

expeditiously. If one cannot review a manuscript within the allotted time, it should be returned to the Associate Editor immediately.

The greatest manuscript delay—as judged

by the data from the May and July 1987 *Journal*—occurs with the author. Here the matter of timeliness and manuscript importance lies squarely where it should—with the

author. If the original research problem was important and the experimental results worthy of exposure, they deserve expeditious treatment, especially by the author.

Improving Horticulture Internship Programs

Mary Haque¹ and Preston Lewis²

Department of Horticulture, Clemson University, Clemson, SC 29634-0375

In 1980, ASHS completed a survey of internship programs offered at institutions with 2- and 4-year horticulture programs and landscape architecture programs. The results indicated that 50% of 62 responding institutions had internship programs; however, the number of students taking advantage of existing programs was relatively small (1).

With so many universities offering internship programs and so few students participating, it seems appropriate to take a critical look at internships. Departments periodically should evaluate, review, and, if necessary, revise their program, keeping in mind the learning objectives of the internship experience. Departments that do not offer an internship option should consider developing a program.

This paper presents an overview of the value of internship programs, discusses an approach involving students to assist with the revitalization of an existing program at Clemson Univ., and presents guidelines for administering programs.

A well-run and monitored internship program is valuable in numerous ways. Internship programs ensure “hands-on” experience for horticulture students. Students learn an appreciation for the work ethic as well as practical skills while interning. Learning more about the occupations of their choice, they can evaluate occupational goals in time to alter these goals before completion of their formal education.

“Hands-on” experience encourages a mature attitude toward academic preparation and emphasizes the need for classroom instruction. Interns work with equipment that is often not available at the university and acquire experience with actual customer and employer relationships.

By working in the professional world, students learn the value of initiative, neatness, politeness, punctuality, and courtesy while developing a strong sense of responsibility (3). In certain cases, students are broadened through travel and cultural experiences related to internship placement as well.

Received for publication 31 July 1987. Technical Contribution no. 2752 of the South Carolina Agricultural Experiment Station, Clemson Univ., Clemson, S.C. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

¹Associate Professor.

²Graduate Research Assist.

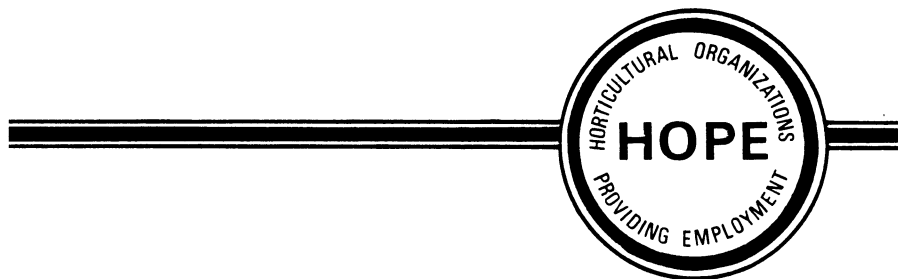


Fig. 1. HOPE acronym and logo designed by undergraduate students to serve as letterhead and symbol for the internship program.

Internships provide avenues to jobs after graduation. LaPrad (5) reported that 56% of their agricultural interns were offered jobs by the firms that hosted the students' internships. He credited this as a major factor in the growth of internship programs at Michigan State Univ. Cessna (4) found that 87% of the students who had participated in internships found employment in the same general career area as their internships. He also found that employers stress career-related work experience earned prior to graduation as being more important than grades, courses completed, personality, or references.

As horticulture enrollments have dropped, employer demand for interns exceeds the supply of interested students. At Clemson Univ., more than 257 available jobs are listed, and only 10 students are registered for 1987 internships. With declining horticulture enrollments and a growing horticulture industry, this gap may widen.

Although the value of internship programs is generally well-understood, the quality of many programs may need some improvement. Few teachers are familiar with the administration of internship programs, and programs are likely to flounder unless guidelines are available to direct both new and experienced internship coordinators.

Although students traditionally have been allowed to participate in internship opportunities at Clemson Univ., only 8.9% of horticulture majors and MS students enrolled during 1981 and 8.6% in 1982. Student awareness was identified as a critical factor in revitalizing the Clemson Univ. program. In consultation, senior horticulture majors indicated that many of them had not been aware of the existence of the program. Two senior students volunteered to assist with the development of a new program. An initial brainstorming session produced three goals to be pursued: the establishment of an iden-

tity for the program, the dissemination of information, and the development of criteria for participation in the program.

