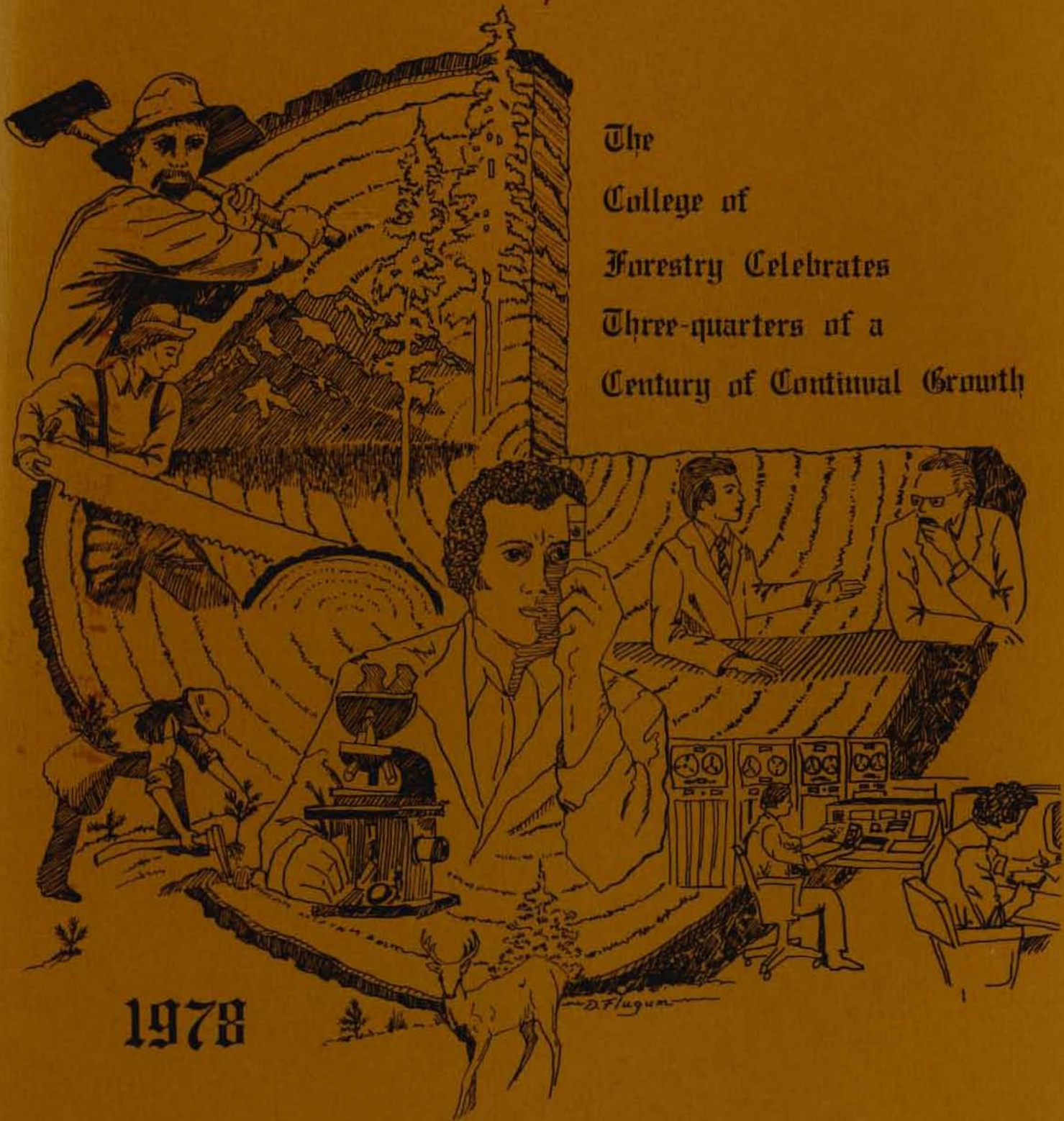


GOFFER HEAVEY

The
College of
Forestry Celebrates
Three-quarters of a
Century of Continual Growth



1978

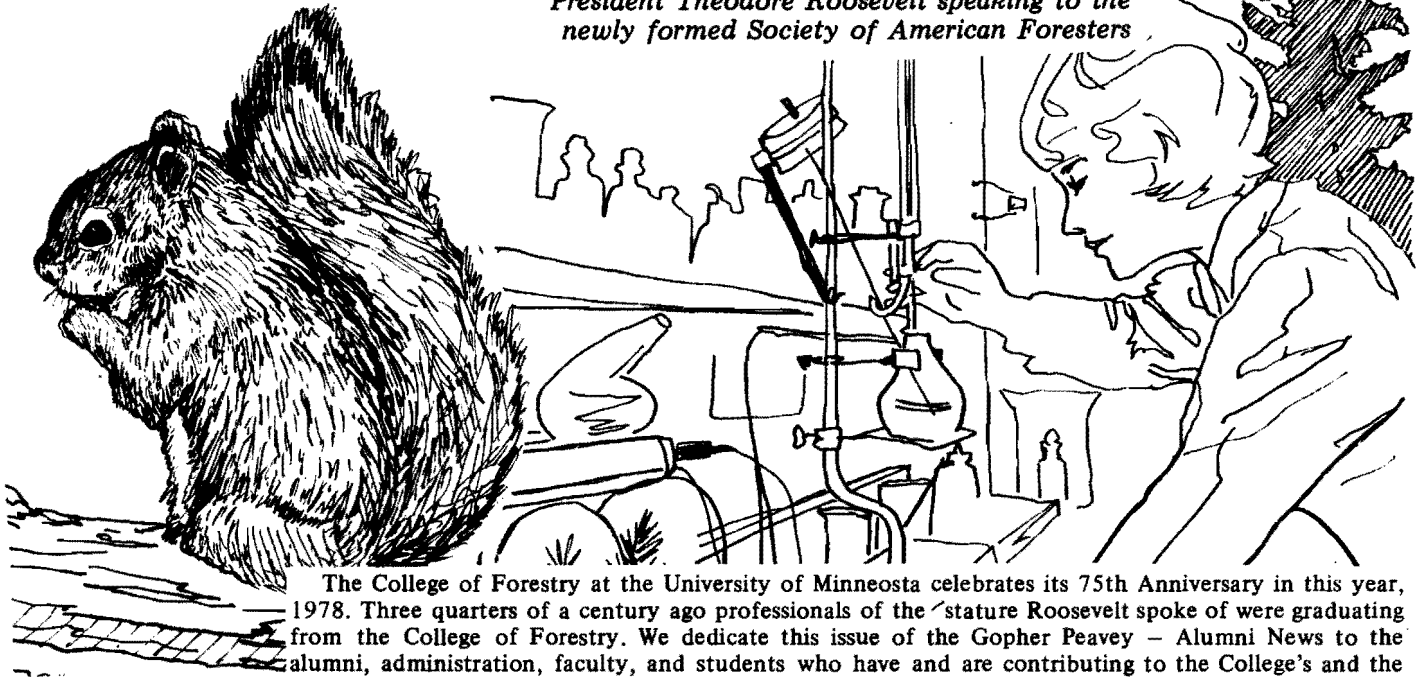
ALUMNI NEWS

THREE QUARTERS OF A CENTURY

"You have created a new profession of the highest importance, of the highest usefulness to the state, and you are in honor bound to yourselves and the people to make that profession stand as high as any other profession, however intimately connected with our highest and finest development as a nation. You are engaged in pioneer work in a calling whose opportunities for public service are very great. Treat that calling seriously; remember how much it means to the country as a whole.

"The profession you have adopted is one which touches the republic in almost every side — political, social, industrial, commercial; to rise to its level you will need a wide acquaintance with the general life of the nation and a viewpoint both broad and high."

President Theodore Roosevelt speaking to the newly formed Society of American Foresters

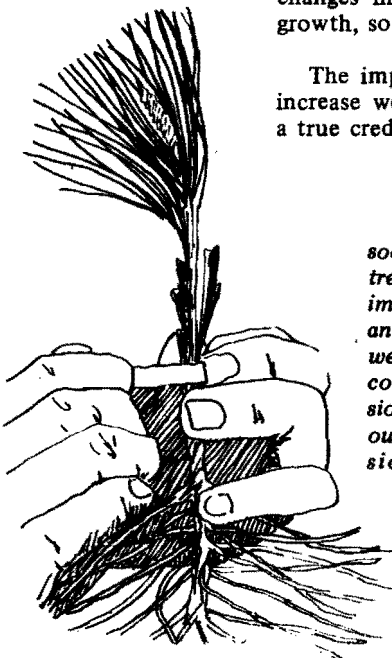


The College of Forestry at the University of Minnesota celebrates its 75th Anniversary in this year, 1978. Three quarters of a century ago professionals of the stature Roosevelt spoke of were graduating from the College of Forestry. We dedicate this issue of the Gopher Peavey — Alumni News to the alumni, administration, faculty, and students who have and are contributing to the College's and the profession's rich past.

The cover of the 1978 issue of the Gopher Peavey — Alumni News was designed to depict historical changes in Forestry and the diversity within the profession today. As the rings of a tree record its growth, so history records our growth.

The importance of forest management to the nation and the world has increased yearly and will increase well into the 21st century. We salute all who strengthen the forestry profession and who are a true credit to our school.

In order to relate to a dynamic society, we need to plant more than trees for the 21st century. We need to implant in the public's mind our hopes and goals. In order to communicate well with the public, we must first communicate well within our profession. Only through communication of our ideas can the forestry profession's strength continue to grow.



D. FLUGUM



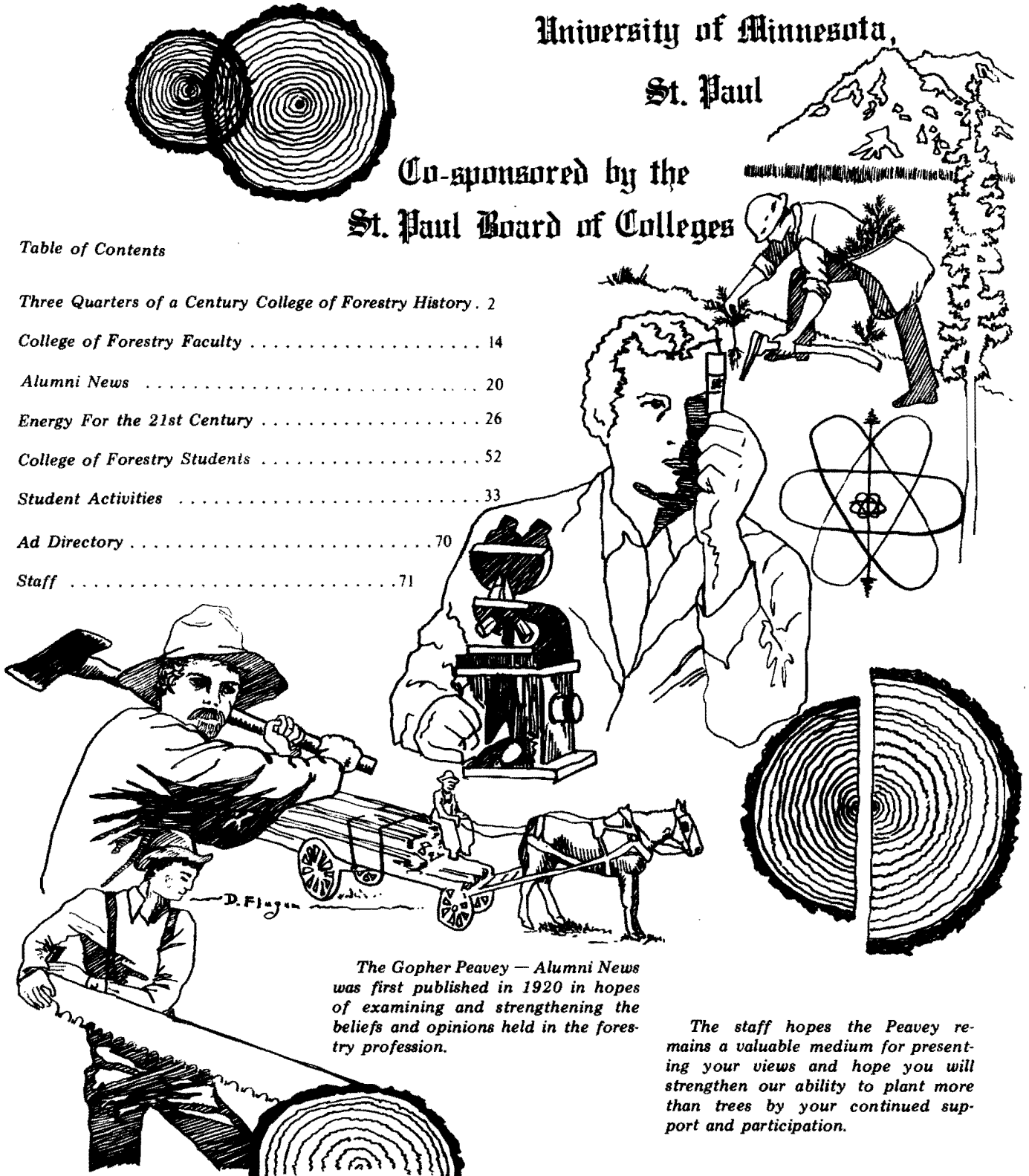
GOPHER PEAVEY - ALUMNI NEWS 1978

Annual publication of the forestry alumni and students of the University of Minnesota, St. Paul

Co-sponsored by the St. Paul Board of Colleges

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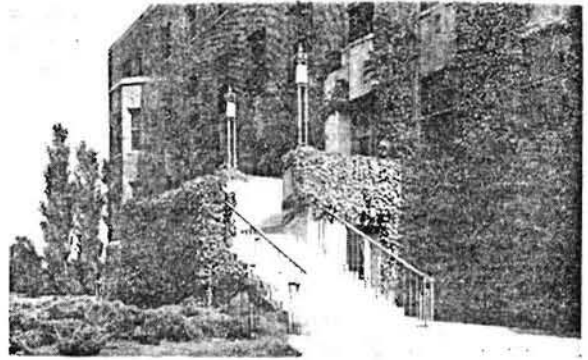


The Gopher Peavey — Alumni News was first published in 1920 in hopes of examining and strengthening the beliefs and opinions held in the forestry profession.

The staff hopes the Peavey remains a valuable medium for presenting your views and hope you will strengthen our ability to plant more than trees by your continued support and participation.

Reprinted from a 50th anniversary publication.

The School of Forestry 1903 - 1953



Green Hall, home of the School of Forestry and of the Lake States Forest Experiment Station.

Visitors to the St. Paul Campus frequently comment on the fact that the attractive home of the School of Forestry is named Green Hall. Few University buildings are more appropriately named. A bronze plaque below the portrait of a kindly, handsome, and rather striking man, which hangs on the first floor of Green Hall, bears the following inscription:

Green Hall
Named in Honor of
Samuel Bowdlear Green

Horticulturist of the Experiment Station, 1888 to 1910.
Professor of Horticulture, 1891 to 1910. Professor of
Horticulture and Forestry, 1897 to 1910. Dean of the
Department of Forestry and Professor of Horticulture, 1910.

EARLY HISTORY

The first proposal for a forestry school in Minnesota was made by University President Folwell to the Board of Regents in 1884. A bill was introduced into Congress by Senator McMillan of Minnesota to provide a land grant for such a school. But these recommendations were not heeded and it remained for the pioneering enthusiasm of Samuel B. Green to bring into being forestry education in Minnesota.

Through travel in Europe and a close friendship with General C. C. Andrews, one of the early pioneers in forestry and conservation, Professor Green soon became deeply interested in forestry. He early recognized what most of his associates closed their eyes to—that about 2/5ths of Minnesota's land, an area of about 20,000,000 acres, was and would always be better suited to growing tree- than food-crops.

Through Professor Green's influence there was established in 1889 in the high school level School of Agriculture the initial forestry course in Minnesota. Through the vicissitudes of changing teachers and curricula, this course has remained until today, and might well claim to be the oldest, continuously-taught forestry course in the U. S. By 1891 Green was including forestry material in his horticulture courses, and in 1896 he taught the first forestry course in the College. In 1896 H. H. Chapman received his bachelor of science degree and in 1899 a bachelor's degree in agriculture. He had completed all the available forestry courses and had caught the forestry virus badly enough so that he never got over it. In 1899 Green's title was changed to Professor of Horticulture and Forestry. During the period up to 1903 the number of forestry courses gradually increased to 7 and forestry began to look like a curriculum. Martin L. Erickson graduated in 1903 with a master's degree in agriculture, having taken all the available forestry work from Green.

The College Catalog for the year 1903-04 listed for the first time offering of a Bachelor of Science degree with a specialization in forestry. In this year the number of forestry courses was increased to about 16, and M. L. Erickson and A. Wheeler were hired as instructors to help Green conduct the courses. With this expansion, Minnesota offered for the first time a professional curriculum in forestry leading to the Bachelor of Science degree.

