This gift will bring it back to \$75.00, leaving only a \$25.00 loss.

At the 1933 annual meeting in Boston the executive committee approved a resolution from Shull (26, 27) to allow members 20 free pages, including no more than five pages of tables and cuts, and requiring payment for any additional space. Non-members were to be charged \$10 per paper in advance (twice the cost of membership). The secretary was authorized to spend up to \$150 "for printing and distributing leaflets calling the attention of foreign libraries and individuals to *Plant Physiology*." Memberships and subscriptions from abroad were increasing and might be increased further, compensating for the decline at home.

Shull printed a note in *Plant Physiology* (28) explaining the reduction in publication:

The October [1933] number of PLANT PHYSIOLOGY will be small, since it is necessary to utilize reserves in order to provide an October issue. Those who drop subscriptions during the depression are voting to discontinue the

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facilities for publication of research. At the same time, authors are more urgent about the appearance of their papers than in normal times. With more material on hand than can be used promptly, each member of the society should aid the membership committee to enlarge our funds for publication. Every new member helps just that much. Each fee pays for one page of printed matter. A few orders for back volumes would be valuable in providing larger funds for immediate use. It is not a question of whether one can afford to subscribe for journals at this time, but whether we can afford not to maintain the usual outlets for publication of material. Research is without much value until it has been published and its results utilized by mankind.

These last remarks make Shull seem insensitive to the very real problems faced by plant physiologists less well established than himself. Does one spend \$5 for ASPP membership or on coal for the winter ahead? As Oran Raber, author of *Principles of Plant Physiology*, explained in dropping his membership (29), "I must economize wherever possible. My membership in the various societies seems to be a place where I can cut expenses... When I get a position [that pays enough] I shall certainly return to the fold." Actually, Shull seems to have been a thoughtful and compassionate man in his dealings with others, unless they threatened his Society. But in the broader scope of his devotion to the Society, he saw membership figures, not members.

Were there alternate sources for supporting the journal? In a letter to Gardner (30), Shull discussed one possibility: "And directors of Exp. Sta's. when they O.K. a paper for publication, should be willing to provide 50% of the costs of printing. If we had such a source of income, we could keep up with our schedules and never have a surplus of unused manuscripts." There is no evidence, however, that the experiment stations were approached for such support. They would not have given it; they had their own problems (e.g., ref. 21).

In the end, the use of the reserves in 1933 was small and was not necessary again. As shown in Table 7, the net worth of the Society fell by only \$290 (close comparison of the fiscal year reports is difficult due to year-to-year fluctuations in receipts and expenditures at the time of audit). Prompt publication had been sacrificed to financial stability, which seems odd for an editor, particularly one who had been instrumental in setting up a \$1000 reserve for emergencies. But Shull saw the security of the Society in terms of sound finances; the journal, although the major vehicle of the Society, was an expression of the science which could more safely be perturbed.

Perhaps he was right. During the following year (1934), the backlog of papers was largely published, the defaulting members started to rejoin, buying the back issues they had missed, and there was a sizable increase in resources. By 1935, Shull's cherished Barnes fund had grown to \$3000 (31), providing adequate income for an award each year. The Depression was far from over, but the New Deal acts and appropriations were beginning to ease the economic distress. Another impor-

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tant factor in the Society's recovery was the slow but continued increase in subscriptions from abroad; U.S. subscriptions actually declined a little while memberships were increasing. Last, there was a steady (and very gratifying) increase in membership applications from the Physiological Section "hold-outs." Shull wrote to Loehwing (32) in May 1935 that new entrants "like Curtis, at Cornell, and Lauritzen of the U.S.D.A., indicate that we are finally getting some of the irreconcilables of 1924 lined up. There have been several new members from Cornell as a result of Curtis's joining, and Michigan is at last becoming active in support." The Society steadily gained ascendancy.

Table 7 shows a puzzling burst of publication centered on 1937. As pointed out previously, Shull had a backlog of papers to publish, but where did he get the money? Although the source is not identified in the financial reports, Shull seems to have obtained a grant for this purpose. An item in the minutes of the business meeting (33) for December 29, 1939, reads, "The Rockefeller Institute of Medical Research at New York City and Princeton, New Jersey, has for three consecutive years donated \$200 per year toward the publication of the journal, PLANT PHYSIOLOGY. This generosity was called to the attention of the Society and the Society voted thanks to the Rockefeller Institute..." The implication is that Shull managed the fund privately. And he managed to keep \$200 coming from the Rockefeller Institute for some years afterward. In a letter to Shull at his Asheville, NC, retirement home on December 4, 1944, Edric B. Smith, business manager of the Rockefeller Institute wrote (34):

It gives me pleasure to enclose herewith a check for two hundred dollars, covering the Institute's contribution to the journal 'Plant Physiology' for the current fiscal year ending June 30, 1945. As in previous years, this sum has been made available in order to make it possible for more pages to be printed in your journal, increasing the facilities for the publication of papers in the field of plant pathology.

Shull sent the check to Stanfield, the new executive secretary-treasurer, who deposited it and informed Loehwing, the new editor. Loehwing wrote back to Stanfield (35), "I am not sure I recognized the organization which is making this grant. Is this the Smithsonian Institution?" Stanfield told him (36) it was the Rockefeller Institute and added, "You will note that he said Plant Pathology. This is for effect in their offices, so states Shull, and all contributions are sent under this heading; that is, plant pathology." Plant disease was a major agricultural concern of the Institute, and Shull must have written his proposal around the need for pages to publish pathological papers with physiological import, or vice-versa.

The figures given under Resources in Table 7 mask a major problem which had arisen with the investments. The Forman real estate bonds, purchased with the funds initially collected for the Hales endowment, defaulted in 1930. So did three other \$100 real estate bonds, one of which on Park Lane Properties (22) was that

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which Shull mentioned as redeemed for \$20. However, for many years the bonds were carried on the books at face value, and the loss was not reflected in the reported resources.

But the loss was reflected in a good deal of chagrin and regret among the officers. Shull wrote Gardner on August 1, 1930, in a letter (37) transmitting his gift to the Hales and Barnes awards, "The finance committee is opposed to investment in very high yielding securities... You can see how things go when we try to get too high rates, by the predicament of \$1000 of our 6 1/2% real estate 'gold bonds'." He added, "Of course, the treasurer must use his own judgment to a large extent, and we expect you to—but the finance committee believe 5% and safety are all we can hope for, and we should be satisfied with that."

But what was to be done with the defaulted bonds? In a letter to Eaton (38) on December 15, 1930, Gardner suggested on the advice of his Auburn banker, that the small (\$100) building bonds be sold and replaced with \$500 or \$1000 municipal, state, or utility bonds, and he added, "I hope you will talk this over with Dr. Shull and be ready to discuss the possibility [at the approaching annual meeting]." Shull did not agree and wrote Gardner (11):

In regard to the bonds, it will not be good policy to try to sell them now. If they are not worth anything, we are no worse off to keep than to sell. If they are to be redeemed, we would lose a good deal by selling now. I would let Foreman Co. have all the time needed to reorder the handling. The main losses arise through ill-advised selling. If they turn out to be worthless, we will have to replace them—but just now replacing the interest by interest on the other funds is all that seems feasible. Of course, Eaton's experience should be taken to heart, and real estate bonds discarded as a type of investment in the future.

Eaton was secretary-treasurer when the Forman real estate bonds were purchased for the Hales endowment fund, and the imprudent investment is credited to his "experience." But it seems unlikely that the purchase would have been made by Shull's junior colleague with money raised by Shull without Shull's approval. Shull's own problem with failure of real estate to pay (10, 20) suggests that he had shared Eaton's "experience."

It is difficult to determine from the archives what eventually happened to the defaulted real estate bonds. They were quickly removed as support for the Hales endowment (12): "The Secretary was instructed to transfer the Texas Corporation bond to the Stephen Hales fund in exchange for the equivalent of the present bonds in that fund." The defaulted bonds wound up in the reserve fund (22), which appears to have been emptied by the purchase of the Texas Corporation bond. Hence, the only real reserve left was that in the cash accounts, which even in 1933 gave some freedom of operation.

Why was Shull willing to sacrifice the cash reserves this way? Clearly, he wanted to stabilize the awards he had instituted, but he also mistrusted banks. As he wrote to Gardner (39) in March 1932, "Before you turn over the treasury to

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anyone else [Gardner, now a dairyman, may have suggested resigning], I think as much surplus money should be invested as possible. In view of the insecurity of banks at various places, many still closing, we ought to keep only as much in cash as we have to."

Trusts had been set up to manage the defaulted bonds, with any returns over expenses used to retire them. In his fiscal year report for July 1, 1937, Loehwing listed the bonds as follows (40):

Reserve Fund, Principal

This consists entirely of defaulted securities of unknown market value, listed here at face value as a matter of inventory only.

1 Woodland Trust Bond 4993	100.00
1 Lake Shore Drive Bond C 140	100.00
4 Foreman Realty Trust Bonds C 20 to 23	400.00
1 " " " " D 13	500.00
9 shares Foreman Realty Trust common stock	<u>unknown</u>
	1100.00?

Loehwing, however, included the inventoried \$1100 in calculating the \$9312.09 of total resources (like his colleagues he wrote "Foreman"). By 1940, though, Loomis excluded this "reserve," less the Woodland Trust bond which must have been redeemed, from the net worth with the comment (41), "Securities in reorganization—making interest payments at reduced rates. Market value unknown."

In the last secretary-treasurer's report (42) before the reorganization with Stanfield as executive secretary-treasurer, July 1, 1944, the defaulted bonds were again listed among the assets without assigned value. The active bonds listed were four railway, two investors trust, one utility, one industrial, one remaining refinanced real estate bond (\$100), and two U.S. war bonds, for a total of \$10,000. Of this, \$3000 was assigned to the Barnes endowment, \$2000 to the Hales, and \$5000 to the life membership and general endowment. Purchase of the investors trust bonds was explained in a finance committee report (43) of December 29, 1936: "All high grade bonds...sell at premiums of 104 to 105 and this fact coupled with callable clauses has led to the decision to purchase a block of the best rated and diversified trust share stock...to be held temporarily until a bond market favorable to the investment program of the Society is re-established." In fact, these and other trust and mutual fund shares were not temporary but continued as part of the holdings.