The first goal, establishing an identity, inspired students to design an acronym and logo (Fig. 1). HOPE, Horticultural Organizations Providing Employment, was chosen as the title that would serve as a letterhead and symbol for the program. Similar acronyms at other universities included the Professional Experience Program (PEP) at the Univ. of Minnesota and the Pre-Occupational Preparation Program (POP) at the 2-year technical college of agriculture at the Univ. of Minnesota, Waseca (3).

A letter explaining the HOPE program, along with a response form, was mailed to more than 300 horticultural businesses to determine the level of interest in accepting student interns. Industry response was enthusiastic, with more than 200 potential employers expressing interest. Industry responded by indicating the type of job available, salary range, and availability of housing. They also sent brochures, photographs, and slides to provide interested students and instructors with a better understanding of each business. All responses were compiled into a “HOPE NOTEBOOK”. Students interested in internship opportunities were now free to browse through this listing of job opportunities and to contact potential employers with the assurance that each business was interested in and familiar with the program.

The HOPE NOTEBOOK, in addition to giving identity to the program, proved to be the first step toward realizing the second goal, disseminating information. To supplement the notebook, the students spearheading this project designed a poster and put together a light-hearted slide show highlighting the advantages of internships, the process for applying, and opportunities available. They wrote a script and showed the slide show in

classes and at a horticulture club meeting to make as many students as possible aware of the internship option. The response was overwhelming. Registration for summer internships jumped from 8% of undergraduate majors and MS students in 1982 to 16% in 1983.

This initial success provided an additional source for disseminating information in following years. Formal seminars and talks and informal conversations by participating interns contributed significantly in building interest and enthusiasm among other students in the department from year to year.

LaPrad (5) reminds us that student and employer sign up does not happen by chance; an "active promotional campaign is an ongoing necessary activity involving the faculty, students, and employers". Suggested promotional activities include: use of the public press, radio and television programs, campus and industry literature, and posters and flyers.

The third major goal of the student project was to fortify the requisites for internship credit. A detailed form outlining student, employer, and university responsibilities was developed. For students to receive 3 hours of credit, 10 weeks of full-time work for an approved horticultural business was required. The intern must submit two detailed monthly reports discussing the history and scope of the business, outlining work responsibilities and duties, and critiquing their own job performance. Upon returning to school, a formal seminar is presented to faculty, interns, and other interested students.

According to the ASHS survey cited previously, credit awarded per experience averages 7, with a range of 1 to 15 semester hours at various institutions (1).

Employers must guarantee rotation of duties so that each internship is a unique learning experience. Students have reported that the formality of an internship agreement provided them opportunities to rotate through design, implementation, maintenance, and sales areas, whereas other students not involved with an internship program were often unable to experience as many horticultural tasks.

Employers also must complete a mid-term evaluation that is discussed with the student and returned to the university. This evaluation provides an opportunity for the student and employer to discuss strengths and weaknesses openly, and it gives the student a chance to improve before the final employer evaluation, which constitutes 65% of the student's grade, is submitted.

The university coordinator has numerous responsibilities from developing an initial program to administering one on a continuing basis. The success of both newly developed and "revitalized" programs depends on how the program is administered on a continuing basis.

Revising the internship notebook, which contains the listing of potential employers; promoting a campaign involving new articles, presentations, and interviews; and keeping up with administrative records is a constant requirement that demands timely

action year after year. Administrative records are improved significantly by developing forms such as an agreement form, responsibilities form, student report form, and employer evaluation form.

The first of these, the agreement form, should contain a detailed job description emphasizing rotation of horticultural duties; the name, address, and telephone number of the business and supervisor; and the salary, work hours, and dates agreed on by the student and employer. Signatures by the student, employer, internship coordinator, department head, and dean finalize the agreement contract.

The responsibilities form, which outlines student, employer, and university responsibilities, is given to both student and employer to be studied prior to signing the agreement form. A form outlining requirements for the student reports and final seminar is also given to each student. This aid has proven invaluable at Clemson Univ., reports and seminars prior to the development and distribution of this form were inconsistent and often weak or incomplete. The form should contain guidelines about due dates for reports, format for writing, and, most important, suggestions for topics to be covered. In the first report, students are required to describe the business or work station, discuss the history and organization of the firm, lines of authority, and products sold or services performed. In addition to reporting on the station, students describe their work assignments, the physical and mental requirements necessary for the job, and the standard of work required.

The second report focuses primarily on student work progress, problems, or concerns of the business and changes in work responsibilities. A self evaluation is required where students outline their faults and virtues, how they effect the efficiency of the business, and ways and means they are using to improve the execution of duties. They are also asked to rate themselves regarding attitude, promptness, and other personal characteristics.