In 1905 Harold Cuzner earned Minnesota's first B.S. degree in forestry. The following year the larger class of Bill Cox, Dillon Tierney, Sam Detwiler, and Frank Rockwell received degrees and set out to spread the forestry gospel. In



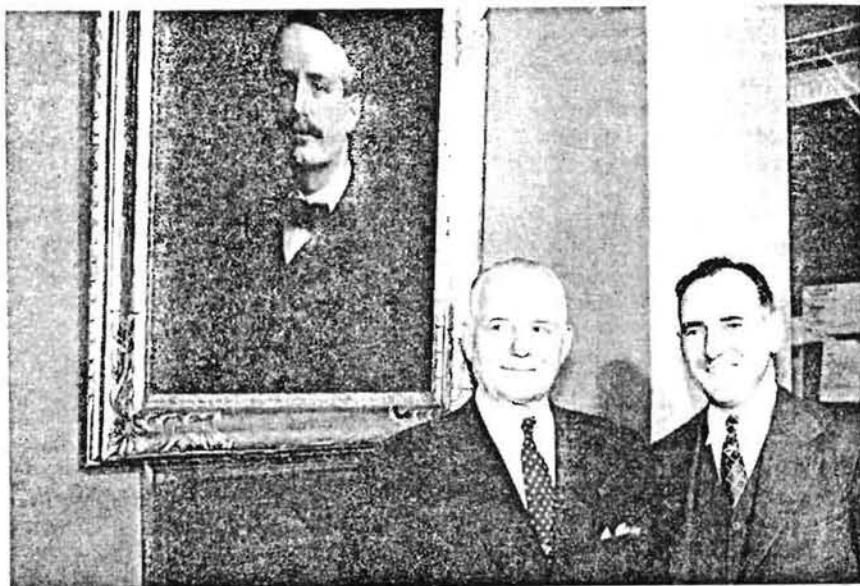
In the fall of 1905 the expanding school obtained the services of E. G. Cheyney who for the next forty-two years was to be a guiding light for the School and all its students. The need for foresters by the U. S. Bureau of Forestry, which had just received administrative direction of the Forest Reserves, boosted enrollment rapidly during these early years, and further staff increases were needed. J. P. Wentling joined the staff in 1908 to teach the courses in dendrology, silviculture, and wood technology.

During these years Minnesota had the great advantage over eastern schools of being close to large-scale logging. Green's energy and vision led him to stress wood's experience. Extended logging field trips were taken, and students were given a first-hand look at rough logging-camp life. On some of these trips Professor Green impressed the students with his ability to handle an ox team and do other difficult logging jobs. The field work at Itasca Park, begun in 1909, was given to the junior class and commenced in the middle of the spring semester. Green also laid the foundation for research by obtaining the Cloquet Experimental Station from the Weyerhaeuser interests in 1909.

By this time forestry had been separated from horticulture, but Green headed both divisions. He was instrumental in getting the Regents to make Forestry a separate College in 1910, and might have been able to maintain the separate status had he not died suddenly of a heart attack at Itasca Park in the summer of 1910. He left, however, a vigorous school firmly established and operating. In fact, an examination of catalogs of those years shows that most of the courses now given were represented in some form in the curriculum. Then, as now, strong departments of pathology and entomology in the College of Agriculture contributed to the strength of Minnesota's forestry training.

With the death of Samuel Green, E. G. Cheyney was placed at the head of the new College of Forestry. He successfully piloted the School through some of its most difficult years, when the only employment for foresters was in the U. S. Forest Service, which was expanding, but very slowly. After two years the University administration, which had been somewhat reluctant to give forestry college status, recombined forestry with agriculture in the College of Agriculture, Forestry and Home Economics. Enrollment steadily dropped to a peacetime low point of 36 in 1916-17. The budget for forestry at that time was about \$9,000.

This was the period of expansion of the Itasca field work, which is described in a separate article. It was also the period of the first exploration of graduate work for foresters. In 1913 another man who was to devote a lifetime to the training of foresters in Minnesota appeared on the scene. J. H. Allison, fresh from the Cocanino National Forest in Arizona, began teaching mensuration, protection, forest products, and forest management, trying to put forestry across to the young woodsmen at Itasca. He was joined by others so that the staff in 1915 consisted of Cheyney, Wentling, Allison, Kennety, Wiggin, and Wilson.



S. B. Green (in portrait), Henry Schmitz, and F. H. Kaufert, have had strong influences on the growth of the School.





One of J. H.'s major projects and a lasting monument to his forestry knowledge is the over 200 acres of coniferous plantations at Lake Vadnais, a reservoir for the St. Paul water system. The first plantings were made in the area in the spring of 1914, after Professor Cheyney, in a talk to a local group of engineers, had aroused the interest of Mr. G. O. Hause, then Superintendent of the St. Paul Water Department. The plantations of Scotch, Norway, jack, and white pine and white and Norway spruce have flourished. Now they provide not only watershed protection and scenic beauty but an easily available field laboratory for classes in silviculture and mensuration.

The 1913 catalog noted for the first time a division of work in the School into two curricula, 1) "Technical forestry", and 2) "Experimental silviculture", because "the field of forestry is at present so large that it is no longer possible to train a man in a four-year course to handle all branches of the work." Further diversification into the fields of utilization was being demanded so that by 1917 the School offered curricula in 1) "Technical Forestry", 2) Commercial Lumbering", and 3) "Wood Pulp and Distillation". This period was brought to a close by World War I, when teaching operations practically ceased. J. H. Allison returned to the Southwest for a year and the rest of the staff gave ROTC instruction or did other war work. In 1919 the field work was given to only two students and transferred to Cloquet. Nevertheless, the subsequent contributions of these two men to forestry has justified training so small a group; they were Hubert Person and Leo Isaac.

Growth After World War I

The post-war boom did not overlook the forestry school. The "G. I. Bill" that followed World War I helped only disabled veterans, but there was a new interest in forestry and enrollment climbed. From 66 students in 1919-1920 the rise was steady and rapid. The forestry needs expanded the School into the remodeled upper floor of the Horticulture Building, and Sam Green's innovation almost dispossessed the parent department, Horticulture. The teaching in logging and lumbering, pulp and paper, and mechanical properties of wood was expanded by the addition of several new courses.

The rapidly expanding school in 1919 acquired the services of Thorvald Schontz-Hansen, who since has divided his time between the Cloquet Station, teaching at St. Paul, and developing the Biological Station at Itasca Park. In 1923 J. H. secured sabbatical leave for a trip to Sweden to observe forestry in a more advanced stage.

This post-war period was marked by renewed and expanded outside activities by foresters at the school, especially two projects that were to be a vital part of forestry schooling at Minnesota. The first of these was the publication of the first year book in 1920, the "Minnesota Forest School Annual." No publication was made the following year, but in 1922 the year book was re-named the Gopher Peavey—Gopher for obvious reasons and Peavey because that was the insignia of the Forestry Club.

The second project was acquisition of a rooming house on Langford Avenue. The house was a center for forester activities of all kinds—meetings, dances, dinners, and endless ingenious kinds of horseplay. It gave Minnesota's Forestry Club a distinctive feature which J. H. could brag a little about when he attended a national meeting of forester club representative at East Lansing, Michigan, in 1920.

In July of 1925, Dr. Henry Schmitz came from Idaho to Minnesota as head of Forestry. The transition from Cheyney to Schmitz was a smooth one. Doc tells how Cheyney, immediately upon his return to the campus from Itasca, appeared in his office to offer his whole-hearted cooperation in building the School. In Cheyney's words, written several years later, "The school immediately responded to the change with a new era of prosperity." J. H. Allison writes, "Dr. Schmitz put new life into the School." R. M. Brown and L. W. Rees were added to the staff in 1927 in the field of mensuration and wood technology respectively.



E. G. Cheyney directed the School from 1910 to 1925.

During this period, forestry organizations thrived at the School. The Forestry Club took on the engineers and placed an historic headpiece in the fireplace at Cloquet, "the only truly American Forester's Blarney Stone." The Minnesota Chapter of Xi Sigma Pi became the National Administrative Chapter with

Henry Schmitz as forester, and Tau Phi Delta provided a residence for Minnesota Foresters. Schantz mentions an organization known as the "Gobblers" and continues, "I don't know just what the Gobblers were but lots of fellows belonged." Students cut classes annually about Washington's birthday for the "Gayety" party.

The 1924-26 catalog records: "The course of study in forestry provides an opportunity in the junior and senior year to major in one of the following fields: (1) Silviculture, (2) Forest Organization and Management, (3) Forest Products". During the next 10 years, a number of changes were made in curriculum offerings within the School including commercial lumbering (which had been offered previously), forest by-products, landscape gardening, forest technology, forest sciences, grazing, and game management. Later, forest technology was changed to wood technology and commercial lumbering to lumber merchandising and construction. Current curriculum offerings include (1) forest management, (2) forestry-wildlife management, (3) wood technology, (4) building products merchandising and construction, and (5) wood technology-furniture.

From the CCC's to the Present

Of the lush forestry years of the early Roosevelt administration, Cheyney wrote, "The establishment of the CCC made forestry the only profession in the United States with no unemployment, and students poured into the forestry school til registration reached an all-time peak . . ." Even in the post-war years with the "G. I. Bill" assistance, this enrollment maximum has not been exceeded.

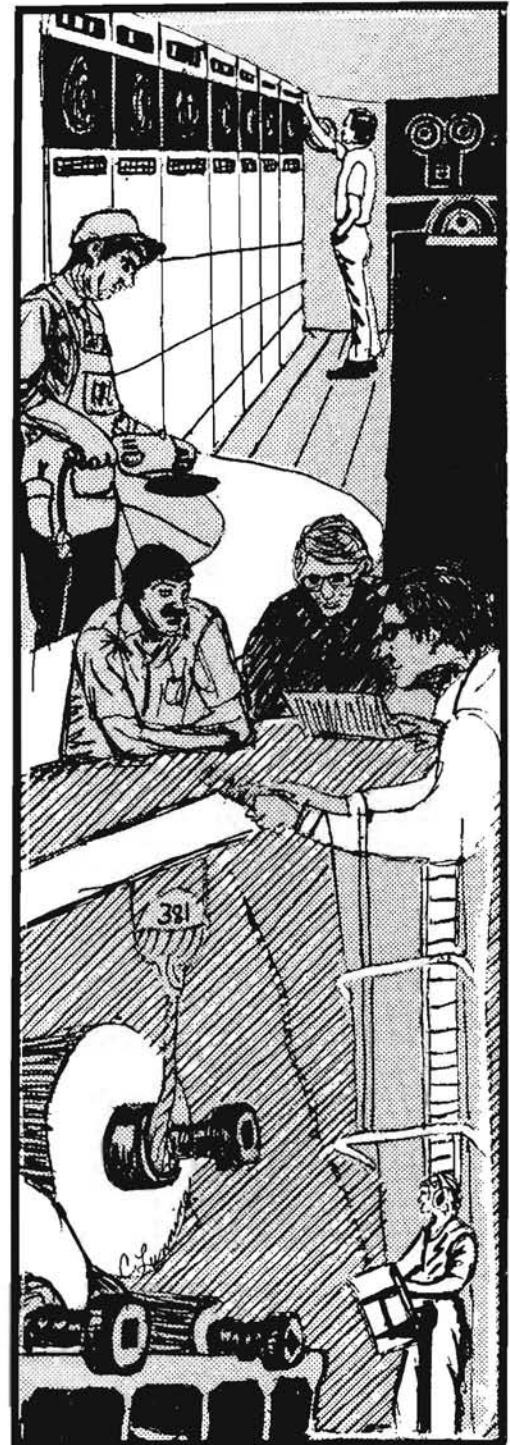
Certainly one of the major milestones in the progress of the Forestry School at Minnesota was its acquisition of Green Hall, the home not only of the School but also of the central office of the Lake States Forest Experiment Station. Soon after his arrival here, Henry Schmitz began his tireless drive for a new forestry building, a campaign which was to continue for over 10 years. On April 24, 1937, Governor Benson signed the bill providing \$250,000 for the erection of a forestry building at University Farm. Dedication took place on November 18, 1938, with a bright array of prominent personages on the program followed by an Open House. Although Minnesota had always been accredited by the Society of American Foresters, the new forestry building rated her with the top forestry schools of the United States.

Dr. Schmitz in 1944 took over the duties of Dean of the College of Agriculture, Forestry, and Home Economics as successor to Dean E. M. Freeman. He continued as head of Forestry until 1947 when Dr. Kaufert took over the reins. In the summer of 1952, Dean Schmitz was called back to his Alma Mater, the University of Washington, to become President of that institution. Doc had made a real place for himself at Minnesota, not only as head of the School and Dean of the College, but University-wide. In an editorial in the Minnesota Daily these comments were made and speak for themselves: ". . . He has done something which others will not do as well . . . Who else can cast over our work that aura of good will which was the mark of everything Henry Schmitz touched? . . . Who else can do so much to make a community out of our gigantic corporation? . . . It'll take more than a dean or committee member to fill his place. It'll take a big heart."

Service to the people of the State has become an ever more important function of the entire University. This has been reflected in the demand upon the Forestry School staff for technical information, leadership in various forestry matters vital to the entire state, and participation in public meetings of a wide variety. One of the stories which lives after Cheyney relates to this phase of the work. A lady called to inquire about a tree which had caused her some concern. Cheyney indicated that the tree apparently was overmature and that its condition was probably normal for old age. This simple explanation was not satisfactory, however, and the fretful inquirer asked to speak to one of the "experts"—perhaps to a staff member who had been here a little longer. Cheyney removed the pipe from between his tightly-clenched jaws and with the calm of superbly truthful irony drawled, "Lady, I've been around here for over 40 years and before me there was no forestry school." He replaced the receiver and marched out of the office.



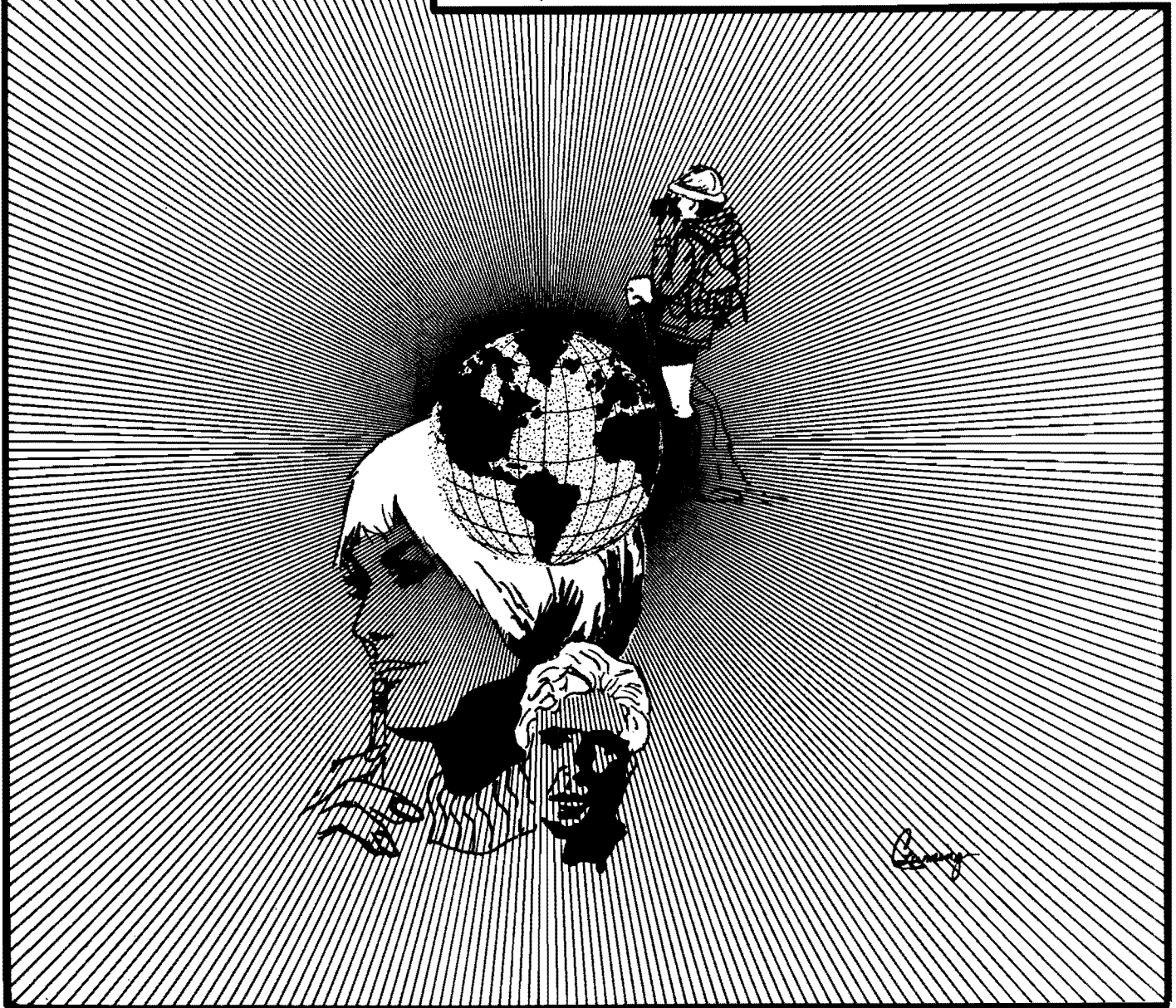
G. C. Lindeberg ('14), and S. A. Graham ('14) type mapped the Water Department holdings at Lake Vadnais in 1914 before planting began. Here they are shown in one of the plantations on the 50th Anniversary field trip.



The advent of World War II severely reduced enrollment at Minnesota as elsewhere. With its cessation, however, the School once again began to build. With the aid of the "G. I. Bill", foresters entered or returned to Minnesota in large numbers and during the years 1946-1950 enrollment in forestry consistently exceeded 350. The 92 graduates of the School in 1950 even exceeded the number receiving degrees in any one year during the expanded 1937-'40 period.

In 1936 Dr. Kaufert had left Minnesota for three years with the Forest Products Laboratory and four years with DuPont, broken by a short interim return to Minnesota just before the war. At the time of his departure, the 1937 Peavey editor wrote, ". . . Students and faculty alike were keenly aware that they were losing a teacher not only well qualified to teach by his broad training and experience, but an inspirational teacher as well . . . The students' interests and problems were also his . . . We like to think and hope that some day Frank will return to these old stamping grounds where he rightfully belongs."

In 1945, Frank did return, and in the fall took over as Director of the School of Forestry, a capacity in which he had been acting following Dr. Schmitz' acceptance of the deanship of the College of Agriculture, Forestry, and Home Economics several years earlier. His administration of the School has emphasized (1) increased development of cooperative relationships with both public and private forestry organizations throughout Minnesota, (2) increased quantity and quality of graduate study, and (3) increased emphasis upon research activities by the School.