By 1948, the next financial report we have, the defaulted bonds were no longer reported. Perhaps they were finally redeemed, but there is no record of this. More likely, with the retirement of Shull (who had felt that they might eventually be worth something [11]) and the organization of a business office under Stanfield, someone must have asked if 15 years was not enough to carry these worthless bonds on the books. By this time the endowment investments stood: Barnes, \$4000; Hales, \$2500; life members and general, \$9900, and recovery of the defaulted bonds was

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not important.

As shown by the growth in resources (Table 7), there was no real financial problem after the mid-1930s. With American entry into World War II (1941-1945), there was a decline in foreign membership and subscriptions, but this had little effect on the Society's funds or journal, although there was some fretting over it. Growth resumed rapidly at the war's end. There were more plant physiologists to be served than even the principal protagonist realized (9), for he seems not to have made adequate allowance for growth of the science.

There is in the archives an undated, unsigned document entitled "General Endowment" (44), which from internal evidence must have been written about 1939, probably by the finance committee in the person of Shull, to clarify the purpose of the fund and procedures for augmenting it. These procedures are essentially instructions for rapidly transferring all loose monies to the endowment.

The American Society of Plant Physiologists has attempted for some years to build up provisions and machinery to insure a slow and steady growth of its general endowment funds, in the hope that this fund may return enough to the Society in time to take care of the general expenses and overhead required for the official conduct of the Society. The actions of the Society, and the treasury practices that have been adopted toward this end, may be summarized under six general heads, as follows:

1. Transfers of life membership fees of Barnes members and patrons upon decease of such members—transfers to be made immediately following decease. (Established in 1925, at the time the life membership plan was approved.)

2. That portion of each patron's fee [\$200 or more] above the amount necessary to support the patron as a life member (\$100) in receipt of Plant Physiology for life—excess to be added to the general endowment at time of receipt of patron's fee. (Established at the time the patron membership was established in the constitution [June 1929].)

3. Monies received from sale of back numbers of Plant Physiology which are at the time over five years old (before Jan. 1, 1932, during the year 1938)—income to be added as received during the year. (Action taken at the Boston meeting, 1933, deferred in taking effect till 1934.)

4. Surpluses left in the available funds after awards have been made, annually in the case of the Barnes awards, biennially in the case of the Hales awards,—surplus added to general endowment on January 1 of the calendar year following that in which the award is made. (Action taken at Indianapolis in 1937.)

5. Interest on any uninvested funds of the general endowment held as cash in the savings account of the Society—interest added to principal semiannually at time interest is paid. (This has been merely a general practice of the treasurers over the last ten years, ever since the first gift of \$100 was made to the general endowment by Walter Thomas.)

6. Gifts and bequests made by anyone directly to the general endowment fund, and gifts made, without designation to some other specific fund, to be added as made, or received. (This has been in effect since the general

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endowment was provided for in the constitution of the Society.)

The general endowment, along with the award endowments, was an obsession of Shull's, and every instruction in this anonymous document, including the formation of the fund, can be traced to him and his relentless drive for fiscal security. He had grand plans for the endowments which he confided to Loehwing (45):

I am looking at our society not as an ephemeral thing but a permanently growing thing that some day should be able to do big things—make research grants, adopt programs requiring outlays of research money. Endowments do such things, and like a snowball, endowments attract money as they grow. It's just a pipe dream, I suppose, but one that attracts me very much.

In a letter to Kramer (46) (secretary-treasurer, 1941-1943) discussing the above report (44), Shull wrote that \$3000 in the general endowment, "represents only a face-value investment after a severe juggling which took good bonds out of the general endowment, and replaced them with poor stocks at face value. The finance committee will allow no more stock purchases, and no more unauthorized bond purchases. When there is money to invest the finance committee will be responsible for choice of the bonds." The records do not show when the finance committee was authorized to direct the investments, rather than advise them.

Shull was perennial chairman of the finance committee and controlled it. And the appointments to it. President Cullinan wrote Loomis (47): "I fear that Dr. Shull may be offended if his recommendation is not followed. He told me definitely at Philadelphia that he should like to have Thomas left on the [finance] committee." Loomis replied (48), "The finance committee appointment is your trouble...I think that we might feel the democratic thing to do in this case is to rotate the responsibility among other members of the Society." Thomas was reappointed.

Shull did not take advantage of every opportunity to augment the treasury. In transmitting a printing bill to Kramer for payment, he wrote (49), "I note that Science Press in the charge for engravings made a mistake in the decimal point, which results in the charge being \$113.01 too low. I have indicated this and O.K.'d the bill for \$1287.55, which should have been rendered...They seldom make mistakes, but I never turn them in without calculating them to see if they are correct."

Increased sales of back volumes to libraries made a steady contribution to the general endowment. In a letter to Loehwing (50), who became secretary-treasurer in July 1935, Shull added up the back volumes at library rates and came up with \$9486 of potential future income (Shull had gained confidence in future sales and had press runs with overages of about 200 copies). Including these holdings, he calculated a net worth "approaching \$20,000 at the close of publication of volume 10. You will not wonder that I have been pleased and happy in spite of all the hard work that has been involved..." He carried on with a pep talk: "I hope that there will be pleasure enough in it to make it something less than drudgery to you. We have

together a great opportunity to continue to guide the forward march of plant physiology as a science, and to build such a foundation that future generation of workers will be glad we had the courage to give our lives to this work." Loehwing, a favorite past student of Shull's, replied in his rather formal way (51), "It is the privilege of working together with you on this project of such great interest to both of us that leads me to undertake the work with enthusiasm." (Loehwing's records and correspondence indicate very careful and conscientious work, but his enthusiasm for it is less evident.)

Publications

Shull continued as editor-in-chief of *Plant Physiology* throughout this period, finishing with volume 19, 1944. There was very little change in the journal during his 20 years of editorship (1925-1944)—same printer (Science Press of Lancaster, PA), same font and format, issued quarterly, sometimes a bit late. Early in this period, unnecessarily long papers were still being published (one of 55 pages by W. Thomas, who served with Shull on the finance committee, provoked the critical comment from Gardner mentioned earlier [14]). However, by the time he retired Shull had become more strict, and only two papers in volume 19 exceeded 20 pages. More surprising is the lack of any major change in the kinds of papers being published. Judged by the journal, plant physiologists were doing much the same kind of research in 1945 as they had done in 1925.

Table 8 classifies by five-year intervals the papers published from 1931 to 1945, corresponding approximately to the Depression, the New Deal, and World War II. Classification of the papers is imperfect: is a paper discussing the effects of water deficit on photosynthesis to be classified under water relations, environmental stress, or photosynthesis? The classifications given in Table 8 are based on what appears to have been the subject of major interest. It must be kept in mind that studies in some subject areas were not far advanced—papers classified under biochemistry are more likely to deal with the carbohydrate or organic acid content of plants than with the enzymes that metabolize them.

Perhaps it is too extreme to say that the journal underwent no important change during Shull's editorship, for some changes arose from new discoveries and broadened interests. The concept of plant growth regulation by hormones, or growth-regulating substances (initially disbelieved by plant physiologists who had, or thought they had, evidence for nutritional regulation [52]), was affirmed by the discovery of indoleacetic acid, which provided new avenues of experimentation. After 1935, papers on hormones and other growth-regulating compounds appeared (ethylene was not yet thought of as a hormone, and most of the ethylene papers of Table 8 fall in the category "Fruits"). However, there was more hormone research published than indicated by Table 8. Many of the more important auxin papers of this period appeared in the *Botanical Gazette* or the *American Journal of Botany*.

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Table 8
Classification of Papers Published in *Plant Physiology*, 1931-1945

Category	Number		
	1931-1935	1936-1940	1941-1945
Methods, techniques	49	39	48
Mineral nutrition, ion uptake	51	55	60
Biochemistry, metabolism	38	52	37
Response to environment, stress	29	33	27
Growth, development, tropisms	29	23	21
Photosynthesis, respiration	16	24	18
Water relations, vascular transport	19	33	27
Pathology, injury, toxins	11	18	26
Biophysics	9	11	6
Fruits: growth, ripening, storage	8	7	8
Seeds: formation, germination	8	5	8
Flowering: photoperiod, vernalization	4	7	6
Hormones: growth-controlling substances	1	13	14
Miscellaneous	11	6	6
Totals	284	326	312

Which may not have bothered Shull. His early understanding of hormones is apparent in a June 1935 letter to Loehwing (53): "The heteroauxin has been received, and we will find some place to use it in our work. Did I mention Roger J. Williams 'Pantothenic acid'? Do you know whether there is any possible relation between his compound and the one you have prepared?"

The one area that grew steadily over these 15 years was in research associated with pathogens and with plant response to injuries and toxic compounds. Interest in plant protection had extended into details of the plant's response, a trend that continues.

But these trends do not bespeak any basic change in Shull's way of editing or the kinds of papers that *Plant Physiology* attracted. The journal may be fairly described as conservative, serving a membership primarily interested in the physical and chemical aspects of plant life and in the analyses needed to determine them. The journal was diversified, however, by a scattering of papers not so evidently physiological, perhaps from more biologically oriented members. Loehwing must have passed on some criticism of these outside papers to Shull, who replied (54):

If we are publishing papers too far outside our own field, the Exec. Com. might make some definite and specific recommendations as to what types of papers should be excluded...I don't care much who belongs, or who publishes in it, if the paper belongs in our field. Botanists are becoming more "plant physiology" conscious all the time, and they evidently want to belong and

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receive the journal. The original idea was service to a large group of related fields. I think we are admirably fulfilling the ideals set forth in the foreword of Vol. No.1, Jan. 1926 [cited earlier in Chapter 2].