A work station evaluation is also part of the final report. Coordinators need to know from the student's point of view which work stations provide interesting and educational experiences for students, whether duties are being rotated frequently, and whether supervisors are fair in assigning and evaluating work. This part of the report often influences decisions about recommending stations to other student interns.

Mid-term employer evaluation forms are distributed half-way through the work experience, and employers are encouraged to sit down with the student to discuss the student's strengths and weaknesses. Items such as dependability, motivation, ability to learn new tasks, ability to work with others, attitude, responsibility, initiative, and contribution to the business are included on the form, and space for additional comments is provided. This critical analysis allows students and employers to communicate and to perfect the work experience before a more detailed final evaluation form is sent at the

end of the term.

The question of on-site visitation is a much-debated issue. The ASHS survey indicated that $\approx 70\%$ of students are visited by an institution representative during the experience (1). A visit to the job site gives the representative a clear idea of what and how the student is doing, and it is an effective way to establish good public relations between university and industry. Such visits, however, can be very time-consuming and expensive, especially if several students have out-of-state placements. Telephone visits are an effective substitute, and notes from either an on-site or telephone visit can be recorded on a visitation form and kept in the student's file. Another alternative that has been practiced at Clemson is for the coordinator to distribute a list of all interns and employers, with names, addresses, and telephone numbers, to all faculty at experiment stations as well as on campus, and to extension agents around the state. Such personnel can be asked via an attached cover letter to visit intern locations in their county, or, if traveling near a location, to stop in for a visit. Several informal contacts can generally be made in this fashion, with the university representative reporting back to the coordinator about details of the visit.

Assigning grades for internship work is a difficult task. About one-half of institutions surveyed by ASHS give letter grades and one-half give pass/fail (1). Grades may be based on the employer's final evaluation, written reports, a seminar, and attendance at and participation in other internship seminars.

Written correspondence, in the form of check-up and follow-up letters, is necessary to ensure a smoothly functioning internship program and good public relations. In an average case where no problems exist, these letters can usually be mailed to employers with the mid-term and final evaluations. Employers should be thanked for their interest in and support of the program, and inquiries as to whether or not they are interested in hiring future interns also can be made. Munson (7), at Texas Tech Univ., suggests framed certificates, books, or tickets to movies or plays as additional forms of expressing appreciation. He points out that "a framed certificate has two advantages: it is rather inexpensive, and, if displayed by the employer, it serves as an effective advertisement for your internship program".

In conclusion, horticultural internship programs are a valuable means of providing "hands-on" experience and industry contact for students. Success of a program depends on its development and administration and on the enthusiasm of students, faculty, and employers. Student involvement under a coordinator's guidance can enhance programs and facilitate timely development and continual improvement.

Literature Cited

1. Ballinger, W.E. 1982. Effective internships for horticultural students. *HortScience* 17(2):133-134.
2. Mortensen, J.H. 1981. Field based agricul-

- tural skills workshops for students deficient in practical agricultural experience. NACTA J. XXV(3):21-26.
3. Fog, P.A. 1980. Developing an internship program: A study of POP. NACTA J. XXIV(3):26-28.

4. Cessna, D. 1977. Experiential learning: A detailed case study. NACTA J. XXI(1):8-11.
5. LaPrad, R.G. 1977. Internship means obtaining jobs. NACTA J. XXI(3):14-181.
6. Seals, R.G. and R. Armstrong. 1983. Intern-

- ship program provides hands-on learning. NACTA J. XXVII(2):20-24.
7. Munson, R.H. 1984. Agricultural internship program administration. NACTA, J. XXVIII(1):28-30.

LETTERS

ACCURACY OF ANALYTICAL DATA

At the 1987 International Conference on Heavy Metals in the Environment, conferees expressed concern regarding the accuracy of analytical data in the published scientific literature. Journals dealing with human health and environmental issues are now rejecting papers in which authors fail to use either accepted reference methods of analysis and/or do not include assay results for a recognized standard as a means of verification of accuracy for their reported analytical results.

Similar concerns exist for many of the analytical data that appear in the *Journal of the American Society for Horticultural Science* and *HortScience*. Today, some research efforts rely considerably on past analytical information for a great variety of uses. Those who have reviewed the literature intensively, as I have, frequently discard published information because of suspicious results and questionable analytical procedures. Frequently, authors fail to provide the reader with sufficient detail of their methodology to adequately judge the reliability of their analytical data. Being an editor myself, I have become more sensitive to the need for authors to give specific details of their analytical procedures by either referencing the primary source for a procedure used, or by providing a detailed description in the written text. An excellent example is the Kjeldahl N procedure. There are many ways to perform a Kjeldahl digestion, and how it is done will affect the N result obtained (3). It is common practice for an author to use only the word "Kjeldahl", thinking this sufficient to describe the method. Another common practice is for an author to refer to either a laboratory manual or book for a description of the methodology, sources that may describe various procedures, but not give a specific citation for the procedure used. Another common practice is to reference a method as "modified", meaning a modification was made to a commonly known procedure, but without the authors describing what part of the procedure was modified. Authors may name the instrument they used to conduct an assay, but frequently fail to adequately describe sample preparation and assay parameters. Another important point to recognize: using a commonly accepted method does not automatically ensure the accuracy of the reported result.