As the Dean Bows Out: Needs — and Opportunities

This is my twenty-sixth and last report on the College and its predecessors. I recently reviewed most of the Gopher Peavey-Alumni News containing these reports. It was kind of nostalgic but fun to see the changes in hairline, faculty, students and office staff. Although the Gopher Peavey - Alumni News has changed during this period, it still is the same lively and interesting annual production that it was in 1948 and in all earlier years. It has always been and still is primarily a student production with cooperation from the faculty and the support of alumni, without which it would soon perish.

In each of the twenty-six reports prepared since this series started there has been a certain amount of boasting relative to developments in faculty, facilities, etc. However, there truly have been many developments that justified at least some boasting. To review the total happenings during this quarter century one needs to review all of the Peaveys, because a fairly complete record is presented in the annual reports and in other parts of this annual. In this last report let's look at the future. While what has been accomplished has been considerable, the job ahead appears to have even greater and more interesting potential and challenges.

Faculty

Much has been made of the fact that in the last quarter century the faculty of the College of Forestry has grown from 6-7 to about 40. The number will be over 40 when the present open positions are filled. It would appear on the surface that such a sizeable faculty should be adequate in 1974 if a faculty of six could do the job in 1947. However, as all of you well recognize, the entire field of forestry has changed and many important areas of the total field have been developed into disciplines as broad and challenging as was the entire profession in 1947. The result is that the College of Forestry, even with its 40-man faculty, has only skeletal staffing in such important areas as Remote Sensing and Aerial Photogrammetry, Recreation and Resources Management, Forest Hydrology, Physiology and Genetics, Forest Measurements, Forest Fire and Forest Management, Timber Harvesting and in all areas of Forest Products. We were successful this year in adding a faculty member in Forest Products, thus giving us two faculty members in the area of Pulp and Paper, which we are developing and staffing with the help of a fine grant from the Blandin Foundation. This skeletal-staffing situation must be corrected if the College is to develop the type of strength that we see in our sister Colleges of Agriculture and Home Economics on the St. Paul Campus and in leading forestry schools of the U.S.

Another faculty area in which the College is understaffed is in Extension. Although we are this year establishing a new one-half time Extension position at the Cloquet Forestry Center, this will bring our total to only 3½, with only one in the area of Forest Products. Extension staffing should be increased several-fold to accomplish what is needed in terms of continuing education, dissemination of research results and a better contact with the public.

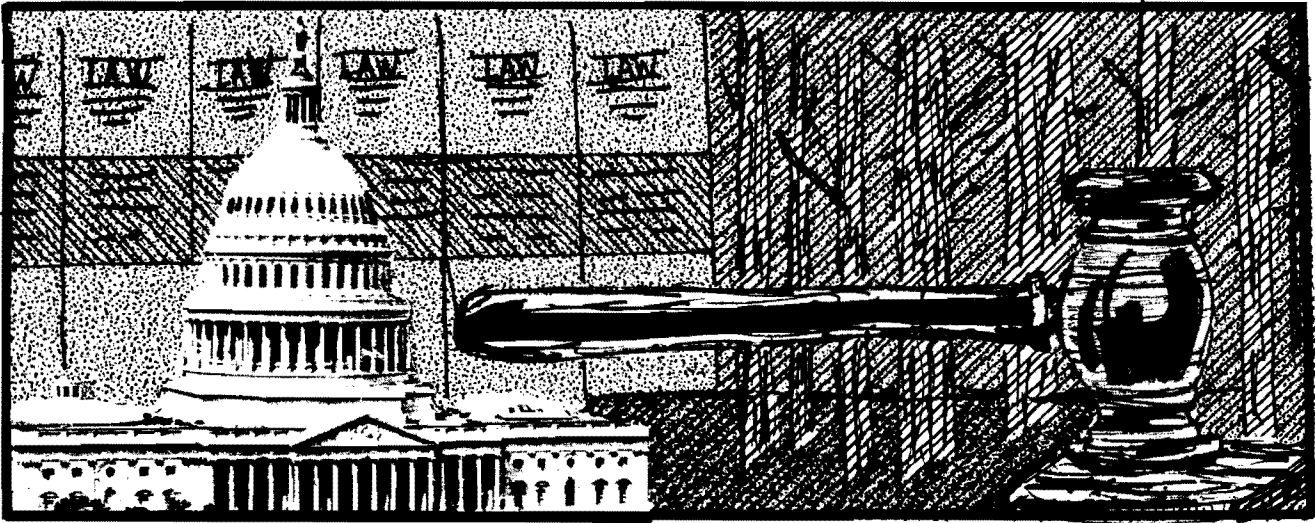
Our College Office is an added area in which we are very thinly manned. With Ken Winsness and an assistant handling most of our freshmen and transfer student advising as well as operating the entire College Office set-up, we are not now adequately meeting student's needs. A part- or full-time job-placement officer is needed in the College Office.

Facilities

In the late 40's and early 50's we concentrated rather heavily on building and developing the Itasca Forestry and Biological Station facilities. The expansion there was considerable and the majority of the buildings still are those built by Dr. T. Schantz-Hansen, Walter Nelson and Eric Wallin. The College asked to be relieved of the management responsibilities for the Itasca Station in 1954. In recent years several new laboratories and cabins have been added with grant funds and legislative appropriations, but the basic nature of the campus and its structures are similar to what they were in the mid 1950's. The \$20,000 assembly hall, dining room and kitchen that Schantz, Walt and Eric built in 1950 recently was remodeled, or is being remodeled, at a cost of several hundred thousand dollars. This gives you some idea of how building costs have changed.

The offices, classrooms and student living quarters at the Cloquet Forestry Center are largely new, having been built since 1960. All student cabins have been modernized and the classroom and other facilities are now useable on a year-around basis. However, we lack the second unit of the classroom-laboratory facility and we will be asking the 1975-77 Legislature for this. The classroom-laboratory building was originally planned to have a major research component, but only the classroom-office portion was built as Phase I. The research phase of this building should be added in the next few years.

On the St. Paul Campus we are in the process of completing the third phase of the Forest Products Building, which ties all three phases together into a most attractive and useable structure. The Forest Products Building probably will be adequate to take care of Department of Forest Products needs for some years. However, new equipment and some modification of existing space are still critical items.



Probably the greatest single College facility need is for the Green Hall Addition, for which \$25,000 of preliminary planning funds were provided in the \$1 million appropriated for Phase III of Forest Products. Funds for working drawings and construction of the Green Hall Addition were not provided by the 1973 Legislature. Green Hall is terribly cramped presently, with inadequate space for faculty and graduate student offices, remote sensing, aerial photogrammetry, forest hydrology, forest recreation, forest measurements and forest genetics, library, College Office and Student Commons. The College of Forestry will be seriously handicapped and will not rank with the best in the country until this serious deficiency is corrected.

Research

It is not surprising that there has been considerable emphasis from 1947-1974 on development of the College's research program. In 1947 we had \$500 of research funds. Through the gradual addition of Federal Hatch funds, State General Agriculture Research (GAR) funds, Grant funds, McIntire-Stennis Cooperative Forestry Research Act funds (Federal), and, more recently, State Agricultural Special funds for such projects as our Cloquet Forestry Center "Effects of Mechanized Logging" study, we have built the total research funds available in 1974-75 to approximately three-quarters of a million dollars.

A considerable part of our research is cooperative; with the North Central Forest Experiment Station, State Department of Natural Resources, the Minnesota forest industries, and such University Departments as: Entomology, Fisheries and Wildlife; Plant Pathology; Soil Science; Agricultural Economics and other groups.

While this research growth has been gratifying, it has been far too slow to take care of the needs in most of the disciplines in which it is concentrated. We should have three-quarters of a million dollars of research funds to adequately take care of our Forest Products research, if this program is to develop as hoped for and is to realize fully the potential of the available facilities and equipment. We need additional

funds to better finance the excellent projects at the Cloquet Forestry Center, such as that on "Effects of Mechanized Logging." A many-fold increase of research funds is needed for our remote sensing and aerial photogrammetry program, and similar increases are essential for economics, fire-use, recreation, biology, hydrology and measurements research.

Some of these funds will no doubt need to come from the same sources that provide most of them presently: State General Agriculture Research, State Specials, Hatch, grant and especially McIntire-Stennis Cooperative Forestry Research Funds. The latter source would appear at this time to offer possibly the greatest promise of new funds for research. All McIntire-Stennis funds coming to Minnesota are in the College of Forestry. We have not been very active or effective in obtaining larger amounts of grant funds for forestry research. The faculty, particularly as it grows and is "fleshed out," needs to become far more active in soliciting and obtaining grants in order to achieve the increases in research funds that appear to be needed and could be effectively utilized in conducting research of value to Minnesota and the nation.

Teaching

The College of Forestry faculty has always considered undergraduate teaching its first and most important single function. After this commitment come research, graduate education and public service.

With growth in enrollment many of our classes have increased to almost impossible sizes, 125-160 students in many junior-senior or professional course classes. Such large classes have resulted in considerable student as well as faculty dissatisfaction. These classes need to be broken down into smaller groups, a possibility only if we are able to substantially increase our faculty numbers in the future. This should be one of the prime challenges of the College of Forestry and its leadership in the coming years.

The College of Forestry faculty has been very active in developing and adapting new teaching techniques. These have been helpful efforts and have had fine student response. However, there is so much more that can be done in this field of self-study aids and new teaching techniques.

Enrollment Limitations

For too many years the availability of 0100 or teaching funds was keyed to total enrollment. Total enrollment still is a factor in allocation of teaching funds. However, to an increasing extent fund allocations are being equated to teaching loads or student contact hours (SCH).

With this development there will be greater opportunity for the College of Forestry to go to Senior College status and admit only at the Junior level, at which most of our professional course work begins. Since Itasca now is the entrance point for Juniors in Forest Resources Development, who make up 95+% of our Itasca enrollment and 80+% of our students, the College could become a Senior College in the future with fewer complications than in the past.

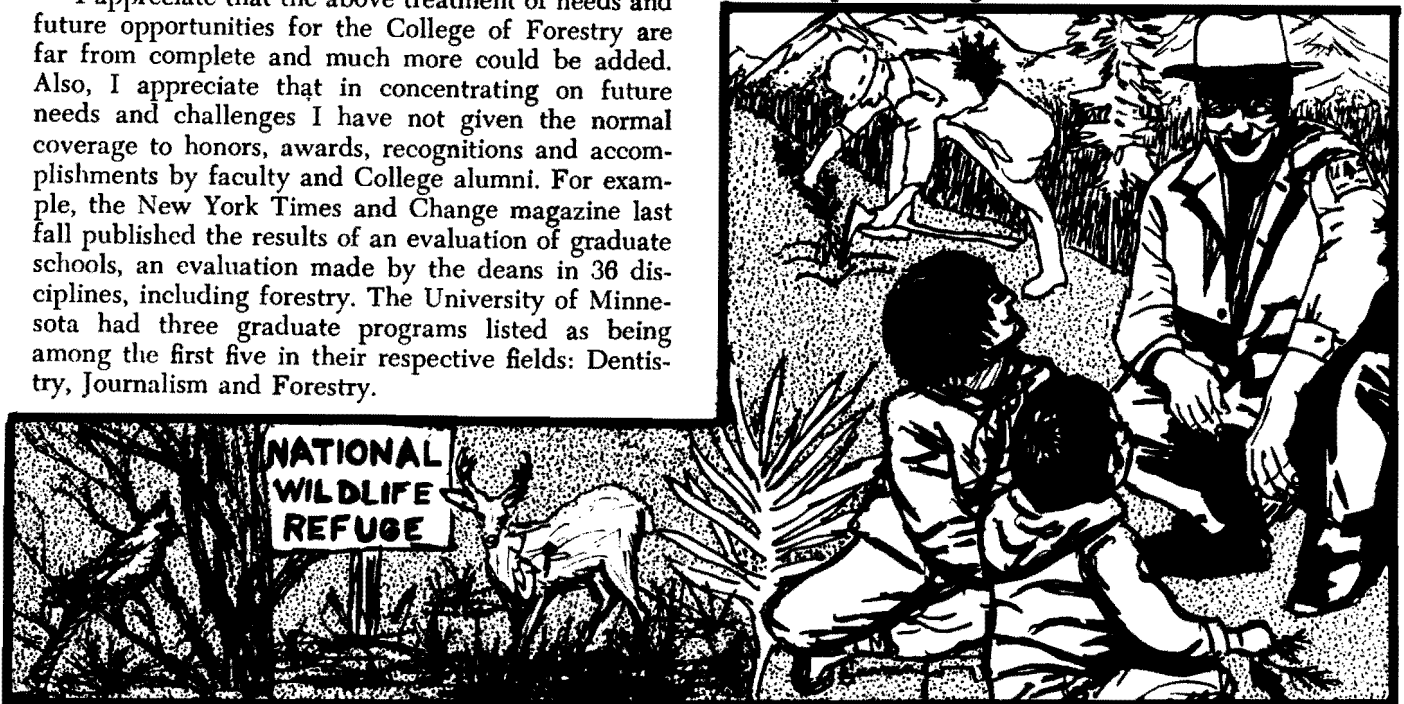
Also, with regard to undergraduate enrollment, the capacity of the Itasca and Cloquet facilities should largely govern future enrollment in the Forest Resources Development curriculum, and the College should go slow in repeating the same mistake made in 1937-38, when special field sessions were held on the Chippewa National Forest in order to accommodate the large enrollment. The results were disastrous, with 92 students graduating in 1938 and job opportunities available for few of them. By counseling more students into Forest Products, where employment opportunities are excellent, by increasing entrance requirements, and by selecting as juniors in Forest Resources Development only the number of quality students that can be accommodated in the Itasca and Cloquet facilities, the number of graduates produced in the next few years should be kept in reasonable balance with employment opportunities. Although some students wishing to enter Forest Resources Development may be excluded under such an arrangement, the number should not be large and the quality of students and graduates should be increased.

I appreciate that the above treatment of needs and future opportunities for the College of Forestry are far from complete and much more could be added. Also, I appreciate that in concentrating on future needs and challenges I have not given the normal coverage to honors, awards, recognitions and accomplishments by faculty and College alumni. For example, the New York Times and Change magazine last fall published the results of an evaluation of graduate schools, an evaluation made by the deans in 36 disciplines, including forestry. The University of Minnesota had three graduate programs listed as being among the first five in their respective fields: Dentistry, Journalism and Forestry.

Many faculty members and alumni have been recognized and honored. I apologize for not providing coverage for at least a number of these. With four of the six U.S.F.S. Forest Experiment Stations now headed by Minnesota alumni; with the Chief of the U.S. Forest Service and Commissioner and Deputy Commissioner of the Minnesota Department of Natural Resources being College alumni; and with 14 of the U.S. accredited forestry schools having Minnesota alums in top leadership positions, this would indeed have been the year for a bit of chest thumping. However, I'll leave such accounting of accomplishments by alumni and faculty for some future effort.

In closing this report, and series of reports starting in 1948, one year after I took over as Acting Chief of the then Division of Forestry, let me say that while I write this last report with some regret, I also do so with a deep sense of satisfaction and gratitude. As things have turned out, I do not regret having returned to the University of Minnesota College of Forestry from the DuPont Chemical Company in 1940, the Forest Products Laboratory at Madison, Wisconsin in 1945, and, ten years ago, from the Cooperative State Research Service in Washington, D.C. It has been a busy life. It has been full of challenges and opportunities. It has resulted in some accomplishment, and in the development of a base on which others can build stronger and more adequate programs than we presently have. What has been accomplished has been possible only because of the continuous and complete cooperation of a fine faculty and office staff, a cooperative University administration, hundreds of students and graduate students, and the continuous loyalty and support of alumni. I thank all of you for your cooperation, loyalty and contributions, without which few of the developments and accomplishments of the past 27 years would have been possible.

"Keep 'em rolling."



Report of the Dean
R. A. Skok

"A TIME TO PAUSE AND REFLECT"

A 75th anniversary is a time to pause and reflect upon what has been accomplished. In 1978 we officially recognize the College of Forestry for its three quarters century of continuous contribution through forestry education. Involvement of the College in the development of forestry professionals and scientists nearly covers the history of the forestry profession in the United States. With over 3,000 baccalaureate and nearly 500 graduate degrees granted in and forest products, Minnesota's contributions have been legion. Leadership in industrial and public forest resource management and utilization, in forest science including research and development, and in forestry education has become expected of Minnesota graduates nationwide and indeed in some instances worldwide.



A tree... a forest... a future

Much credit for achievements of the College can be directly attributed to the dedication, capabilities, and wisdom of such faculty and administrators as Frank Kaufert, Henry Schmitz, E.G. Cheyney, R.M. Brown, J. H. (Pop) Allison, T. Schantz-Hansen, and Louis Rees. They were the faculty and leaders during the era when undergraduate instruction was the dominant program and activity of the College and the mark of accomplishment by which we were measured.

While undergraduate curriculums offering majors to students in forest resources, forest products, forest science, and recreation resource management remain central to our mission, these activities no longer represent the major budgeted activity of the College under shifting program emphasis. Over the past 15-20 years and under Frank Kaufert's leadership forestry research and graduate instruction emerged as full fledged programs of the College. This has been an important achievement. We are now full partners in the work of the Agricultural Experiment Station and gradually emerging as such with the Cooperative Extension Service. In other words we are now fulfilling the total Land Grant obligation of the forestry program at the University of Minnesota. The challenge ahead is one of improving the productivity of our programs and defining priorities based upon needs and institutional capabilities.

A major anniversary such as we are recognizing this year is a time when special attention should be given to defining goals for the future. The College will give this careful attention. Counsel and advice from alumni and friends of the College are always welcome and helpful in such deliberations.

Some thoughts I have about the decade ahead would set out for priority emphasis the following program areas of the College:

1. GRADUATE EDUCATION IN FORESTRY AND FOREST PRODUCTS

We are one of relatively few forestry schools located at a strong major university. This permits advanced degree programming with strength in a broad range of subfields of forestry and forest products. Employment for advanced degrees in forestry remains generally very strong. The professional of the future in resource management and utilization

will increasingly be required to have education beyond the baccalaureate. Forest scientists are in short supply and there appears to be no surplus likely over the next 5-10 years in most subfields.