The journal published more than research papers. Shull continued to educate the members by publishing short biographies of notables in the history of plant physiology or of related fields (*e.g.*, Jethro Tull in *Plant Physiology* 16: 223-226, 1941). He printed obituaries of deceased members and honored important senior members on their 70th birthdays. Each issue had a "Notes" section which notified members of Society affairs and meetings, occasionally with a gratuitous appraisal ("Main features of the annual meeting were the incessant rain, the Sachs centennial celebration and the annual dinner...In view of the small attendance at the banquet, it seems to be a mistake to place this function at the end of the meeting," 8: 343, 1933).

There were always brief book reviews, and in time the "Notes" carried most of the obituaries. Instructions for authors were included, plus any notices relevant to publication: *e.g.*, the limit on manuscripts has been extended to 24 pages, the proportion of tables and cuts left to editorial discretion (11: 215, 1936); papers will not be printed until the abstract for *Biological Abstracts* is received (12: 224, 1937); the editor is absent on leave for the spring quarter, and papers should be held for submission until he returns (12: 563, 1937); the charge for resetting galley and page proofs will be 12 cents a line (14: 396, 1939).

One other publishing venture was undertaken in this period. There was a low-voiced but persistent opinion that the Society should publish reviews that would bring specialized research topics into focus for teachers and non-specialists. In 1936 a committee, chaired by Murneek, was appointed to investigate the need and support for reviews. It reported favorably on publication of critical reviews, initially as periodic supplements to the journal (55). But nothing was done. Starting such a venture would have required Shull's active support and, although he was a member of the committee, he must have had reservations about taking on extra work in the form of review supplements.

However, in 1940 a new approach emerged. For the Philadelphia meetings in 1940, W. Seifrizz of the University of Pennsylvania, had arranged a very successful symposium, "The Structure of Protoplasm," and the executive committee decided to publish it with Seifrizz as editor. Loomis checked with Shull, who approved (56), saying, "I believe we might undertake ultimately to build symposia with the best workers invited, with the deliberate intention of making monographs of them." Loomis, now chairman of the monographs committee, told Seifrizz (57) to proceed with collecting and editing the manuscripts, but that Sponsler's proposed 60-page article was largely published already, and unless there was new material "there might be room for some fading." The Iowa State College Press agreed to publish, subject to contract, taking the entire responsibility without security from the Society, "but in this case [ASPP] will wish to charge \$3.00 or \$3.25 for the book.

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If we are willing to underwrite its publication to a moderate extent, the price can be considerably reduced..."

The Society did underwrite the monograph, apparently for \$500, and sold it prepublication for \$2 (at least \$20 in today's money). It was a success. From April to September it sold over 400 copies (58), which greatly encouraged Loomis, who began to think in terms of a photosynthesis symposium. But this had to wait until after the war.

By the mid-1930s, when the post-Depression surge of growth began, the journal had gained a good deal of respect, even from the "hold-outs" of the Section. Loehwing wrote Shull (51), "In talking with Crocker and some of the Boyce Thompson staff last summer they were unusually enthusiastic in their praise of the Journal and I think that if we can only show them how to enter the Society without loss of face they would be glad to come in and put their shoulders to the wheel."

Although documentation is sparse, the success of the journal in the late 1930s was paralleled by a growing dissatisfaction in the handling of the papers, which appears to have been slow and erratic. In April 1937, Livingston in a letter to Loehwing (59) compared the *American Journal of Botany* (AJB) and *Plant Physiology* with respect to cost of printing and editorial policy. He reported that the new two-column format of AJB had reduced printing costs by about half, and wondered if *Plant Physiology* should not investigate; "I haven't pushed this idea with our editor, and I feel sure he would oppose it." Livingston was pleased with the handling of papers in AJB, whereas with Shull, "manuscripts get more or less tampered with and the author has no knowledge of this until he sees the galleys. Then one thinks of printers' charges and says, 'oh, let it go'."

At the executive committee meeting of December 28, 1937, there must have been a discussion of some of these complaints, because the following editorial decisions were included in the minutes (60):

6. The Executive Committee authorized Dr. Shull to proceed with the method now in use in classifying and publishing papers in the Journal and to continue publishing papers within each classification group in the order of their receipt. The Executive Committee further approved the method of publishing papers without date of receipt from the author.
7. The Editor of *Plant Physiology* was instructed to change the form of brief papers to conform to that of longer papers now published in the Journal... It was recommended that the practice of not publishing signed book reviews in the Journal be continued.
8. The Executive Committee authorized the Editor, Dr. Shull, to obtain the services of a competent Assistant Editor, trained in *Plant Physiology*, to be appointed July 1, 1938.
9. The budget of \$420 for the expense of the Editor's office was approved, this to cover the salary of the Assistant Editor and postage costs for the mailing of manuscripts and proof.
10. It was suggested to the editor that when two or more papers were submitted for publication at one time by the same author that but one paper be

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published in a single number, and that the editor use his judgment as to how often the same author may be entitled to space.

11. It was recommended that the editor regularly submit manuscripts accepted for publication to two reviewers, who may be members of the Editorial Board, or other specialists in the field covered by the manuscript, who are members of the Society.

Shull clearly needed the editorial assistant (item 8). Publishing papers without giving the date of receipt (item 6) would eliminate public evidence of the delays some authors were claiming. Item 11 suggests that papers were accepted for publication before they were reviewed, which seems unlikely unless Shull sent out for review only those papers that passed his preliminary scrutiny (this remains undetermined). Although these decisions on editorial matters are attributed to the executive committee, they undoubtedly represent approval of proposals made by Shull to counter criticisms of the type made by Livingston.

The classification groups mentioned in item 6 are something of a puzzle. Perhaps what is referred to is the sorting of manuscripts as described in the executive committee minutes of the 1937 summer meeting in Denver (61):

With reference to publications in Plant Physiology, the following practice is adopted:

'The papers offered to Plant Physiology for publication and accepted by the editors are filed in three separate series. Those papers which will print from 12 to 24 or more pages in length are filed in consecutive order of receipt. Papers ranging in size from 12 to 4 pages in length are placed in a separate chronological file of short papers. Papers printing less than four pages in length are filed in order of their receipt as Brief Papers.

'In selecting papers for any given number of the Journal, papers are taken from these files, chronologically from each of the three files, to provide an appropriate number of papers, approximately 20 for each issue. Usually about five or six of these are of the longer classification, a slightly larger number of the shorter ones, and the brief papers are usually exhausted for each number. The latter are not allowed to accumulate. This method of selection has been adopted in order to provide outlet for about 20 authors each quarter, and to provide a more varied content than could be obtained by strict chronology without regard to size.

'At the time each number has gone to press, the files have contained from 10 to 20 manuscripts left over for future use. The oldest manuscripts in the file after a number has been closed is usually about 6 months.

'Institutions that agree to pay the complete costs of publishing individual papers are permitted prompt publication for those papers, but in no case is a "paid for" paper allowed to appear sooner than any other paper in the files on that same subject, which bears an older date in the files. No "scooping" is allowed within our own files by institutions or authors paying for early publication.'

The editorial assistant turned out to be J. Fisher Stanfield, whom Shull

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probably had in mind, and who later became business manager, and still later executive director (see earlier discussion under "Officers").

The addition of an editorial assistant did not solve the problems of publishing delays, so the following year the executive committee seems to have authorized appointment of a secretary to the editorial board (minutes of the executive committee meeting for December 1938 are missing). An announcement of this action appears in "Notes," 14: 610-11, 1939:

The changes in the editorial service ordered at the Indianapolis meeting in 1937 increased the necessary work and keeping of records very materially. With the doubling in size of our official journal, the editorial responsibilities had grown to such an extent that there was not enough time to take care of all of the required work in a single office. The handling of manuscripts previous to their use interfered with the progress of the journal through the processes of manufacture. Serious delays arose, and these have forced us to adopt certain changes to relieve the pressure upon the editorial functions. Every member of the Society should note these changes and cooperate with us to render the service most promptly and efficiently.

The receipt and handling of papers during critical examination and revision has been placed in another office. Dr. Walter F. Loehwing...has consented to serve as secretary to the editorial board. All manuscripts should be sent directly to him. He will send them to readers in whose field the papers fall, communicate with the authors as to advisable revisions, and assume full responsibility for care of the manuscripts until they have been passed upon by the editorial readers. Papers which successfully pass these requirements are then transmitted to the editor-in-chief, presumably to be used, unless there are obvious reasons for some other course. The editorial office will concentrate upon the problems of getting the journal out on time, meticulous editing of the papers, indexing of volumes, and all other matters concerned with the issuance of the journal, preparation of author reprints, etc. This division of labor, it is hoped, will render the service less burdensome, lead to more prompt and efficient handling of our publication activities, and yet maintain the same standards of excellence for PLANT PHYSIOLOGY. Authors of papers are requested to send their manuscripts directly to Dr. Loehwing; and please do not ask us to read and advise about papers which are not yet ready to be submitted. There is no time available for such advisory services.

It is difficult to identify any "changes in the editorial service ordered...in 1937" which increased the work load (60)—indeed, the work should have decreased with the employment of an editorial assistant. The size of the journal had doubled, yes, but only with respect to volume I. Shull's meticulous scrutiny of each paper did overload him with editorial work, but this could have been said without hyperbole. The real problem was excessive delay in getting papers published.

The appointment of Loehwing to get the reviewing done, and the employment of Stanfield to do much of the editing, seemed to ease the criticisms somewhat. An undated letter from Stanfield to Kramer (62) (probably late 1941) suggests that

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Shull's health may have been a factor in the need to reduce his work load:

Our situation has changed markedly since 1939 when I began working with him. He is better physically and the work has been cleared up to a remarkable degree between us. I will admit that I do not like this late release as in the last number but that is not my responsibility. I guess we did have a serious condition existing three years ago but not for the past 18 months. Many short papers have gone through in 30 days. I know of one paper that lost three months because he [author] had it in such poor shape that I had to return it for copying; we refuse to accept or send to the printers poor copy. I often have to copy pages and even rebuild tables for publication. They just do not give enough attention to them or do not study our journal first; some big men are guilty of this and then they object and say we are too slow. That was once true, Kramer, but not now. I am happy to make this statement. We are out of the woods and I hope to continue this way in the future. It takes hours of work and is an endless task. Of course, with more funds we could hire more done but we want to KEEP our money if we can.