The editors and reviewers of ASHS publications must carefully evaluate analytical procedures referenced or described in sub-

mitted papers. I did not find in the 1985 *ASHS Publications Manual* any guidance to authors regarding analytical methods or their description, nor were there instructions to reviewers with regard to judging the adequacy of analytical procedures described and used. I recommend that this deficiency be corrected in future issues of the manual and that a careful study be made by knowledgeable ASHS Members to determine if there is a need to establish specific criteria for assessing the reliability of published analytical results, criteria that would be based on either accepted methodology and/or proven performance using standards of known origin and composition. The issue of *quality assurance* (2) has equal application for those who assay soils and plants and then report their analytical results. Some believe that there are only certain applicable methods for determining the chemical properties of soils and plants. Considerable efforts are being made today to standardize analytical methods. Maybe there is need for an "AOAC" manual for those procedures used to characterize the chemical properties of soils and plants that would have application to results published in ASHS publications.

With increasing public interest regarding the impact of crop production practices on the environment and the quality of produced farm products has come the demand for accurate and reliable analytical data. Some of the laws written to bring agricultural practices under some degree of control frequently require that decisions be based on analytical data by referring to "reference methods" and "certified" laboratories. Such designations would suggest that, for legal purposes, accuracy and reliability are only obtainable when using "reference methods" conducted by "certified" laboratories. There is also the same implied reliability if the analytical laboratory has a functioning quality assurance program in force (1).

Referring to the 1987 Trace Element conference, I heard knowledgeable and respected researchers say that they would estimate that less than 25% of the published data on trace elements found in the environmental and health related literature is reliable, stressing the need to tighten the review process for manuscripts that include substantial critical analytical data. Such advice, it would seem to me, equally applies to the *Journal of the American Society for Horticultural Science* and *HortScience*.

J. BENTON JONES, JR.
Dept. of Horticulture
Univ. of Georgia
Athens, GA 30602

Literature Cited

1. Dept. of Health, Education, and Welfare. 1976. Nonclinical laboratory studies, good laboratory practices. Fed. Reg. 22 Dec. 1979, Part II, Vol. 43, no. 247.
2. Garfield, F.M. 1984. Quality assurance principles for analytical laboratories. Assn. of Offic. Anal. Chem. Arlington, Va.
3. Jones, J.B., Jr. 1987. Kjeldahl nitrogen determination—What's in a name? J. Plant Nutr. 10:1675-1682.

POLLENIZER vs. POLLINATOR

I would like to clarify the difference between two words that are frequently misused in our publications. I suppose the words "pollenizer" and "pollinator" have been confused since their invention, given their consistent misuse in at least one major pomology text (*Tree Fruit Production* by Teskey and Shoemaker). A pollinator is the agent of pollen transfer, which, in many species, are bees or some other insects; a pollenizer is the source of pollen, which is usually a flower-producing plant. One recent paper talks of "planting of pollinators", which brings up visions of planting bees in the orchard, and of "pollinator frequencies", which indicates the author is referring to bee hive density, when the author was really referring to the density of trees as pollen sources. Another author was describing parentage of some tree fruits and said that cultivar A "was the progeny of unrelated unknown pollinators of" cultivar B. How fruit trees can be the progeny of fruit insects is beyond me! Of course, the authors meant to use the word "pollenizer", not "pollinator". Similar mistakes have been made throughout the literature equally by professionals in a range of disciplines.

I think it reflects poorly on our publications to have such basic technical words misused and also makes it difficult to teach students the proper usage when they see the words used interchangeably. I suggest we include these words in the *ASHS Publications Manual* in Section L (Special Word Usages) when it is updated.

DAVID H. BYRNE
Dept. of Horticultural Sciences
Texas A&M Univ.
College Station, TX 77843-2133

Letters to the editor, with the writer's name and address, should be sent to: ASHS Editorial Office, Lincoln C. Peirce, Science Editor, Dept. of Plant Science, Nesmith Hall, Univ. of New Hampshire, Durham, NH 03824. Letters may be edited for purposes of clarity or space.