2. UNDERGRADUATE PROGRAMS IN FOREST PRODUCTS AND IN DEFINED AREAS OF RESOURCE MANAGEMENT

Instructional funding for the College has been limited and will likely prove to be even more so in the decade ahead. With excellent employment and support from industrial groups for the forest products curriculum, greater relative emphasis here as opposed to resource management seems merited. As with graduate education, we have one of the few facilities and faculty of quality and depth in the United States for an undergraduate forest products program. We should capitalize on this uniqueness.

I further suggest that we consider limiting enrollment in our forest resources undergraduate program to maintain its quality. There are a number of forestry schools nationwide that can effectively provide baccalaureate degrees in forest resource management. While we owe the Minnesota citizens the opportunity to avail themselves of such a program in their own university, it should be of a scale recognizing the need for quality and the fact we do not have the same comparative advantages in this as in other programs. Consideration must also be given to the growing issue of generalist versus specialized emphasis at the undergraduate level.

3. CONTINUING EDUCATION AND EXTENSION -- THE UNMET NEED

The need to speed the rate of adoption and application of information and new knowledge to forestry and forest products operations seems universally accepted. A powerful mechanism that remains underdeveloped is the role of the forestry schools working with and through the Extension Service to reach the forestry community. A well planned and delivered sequence of educational offerings is required. The excellent prospects for passage of the Weaver Bill (H.R. 11779) by Congress this year suggests realization of a level of financial assistance that will make this a reality by 1980. Among the highest priorities I see for Minnesota is that of continuing education non-credit offerings for professional resource managers. We need to find improved ways of weaving this into the fabric of the programs of the College and the University.

4. RESEARCH PROGRAM- DEFINITION OF NEEDS AND PRIORITY EMPHASIS

Nearly two-thirds of the current year's budget of the College is from funding specifically directed to research. The rapid growth in this type of funding in the decade of the 70's suggests we require improved research planning and management methods while still retaining those elements of academic independence so crucial to our research environment.

We recognize we cannot have research capabilities to meet the total array of forest and related resource problems of importance to Minnesota. Establishing improved means of determining research problems and priorities is crucial. Evaluation of the productivity of our research efforts periodically is a corollary to priority setting. Involvement of representatives from groups who use and are affected by our research is an increasing need and one we should pursue vigorously.

Along with the program areas that can be defined for special attention in the decade ahead are at least three elements of program conduct that are of special importance in my view: These are:

1. INVOLVEMENT OF NON-TRADITIONAL STUDENTS IN OUR PROGRAMS

Substantial progress has been made in recent years in attracting women to our undergraduate and master's degree programs. We need to expand this to the PhD level. By the early 1980's this College should have a continuous enrollment of doctoral women students.

As is the case for nearly all forestry schools, our minority student enrollment is poor. Increased effort and creativity must be directed toward assuring that the opportunities are made known and available to this group.

We have gained considerable experience over the past 5 years with non-forestry baccalaureate degree students at the master's level. Overall this has added an important new dimension to our program in my judgement. We need to learn from our experience and improve this alternative academic track into the profession and science of forestry.

2. RELATED RESOURCE PROGRAMS IN THE UNIVERSITY

Minnesota has traditionally had the separation in various academic units of disciplines closely related to the broad spectrum of activities and

resources we identify with forest resources. Nothing presently suggests organizational change in this relationship. We need to assure that the instruction and research programming necessary to address problems across discipline and organization lines can be achieved with a minimum of difficulty.

3. ADEQUATE FACILITIES TO CARRY-OUT FORESTRY PROGRAMS

In 1981 it will be a decade since the last substantive appropriation for capital improvement expansion for the College of Forestry. The growth in research and graduate education programs since then has been such that we are literally bursting at the seams. To maintain and enhance the quality of our programming added space is and will continue to be essential. Without relief in this area severe limitations will be imposed on the expanded role the College of Forestry needs to fulfill in the 1980's.

Personal Developments

I wish to report briefly on some changes in personnel we have experienced over the past year.

Rod Sando, instructor in fire and timber management planning, was named director of forestry for the Minnesota Department of Natural Resources effective January 1, 1978. Rod has been on the faculty since 1971 while pursuing his doctoral studies.

Arnett Mace, resigned as head, Department of Forest Resources, to assume the position of Director, School of Forestry and Conservation at the University of Florida effective March 1, 1978. Arnett had joined the faculty at Minnesota in 1967 as an assistant professor in forest hydrology.

Carl Mohn, associate professor, is serving as acting head, Department of Forest Resources during the period until a new head is selected and arrives. In another administrative change this year, Larry Meriam, professor in forest recreation was appointed as coordinator of Recreation Resource Management in the College of Forestry.

New faculty have come to College over the past year. In Forest Products, Harlan Petersen joined us on October 1, 1977, as a research fellow and extension specialist. Harlan came to us from the University of Wisconsin where he had been in extension

forestry for two and one-half years. His initial effort here has been assisting communities and agencies to develop improved utilization of diseased elm wood material -- a major task.

Steve Sinclair came to the Forest Products faculty in mid-April as an assistant professor. A native of North Carolina, Steve was an instructor at Virginia Polytechnic Institute prior to joining us. Steve's primary responsibility will be to undertake research directed toward increasing the utilization of low grade hardwoods and wood residues.

Clarence Buckman, retired deputy commissioner of the Minnesota DNR was appointed a part-time visiting professor in October 1977. Clarence is serving as a program coordinator in the Office of the Dean for the Blandin Distinguished Visitor Program. Offered spring quarter 1978 the program theme is "Lake States Public Lands: The Challenge to Forestry."

The Department of Forest Resources welcomed several new faculty. Alan Ek was appointed associate professor on July 1, 1977. Al's responsibilities cover forest measurements and the inventory area in both instruction and research. He had previously been on the faculty of the University of Wisconsin-Madison.

Two new faculty joined in the spring of 1977. These were Erv Berglund and Jim O'Rourke both appointed as assistant professors. Erv's specialty is watershed management while Jim's is range management. After 10 weeks of intensive French language training at the University, Erv, Jim and their families joined the Minnesota program at Institute Hassan II, Rabat, Morocco. This is a US/AID funded project to develop research and graduate education programs in selected agricultural disciplines in Morocco. Jim O'Rourke was previously on the faculty at the School of Renewable Resources, University of Arizona. Erv Berglund had been on the faculties at the University of Alaska and Oregon State University.

In August, 1978, Tom Lillesand joins the FR faculty and the Remote Sensing lab of the College as an associate professor. Tom's specialization is in remote sensing of the environment including surveying and photogrammetry. A graduate from the University of Wisconsin with his PhD in civil engineering, he comes to this College from the Department of Forest Engineering at the college of

Environmental Science and Forestry, State University of New York-Syracuse.

Arno Bergstrom has served as an extension assistant specialist in forestry at the Cloquet Forestry Center during this past year. This temporary assignment has been very capably handled by Arno.

Tom Houghtaling served as an instructor in forest economics during this past year while Hans Gregersen was on sabbatical with FAO in Rome, Italy. Tom taught several courses while completing work on his dissertation.

May there be 75 More

I have taken the occasion of the 75th Anniversary to discuss with you some of what I believe should be the aspirations for the College in the 1980's. This leaves no space to discuss the many exciting program occurrences of the past nor the short term concerns related to program support problems. But a 75th Anniversary is a unique occasion and should be treated accordingly.

Frank Kaufert, Dean Emeritus, and I hope you share in the pride we have in the accomplishments of the alumni, faculty, staff and programs of the past 75 years of this College of Forestry. While a tough act to follow, we look forward to an even greater contribution for the next 75. With your help we know it can happen.



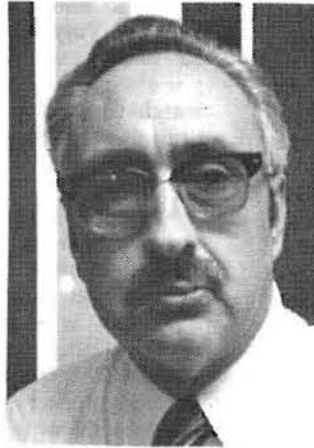
Having the technical expertise in hand is not of much practical value in today's world if the person cannot share it with others. Often the job is made more difficult when the audience you are trying to reach is opposed to your line of thought.

MICHAEL W. CAREY '69

**FACULTY
&
STAFF**



*Frank Kaufert
dean emeritus*



*Richard Skok
dean
College of Forestry*



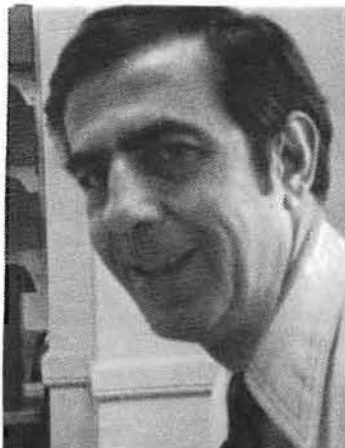
*J.H. Allison
professor emeritus*



*Randolph Brown
professor emeritus*



*Ken Winsness
director of Student
Services*



*Carl Mohn
acting head
Forest Resources*



*John Haygreen
department head
Forest Products*



*Frank Irving
director of Graduate
Studies*



*Merle P. Meyer
Aerial Photography
Range, Remote Sensing*

The public welfare cannot be served by walking blindly in the old ruts. Times change, and the public needs change with them. The man who would serve the public to the level of its needs, must look ahead.

GIFFORD PINCHOT

Forest Resources



*Paul Ellefson
Forest Policy*



*Hans Gregersen
Economics*



*Ken Brooks
Hydrology*



*Lee Werth
Aerial Phogography
Remote Sensing*



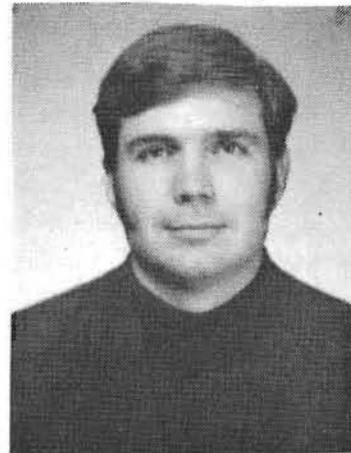
*Timothy Knopp
Recreation*



*Lawrence Merriam
Recreation*



*Clarence Buckman
visiting professor*



*Alan Ek
forest measurements*



*Edward I. Sucoff
Tree Physiology*



*Dietmar Rose
Quantitative Management*

The forester must think "environment" instead of trees. He must be a prophet, an environmental missionary, an educator, a sociologist, and an outspoken advocate of good land use. He cannot bury himself in the woods and ignore the world.

People have suddenly become aware that they are a part of nature. It is the duty of every trained land manager to capitalize upon this awareness and provide the public with leadership before they lapse back into a final state of hopeless apathy. (Craig M. Smith, '65)

Forest Resources



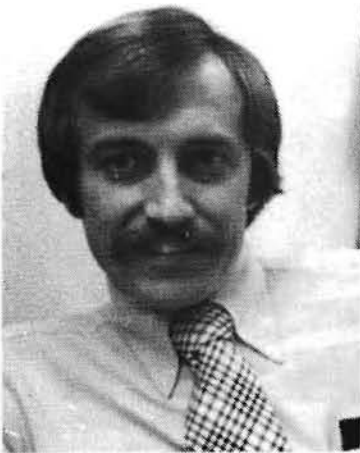
Henry L. Hansen
Silviculture, Ecology



Harold Scholten
Silviculture



Vilis Kurmis
Ecology Research



Phil Splett
Career Opportunities



Egolfs V. Bakuzis
Ecology

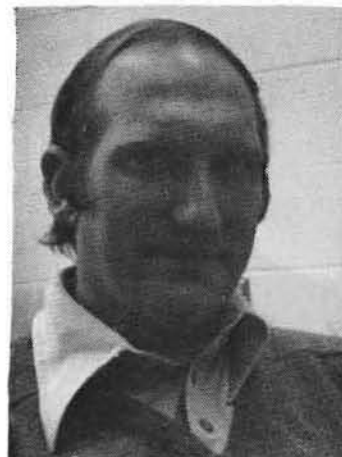


College Office Staff

New Faculty Members



Foresters now and in the future should not only be *leaders in managing* the Forest environment, but should also be the *leaders in keeping his fellow citizens correctly informed* about the resource management problems this country faces and the proper solutions to them. This is a big responsibility; but unless all Foresters get into the public eye and "tell it like it is" we as a profession can expect to be lost in the emotional flood waters of the preservationists and flounder with them. (Paul J. St. Amant, '31)



Karl Ketter
Forest Products



Harlan Petersen
extension specialist

Forestry will become increasingly important as more people realize that trees are one of the few renewable natural resources we have on earth. . . . (David Hakala, '68)

Forest Products



*Ralph Hossfeld
Wood Chemistry*



*Robert Erickson
Wood Physics*



*Roland Gertjeansen
Pulp and Paper*



*Ronald Neuman
Pulp and Paper*



*Henry Hall
Research*



*Jim Bowyer
Production Management*



*Lewis Hendricks
extension specialist*



Forest Products secretaries

Cloquet Forestry Center



*Al Hallgren
Director, Cloquet Center
Forest Management*



*Al Alm
Cloquet Center
Silviculture*



*Ed White
Cloquet Center
Silviculture, Soils*



*Ray Jensen
Cloquet Center
Associate Scientist*



*Arno Bergstrum
extension specialist*



*David French
Forest Pathology*

Forestry Related Studies



*W. H. Marshall and D. L. Frenzel
Fisheries and Wildlife*

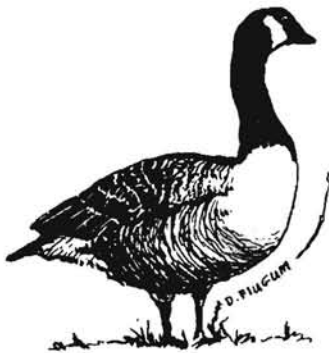


*Herb Kulman
Forest Entomology*

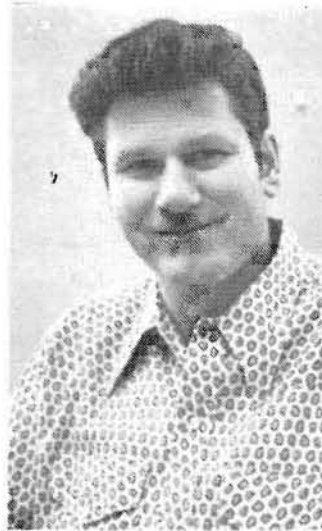


*L. W. Krefting
Wildlife Research*

Extension



Marvin Smith
extension specialist



Carl Vogt
extension specialist



Mary Ann Hellman
secretary, Extension

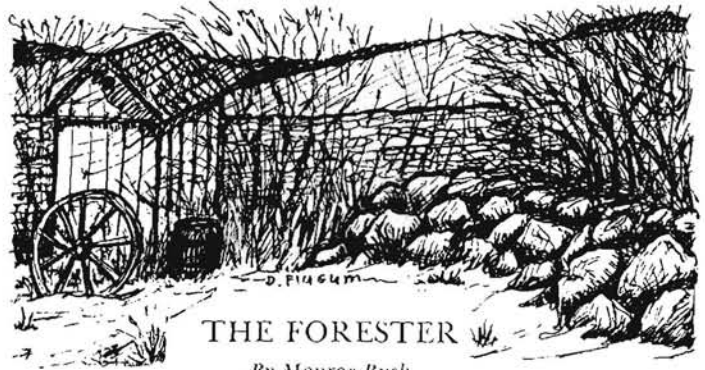


Forestry education must be strengthened by giving students something to help him, or her, promote proper management of our resources to both people who do not care and to people who are enthusiastic but who are not well informed. It is not enough to know the technical answers unless they can be presented in such a way that all people understand the problems.—(Paul J. St Amant '31)

Ken's Office



Pete Engh, Gretchen Douma, Lavonne Marcus, Mike Kuether.



THE FORESTER

By Monroe Bush

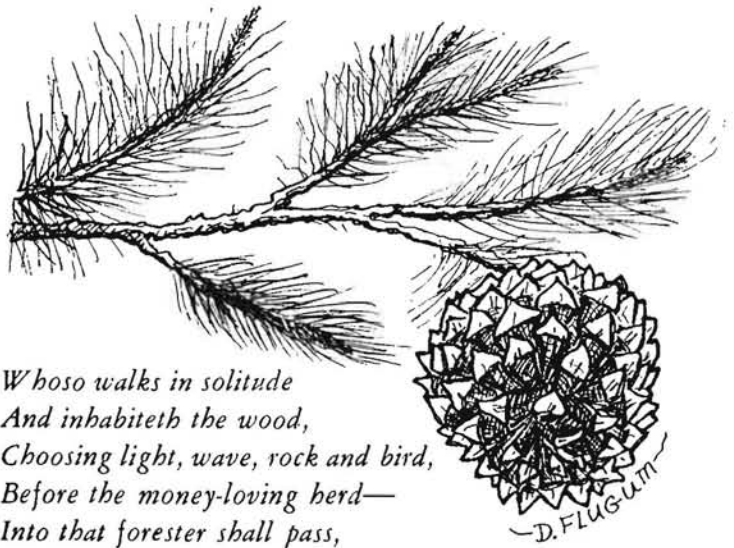
A forester stands at a gate between two worlds. Pass through this gate in one direction and you come into the intricate world of human technology; pass through the opposite way and you enter the perfection of God's natural world.

The forester is the gatekeeper. More than any other man he determines the effect of one world upon the other. Whether the hunger of technology for raw materials will exhaust the earth, or the earth provide a sustained flow of resources for the well-being of mankind, is to a great extent the responsibility of the forester.