Stanfield's last statement sounds as if he were a Shull disciple, and he was. Shortly after he became business manager, Stanfield concluded that a contract was needed with the printer but he had to write Kramer (63): "Dr. Shull has handled [arrangements with Science Press] and apparently intends to continue doing so...Dr. Shull is a wonderful man and I shall do nothing to even suggest an insubordinate attitude. Since I work rather closely with him on the editorial end I shall let him handle this in his own way."

Kramer's reply (64) was, "I probably can understand one reason why you are reluctant to start any move about a more business-like agreement with the Science Press. Dr. Shull has handled all of the business so long that he probably does not think any one else could do it as well as he...I suspect that he is a difficult man to assist beyond a certain point."

Not everyone saw as much improvement in the mechanics of publishing in *Plant Physiology* as Stanfield. Loehwing, as secretary of the editorial board, received complaints and suggestions that might better have been sent to Shull, except that Shull's personality seemed to inhibit even implied criticism. F. W. Went wrote Loehwing (65):

I was glad to hear that you have been able to print all manuscripts accepted. However, I don't think you have taken into account the fact that many more articles would be submitted if publication were more prompt. The long delay in publication, between submitting the manuscripts and the final printing, automatically reduces the number of manuscripts which are submitted. I think that this a more serious objection than the mere time delay. For articles on subjects which deal with most up-to-date problems in which research continues actively will not be submitted for publication. In this way there exists a certain danger that the journal will have a greater proportion of articles which have no timely interest. This was clearly demonstrated eight years ago with the contents

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of the American Journal of Botany. Their policy of speeding up publication has resulted in a remarkable improvement in the quality of the papers published. I don't want to reflect in the least on the quality of the papers in Plant Physiology but I only want to point this fact out as a possible danger for the future. And I only want to point out that even when all papers submitted can be published in the course of time, this does not prove that publication costs are not too high.

Loehwing sent a copy of Went's letter to Kramer (66), suggesting that it might be discussed informally at the forthcoming meetings in Dallas (December 1941), and saying that it was of great personal interest to Shull. "Similar questions have been brought up repeatedly in the past, and in my judgment often resulted in ill-advised editorial policy which has entailed complications which the members of the Executive Committee could probably not anticipate. The difficulty to which Dr. Went refers resides largely in the fact that ours is a quarterly instead of a monthly journal."

Kramer replied to Loehwing (67):

Apparently Went's complaints are the length of time required for publication, and the cost... I have had some questions about both of these problems myself, and may have written you about this a couple of years ago.

I have not published as many papers in Plant Physiology as in the American Journal of Botany simply because of the uncertainty as to what would happen to the manuscript. For example, several years ago I sent Shull a manuscript and after waiting six months I wrote and asked about it and he said he had looked for it in the files and since it was not there it must have gone to press. On another occasion he wrote and asked if a certain manuscript had been returned to me by a reviewer as he could not locate it. Fortunately it was later found. When I send a manuscript to the American Journal of Botany it always goes through the same routine. I promptly receive a postcard acknowledging its receipt, and in six or eight weeks have it returned with the reviewer's comments. When returned to the editor I presently receive a card saying that it will appear in a certain issue...it gives one a feeling of satisfaction to know just what is happening...

With reference to cost of publication you also are much better informed than I. Plant Physiology must have a high cost per 1000 words of text because of its wide margins and general high class format. Presumably we could print as much text at less cost by adopting a different format, resembling that of the American Journal of Botany for example [two columns]. Doubtless Dr. Shull would oppose this...If we are faced with the alternatives of seriously reducing the number of papers published or changing to a less luxurious format I would chose the latter. One hesitates to hurt Dr. Shull's feelings since he has done so much for the Society and the Journal. Incidentally I believe that so far he has not turned over any of the business details to Stanfield...You might encourage Shull to make use of Stanfield as much as possible.

Loehwing replied to Kramer (68) in his usual measured terms:

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The editorial matters referred to in Dr. Went's letter, as I stated, are sensitive points with Professor Shull. It has been the considered opinion of the Executive Committee in the past that the Society has profited to such a large degree financially by having the service of Professor Shull *gratis* as an editor, that it would be unwise to adopt any editorial policy or change in format of the Journal that might force him to resign as editor...the cost of hiring an editor would more than offset any economies achieved by a change in format or a switch to a monthly journal.

The sort of difficulties with lost manuscripts to which you refer I hope has been overcome by having a secretary of the Editorial Board, charged solely with...keeping track of the manuscripts. We do avail ourselves of considerable time in editorial scrutiny of our manuscripts, but this usually entails no delay in publication. Authors now receive acknowledgment of the receipt of manuscripts on the day it arrives and publication takes place in the order of receipt. We also send a card to the author definitely advising him of the acceptance or rejection of the manuscript, as soon as the Editorial Board has acted. Hence, there is really no delay in publication due to leisurely editorial scrutiny.

I am fully aware of the fact that [members] prefer to use the AMERICAN JOURNAL OF BOTANY when early publication is desired. Having listened to discussion of these questions perennially since the formation of the Society, I believe that I can safely venture the guess that any recommendation on the part of the Executive Committee to shift to a monthly basis for PLANT PHYSIOLOGY or to adopt a format of the AMERICAN JOURNAL OF BOTANY would result in Dr. Shull's resignation as editor. Naturally, we would very much regret to see him sever his connections under unpleasant circumstances.

We must, however, face the fact that this is probably his last five year term as editor and that he will be [sic] asked to be relieved. If my recollection serves me right, he was appointed for a five-year term at Madison, in 1939 [correct], so that we must look forward to his probable retirement in 1943 or 1944.

These letters provide examples of the two major attitudes toward the journal. One view was that a much more efficient job of editing and printing needed to be done, and the other was that the Society owed so much to Dr. Shull it should not offend him by making these changes—rather wait and make them when he retired in 1944. If he were angered and resigned, the Society would have to hire an editor (not likely; small societies seem always to find editors willing to work out of a sense of duty or for the honor).

But why should it have been so hard to persuade Shull to adopt a publishing format and schedule like that of the *American Journal of Botany*? It not only would have accelerated publication and increased submissions, but also would have saved the Society money, usually a concern of the first rank with Shull.

There is no definite answer. Shull seems to have viewed the Physiological Section as an adversary or competitor and measured the success of the Society and *Plant Physiology* in terms of the Botanical Society counterparts. Hence, adopting improvements they had introduced would be to score one for the enemy, with a consequent loss of face. On the other hand, Shull also viewed the success of the journal as clear evidence for fully adequate (even superior) editing and printing.

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And Shull was a true anti-New Deal conservative, not about to let a secure procedure go for an unproved one espoused by young reformers.

At the suggestion of Shull (69), and with authorization of the executive committee (70), E. C. Miller (president, 1941-1942) appointed a committee consisting of Stanfield (chairman), Loehwing, and Shull to investigate printing costs. The following year, 1942, there was no annual meeting, but Loomis (president 1942-1943) circulated a summary of the committee's report to the executive committee (71). "An extensive study of effect of format, cuts, tabular matter, etc., on printing costs has been made. Minor changes, such as the omission of blank pages and more careful editing to reduce correction costs, have reduced printing costs about 5 per cent." The committee recommended that there be no change in printer and that cuts and tabular matter should be no more than 25 percent of a paper. In short, the committee endorsed current practices, as could have been predicted from its composition.

A letter from Stanfield to Kramer (72) explains the decision more completely: "Changing a format...involves a far reaching change in editorial procedures and even preparation of papers...it will also involve a much heavier load of editorial work...In the final analysis it boils down to whether we want a change or want Dr. Shull for he will not work these last few months under a new routine."

The minutes of the executive committee meeting at which the study of printing costs was authorized (Dallas, December 1941, the last meeting for three years), report a minor revolt on the part of the membership (70). C. B. Lipman, Dean of the Graduate School, University of California, Berkeley, who had served on the editorial board since its inception, was up for a five-year renewal of his appointment. Shull was not at the meeting to move the appointment (the first meeting he had ever missed; he had to testify in a suit involving American Cyanamid, for whom he had done some research [73]). Instead the task was done for him, probably by Loehwing. The relevant minutes read:

9. Recommended that C. B. Lipman be reappointed to the Editorial Board of Plant Physiology for a period of five years. (Not approved by the Society). [Alongside is handwritten, "Approval of Society not required".]

It was recommended from the floor that members of the board not be reappointed.

Apparently, at the business meeting the actions of the executive committee were reviewed (minutes are missing), and this one appointing Lipman was disapproved. Some members were tired of having the same old group pass on their papers and spoke out against routine reappointments.

The authorization for the editorial board in Article IX(5) of the constitution as amended July 1, 1941 (74) says nothing about reappointments.

The editorial board shall consist of eight members, five appointed by the Executive Committee, one each year for a period of five years, and three

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elected by the Society, one each year for a period of three years. The editor of the official journal shall be chairman of the editorial board.

Bulletin No. 13 lists seven editorial board members plus Shull (74), who was the eighth appointed member. Loehwing's appointment as secretary of the board was not authorized in the constitution (74). Since reappointments were not forbidden, they were assumed permissible. There was no requirement for Society approval of editorial board appointments made by the executive committee. But what happened when the members voted disapproval of an executive committee action?

In this instance the executive committee decided to reappraise its action. Kramer explained it (75) to F. P. Zscheile, Purdue University, a member of the executive committee who had been unable to attend the Dallas meeting and who had received an outraged letter from Shull:

The Executive Committee (or some five of the members) met at Dallas and made some recommendations for action at the business meeting the next day. Eight of these were discussed and approved... The ninth relating to the reappointment of Dr. Lipman to the Editorial Board was also read. There was some comment from the floor criticizing the immediate reappointment of a member at the end of a term and suggesting that occasional changes in personnel of the Editorial Board would be desirable. Dr. Loehwing pointed out that power of appointment was vested in the Executive Committee and that the membership could merely discuss, but not control the appointment. A motion was then made and passed recommending that the Executive Committee not immediately reappoint a retiring member of the Editorial Board.