Trees and their forest communities are a fulcrum upon which the entire natural world of renewable resources is balanced. He who manages the forest manages the key to an undiminished yield of the earth's living abundance. The harvest of timber must be adequate for every industrial need, yet this harvest must not jeopardize a maximum forest growth. Neither must the harvest depreciate the role of the forests in building and maintaining a fertile soil, in the management of rainfall, or in providing an essential habitat for wildlife and a no less essential sanctuary for men. Thus to obtain the wood resources which are demanded by the present and, at the same time, assure an adequate future supply of not only wood, but those other resources which our timberlands sustain, is the forester's challenge.

To succeed, he must bring to his critical challenge not only complex technical skills and a vast knowledge of his profession, but those human qualities of vision, diplomacy and broad judgment without which no man can accomplish an important work.

How well he mediates, then, between these two worlds of technology and forestry, to what degree he can correlate industrial appetite with sound woodland management, will determine the health of the living earth for not only this generation, but for as far as the mind's eye can see. And by this means, ultimately, the forester will determine in large measure the welfare of our civilization.



*Whoso walks in solitude
And inhabiteth the wood,
Choosing light, wave, rock and bird,
Before the money-loving herd—
Into that forester shall pass,
From these companions, power and grace.*

EMERSON—"Spiritual Essays on Nature"

MFAA

MEMBERS

Willard West — '44
James Teskey — '60
Curtis Solly — '48
Herbert Finch — '48
Richard Fowler — '67

EXEC BOARD OFFICERS

William Morrissey — '71 President
Rodney Rowe — '50 Vice-President
Marvin Smith — '41 Secretary-Treasurer
Paul J. Arend — '60 Past President
Richard Skok — '50 Ex Officio

ARNETT MACE, JR. ACCEPTS NEW POSITION

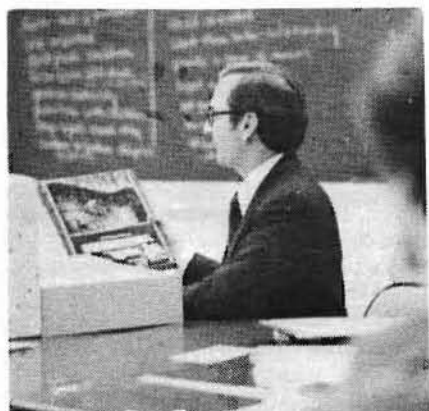
Arnett C. Mace, Jr., former department head of the college's Forest Resources has moved to Florida. Here he acts as the Director of the School of Forest Resources and Conservation, University of Florida.

Dr. Mace joined the College of Forestry in Minnesota in 1967 and has contributed much to the college since his arrival. We wish him and his family well in their new surroundings.

Dr. Carl Mohn has taken on the responsibility of Acting Department Head until a search committee has secured a new Department Head for Forest Resources.



Mace receives gift from Forestry Club.



The gift was a wood burning by Cindy Lunning.

QUALITY EDUCATION FOR PROFESSIONAL COMPETENCE

(Third SAF Forestry Education Symposium)

The College of Forestry hosted a symposium whose purpose was to identify, assess and recommend on contemporary issues of forestry education. The symposium was sponsored by the Society of American Foresters and held June 22-23, 1977.

The following speeches were presented:

- Challenges to Quality Education for the Profession of Forestry and the SAF by Keith Arnold, president, Society of American Foresters;
- The University Environment and Forestry Education by R. Rodney Foil, dean, School of Forest Resources, Mississippi State University;
- Designing Requirements for Quality Education in a Profession by Owen Loippe, provost, Academic Affairs, University of Missouri;
- Forest Resource Goals and Forestry Education — A Private Sector View by Jay Gruenfeld, vice president, Lands and Forestry, Potlatch Corp;
- Forest Resource Goals and Forestry Education — A Public Sector View by Tom Nelson, deputy chief, National Forest System, Forest Service, USDA.

A panel discussion was held with the topic "Considerations in Meeting Forestry Education Needs for the 1980's." H.H. John, director, School of Natural Resources, University of Vermont was the moderator with Donald P. Duncan, C. Robert Binger, H. Gene Hertel, Earl P. Stephens, Bonnie L. Dovenmuehle, and William R. Beaufait were panel members.

The steering committee was headed by Richard A. Skok. He was assisted by O.M. Jackson, Robert D. Raisch, R.G. Merrifield, Wallace R. Otterson, Perty R. Hagenstein, Clarence Richen, and Paul B. Stegmeir.

Before the program ended, Frank H. Kaufert, dean emeritus, College of Forestry, University of Minnesota, spoke concerning forestry education in review. Bernie Orell, vice president, Society of American Foresters gave a final speech for the program after working group reports were presented.

FRANK IRVING AWARDED

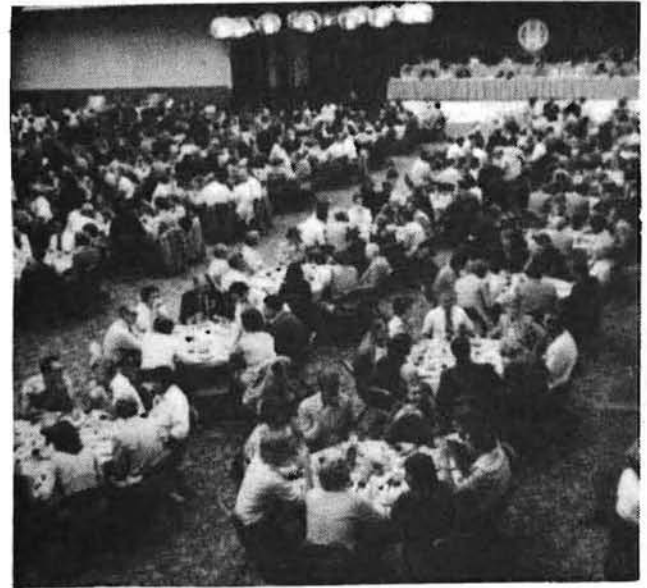
Frank Irving, professor of Forest Resources has been awarded the nature Conservancy's President's Award for his work in advancing the art and science of stewardship on Conservancy preserves. Dr. Irving, past chairman of the Preserve Management Committee, Main Chapter TNC, has been instrumental in developing the chapter's grassland management program in Minnesota.



ALUMNI BREAKFAST IN ALBUQUERQUE, NEW MEXICO

The following alumni attended during the national SAF meeting held October 4, 1977:

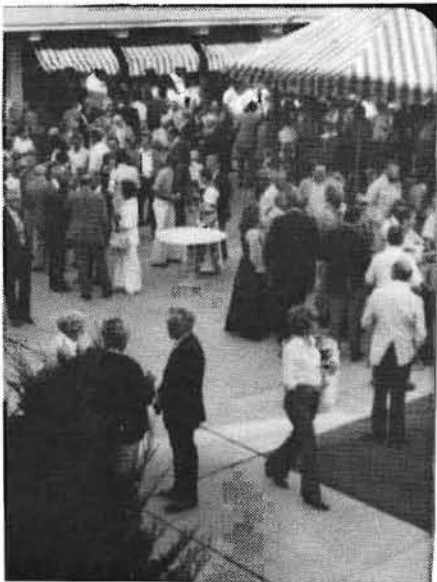
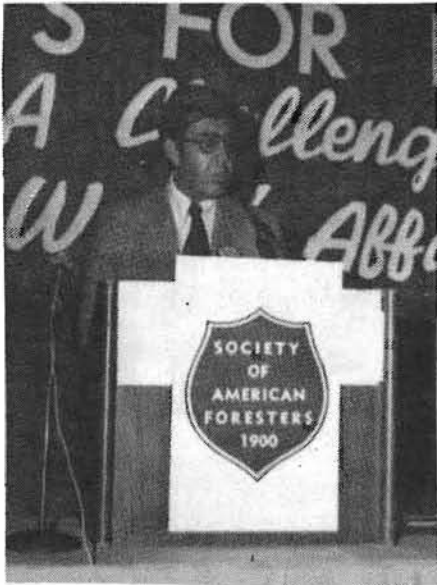
Richard Skok
Arnett C. Mace, Jr.
Yale Weinstein
Darrel L. Kenops
Lynn Sandberg
Don Duncan
Ed Jancock
C.T. Eggen
Ed White
Mike Kerrick
Jim Lennarts
Charlie Larson
Darrell Crawford
John C. Barber
Philip K. Hawkins
Ray Carson
Pat West
Larry Ritter
Gary R. Nordstrom
Harry Mosebrook
Sid Frissell
Zeg Zasada
Corneli Grootshouse
Dick Smith
Walt Schloer
F.H. Kaufert
Ralph W. Lorenz
Bob Strand
Al Alm
Jim Hovind
Mike Carey
Art Ferber
Peter Follitt
J.A. Brown
Phil Knorr
Dave King
John Witter
Harry Morton
Dwight Bensusan
George Asmus
Sig Dolgaard
Bob Stone
Bill Patterson
Gene Steinbrenner
Norm Aaseng
John McGuire
Willie Curtis
Stan Blinks
Forrest Hales
Roger Bay
Jim Brown
William Aultfather
Dave Schreiner
Norman Borlaug



SAF meeting in Albuquerque attracts alumni and fellow foresters.

THEMES OF ANNUAL MEETINGS OF SAF . . .

Year	City	Theme
1946	Salt Lake City, Utah	Land Use in the Inland Western Mountain Region
1947	Minneapolis, Minn.	Progress of Private Forestry in the Lake States
1948	Boston, Mass.	50th Anniversary of American Forestry Education
1949	Seattle, Wash.	Forestry in the Pacific Northwest
1950	Washington, D.C.	American Forestry in the Twentieth Century
1951	Biloxi, Miss.	Southern Forests — Past, Present, and Future
1952	Montreal, P.Q.	Trends in North American Forestry
1953	Colorado Springs, Colo.	Nature on Edge
1954	Milwaukee, Wis.	Our Changing Forests
1955	Portland, Ore.	Coverting the Old Growth Forest
1956	Memphis, Tenn.	Forestry Faces Forward
1957	Syracuse, N.Y.	Forest Land Use in Transition
1958	Salt Lake City, Utah	Multiple-Use Forestry in the Changing West
1959	San Francisco, Calif.	Forestry and People
1960	Washington, D.C.	Forestry's Expanding Horizons (60th Anniversary Meeting)
1961	Minneapolis, Minn.	Forestry's Common Frontiers (Joint w/ CIF)
1962	Atlanta, Ga.	Southern Forestry on the March
1963	Boston, Mass.	Wood, Water and People — Forestry for Better Living
1964	Denver, Colo.	Forestry at the Top of the Nation
1965	Detroit, Mich.	Forest Resource Decisions in a Changing Power Structure
1966	Seattle, Wash.	Foresters and Resource Policy
1967	Ottawa, Ont.	Not By Forestry Alone
1968	Philadelphia, Pa.	Forestry and the Human Environment
1969	Miami Beach, Fla.	Measuring Up!
1970	Las Vegas, Nev.	Managing Environment . . . Role of Resource Professionals
1971	Cleveland, Ohio	Forestry in an Urbanized Society
1972	Hot Springs, Ark.	Sound American Forestry (SAF)
1973	Portland, Ore.	Today's Forester in Land-Use Planning
1974	New York, N.Y.	Emerging Forestry Issues for Urban America
1975	Washington, D.C.	America's Renewable Resource Potential — 1975: The Turning Point (75th Anniversary Meeting)
1976	New Orleans, La.	Forestry for America's Future: Beyond the Bicentennial
1977	Alburque, N.M.	Forests for People: A Challenge in World Affairs



SAF speeches centered on the theme "Forests for People: A Challenge in World Affairs."

Kaufert Receives Gifford Pinchot Medal

Frank H. Kaufert, Dean Emeritus of the College of Forestry, University of Minnesota, was awarded the Gifford Pinchot Medal by the Society of American Foresters (SAF). Kaufert received the honor in recognition of outstanding services to forestry.

SAF President R. Keith Arnold presented the medal in ceremonies in Albuquerque, New Mexico at the national convention October 5, 1977.

While heading the University of Minnesota forestry program from 1947 until his retirement in 1974, Kaufert was a vigorous and imaginative leader in establishing educational and research policy at forestry schools throughout the nation and the world. He has also been an active spokesman for innovative forest management policies.

The McIntire-Stennis Cooperative Research Program is a forest research landmark developed largely through Kaufert's guidance. He served as chairman of its Advisory Board from 1971-1973.

Having authored over 150 scientific and general publications, Kaufert was senior author of SAF's Forestry and Related Research in North America.

Kaufert has held major positions within the Society, including two terms as member of the Council, its governing body. He was elected a Fellow in 1955.

A graduate of the University of Minnesota, Kaufert remained at the school to receive a masters degree in forestry and plant pathology and a doctorate degree in forest pathology and forest products.



Frank Kaufert is honored with Gifford Pinchot Medal.

YOUNG ADULT CONSERVATION CORPS

The Young Adult Conservation Corps (YACC) has been activated. This \$233 million program is jointly administered by the Departments of Agriculture, Interior, and Labor to provide 22,000 year-round jobs for unemployed and out-of-school youth, 16 - 23 years of age, in conservation work on national forests and other public lands.

These will be both residential (camps) and non-residential programs. It will be approximately one-tenth the size of the original Civilian Conservation Corps (CCC). It is estimated that there may be as many as 4000 positions for foresters, forest technicians, wildlife biologists, etc. These are one year temporary positions with renewal possibilities.

Resource agencies involved in Minnesota include both the Chippewa and Superior National Forests, North Cen-

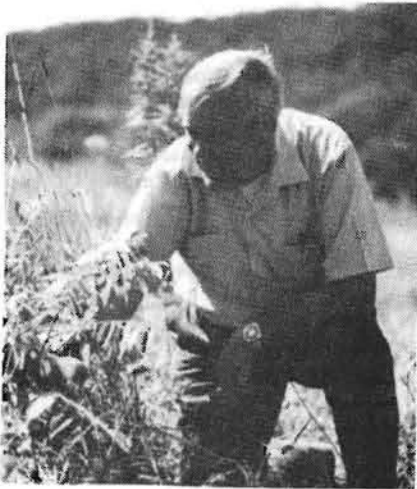
tral Experiment Station, and the Minnesota Department of Natural Resources.



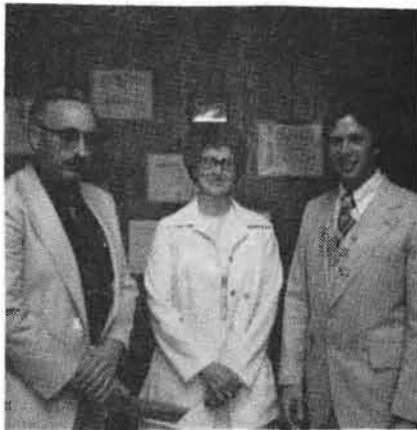
William Miles Scholarship

A scholarship in honor of the late William R. Miles has been established through the William R. Miles Scholarship Fund. The purpose of this scholarship is to encourage the development of professional and personal integrity and to assist and guide a deserving forestry student in completing an undergraduate degree program in the College of Forestry.

This scholarship is open to all seniors enrolled in the College of Forestry, University of Minnesota. The student must have a G.P.A. of 2.5 or greater at the beginning of Fall Quarter of his senior year. Criteria for determining the recipient are based upon professional promise, personal attributes, academic aptitude, and leadership qualities. The scholarship has been established at a sum of \$500 annually.



The late William R. Miles.



Mike Pateneude received the first W. R. Miles award.

Clarence Buckman Leads Program

Clarence Buckman, retired deputy commissioner of the Minnesota DNR, returned to the College this year as a part time visiting professor.

He was program coordinator for a new Blandin Distinguished Visitor Series offered to graduate students this spring. The three credit course he taught acquainted students with a variety of forest resource issues through seminars and dinner meetings. The Blandin Foundation aided in the funding of the program. The theme of the 1978 program was "Lake States' Public Lands: The Challenge of Forestry."

HAROLD E. ENGSTROM HONORED

Harold E. Engstrom of Hangtown, California and 1932 graduate of the College of Forestry was honored by the Los Rios Community College District.

The Board of Trustees of the District voted to name the science building at American River College's Placerville Center in Honor of Mr. Engstrom. The building was dedicated on November 16, 1977.

Harold and his wife are both active NARFE members. He is chairman of the Chapter's Membership Committee and serves on the Nominating and Election Committee as well.

He has served for 36 years as a forester throughout the United States. Currently, he and his wife operate a Christmas tree farm in the Sierra Foothills.



Harold Engstrom

DEAN ELECTED FELLOW

R.A. Skok, dean of the College of Forestry, was elected Fellow in the Society of American Foresters. He was one of two members of the Upper Mississippi Valley Section so recognized by the national organization this year.

Sando Appointed Director

Rod Sando, a graduate of the College of Forestry has been named Minnesota DNR Director of Forestry by Commissioner William Nye. Mr. Sando has been a member of the College Faculty since 1971. He assumed his new responsibilities at the end of fall quarter 1977.

As a member of the commissioner's staff he will have policy making, budgeting, programming, and long range planning responsibilities for the forestry division of DNR. He will also serve as a staff liaison member to the DNR regional forestry personnel. We wish Rod the best in his new position.



Energy for the 21st Century

A Look at Survival

"After the work of Copernicus and others had demonstrated that the earth was not the center of the universe but only a part of a much larger system, the world began to change its vision of reality. The process took hundreds of years. Today, because humanity has become a dominant influence on earth, we are faced with another such change: from nature being a convenience for people, to people being a part of nature. The scope is similar. The practical significance is of far greater consequence than the Copernican revolution but we have only a generation to complete the change."

Mike Nickerson

Life on the Planet

There has been life on this planet for hundreds of millions of years. Humanity is a relatively new form of life and very much unlike any form found here before.

Whereas individual species have evolved through the workings of natural selection, the human race seems to be directed by its own will. When our cultural evolution out-paces the slow workings of natural selection, we tend to forget we are still dependent on the natural processes. Our evolution is directed on considerations other than compatibility with life on earth.

Our culture has yet to be tried in the court of natural selection, but there are signs a trial is nearing. We are being pressured by diminishing energy supplies, depletion of other vital resources, strained agricultural production, pollution, and deteriorating social conditions.

For the majority of our history, we had minor impact on the basic life cycles of the earth. Of late our members and actions have become significantly great and are altering some fundamental processes. Our cities continue to expand as does industry. Much of the population believes life consists of jobs, mortgages, material goods, and life insurance.

Increasing numbers of people are becoming not only aware but also actively responsive to the accumulating evidence that our present developments do not ensure a secure future for ourselves or our children. Only if we are able to adapt our expectations and life styles will we be able to carry our society through the coming turmoil.

Energy Supplies

Life has traditionally received its energy from the sun through photosynthesis and the consumption of photosynthesis life forms. Until fire was discovered, these were the only energy sources available to life. Fire was another way of releasing solar energy stored by trees. The use of fire represented a radical departure from energy transfer from photosynthesis.

For the most part, the introduction of fire had little effect on the life processes.

In 1698 the steam engine was invented. As the engines started to secure the coal needed to reproduce and run themselves, a great change was underway. Coal and the industrial revolution became synonymous. By 1880 more coal was being burned than wood.

Coal yielded to oil and humanity has seen a dramatic evolution with the accelerating use of fossil fuels. Technology could create more technology. This process has continued to the present and has resulted in our con-

suming more energy in the last thirty years than was used in all previous human history.

The energy in both coal and oil comes originally from photosynthesis and the sun, but the present rate of consumption does not match the rate of production. The oil and coal we burn will not be regenerated in our life times. Our dependency on oil and coal places human culture outside of the natural cyclic processes of nature.

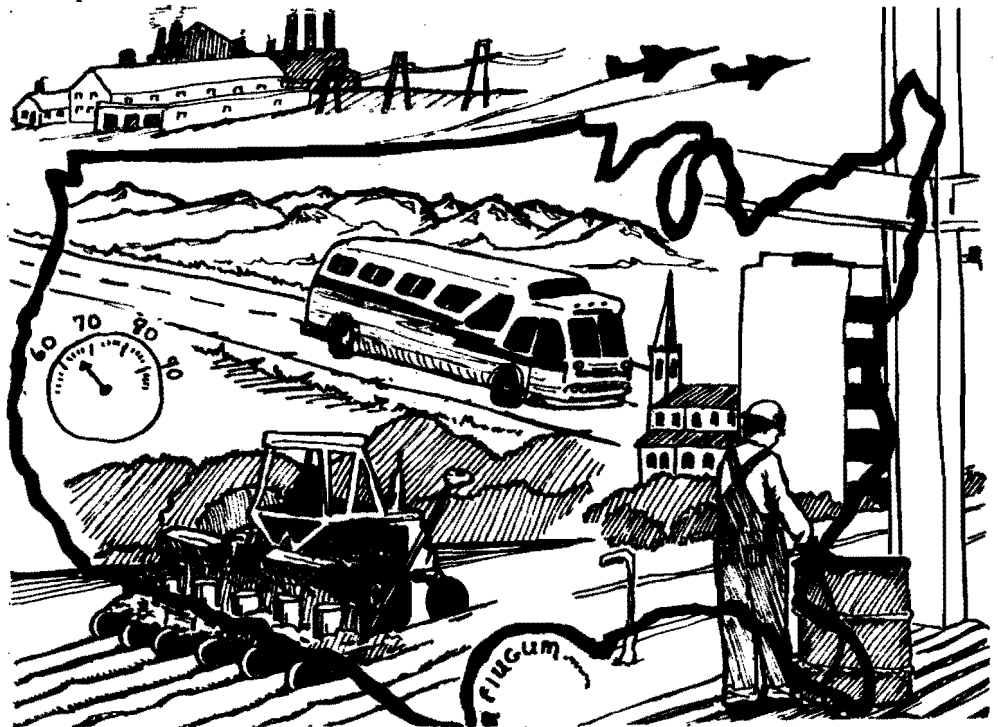
We will soon deplete all the petroleum and coal reserves of the planet. Yet many people do not believe we have an 'energy crisis.' There is only a small portion of society which understands the precarious position that heavy dependency on oil has put us in. For most people, some sort of shock will be necessary before they will explore new life styles. Judging from the return to normal after the first energy shortage it appears the shock will have to be a dramatic one.

Many people believe technology will pull us through the crisis.

"The conviction that technology can and will shelter mankind from disasters of his own making is one of the contemporary world's most persuasive and dangerous myths."

Kenneth Stunkel

It is true we have other energy resources to draw upon but there are problems with lead time, technological developments, cost factors, environmental constraints, and social acceptance.



Energy For Our Future

Between now and the year 2000 the U.S. will consume more energy than its entire past history. Also by the year 2000 the U.S. demand for energy of all forms is expected to double and the worldwide demand will probably triple. If these projected increases become reality, our ability to meet the demands will indeed be tested. We will and must now carefully examine the necessity of these increases in relation to our quality of life. Then we must develop and use the options which are practical, economical, and environmentally and socially acceptable. The following is a listing of some potential energy sources for the future.

Petroleum

This energy resource is finite. If worldwide energy use grows at 4 to 5% per year, all known oil reserves will be gone by the year 2012. However, there are undoubtedly substantial undiscovered reserves both on land and under the seas. These potential reserves could increase the amount of oil available for our use and carry us well beyond the 2012. In 1975 oil provided 47% of the U.S. energy. Petroleum will continue to be one of the principle sources of energy for a number of years but the shift to alternatives must begin now. Reserve oil must be left for essential uses such as lubricants, plastics, and transportation.

Natural Gas

Proven reserves of natural gas, at present rates of consumption, will last only another decade. Undiscovered reserves could increase our supply and extend our use of natural gas into the 21st century. Both industry and government are working to develop synthetic gas from coal and other sources. As with oil, we must reserve natural gas for areas where substitution is inefficient or impossible.

Shale Oil

Some experts believe that the U.S. has more oil in the form of shale oil than all of Saudi Arabia's proven reserves. Oil can be extracted with heat from this sedimentary rock which exists mainly in Colorado, Utah, and Wyoming. With present technology,

this form of energy will be very costly relative to petroleum. Major breakthroughs are required to solve the technical, economical, and environmental problems associated with its extraction before shale oil will become a major energy source.

Coal

Coal is our most abundant fossil fuel. With today's technology and environmental controls, proven coal reserves will last at least 200 years at 1990 consumption rates. Coal will be a major factor in our energy future.

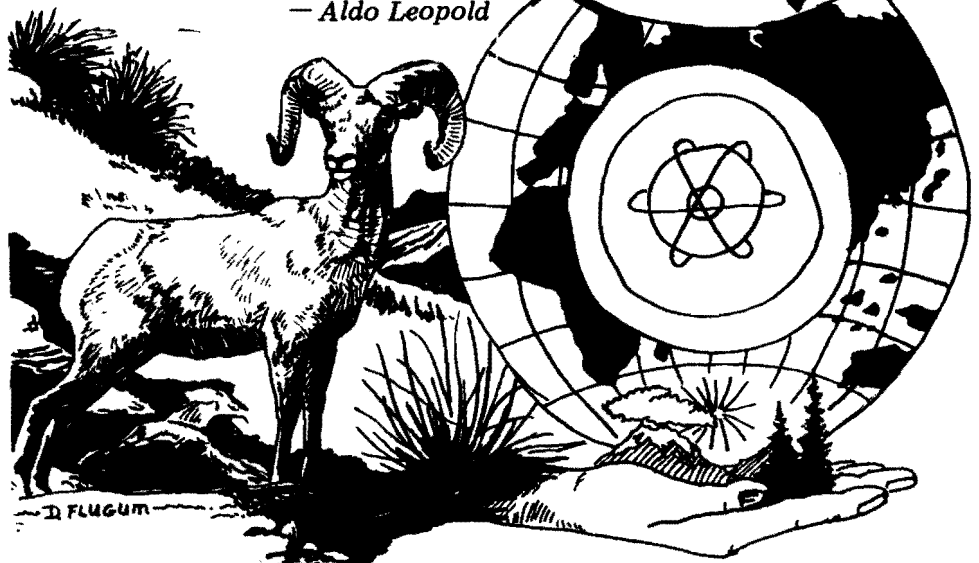
Coal gasification and coal liquification are technologies which could help solve many of the environmental and transportation problems of burning coal. These concepts have been proven only in test programs. They are presently very costly and have yet to be given commercial applications.

Water Power

The energy in water falling over a dam or waterfall can be converted into electrical energy and into our future needs. Most favorable water power sites have already been developed. These sites will continue to supply energy with new developments such as pumped storage systems. This system uses water to store energy. When the demand for energy is low, electricity is used to pump water from a lower water reservoir to a higher one.

"The last word in ignorance is the man who says of an animal or plant, 'What good is it? . . . To keep every cog and wheel is the first precaution of intelligent tinkering.'"

— Aldo Leopold



Then when the energy demand is high the water from the higher reservoir is used like the water from a dam to make electricity. This system uses more than it makes, but it is financially worthwhile since it reduces the need for new power plants and allows for continuous operation of plants which are difficult to shut down.

Uranium (Nuclear Fission)

Electricity can also be made from the heat which is released when uranium or plutonium atoms break up into other elements (fission). It has been estimated that by 1990, nuclear plants may account for 35-40% of our electricity. This source of energy is a very promising one but has stirred a great deal of controversy among U.S. citizens who fear nuclear disasters. The future growth of nuclear power will depend upon favorable public acceptance and upon government and industry action to resolve present uncertainties.



"Conservation means the wise use of the earth and its resources."

— Gifford Pinchot

Deuterium/Tritium (Nuclear Fusion)

Our solar energy originates from the nuclear fusion process on the sun. On earth, electricity could be made from the heat released when deuterium and tritium atoms combine to produce helium. There are many obstacles to overcome with this source of power. To produce fusion, extremely high temperatures of about 100,000,000 C must be obtained and controlled. Break-throughs have occurred in laser fusion but this source will remain untapped unless more occur.

Geothermal

Electricity can also be made from heat coming from the earth's core at hot springs and geysers. Only about 11700 megawatts can be considered as reserves with current technology or about 1% of the nation's total electrical generating capacity. Though natural steam will not be a significant energy source, it will be a useful addition to our total energy inventory.

Hydrogen

Hydrogen can be made from water at central plants and then transported to be burned where needed just like natural gas. With this system we could have a nearly inexhaustible supply of energy from the seas. Once again a number of technological break-throughs are needed.

Concentrated amounts of energy are required to produce hydrogen and some safety questions remain unanswered. Hydrogen will be a promising future source of energy when these questions are answered.

Trash

Trash and sewage sludge can be used to supplement fossil fuel in producing electricity. This will help solve environmental problems, conserve scarce fuels, as well as reduce the amount of land required for dumps. Trash and sewage sludge can be useful as a supplemental fuel especially in large cities.

Solar Energy

Without question our most abundant form of energy is energy from the sun. It generates our winds and weather as well as promotes growth of all vegetation. One drawback is that it is highly diffused with only one kilowatt per square meter striking the earth in the form of heat and light. Energy from the sun also alters from

night to day, season to season, and place to place. Direct use to run power plants or automobiles will be difficult to achieve.

Solar hot water, solar space heating, and solar air conditioning are our most promising uses for solar energy. Such systems are in use already and are gaining popularity. If 1/3 of the U.S. homes received half of their heat from the sun in the year 2000, this would amount to around 2% of our total needs.

Solar energy can be used to create steam and then to run electric generators. This is not yet practical with today's technology since the energy from the sun is so diffuse and the cost factor too great.

Solar cells use crystals of pure semiconductor materials to generate electricity directly. Today they are used in special situations like outer space but are too expensive for common use.

Windmills are being considered on a large scale to produce energy. Widespread use is not expected because of limited sites, high cost, and environmental effects. However, extensive use of wind driven turbine roof ventilators are expected to replace air conditioning.

Deep sea thermal gradients may someday become feasible for commercial use. Temperature differences of as large as 45°F exist between the ocean surfaces and ocean depths due to the sun's heat. A heat engine could operate across this temperature differential.

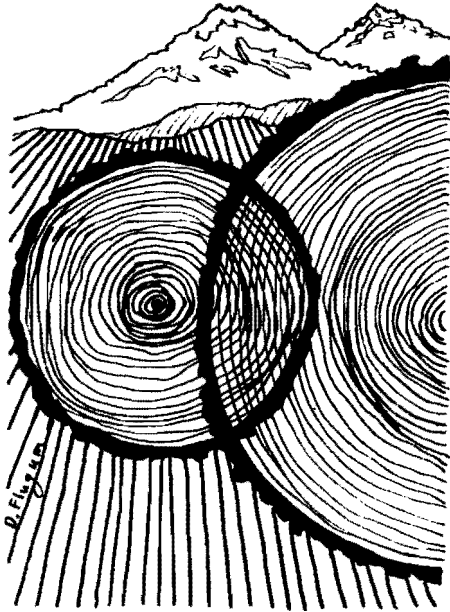
At present solar energy is the energy system which is being pursued with greatest vigor. However, solar energy is not likely to contribute a great deal to our energy needs this century. If research produces the needed break-throughs, it may become more significant in the 21st century.

Wood

Alumni have responded to questions concerning wood's relation to the energy situation. The majority feel that many families will choose to return to wood as a major form of home heating, but that wood will not be used in many other ways to produce energy.

On the following page Dr. John Haygreen relates the energy problems of the world to the forestry profession.

The Impact of Energy and Forestry



Impact of the world's energy problems on forestry's future was discussed by Dr. John Haygreen, Head, Department of Forest Products at the annual Forester's Day Banquet.

Following is a perspective he suggests for viewing what role forestry and forest products may play in the future and how this is being radically changed by the world energy situation.

There are four major energy related premises on which I'm going to base my argument. If correct, I maintain that these will affect the future role of foresters. Let me first list these "truths" so you have an idea of what I'm proposing.

These premises are:

1. The world supply of oil and natural gas is limited and is inadequate to continue to power the world indefinitely.
2. Wood-base materials can be manufactured with the energy produced from residues, i.e., with little purchased energy.
3. Alternative non-wood materials such as concrete, steel, aluminum and plastics used for building homes, packaging, writing and print paper are much more energy intensive than wood products as well as hav-

ing environmental impacts from manufacturing which are more serious than the environmental impact with wood products.

4. There are un-used wood materials and residues available in both the developing and the developed countries of the world to provide all the energy consumed in forestry and forest products. This energy could be provided without increasing the area of land being harvested – only the percent of recovery and the efficiency of manufacture would need to be increased.

The source of the world energy problem can be quickly demonstrated by considering the figures for energy production in 1955 vs. 1972. (In MBDOE.)

	1955	1972	% of 1955	% Increase to 1972
Coal	27	29	107%	7%
Oil	14	58	414%	314%
Gas	5	22	440%	340%

In 1955 oil and gas provided 40% of the world's energy supply and in 1972 they provided 70%. Coupled with the rapid increase in energy demands it is unlikely that oil will continue to play the dominant role it now has in the world's energy supply. A major study last year by a group representing countries which consume 80% of the world's energy concluded that oil supplies will fail between 1985 and 1995 to be available to meet needs. They further concluded that renewable sources of energy will be important within 25 years.

The public attitude regarding the energy situation in the U.S. seems to vacillate between:

- A – No real shortage – only a distribution and price problem.
- B – At some time before long there won't be enough energy to go around.

Unfortunately the apparent lack of urgency in Washington about the energy situation lends credibility to the first of these attitudes.

This attitude can't be expected to change while our national leadership is obsessed with blaming the energy situation on the petroleum companies. It is unfortunate that much of the

world is looking to the U.S. to provide leadership in tackling the energy problem.

In considering energy problems we must attempt to understand the global situation. How about the energy situation in developing areas of the world where much of the forest resource is found? Right now LDC's consume only about 15% of the world's energy but their consumption is rapidly growing particularly in the OPEC and middle income developing countries. The low-income countries of the world, incomes less than \$200/year/person, use less than 3% of the energy in the world. These countries have about 1.1 billion people, about 30% of the world's population. Few of these countries have forest resources. Within 25 years the LDC's will be consuming

about 25% of the world's energy. The impact of energy on forestry in developing countries may be quite different in those which have fossil fuels available. LDC's high in fossil fuels and forests aren't many - Indonesia, Venezuela, Brazil, Mexico (oil); and India (coal).

It's worth noting that in developing countries about 40% of energy consumption is by industry as compared to only 20% in the U.S. Therefore in LDC's energy management and conservation programs are seen as much more a problem for industry than they are here. I've tried to separate out the statistics for the LDC's which have major forest resources. The energy consumption projections for these countries (World Bank and others) is for a fourfold increase by year 2000. Much of this is based upon expected industry development. A real question is where will this energy come from – I believe significant amounts will be from wood.

My comments are based on the belief that there will be an increasing worldwide problem in regard to the cost and availability of oil and natural gas.

We need to understand a little bit about the source of energy in forestry/forest products today. In the U.S. oil

and gas are by far the most important sources for the forest products industries and also for forest management.

quired to produce a product – in lumber it amounts to about 16% and in pulp and paper to about 2%.

How about the energy self-sufficiency in the U.S.? Technically it could be done here too – based upon the existing resource. Ellis has put together some interesting figures in this regard. He shows that all woods and mill residues potentially available annually in the U.S. amount to about 3% of the total national energy consumption. The present total purchased consumption of the forest products industries is also about 3%. In other words if the wood available were used for energy it could make the U.S. industry free of purchased energy. The trend will be in that direction. The rate of price increases and questions of availability of fossil fuels will determine how fast this shift occurs.

PURCHASED ENERGY		
	Pulpland Paper	Forest Products
Oil	40%	60%
Gas	35%	25%
Oil & Gas Total	75%	85%
Electricity	8%	16%

Why this reliance on gas and oil? These considerations affect the selection of alternate fuels.