In view of this action Dr. Loehwing, who is secretary of the Editorial Board, suggested that I send out a list of eligible persons to the Executive Committee and ask them to nominate some one to fill Dr. Lipman's place with a view to getting a man in one of the fields in which we have been weak. I therefore sent out the letter which you received in January.

Dr. Shull seems to view the whole proceeding as an attempt of some clique to gain control of the Journal. He argues that the whole procedure was unconstitutional and anyway he wants Lipman on the board. There has been a feeling in some quarters for several years that we could use a little new blood on the Editorial Board. There has also been pressure to make changes in the format of Plant Physiology. All of this has been strongly opposed by Dr. Shull, partly wisely, but partly, I think, unwisely. I have no doubt that decreased income and increased cost of printing will force us to make some changes in format. No one has any objections to Dr. Lipman who has been a very useful member of the Editorial Board ever since it was set up. I think, however, that there is a growing feeling that the same people have always controlled the Society's policies and we should probably make some concessions to this sentiment.

Personally I have very little feeling in the matter, except that it is very unfortunate to hurt Dr. Shull's feelings since he has contributed so much to the Journal. Nevertheless I expect he will eventually have to defer a little to the views of some of the other people.

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On the same day, March 17, 1942, Kramer wrote Loehwing, who had been advising him, a less temperate letter (76):

Although I have not been favored with a letter I understand that Dr. Shull has been writing various members of the Executive Committee complaining about our action. At least two members have so informed me. Threatening to resign was a childish bluff which I wish we could call. He probably has a legal technicality to argue on. I should have put a statement in my letter to the Executive Committee specifically asking for reconsideration of our action at Dallas. Then there would have been no room for any sort of argument.

His jealous concern over any action regarding the Journal which he regards as inimical reminds me of Dr. W. C. Coker...regarding the Elisha Mitchell Journal. Dr. Coker has been editor for years, has put money in it ...and now regards it as his privilege to decide everything about it. Since Dr. Shull has contributed so much of his life to Plant Physiology one hesitates to hurt his feelings. Nevertheless sooner or later he will have to defer to the views of others regarding certain things.

One of the two executive committee members who wrote to Kramer was Loomis, who enclosed the following letter from Shull (77), which shows no deference to anyone:

As chairman of the Editorial Board of Plant Physiology, I am protesting and contesting all of the actions in the Society Business Meeting following the Executive Committee reappointment of Dr. Lipman to the Editorial Committee. The reading of Exec. Com. minutes to the Society Business meeting was not a correct parliamentary procedure, and since the Exec. Com. is solely empowered to appoint the 5-year appointees, no Society action could change that after the appointment had been made.

At best their action could be accepted only as expressing a wish. The Exec. Com. is absolutely free in its work, and I am sure will not in the long run accept even the wish, because the legislation would be unwise, even if were it not an unconstitutional infringement...

The proper functioning of the editorial work requires continuity of service, and I will not work on a board that is constantly shifting with untrained men who do not know past history and past decisions...I have suggested to Dr. Miller that if any one wants to change the Board, take my name off. I've been on longer than anyone else, so if any change is to be made, that is the most appropriate change. The Society was given three members to play with, and that is enough. Kramer thinks the Society's action removed Dr. Lipman's name from the board, but nothing could be farther from the truth as I see it. The Exec. Com. minutes show that Lipman was reappointed. The only way that action can be reversed is by a rescinding of the action by the Exec. Com. This was not done, and if it is done, now or at any later time, I shall consider my service on the journal as ended. I have laid aside the unfinished April no. until we can straighten out this matter.

We cannot afford to let any local feeling in California about Dr. Lipman guide our actions...It is not a question of whether he is liked by a few people, but

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whether he is needed on the Board. He is the only man on the 5-year appointment section who knows everything back to the beginning, and...is the best aid I have on policies of the journal. That should outweigh all other considerations. When it does not, I want to be relieved from the job altogether. I am putting it plainly to other members of the Exec. Committee, for I want the situation understood as it is from the inside of the editorial work. I don't know what your own idea of this may be, but I am asking the Exec. Com. to consider my needs as paramount in such decisions.

Loomis' comment to Kramer (78) was, "Technically, I suppose he is right on the two points that the men who proved most effective should be retained on the Board and that official action by the full Executive Committee was not taken to rescind the appointment..."

There are several other letters on this editorial board appointment, but the above provide a fair representation of the positions taken. There was a general feeling that the desire of the membership for a more deliberated appointment to the editorial board should be honored, and that a reconsideration of the Dallas action would be in order. However, the membership also recognized that Shull had a technical point in his favor, and they did not wish to offend him, especially not to the point of provoking his abrupt resignation. It would have been very difficult to replace him at short notice, or even to assemble the executive committee to discuss the matter.

In the end Shull won by default. There is nothing to indicate any reversal of the initial reappointment of Lipman. In April 1942, Stanfield wrote to Kramer (79), "The Lipman affair is apparently quiet. Perhaps it is best to just let it die..."

And die it did. In volume 17, 1942, Lipman is listed on the editorial board with 1946 after his name to indicate the termination date of his appointment. The five-year appointees are listed beneath Shull and Loehwing. Then a line is drawn, and beneath it appear the three elected members that the Society was given to play with.

In September 1942, Shull wrote Kramer (80) a friendly letter on a number of topics, concluding with an indication that he would not want reappointment as editor in 1944 when his term expired. He suggested that Kramer's agenda for the upcoming New York meeting should include appointment of a committee to identify a new editor-in-chief. "I expect to be where the editorial work could not properly be done, so this is a must item so far as planning is concerned."

The New York meeting was cancelled at the request of the Office of Defense Transportation. Instead, the president, W. E. Loomis, sent the executive committee a 10-page letter (71) listing 11 items of business and asking for a vote on each. "This communication will constitute our annual business meeting... Will you indicate your preferences on each of the items of business and return these sheets promptly to the secretary." Item V reads, "Dr. Shull has asked to be relieved of the editorship in 1944. It has been suggested that a committee be appointed to survey the situation

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and make recommendations to the Executive Committee for action. Approved? "It was, and in May 1943 Loomis appointed a committee consisting of O. F. Curtis (chairman), F. P. Cullinan, B. M. Duggar, G. W. Scarth, and S. F. Trelease. The committee's report was taken up at the executive committee meeting held in Chicago, January 29-30, 1944 (the usual December 1943 meeting was cancelled at the request of the Office of Defense Transportation).

The committee's report dealt with more than nominations (81):

In its preliminary discussions the committee agreed that, although the early development of Plant Physiology has for the most part been a one-man job, it is now the official journal of a large and well established society and therefore the editorial policies should be under the control of the Society through the editorial board. Although the board should have chief responsibility in determining policies and in selection or rejection of manuscripts, the final responsibility must...rest with the editor in chief because the members of the board are widely scattered...[The editor should] be one who has recognized standing among physiologists, has wide interests in the field of plant physiology and has an interest in the success of the Society. He should also have the ability to evaluate critically, objectively and impartially, manuscripts that deal with varied aspects of plant physiology.

The committee has noted that there is no statement in the constitution or bylaws relative to the term of office of the editor in chief. Under the able leadership of Dr. Shull the possibility that a change in editorship might be desirable has not arisen. With a projected change, however, it seems highly desirable to the committee that the editorship hereafter be restricted to a term of 3 years, that the term be renewable at the discretion of the editorial board, but that the renewal is not to be taken for granted and is to receive critical consideration by the board of editors. In order to conform with the rules...a proposal to make such an amendment is being submitted to the Secretary-Treasurer.

The committee proposed three members for consideration as editor-in-chief (81): B. S. Meyer of Ohio State University, P. J. Kramer of Duke University, and W. E. Loomis of Iowa State College, with Meyer and Kramer tied in the rank ordering. Modestly unmentioned by Curtis in transmitting the report was the fact that the other members of the committee kept voting for him, Curtis. Seeking to clarify the matter, Trelease wrote to Johnston (82) (secretary-treasurer) to observe,

...you should tell the Executive Committee that the first choice of our Committee really was Dr. Otis F. Curtis, with Dr. B. S. Meyer and Dr. P. J. Kramer tied for second position. This result caused Curtis embarrassment, and he decided he would not mention the fact that he had received the highest number of votes. It seems proper, however, for other members of our committee to make sure that the Executive Committee be informed that Curtis was our first choice.

D. R. Hoagland and F. J. Veihmeyer could not attend the executive commit-

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tee meeting, but sent in mail ballots putting Meyer in first place; however, they both voted for Loehwing, in third and second positions, respectively (83). Hoagland commented, "Editor should be sympathetic toward increasing strength of Journal in field of plant biochemistry. Should not be averse to considering new departures in form of journal or general policies, if adequate reasons are advanced."

It all turned out to be a fruitless exercise. The executive committee rejected the nominating committee's proposal for a constitutional amendment to define the appointment and term of the editor-in-chief. Johnston wrote Curtis (84):

The suggested amendment to the constitution as prepared by your committee was brought up for consideration. However, it was pointed out that section 5 of article 9 covered the situation. This section reads as follows:

"The editorial board shall consist of eight members, five appointed by the Executive Committee, one each year for a period of five years, and three elected by the Society, one each year for a period of three years. The editor of the official journal shall be chairman of the editorial board."

In the past, the editor-in-chief has been considered one of the five appointed by the Executive Committee, and Dr. Shull has been appointed twice for periods of five years under the section. A change in the wording is proposed with the idea of making this section clearer.

The need for procedures in identifying and appointing a new editor was ignored. The change of wording to clarify Article IX-5 consisted of identifying the editor-in-chief as one of the five editorial board members appointed by the executive committee (85), much as described by Johnston (84).

The nominating committee members seem not to have asked Shull who his successor should be, probably on the general principle that retiring officers ought not pick their successors. They could have saved themselves a lot of effort, however, if they had done so. The executive committee was readily persuaded by Shull at the Chicago meeting that Loehwing should have the position, advancing from secretary of the editorial board to editor-in-chief. So the executive committee dutifully and unanimously voted for Loehwing. (Both Meyer and Kramer, who attended as members of the executive committee, have been questioned by the author on how a person not ranked by the nomination committee could have been appointed, but they do not remember the details. They do remember that Shull's arguments were not readily opposed. No one wanted to offend him. Besides, they were in the awkward position of being candidates of the nominating committee, and Loehwing was present, Meyer recalls, which made it difficult to speak out in opposition.)

Shull reported the editorial transition this way (86):

After a trial ballot which considered four names, the Executive Committee expressed its unanimous choice of Dr. Walter F. Loehwing...As the current editor-in-chief has not resigned, but merely wishes to let his natural appointive term expire, it was felt that the choice should be ratified by the Executive

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Committee as constituted after the first of July, since this appointment would naturally have been made at the December 1944 meeting, were meetings being held. Some such procedure seemed desirable so that there might be some overlapping of time for consultation between editors; the October number of PLANT PHYSIOLOGY should be ready for the printer by about July 1. Yet the Executive Committee desired not to seem in any way to exceed its authority, and provided for ratification of its action by the officers in charge after July 1, 1944.

Editorial board appointments had always been on the calendar year to parallel the journal, and Loehwing did not take over until January 1, 1945. However, by mid-year 1944 he was dealing with papers for January 1945, and Shull was finishing up the October 1944 issue.

The executive committee also approved appointment of an editorial board for publication of a monograph series (86). The authority for this action is given by amendment in the constitution of 1944 (85).

Meanwhile a war was going on; how did it affect publishing? Only in minor ways. It was a distant war, largely felt in shortage of printing supplies and slower communications. Paper looked to be in short supply with rising prices, and in June 1940, Loomis bought a year's supply through Science Press (87). It is not known how Stanfield, as business manager, subsequently handled paper stocks. He mentions to Kramer a small problem of obtaining staples for reprints (88), and adds, "The Censors have also removed the restrictions on export of scientific journals...; thus no more galleys to send in and have them mull over with no knowledge of the contents. We have so much bungling around here, Kramer, that it makes one sick to look at it." Loomis had a small problem in getting journals into Canada without paying a War Exchange Tax, but as a not-for-profit organization the Society was able to avoid it (89). In general, there were no great difficulties in publishing.

It seems appropriate to close this section by quoting a short self-appraisal of the journal (74) which follows Shull's brief history of the Society in Bulletin No. 13, July 1, 1941. Authorship is not given, but it was probably written by Loomis, the secretary-treasurer.

PLANT PHYSIOLOGY

The official journal of the American Society of Plant Physiologists is an international journal devoted to the publication of original research and to the development of fundamental and applied plant physiology. The Journal and Dr. Charles A. Shull, who has been Editor-in-chief since its initiation in 1925, have contributed immeasurably to the science of plant physiology, which is now coming to be recognized as the basic science of all crop production and plant behavior problems.

Much of the growth and success of the Society also may be attributed to the Journal. It has served as the common meeting ground of plant physiologists throughout the world, and has grown with the Society from 426 pages in Volume 1, published in 1926, to an average of 827 pages in the last 10 volumes. Copies of Plant Physiology go to each of the United States, and to 43 foreign countries and territories. Even under war conditions the foreign library list is 50 per cent

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greater than that for the United States and its possessions. In round numbers Volume 16 (1941) will go to 600 members, 300 foreign and 200 U.S. subscribers.

The Journal is now firmly established as the world's leading periodical in its field, and we may look forward to its continued growth in volume and value as times return to normal.

Note the emphasis on establishing plant physiology as a science. Even at this date there is concern that it be recognized as more than a branch of botany, a recognition now taken for granted. And lastly, lest it be left in the reader's mind that Shull was completely losing support as editor, this paragraph from a letter Kramer wrote Shull (90) on February 20, 1942, should be noted:

You probably receive more complaints than compliments...so I will forward to you what was intended as a definite compliment. Dr. A. R. Davis of Berkeley wrote me when he paid his dues "In my opinion the Journal has steadily improved in the quality of its articles, so much so, that we no longer have regrets over the passing of the former great German journals". Speaking for ourselves we thought the January number was unusually good because nearly every article was reasonably brief and reasonably definite. Long articles with numerous tables and involved discussions usually seem very dreary to me.

Constitution and Bylaws

Periodic suggestions for amendments to the constitution and bylaws were made, but these were not always acted upon. An example is the proposal to clarify the appointment and tenure of the editor (81), a clarification which the executive committee refused to accept (84), probably because Shull wanted minimal regulation of the editorial board. A few additions and amendments were made; however. These can be followed in the Bulletins, which were the vehicles for publication of changes in the constitution.

The first change from the revision of 1929 (chapter 2) was the addition in 1934 of Article X, The Charles Reid Barnes Fund (91), which Shull needed to protect the endowment he had secured for the Barnes award. Article X was similar to that describing the Stephen Hales Prize Fund, but took up half a page rather than two and a half. A principal fund of investments was recommended by the finance committee, the income of which went into an available fund to pay for the Barnes life memberships awards. Awards were to be made when the available fund was sufficient to purchase a life membership. The principal fund grows until it reaches \$3000, after which funds released by death of life members are to be transferred to the general endowment. The president appoints a five-member Barnes award committee each year. For the award "the committee shall consider not only the character and quality of work, but also the age of the candidates, and whenever

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suitable candidates are available, shall select men above the age of 60 years. Special consideration may also be given to plant physiologists who were associated in any way with Doctor Barnes." Awards could be made to non-members, and every fifth award was to be made to some outstanding plant physiologist of a foreign country. Article X simply gave official recognition to what was being done.

In November 1934, President B. E. Livingston prepared a set of suggested amendments to the constitution and bylaws (92). He wrote in a covering letter (92) to Murneek, the secretary-treasurer, "After you and Shull and I have all done our best at these I shall probably go over the result with Appleman and then get the final result mimeographed so that every member of the Executive Committee may receive a copy before leaving for Pittsburgh." The executive committee gave the required unanimous approval, the membership voted approval, and the revised constitution was published in Bulletin No. 9, along with an "International Address List of Plant Physiologists" compiled by Harvey (93).

Minor changes were made to clear up ambiguities: life members and patrons could vote and were given a journal subscription for life; corresponding members were not billed for dues; the bylaws were subdivided by "Section" rather than "Article"; and the like. Some major changes were also made: Article VII was extended to describe all endowments, not just the Hales Prize Fund; the editorial board was added as a standing committee of five appointed and three elected members; and the editor of the journal was placed on the executive committee.

All of Shull's endowments were now officially established, and as editor he had a formal voice and vote in executive decisions.

Bulletin No. 13, July 1, 1941, listed two changes in the constitution and two in the bylaws (74). Article VI of the constitution added the business manager as an appointed officer of the Society with a three-year renewable term of office. Article VIII-2 was changed to read, "If an individual is named for more than one office, the name shall appear on the ballot for the office for which he received the most nominations, or in the case of an equal number, for the highest office." Section 1-d of the bylaws was added to describe the duties of the business manager. Section 4 finally disposed of the partitioning of the dues and subscriptions initially thought necessary to protect the journal. It now read, "The annual dues of each member shall be placed at the disposal of the editorial board of Plant Physiology and of the secretary-treasurer for the expenses of the Society and the Journal."

The following year Shull submitted to Kramer an amendment to change Article VIII-2 back to its previous form (94), that is, "If an individual is named for more than one office, the name shall appear but once, for the highest office for which he was nominated." Shull had decided that placing a nominee on the ballot for the office for which the nominee received the most nominations might "rob" the presidential ballot of the candidates most qualified for the office. Kramer was mystified by this reasoning, and wrote Loomis (95), "It is pretty much a matter of chance under either system whether the best possible candidates are placed on the

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presidential ballot...The situation which existed with respect to Dr. Miller might never reoccur in exactly that form." (E. C. Miller had received five nominations for president in 1941, which placed him in fourth position for the "highest" office, rather than on the ballot for the executive committee, where he had more nominations (96). Miller was elected, which so impressed Shull, that he initiated the amendment to return to this way of dealing with multiple nominations.)

As usual, Shull had his way, and in Bulletin No. 15, October 1, 1944, the constitution was given with the old description restored (85). Also, as mentioned previously, the position and tenure of editor-in- chief was clarified, the new office of executive secretary-treasurer was substituted for business manager, and an editorial board for monographs was established.

Meetings

Table 7 (p.68) gives the locations of the annual meetings held in conjunction with AAAS and its adherent societies. These were December meetings with the exception of the resumption of meetings in Cleveland, September 12-14, 1944. Cooperation with the Physiological Section of the Botanical Society in arranging meetings continued much as described in Chapter 2. There was a problem, however, in coordinating sessions for the 1932 meeting at Atlantic City. J. W. Shive, program chairman, found the Physiological Section chairmen, F. E. Denny and J. M. Arthur of the Boyce Thompson Institute (Crocker's colleagues), very uncooperative in arranging shared or non-conflicting programs. As Shive reported to Tottingham (97), "When I reminded them that a request had come from the Botanical Society for cooperation to the extent of alternating our sessions with theirs, they did not want to discuss the issue and endeavored to shift the responsibility by saying that if the Plant Physiologists had not broken away from Section G, such issues would not arise." In the end, through mediation at the presidential level, non-conflicting sessions were arranged. Aside from a similar lack of cooperation reported by Meyer (98) for the 1939 Columbus meeting, subsequent arrangements seem to have been free of the old antagonism.