A) Cost MM BTU (1975)

U.S. Industry Ave.

Gas \$.47
Oil \$1.90
Elec. \$2.93

B) Capital Cost

Gas equip. costs less than coal or wood systems.

C) Pollution Abatement Problems Minor with Gas

No wonder gas is what industry would like.

How energy self-sufficient are the forest products industries today?

- In the Pulp and Paper 55% of energy is self-generated.
- In other wood products industries the amount is unknown but probably only 5-10% are self generated. Some plants have reduced consumption of purchased energy to 50% in one year.

How significant is the energy expenditure in intensive forestry and harvesting? There has been concern that increasing the intensity of management will greatly alter the energy cost of wood materials.

The energy of harvesting is not a major factor in the total energy re-

Today, we're in a time of rapid change with regard to energy self-sufficiency in forest based industries. The efforts of Boise Cascade and Weyerhaeuser are worthy of consideration.

But how far technically could the forest industry go toward energy self-sufficiency in manufacture of products? (In MN BTU/ton)

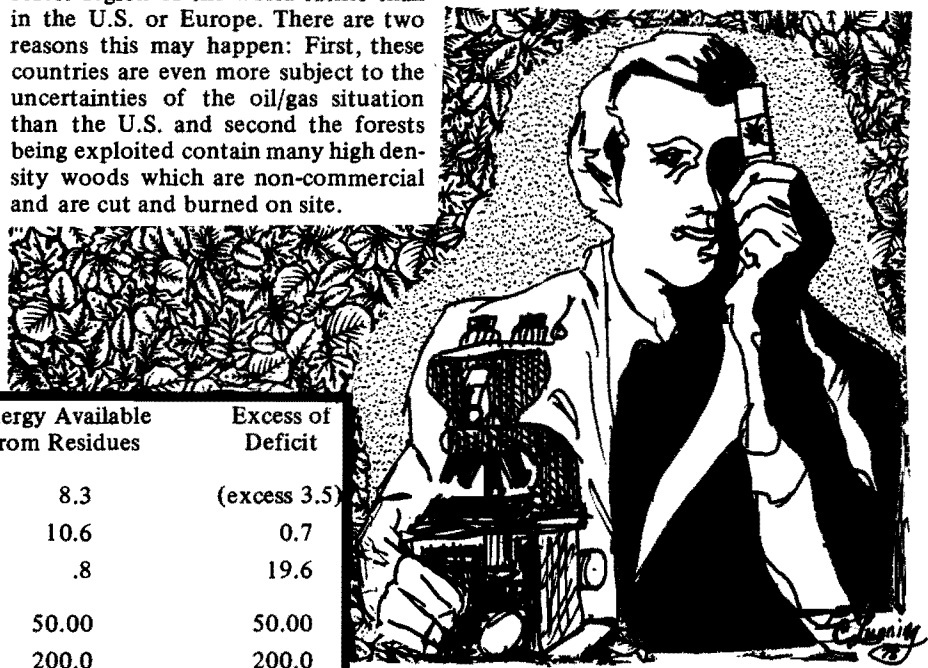
The possibility exists that much of the forest based industries could be energy independent if it became economically feasible to do so and energy costs are making it possible. In integrated complexes where sawmills, plywood plants and board mills or pulp and paper mills are placed together the "excess" energy from one process can help provide the energy for another.

Development of the first energy independent integrated forest products complex may come about in a tropical forest region of the world rather than in the U.S. or Europe. There are two reasons this may happen: First, these countries are even more subject to the uncertainties of the oil/gas situation than the U.S. and second the forests being exploited contain many high density woods which are non-commercial and are cut and burned on site.

What does this suggest that energy problems have done to us or for us?

1. Wood base materials will become more important as industrial materials. This will mean that one of the roles of the forester – to manage private and public lands for the growing of wood – will gain greater respect and appreciation in the eyes of society.
2. The public, hopefully led by foresters, will begin to understand the interrelations of energy, use of industrial materials, population and environmental impacts. We must somehow develop better means of considering the interactions when discussing these issues. Future demands on foresters to analyze and explain in an understandable way these complex relationships will be much greater than those which have faced the present generation.

Product	Energy Required	Energy Available From Residues	Excess of Deficit
Soft Lumber	5.9	8.3	(excess 3.5)
Hardwood Lumber	11.3	10.6	0.7
Wet-Form Hardwood	20.4	.8	19.6
Steel Floor Joists		50.00	50.00
Aluminum		200.0	200.0



WOOD IN THE FUTURE

by James M. Linne

Wood will definitely be a viable source of energy in the future. The only way we are going to solve the energy problems is to look at the whole picture at once. We must consider all energy sources, both renewable and non-renewable, establish an energy budget based on what we can realistically expect to produce from all energy sources in the long term and then restrict our use to that budget. That is a mighty tall order, people being what they are, but it can be done. However, looking at history, I doubt that it will be done unless and until we get ourselves into a crisis.

I see all renewable resources and their by-products becoming a larger part of our energy supply in the future. The basic research has been done (Dr. Yavorsky, Bureau of Mines, for one) on the process for converting carbon compounds into oil or natural gas. Some municipalities are attempting to solve their waste problems by using it. Canada has been interested in reducing their wheat straw surplus by such a method. Feedlot owners have an excess manure problem and in many areas, tons of slash and "uneconomic" wood material are left in the woods or burned in place each year. Many grain farmers still burn their fields to get rid of the excess straw. There is a tremendous source of renewable products which can be converted to energy, but as long as we can afford to use coal and oil and gas, there is just not the incentive to go to alternate sources. On the brighter side, I see a definite shift starting by the consumer to solar energy and the use of wood — particularly for heating purposes. As the non-renewable sources

get smaller and more expensive, I believe we will see these alternate sources grow.

Renewable resources will be able to meet a large part of our needs for many years to come (particularly if we go on an energy budget). The present conversion of wood producing areas into wilderness, etc. is a product of our own doing. We have, in the past, been able to produce more than we need and therefore feel we can afford the "luxury" of wilderness. I personally feel that some wilderness is a necessity for today's society. How much is necessary, I am not prepared to say. In the future, if it comes to a choice between freezing to death and using the products of the wilderness, I am sure that some of them will be used for wood production.

Just who will play the major role of production is difficult to predict. I have a feeling that we will continue to have a combination of federal, state and private forests.

Minnesota Energy MINNESOTA ENERGY AGENCY ISSUES TWO-YEAR REPORT

The Minnesota Energy Agency issued its two-year report to the governor and the Legislature March 13, 1978. It painted a gloomy picture of life in the latter years of this century with widespread job losses unless action is taken soon to fill the gap left by dwindling supplies of traditional fuels.

Mandatory conservation measures coupled with rapid development of alternative energy sources may be needed by the late 1980s to avoid crippling economic effects of a possibly severe energy shortage.

Power from sources such as the sun, the wind, trash, manure and vegetation such a peat and cattails could get Minnesota through an end-of-the-century energy crunch if found to be efficient and if homes and businesses undergo energy-saving refurbishing. Even with such power sources the future will be gloomy without rapid changes in life styles.

Natural gas supply will drop 10 percent by 1995. Homes heated by natural gas will continue to receive it and even increase at a rate of 2 percent annually. This is possible because large volume industrial users are being cut off and will have to switch to some other fuel, such as petroleum or coal, leaving large amounts of natural gas for homes, the highest priority users. Completion of a pipeline to Alaska and possible development of Minnesota's 7.2 million acres of peat may take some of the edge off the natural gas supply decline.

Oil products are the state's largest energy source. The agency is predicting a worldwide petroleum shortage after 1985, meaning Minnesota's supplies are expected to decline by 3.9 percent annually after 1990.

"The outlook for petroleum is serious," the agency reported. "In the 1985 to 1995 period, when the world supplies of petroleum are expected to peak, demand in Minnesota will outstrip available supplies. Industries will bear the main brunt of the shortage. "many will be forced to seek other sources of fuel."

In the last decade of this century fuel oil shortages could lead to unemployment rates of up to 25 percent.

Decline of natural gas and petroleum will cause many industries to shift to coal or electricity. So far, electrical demand forecasts have not dealt with substitution because of the uncertainty of the world oil situation. If oil users were to shift to electricity in great numbers, it would mean construction of additional generating plants — as many as 20 in one estimate — and resistance to such facilities has grown rapidly in recent years.

Electrical utilities construct facilities to produce electricity at peak demand periods. The energy agency feels that steps must be taken to cut down on such demand periods to avoid even more power plant construction.

Among the recommendations to accomplish this are lower rates to businesses on a four-day week during the



summer, encourage use of household appliance after 8 p.m., lower nighttime rates, limiting air conditioner use in public building to night hours when conditioners are more efficient because of cooler outdoor temperatures.

Coal is the growth fuel of the 1980s and 1990s. "Using coal without seriously compromising environmental quality is one of the most challenging energy questions facing our country today," the agency said. About 70 percent of the sulfur dioxide emissions come from coal, which is used primarily to generate electricity. Current estimates are that coal use of Minnesota will double by 1985 and tripple by 1995. Coming from strip mines in Wyoming, Montana and North Dakota, western coal is seen as a plentiful fuel supply for Minnesota for the rest of the century. However its use would be limited by the number and size of electrical generating plants the state would absorb.

Estimates by the agency show energy demand in Minnesota surpassing energy supply from present sources in the late 1980s and early 1990s. To meet this situation the agency calls for a combination of "maximizing traditional supplies, increased conservation and strong support for alternative energy

development," which is seen as the only way to have economic growth continue. It recommends expansion of conservation programs through mandatory and voluntary measures.

"Without an immediate and concentrated effort on the part of all Minnesotans, this balance will not be reached," the agency also reported. "Instead, prices and unemployment will rise and the quality of life of every citizen in the state will suffer as we are forced to drastically cut back our energy use."

Specific recommendations were given to the Legislature and Governor Rudy Perpich. They are as follows:

- * Develop mandatory and financial incentives for owners of existing buildings to invest in energy-saving modifications, such as solar and wind equipment, and adopt stricter energy codes for new and remodeled buildings by 1980.
- * Develop agricultural energy conservation to cut down on increasing energy use on the farm.
- * Increase use of mass transit to cut down on automobile use and strengthen land use controls and encourage plan-

ned development to reduce reliance upon single passenger car use.

* Conduct major studies of such studies as the environmental effects of tripling the use of coal, extraction of energy from animal manure and the use of heat from power plants to heat city buildings.

* Discourage large-scale switching from fuel oil and natural gas to electricity as a way to avoid increased electrical demand that would spur construction of more generating plants and power lines.

* Support construction of a pipeline link to Alaskan oil.

The energy agency clearly puts faith in conservation as a major cure for coming energy ills. The agency concludes, "Energy conservation is the cleanest, cheapest and most readily available source of energy. Reducing energy consumption reduces the stress on traditional energy supplies. It allows us to maintain our standard of living at the same time that we reduce energy use. Perhaps most importantly, conservation will provide valuable time for us to move from dependence on non-renewable fossil fuels to renewable sources such as solar and wind."



THE LOST FIRE
by Dean Makey

"Lakeview dispatch, this is Green Mountain Lookout. I have a smoke. Azimuth 229 30'; the legal is T24 R30 S14 NW/NE. Green Mountain clear."

"10-4 Green Mountain. Lakeview dispatch clear."

". . . Fort Rock Guard Station. this is Lakeview dispatch. Send one pumper to the given legal. Lakeview dispatch clear. 19:09."

"10-4. Fort Rock clear."

Amidst all the commotion at Fort Rock Guard station, the order is given out —

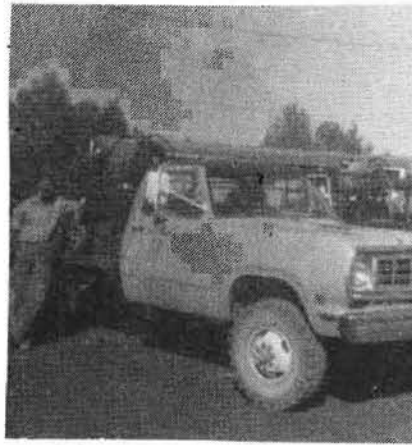
"Monte, Dean, Pat, you guys take pumper 13 and get out on this one!"

Its finally happening, my first real fire! Am I ready for it? During the previous week on the high desert rangeland of central Oregon, I was challenged with sand, sagebrush, Juniper trees, and range elk. Also in that week, we went to fire school. There we learned to locate fires, dig fire lines, fell and buck a Juniper, mopup with a pumper truck, call in to dispatch on the radio and notify them that the fire was out, and apply first aid if necessary. After all this, I was ready to take on the whole Chippewa National Forest! But, in my case, I got a sagebrush desert.



" it was near sunset when we pulled out of the station and this sunset was everything I was told they could be — the skyline to the west was jagged with the silhouettes of the various buttes, the clouds above were majestic with their purplish tint, the rainbow behind us was so pronounced that I could almost reach out and grab the pot of gold, and the ground strikes were blinding against the dark, violent storm clouds to the east."

— Dean Makey



With the passage of an existing storm through our area, anticipation of a night of fire-fighting was running high. And to think I was sent out on the first fire of the season!

After picking the fastest route to the fire, we arrived in the area of the legal. A quick call to the lookout to check on the fire's progress —

"Green Mountain, this is pumper 13. How's the fire doing?"

"It's still putting up some good smoke pumper 13. It looks as though it could be spreading to a second tree!"

A gallon of adrenalin started to flow through my body. Our fire was going to take off before we could initial attack it!

The legal showed the fire about a half a mile off the road, so we started off cross-country. It was fairly dark by now, so we affixed our headlamps to our hardhats. These headlamps and hand lanterns were lifesavers in guiding the truck through grabbing Junipers, around ridges and outcrops, and over dangerous lava rocks.

We kept an eye on the odometer and it seemed like hours to cover the half mile creeping along the terribly rough terrain. It was no use looking into the pitch-black sky for signs of smoke and the trees were a constant obstacle. The only hope we had was to catch a whiff of smoke blowing in the breeze or to spot a glow over the tree tops. We continued on through the trees, but searched in vain.

Once again we contacted the lookout and he repeatedly replied, ". . . It's still putting up a good glow!"

Enough of this chasing in the dark! We decided to go up to the nearby lookout and see exactly where this so called "fire" was.

We retraced our tracks out to the road and were up at the lookout faster than the lightning around us could strike the ground.

The three of us hopped out of the truck and scrambled up the stairs to get our first look at this deceitful fire. Off in the distance appeared the faint lights of scattered ranches. And there, right below us, ready to be stamped out with a foot, was the glow from the two distinct trees. How could we have missed it? It was exactly in the area we were searching!

With renewed spirits and a reaffirmed location, we set off to find this alluding fire.

We had barely gotten off the road and were back in the same atmosphere we knew only so well — black sky with headlights on the trees in front of us. But, having seen the glow of the fire we moved on with unstoppable determination.

Then, as I was guiding, I noticed something in front of us. It was a fresh set of tire tracks! I quickly ran forward to get a better look. We were about to cross our own tracks; we had been going around in circles!

That was it! No more of this stuff! We radioed our foreman and told him it was impossible to see, we could not find the fire, and we would return in the morning.

We started on our way out, but which way was out? We did not want to run any more circles, so we asked our lookout for his assistance in guiding us. We finally reached the road and the assurance of our station.

After a restless night, we were up at daylight and ready to roll. With a little help from our helicopter, we hoped to find the fire. The chopper would guide us into the fire, which he could surely see from the air.

We drove to the area and there over the road was the chopper. He told us to follow him and he would lead us right to the fire. We got a little way in and came upon some tire tracks. Could these tracks be ours from the night before??

We located the chopper, and also continued to follow the tracks. Just a short distance ahead, beneath the hovering chopper, were the two smoking, charred, burning trees. Mysteriously enough, the set of tire tracks ran right beside them.

GREEN HORNS IN THE BIGHORNS

by Earl 'Rusty' Greene

Last summer I had the good fortune of not fighting forest fires and getting my eyelashes burned off like some fellow classmates. Involved in a high school recreation program, I helped students experience the beauty and wonders of the Bighorn Mountains in Wyoming.

The program tried to provide a one-week long backpacking experience to five men and five women each week. As a staff member I had a variety of duties such as providing insurance, renting vans, promotions, and convincing parents this program was on the up and up since boys and girls would sleep in separate tents under adult supervision.

As a co-leader for inexperienced campers who had never set foot in the mountains before, I quickly learned I would have many roles to play.

Role No. 1 . . . Teacher. The problem with wet wood is no one knows how to start a fire with it. One fine frosty morning I awoke to find a circle of woe-begottens standing by the dead campfire waiting for it to start by magic. After hearing a chorus of "I'm so cold, oh I'm so cold," I suggested wood be gathered and a fire worked up. Boy they thought I was smart! Naturally I attributed it to my forestry training.

Role No. 2 . . . Doctor. Nicknamed Doc Rusty, I became a professional healer of scratches, cuts, burns, and blisters. We went through 80 band-aids, two tubes of first-aid cream, one tube of new skin, and two packages of more skin.

Role No. 3 . . . Counselor. Often I was needed to listen to problems, patch up fights between best friends, or listen to stories of the sightings of moose or other wildlife. I talked with them about the purity and origins of the streams and the beauty and peacefulness of the mountains.

Though not every experience was good, I feel each participant experienced many good feelings and thoughts. Some of them will still continue to see each other, some will go back next summer, and I'll see one of them often, as she is now a freshman in our college of Forestry.



UNDER THE WHISPERING PINES

by David Schuller

Last summer I returned to Jay Cooke State Park for the third straight summer in the capacity of parks worker. Jay Cooke State Park is situated thirty miles south of Duluth, within six miles of the Cloquet Forestry Station.

The job of parks worker calls for one to be a jack-of-all-trades, performing such meager duties as mowing grass, cleaning outhouses, painting fenceposts, and hauling gravel. More exciting duties include disposing of road-kills in the park, working the till in the refectory, and selling state park vehicle permits to the foxy looking girls who drive their brand-new Firebirds into the park.