Loehwing sent out a questionnaire with the 1937 ballot on what type of meeting the members wanted. He summarized the results as follows (99) (numbers show the votes supporting/opposing the conclusion):

1. The meetings should not be increased from 3 to 4 days (89/73).
2. There should be one joint meeting with Physiol. Sect., ASHS, and Ecologists (151/14).
3. There should not be more than one joint session each year (103/46).
4. There should be at least one symposium on a topic of current interest each year (172/7).
5. There should not be more than one symposium (92/53).
6. The ASPP should continue to meet jointly with Bot Soc and related

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botanical societies yearly (114/33).

7. There should not be evening sessions (110/63).
8. Two or more sections may meet simultaneously if topics are unrelated (104/68).

These opinions were taken as guidelines. At the Richmond meeting the following year, one multiple session was introduced. Often a paper session was scheduled in competition with a symposium.

Symposiums on teaching were introduced at the 1937 Indianapolis meeting in a session chaired by Shull, and were an annual feature until the war halted the meetings. A meeting was planned for New York in December 1942 and programs were printed (100) that included a teaching symposium on "High school science and the manpower problem," sponsored by the Cooperative Committee on Science Teaching. But the entire 1942 AAAS program was cancelled at the request of the Office of Defense Transportation.

Also planned for this aborted meeting was a joint symposium with other plant societies on "Botany and the War," with lectures on "Basic botanical research under war conditions," "Applied botany and the war," and "The outlook for emergency replacement of crude rubber sources." There was a good deal of straining to be relevant to the war effort, and the National Research Council had recommended that one session of each AAAS meeting be devoted to the discussion of war problems. Shull's comment to Kramer (101) was, "My only caution is that you do not get the same 'wind-jammers' that want on every symposium....The men should be older men with real experience, not youngsters. They should be selected most carefully for real knowledge of war needs, if there are any in botany." In any event the annual meeting was cancelled because the government wanted train seats more than discussions of biological contributions to the war effort.

The 1943 December meeting was cancelled before it reached the planning stage, but, as already reported, an executive committee meeting was called the following month to appoint Shull's successor and to establish the office of executive secretary-treasurer.

By mid-1944, a good deal of resentment and opposition had mounted toward further denial of meetings. F. R. Moulton, permanent secretary of AAAS, sent a letter to constituent organizations analyzing the claim of the Office of Defense Transportation that such meetings created a travel burden (102). He calculated that 1,340,00 out of 1,640,000 daily rail passengers in the East were civilians. "The inescapable conclusion is that there is excessive civilian travel which is not being controlled—everybody has money and is going to visit Aunt Emmy for a few days...No scientist would interfere with the transportation of any member of our armed services, wounded or not wounded, but in effect we are asked to give way to uncontrolled civilian travel." Shull advised Johnston (103) to "go ahead and hold a meeting. The govt. by its appeals does not stop many undesirable conventions

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from being held...The scientists are the only group with a bluffable conscience—so they are the ones who suffer.”

Johnston did go ahead. He arranged a program that integrated the contributions of all plant physiologists attending (104): “All programs of submitted papers are to be joint sessions, one with the American Society for Horticultural Science, the others with the Physiological Section of the Botanical Society of America. Each organization is publishing separately the abstracts of papers presented by its members, but no differentiation as to source of papers is made on the program.” This was a program for plant physiologists, stripped of parochialism, and it set the tone for the future. It coincided with the retirement of Shull, but this was probably coincidental. The science had matured to the point of standing free of its nurturing organizations.

The AAAS also held summer meetings, and the Society participated in these for a number of years, beginning in 1931. Previously, there had been summer meetings of the midwestern plant physiologists with the Corn Belt Section of the American Society of Agronomists (ASA). These meetings are listed in Table 9.

These meetings tended to be organized and attended by the regional sections of the Society. The sections at this time (and their dates of founding) were Purdue University (1926), the University of Minnesota (1926), New England (1933), Western (1935), Southern (1940; originally as Southeastern Section, 1939). The 1931 summer meeting in Pasadena was arranged by D. R. Hoagland with the western section of AAAS. Shull commented in his “Notes” (6: 369, 1931), “These summer meetings may be somewhat more local in character than the winter meetings, but they will provide opportunities for less expensive attendance at the

Table 9
Summer Meetings of the American Society of Plant Physiologists

Year	Location	Collaborator
1925	East Lansing, MI	with ASA
1926	St. Paul, MN	with ASA
1928	Lafayette, IN	with ASA
1931	Pasadena, CA	with AAAS
1932	Madison, WI	with ASA
1933	Chicago, IL	with AAAS
1934	Berkeley, CA	with AAAS
1935	Minneapolis-St. Paul, MN	with AAAS
1936	Rochester, NY	with AAAS
1937	Denver, CO	with AAAS
1938	Ottawa, ON, Canada	with AAAS
1939	Milwaukee-Madison, WI	with AAAS
1940	No record of meeting	
1941	Durham, NH	with AAAS
1942-45	No record of meetings	

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meetings for those who happen to reside within a short distance of the meeting places chosen." Distance and expense were major obstacles for westerners in attending the AAAS winter meetings, which in the 1930s were never held west of St. Louis. Western plant physiologists came to depend heavily on the meetings with the Western Section of AAAS and were sufficiently strong and progressive to develop a good deal of independence. The 1937 Denver meeting was one of the few drawing broad attendance from midwestern as well as western plant physiologists (the latter arranged and dominated the program). The Denver meeting also was one of the few summer meetings with any significant executive committee action (editorial policy, ref. 61). For the most part, Society business was conducted at the annual December meeting.

Awards

Table 10 lists Society awards made during the 1931-1944 period.

Corresponding memberships had been authorized in the 1929 revision of the constitution, but no award was provided: Article III-6 specified that "Corresponding members are not entitled to vote, and do not receive the official journal by virtue of such membership." During his term as president, Livingston wrote to H. A. Spoehr (105), chairman of the Barnes committee, "We have conferred a pretty empty honor on F. A. F. C. Went and F. F. Blackman by electing them to corresponding membership, which carries no privileges as far as I can see and demands that they pay regular dues. (The Society ought not to do such things; looks like a poor way to get five dollars a year from a foreigner!)" He went on to suggest that Went or Blackman should be given the Barnes award.

Shull was also upset about billing the corresponding members for dues (106): "It was purely a blunder originally, without any society action...Just imagine electing F. F. Blackman a corresponding member, and then billing him for the journal! Blackman protested and was informed that he was supposed to pay for it! If there ever was a blundering idiot, whoever started this thing should get the blue ribbon..." (Gardner was secretary-treasurer at the time Blackman and Went were elected, but Shull avoids identifying him as the idiot. Perhaps Shull's conscience told him the idiot was simply responding to his incessant drilling on fiscal stability.) On the other hand, Shull was not about to give the corresponding members the journal (106): "If we had many it would be ruinous...There must either be an endowment in the life membership fund to correspond, or we ought to cease sending anything but our programs, membership lists, and international membership lists...That is enough to give them."

And that is all they got. The revised constitution of May 1935 reads, "Corresponding members shall not be billed for annual dues unless they hold annual membership in addition to corresponding membership. They shall be entitled to receive the Bulletin throughout life." In 1941 (Bulletin No. 13) the exclusion of the

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Table 10

Barnes, Hales, and Corresponding Membership Awards, 1931-1944

Year	Barnes	Hales	Corresponding
1931	C. O. Appleman		
1932	C. F. Hottes	H. B. Vickery	F. F. Blackman F. A. F. C. Went
1933	J. B. Overton		
1934	F. F. Blackman	C. A. Shull	G. Haberlandt V. N. Lubimenko N. A. Maximov H. Molisch B. Nemec
1935	F. A. Andrews		
1936	D. T. MacDougal	K. V. Thimann	
1937	A. P. Anderson H. R. Shantz		H. H. Dixon A. Ursprung
1938	L. Jost	J. W. Shive	Sir John Russell
1939	W. J. V. Osterhout		
1940	W. F. Ganong	P. R. White	P. Boysen Jensen
1941	B. M. Duggar		
1942	O. L. Sponsler	C. B. van Niel	
1943	N. G. Cholodny W. Thomas		
1944	G. W. Scarth	R. F. Dawson	

journal was made specific by addition of the phrase, "but not the Journal unless they are also annual or life members" to the previous sentence.

The addition of Article X, The Charles Reid Barnes Fund, to the constitution (91) in 1934 permitted granting the Barnes award to a non-member, provided the executive committee approved and the nominee was willing to accept. This opened the way to give D. T. MacDougal, one of the most senior and highly respected plant physiologists in the country, the award. During the formation of the Society, Shull had in some fashion deeply offended MacDougal, and he would never join Shull's society. Shull, however, did not oppose giving him a Barnes life membership, as long it was done as provided by the constitution (107). The committee selected MacDougal, the executive committee approved, and after a 12-year lapse, he became a member of the Society at age 73. Volume 14 of *Plant Physiology* has an issue dedicated to him.

A clue to the conflict is found in a letter Loehwing wrote Livingston (108) after MacDougal had been given the Barnes award: "Shull says he never received MacDougal's telegram and hence thinks that MacDougal's irritation is unjustified...From my conversations with Shull I know that he has always held MacDougal in high personal and professional esteem, but on the other hand he has not felt obliged to admit that he knew of any prejudice and certainly that he was in no way called upon for an apology..." Livingston replied (59), "Yes, MacDougal

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knows the whole story, how Dr. Shull is unable to remember the episode in question, etc. I think the thing is closed...He still feels that the Society hasn't been managed very well, but I guess we all agree with him on that. Anyhow, we do now have him on our list of members."

Making the awards became a comfortable routine, with former award winners well represented on the committees. The Hales award became the most prestigious (Shull's opinion was that the Hales award "is distinctly not an award for a best anything, but merely a worthy piece of work [9]"). Shull gave brief write-ups on winners (except himself) in the "Notes" section of *Plant Physiology*.

Dr. Charles A. Shull

The initiation and growth of any successful enterprise can be traced to the activities of an individual who will usually, but not always, stand out. The quiet leaders work through others, but close observation detects them. The aggressive leaders "work" others, and make themselves prominent. In most cases the leadership falls between the extremes of persuasion and coercion. But quietly or boldly, the leader generates confidence that the job can be done, drawing on his or her vision, and supporting it by whatever faith and courage are required.

Shull was a prominent leader, with great powers of persuasion and, when needed, coercion. Getting the society initiated required the derring-do of Harvey, but, as we have seen, he was counseled by Shull. Harvey had difficulty gaining the confidence of the membership required for continued leadership—only after repeated nominations was he elected president—while Shull's clear and confident planning, his commitment of his own money and time, his readiness to battle with Crocker, et al., generated the assurance needed to get underway. Those who knew him remember him as Mr. Plant Physiology, and the archives of the Society support and amplify this. For the first 20 years of its life, the activities of the American Society of Plant Physiologists can be traced almost entirely to the vision and determination of Charles A. Shull. His major professional commitment was to the Society (teaching and research were not neglected, however). His powers of persuasion stemmed from this devotion; no one wanted to offend Dr. Shull who had done so much for the Society. What he wanted done was done. What he did not want done was not done.

His attitude and actions were not always admirable. Although he put a conciliatory face on it, he carried a grudge against Crocker and the other "hold-outs." Some of his satisfaction in the growth of the Society was in the failure of his opponents to become the voice of plant physiology, as they had declared. There are indications that he could be rather heartless in his drive for success—poor Miss MacLeod had no chance of getting a raise if it would take \$10 a month from the investments. He honestly admired MacDougal, but would not bend to give a conciliatory apology—even if not fully justified—to gain his support for the

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Society. He arbitrarily edited and altered manuscripts as if they were his own.

Shull could be just plain pig-headed. He would not take sensible advice on journal format and editorial policy. He would determine who sat on the editorial board (if you think otherwise, get yourself a new editor—I'm holding the April galleys for him). Despite any inconvenience, the fiscal year and the election of officers must start on July 1. He was mistrustful of many of his colleagues, apprehensive that some fool would spend the endowments he was building, so they had to be protected by detailed instructions in the constitution and bylaws. He knew better than the committee who should succeed him as editor, and by circumstance and eloquence had his way.

But in one sense these actions were not shortcomings. Determined leaders are self-assured, and need to be. They know their way is the right way, they feel justified in insisting on it, and they are sensitive to criticism of it. The important thing is they get the job done, and the important character traits are those that enable them to do it. Shull did not see himself as an autocrat, but as a builder of a fully democratic organization, governed and protected by a constitution and bylaws. The clearest statement of this philosophy is contained in a 1936 letter to Loehwing (109):

I wonder if I should explain my idea about the Executive Committee and other committees whose duties are specifically outlined in our constitution. The fault of all governments is to try to become personal rather than constitutional. Many of our societies are ruled by cliques, or inner circle. It usually gets to be bad rule. If we can maintain a democratic organization, devoted to constitutional rule, we will be almost unique among societies. I believe in specifying what committees are to do, and what their procedure should be when it is desirable to set any procedure—otherwise let them alone. They'll do a better job, and a more spontaneous one if not hedged about by the Exec. Com....

You see, I am a strict constructionist, and belong along with the New-Deal despised Supreme Court! But I believe the fundamental welfare of our organization depends on the Exec. Com. keeping its hands off the running machinery that is already specified in the Constitution. If anything doesn't run smoothly the way it is outlined, let us change it..., but keep it as strictly as we can a rule of law rather than a rule by individual action.

In contrast, an overview of the Society's first 20 years shows unmistakable rule by individual action—Shull's. On closer inspection, however, one sees that Shull ruled by the rules, persuading the executive committee and the membership to write the rules he wanted. It was selfless rule, entirely for the benefit of the Society. An apparently selfish action sometimes occurred, as in trying to delay the start of the 1936 Atlantic City programs and business meetings to 10:00 AM so that he would miss nothing by attending a AAAS council meeting. He lost this one. As Loehwing said to Harvey on behalf of the program committee (110), "we can not let the whole A.S.P.P. be incommoded by Dr. Shull's other engagements." But Shull was surely thinking of the Society, not himself—he was *needed* to explain and

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correct and guide at the business meetings.

Shull's retirement to Asheville, NC, was much occupied with devoted care of his semi-invalid wife. He continued as chairman of the finance committee, and through correspondence with Lochwing (now addressed as "Dear Walter") he kept contact with Society and editorial affairs. Here are some excerpts from a large file of letters.

[Ref.111, May 28, 1945] I hope you won't blame me for being such a stickler for constitutional processes; I verily believe we can wreck our machine by just ignoring the constitution here and there.

I think you did about as well as you could with the two portraits and the felicitation paragraphs. In case of important men, like Sir John Russell, I sometimes had a friend write a real biography. In the old numbers of P.P. you can find various ways of doing this part of the work...If we are ever rich enough to afford it, Tottinham's portrait ought to be used, and also Charles B. Lipman, who served through nearly 19 years on the Editorial Board. I have made up a list of our members aged 60 or above, for the next C. R. Barnes life membership committee. I have 49 names on the list! I had no idea so many were reaching the eligible age classification.

Mrs. Shull is not getting along very well, mainly because of the O.P.A. mess which has made it impossible to get enough of her dietary needs to keep reasonably free from distress.

[Ref.112, October 29, 1945] If the Society is to be run by mail ballot on Exec. Com. matters, I want to just drop any connections I still have with it... We ought never to transact any business of the Exec. Com. by mail. It just isn't possible to get intelligent, understanding action that way.

[Ref.113, November 14, 1945] I used to think of making a bequest, but I have given it up because of the apparent instability of the fundamental machinery under which we operate. Unless officers stop the business of trying to turn the constitution upside down at their pleasure, nobody will ever trust us to handle trust funds.

[Ref.114, November 17, 1945] And please let us never make our magazine over as the Bot. Gaz. has been done. I think John M. [Coulter] would turn over in his grave if he could see it now! Please, let's keep ours dignified and classical in its simplicity. We'll never be sorry we do not ape the other journals.

I would suggest that sometime you might consider some sort of memorial to Dr. Lipman. Am I not glad, now, that we kept him on the editorial list, instead of throwing him out, after Dallas? We never know how sorry we will be for some hasty or ill-advised action that hurts someone's soul to the quick. One has to be wise as a serpent, harmless as a dove, and kindness personified, to deal with human hearts.

[Ref.115, November 30, 1945]. I have been looking over the history of ASPP, and there is one thing we promised to do when we incorporated that has never been done. We agreed that the corporation should have a board of trustees, three in number—see Bull.No.15, page 4, fourth point under the incorporation...I would suggest a sort of permanence to such appointments, keep them out of "Elections" which would give us more undesirable than desirable selections.

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[Ref.116, September 11, 1947] I am interested in the matter of your successor [Loehwing had resigned as editor-in-chief, but was later persuaded to carry on]. Is Stanfield in any position to take it up?...If he could be induced to undertake it, the easiest transition I can think of would be provided. I don't know what your thoughts are. I am specially anxious that no one connected with the eastern group of Bot. Soc. Plant Physiologists should be appointed. Cornell and Ohio State both have too close affiliations with the east for safety.

I do not personally care anything about a 'Biological Institute' [AIBS]. I think Botanists and Zoologists, and the other people talking Biology, are really on the wrong track. It is unfortunate that the term 'Biology' seems to suggest a unity that does not exist. If the Govt needs a 'Biological Institute' it should set it up and finance it...

[Ref.117, October 16, 1948] I do not know whether a really truthful history of the Society would be relished by a lot of people...You know that there is one thing I detest to do above all others is to appear to blow my own horn! I have not been able to keep any records of those early days. In moving, we had to relinquish almost everything we had in the way of historical records...If I tried to write a history now it would be full of inaccuracies, I fear.

We are well, but too popular! We have to keep a regular appointment book to keep track of the numerous demands on our time. We are judges at fairs, speakers to PTAs, garden clubs, bird clubs, service clubs etc., and it has gotten now that many of them ask Mrs. Shull to read poems before or after my talks. [Lena Mearle Shull published several volumes of poetry.]

[Ref.118, January 20, 1949] One is seventy only once in a lifetime, and if there were any sting in growing old, you have helped take all the sting out of it. I do not feel old, seem to be perfectly well, and so busy that time has no opportunity to hang heavy on our hands.

[Ref.119, August 24, 1949] During the last couple of months I have been suffering from partial blindness of my left eye, and I have had to slow down on all activities requiring eye-sight...It is something one just has to endure and hope it won't develop in both eyes...

That financial report was surprisingly good—and I agree with you, we owe Dr Stanfield more than we can well put into words. If we did not have that AIB[S] hung onto our tails [\$1500 annual dues], we'd still be able to progress. I hope we will not raise dues for such a purpose...

I am in no position any more to help guide the loyal plant-physiology-firsters. Whenever the time comes that Stanfield has to give up the work, we should have a similarly loyal man who will carry out the laws...to see to it that the endowments get every cent coming to them. Six laws protect the growth of those funds. No one should ever be allowed to tamper with the laws, or disobey them...

Since early spring I have been on the Board of Trustees of our local college—Asheville-Biltmore—a junior college now, but soon to be a 4-year college if the forward-looking trustees can gain control of the major plans. I think we can.

Shull's correspondence gradually fell off as his life became more centered on Asheville. By the mid-1950s he was almost fully occupied as nurse to his invalid wife (120). After her death he lived for a time with his son (a physicist with the Bell

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Laboratories), but this did not work out and he returned to Asheville, where "my only serious problem is loneliness" (121). He died on September 23, 1962, age 83, a man of faith. "If we accept life, death is the necessary concomitant. It has to be that way! God's plan for us is a beneficent one! But none is ever ready for the blow when it falls" (121).

A short biography is given in a Shull memorial issue of *Plant Physiology* (122) and in an obituary published in the *Asheville Citizen*, September 24, 1962.

Farewell, Dr. Shull. You realized your goal of leaving the science of plant physiology better off for having been interested in it (10).

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