Of course there are the nerve-wracking duties such as dealing with complaints, trying to fit three parties into two campsites, and dealing with obstinate visitors who refuse to purchase vehicle permits because they "pay taxes."

The job has been very rewarding to me for various reasons. Not only have I gained experience in dealing with the public, which will be highly valuable in future occupations, but the government payroll is higher than many city jobs. Spending forty hours a week outside in the fresh air and sunshine, under the whispering pines, is worth its weight in gold alone.

How did I get such a good job? Well, it was as simple as taking a civil service exam and waiting for the park manager to call me and ask if I wanted to work. You can make an appointment with the Minnesota DNR to take the test by writing them, and soon you too can be spending your summer beneath the whispering pines.

NEIGHBORHOOD SANITATION AID II

by Jeff Rosales

On my first day of summer vacation I woke up and went downtown to look for a job. Then I 'hung out' in the front of the drug store.

On the second day of summer vacation I woke up and went downtown to look for a job. Then I 'hung out' in the front of the drug store.

On my third day of summer vacation I wandered over to Phil Splet's Job Placement Office in the College, he set me on the right track. I soon became a Neighborhood Sanitation Aid II, alias tree inspector, for the city of St. Paul.

I had not taken the tree inspectors' exam. I knew nothing about dutch elm disease other than it existed. Yet, the city had told its residents they had expert tree inspectors roaming the city. I learned quickly!

On the very first day of work I was ready to quit because I didn't think I was going to make any money. But, at the end of the first day we had received two raises because of our good work! I decided to stick out the summer.

I made friends with a lot of little kids in my area. I chased them with my paint can and acted like I was going to mark a ring around them.

I met people who were angry at me for marking their diseased elms, people who wanted trees marked which weren't elms, and others who wanted all of the elms clear-cut.

I met dogs which were very friendly. I met dogs which were not very friendly. I had fun even though at times I was bored. While learning how a city parks and recreation department worked I even learned how to tell if an elm tree had dutch elm disease or not.



RRM?

By Randy Hoffbeck

Now that RRM is officially a curriculum of the College of Forestry, I feel it is my duty to answer the question that's been troubling the great minds of room 15 Green Hall.

What does RRM stand for?

No, Tim, it doesn't stand for *?&&. In fact it doesn't even stand for "One of Them" as Katy thinks. It does believe it or not, stand for Recreational Resource Management.

I realize this may be a startling revelation to all but the 40 RRM students and a few select faculty and administrative staff, however don't let it scare you from reading on. The rest isn't nearly as serious.

The previously mentioned 40 students make up the organization commonly called Recreational Resource Management Club (kind of a catchy name, don't you think). Although club members didn't shake the earth with their activities, they did have a lot of fun. Besides the traditional fall kickoff party at Dr. Knopp's and spring beer-ball game at Como Park, there was moonlight skiing on Midland Hills golf course and even several club meetings.



"When we try to pick out anything by itself we find it hitched to everything in the universe."

— John Muir



"The ignorant man marvels at the exceptional; the wise man marvels at the common; the greatest wonder of all is the regularity of nature."

— G.D. Boardman

In an attempt to stay in the black, the club sold the x-country ski guide Ski Minnesota. With our infinite wisdom we decided that it would sell best while there was snow on the ground, thus the sale took place winter quarter. We must have been right because it sold well.

After arranging jobs with HCPRD for the interested club members, the inevitable happened. We decided to make ourselves known. Throwing all caution to the wind, we challenged the union people of F-Club to a test of kinesthetic prowess. They accepted, and on January 28, the battle took place. We fought gallantly to the end of our rope, but in the end F-Club was victorious. Being vanquished we were forced to give up a priceless possession, a white polyethylene statuette mounted on a hand carved base embroidered in green and black. This tug-of-war trophy forever to be known as the Engineer Throne.

Thus having made ourselves known, we turned to the more serious business of donating our services to build a needed park facility, and touring the Minnesota Zoological Gardens.

I know that I may have taken a slightly too serious approach in writing these memoirs, however I felt I should be accurate. Who knows, maybe next year the club will be lucky and have a less serious group of officers.

"NOTHIN'S FANCY IN PARADISE"
by Peg Moreau

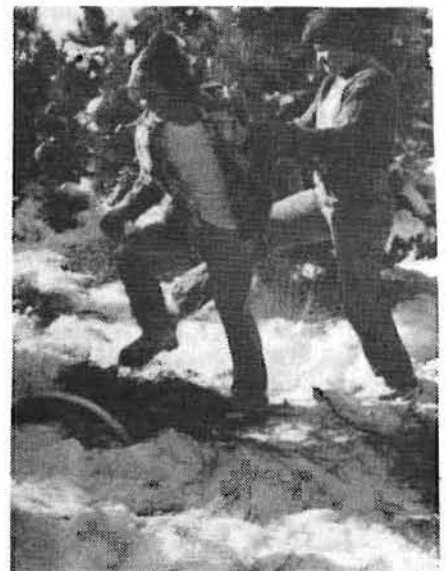
As usual, the Itasca field session was an exciting and worthwhile experience. Although our studies were intense, outside activities were a great aid in maintaining our sanity.

The greatest deterrent we encountered was the weather. After weeks of rain we grew accustomed to being wet. The many puddles and mud-holes added thrills to our daily woodland treks.

The ever-famous traverse lived up to all of our expectations. At first, we were not entirely thrilled at the idea of spending an afternoon following compass points. After we got going, things improved. Walls of beaked-hazel and raspberry bushes provided a fine challenge. Those of us lucky enough to be "swamped" welcomed the chance to practice plant identification of the swamp species in a half-foot of water.

We learned to appreciate each other during the traverse, upon spotting another forester we knew we were not totally lost. Once finished, all agreed it was a very challenging and educational experience; and left one with a feeling of accomplishment. Almost all in time admitted they enjoyed it. "Azimuth" — even ran his course twice for the sheer pleasure it offered; even at the cost of missing one of Gary's wonderful meals.

The studying foresters fully appreciated moments of freedom. Hiking trips to Bemidji and bonfires offered



This is funner than following
compas points!

fun friendly times. One evening was especially well planned. During the last week of classes it was decided there would be one last great dance. The "Nothin' Fancy" was chosen for a Monday night romp. We heard there would be no cover charge for the live band if one wore a "T"-shirt. We all piled into cars containing people over capacity and drove to the "Nothin' Fancy".



"Nothin's fancy at the Nothing Fancy!"
(This is the belly-dancer.)

When we arrived, to our delight, there was no cover charge, and no live band. In fact, there were no other people there. We soon discovered the bar was usually closed on this particular evening, but due to extenuating circumstances they stayed open to accommodate our group. After quite a bit of griping and confusion, everyone settled down. The evening looked like it might flop, but turned out to be a great time. There were at least forty potential foresters in T-shirts, dominating the pool and fussball tables, pinball machines and dance floor. As we were the only customers, we kept the bartenders happy.

After finals were over, cabins inspected, and bags packed and loaded, we were all generally relieved, yet saddened at the thought of leaving our beautiful wilderness wonderland. The friendships we made will continue to grow as will the memories made there. Who could forget volleyball games in the sand pits, stories for recalling Latin names, (remember good old Sambucus pubens) chow rush before it all disappeared, rides in Rusty's "Kinky" car, and the many warm evenings of comradeship by the fireplace?

"THE ALLNEWCLOQUETSESSION" or ENDLESS SUMMER by Lynn Post and Rene Needham

For some, the words "new curriculum" simply mean a different set of required courses, but for 37 seniors and graduate students, it meant cutting short their summer vacations or jobs and heading for the Cloquet Forestry Center to attend a special summer session.

The first two days were wonderful, giving no indication of what was to occur in the next eight weeks. Administrative details were taken care of, everyone was assigned a management group and crew partner, innumerable games of H-O-R-S-E, ping pong, and pool were played, not to mention jogging, saunas, and "refreshment" breaks of various kinds. Then, hard work struck in the form of Dr. Meyer and aerial photos. August is definitely not the prime time for traipsing through bogs to find a dilapidated corner marker. If the mosquitos don't create a permanent blood loss, there is every likelihood you'll die of thirst or "swamp fever" a mere two miles from civilization. (If you call Ray and Mabel's "civilization!") The best part of photos was when Marc Nyman, covered with sweat and bog muck from a day of type mapping, tap danced his way to the dinner table just to prove he wasn't queer!

Dietmar Rose's long shots at H-O-R-S-E were nothing compared to the long shots we students took at estimating volumes in different stands. Mental exhaustion was much more common than its physical counterpart as our management groups tried to devise suitable inventory plans without accurate knowledge of the cover types.

In Doc White's silviculture course we learned about thinning, regeneration, silvical prescriptions and Kentucky Bourbon, but we never learned how one man kept 1100 women happy!

For the first time in the history of the Cloquet session, an honest-to-goodness logger helped teach Harvesting and Engineering. Harry Fisher could be seen stirring his coffee with his thumb and eating leaden pancakes for breakfast before leading us forth to lay-out proper roads. The peacefulness of the BWCA was momentarily interrupted as we headed up the Gunflint Trail to see some of Harry's "beautiful clearcuts." Due to student demand, the logging workshop was held once again, but because of

time limitations, it occupied only one class day rather than a full weekend.

Dr. Brown led all students through a week of sail mapping and lab analysis, but even after studying the Public Land Survey system numerous times, we still haven't realized that all forties are not perfectly square! Time was also spent with the "animal guys," (to quote from a national magazine) seeing grause droppings on various and sundry drumming logs and woodcock night arrivals and departures from the airport runway.

For all, Forest Resources Analysis was an experience that was alternately frustrating, intriguing, and exhausting. Management plans, like policies, "result from what appears to be a very complex and disorderly process," in the words of Dr. Ellifson.

Management planning teams consisted of five or six people assigned an area of land and a specific situation, like a national forest or a consulting firm. The land was to be surveyed and studied, with a comprehensive ten year management plan the end result. Evening seminars given by various speakers were a part of the course as were the field trips to various places in Wisconsin and Minnesota.


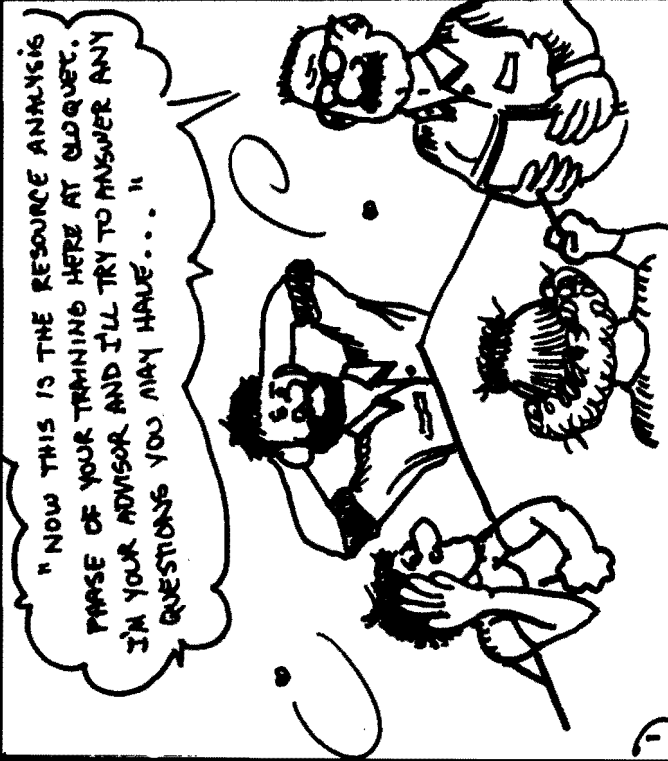
A lack of time, team organization, and information were problems common to every group, but somehow the plans were turned in late Monday afternoon accompanied by outbursts of hysterical laughter and sighs of relief. Oral presentations by each group and critiques rounded out FR 5-225 and the first session under the new curriculum.

Funny moments at Cloquet included Theresa's "close encounter of the Smelly Kind" when she overran a belligerent skunk and three showers in Lysol did nothing to eliminate the smell. Gases tend to diffuse, as we all learned in Chem I-004, but nothing brought that lesson home more forcefully than the smell of skunk filling the girls' cabin. Other incidents not to be forgotten are hearing Whiskey River in Superior, pool cues without tips, the remodeling of the sauna, mattresses mysteriously appearing on roofs, and the farewell party where Glenn Givens and Dave Oleson proved that it is possible to play charades after twelve beers and Tim Hepola proved he could B.S. with the best of them.

Cloquet

in the Fall

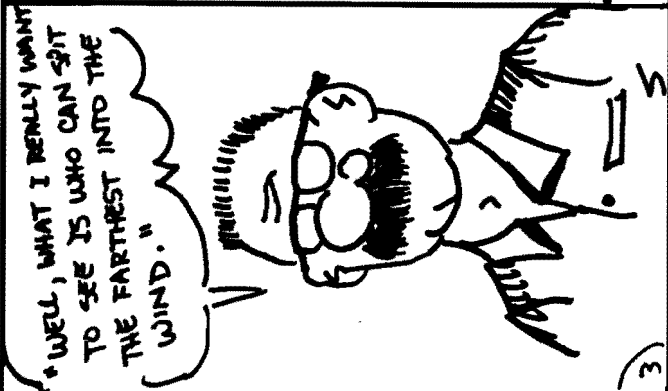
by M. Mann

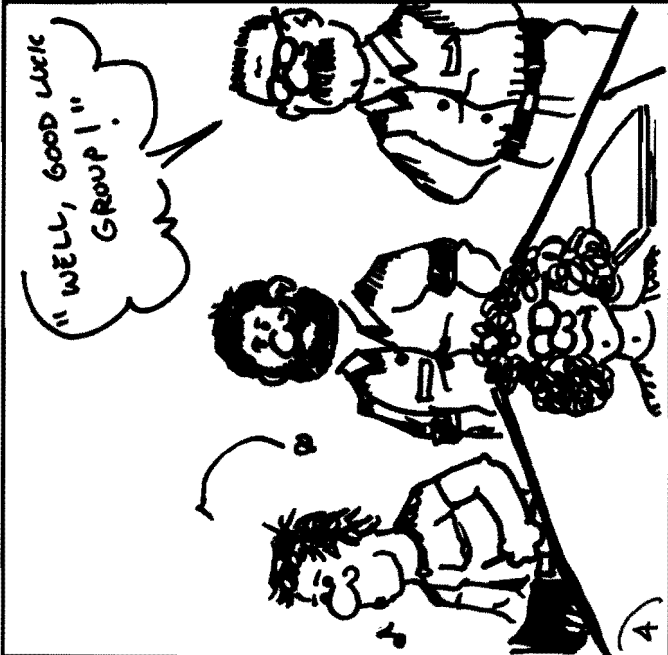
"NOW THIS IS THE RESOURCE ANALYSIS
 PHASE OF YOUR TRAINING HERE AT CLOQUET.
 I'M YOUR ADVISOR AND I'LL TRY TO ANSWER ANY
 QUESTIONS YOU MAY HAVE..."



"DUH, WELL, HOW ARE WE
 SUPPOSED TO DO ALL THIS,
 WHEN WE GOT ALL THAT
 OTHER WORK TO DO?"



"WELL, WHAT I REALLY WANT
 TO SEE IS WHO CAN SPIT
 THE FARTHEST INTO THE
 WIND."



"WELL, GOOD LUCK
 GROUP!"



PERSISTENCE AND NUMBERS
by Terry Doyle

When looking back on the past year I've come to some new realizations about Student Government. One of these is that students do have a say in what's happening here at the University of Minnesota.

A second realization is that it takes time to make changes. The degree of impact any one student makes is directly proportional (sometimes it seems directly inversely proportional) to the amount of time you put into an activity.

I really do believe the administration is willing to consider the students point of view and that they are becoming more receptive all the time. One has to remember you are dealing with people. If you come in all fuming these people might be scared to listen to you or offended. If you come in with a level head and good solid complaints they will listen. They have to, that's part of their job.

I believe there are a couple of ways to impress students' views upon administrators. One is persistence. Most students hold office for one year only of their four or more years at the University. Administrators hear and see many views that come and go like the students. Therefore they must be convinced that the students intentions are true. This is where persistence is important. The Music Department would never hear music in a new building if it were not for persistence.

This leads us to our second strength—that being numbers. Administrators are usually not impressed by one or two students' views on a subject. The more student backing you have on an issue the more impressed the administration will be.

This is especially useful to know and practice in the College of Forestry. The College is smaller so it doesn't take as many students to get the point across and to produce needed results. Fortunately the College of Forestry is blessed with a very open minded and understanding administration.

Students who participated in the Student-Faculty Board this year were:



Our Student Representatives

Mike Lindgren	Senior class representative
Terry Doyle	Junior class representative
Pete Willis	Sophomore class representative
Debbie Frelk	Freshman class representative
Pat Emerson	Graduate student representative
Sue Pflager	Graduate student representative
Duncan Ferguson	Forestry Club President
Fred Kamke	Forest Products Club President
Mike Checky	Twin Cities Student Assembly
Cindy Lunning	Gopher Peavey Editor
Jeff Lewis	Xi Sigma Pi Forester
Tim Kennedy	Student Center Board of Governors
Chuck Owens	St. Paul Board of Governors
Gregg Bennett	All Campus Council

A special thank you to the following who were there to help when we needed it:

- Brian Asmus
- Karen Dahl
- Larry Himanga
- Tina Jowarski
- Sue Madson
- Marty Wiley



SCHOLARSHIPS AND AWARDS

The College of Forestry Scholarship Committee has made the following awards:

- Edward Everett Scholarship—James Nelson, junior, FR and Jeff Rosales, junior, FR.
- Helen A. Young Scholarship—Pete Aube, senior, FR.
- Robert L. Goudy Scholarship—James Mital, junior, FR and James Oesterle, junior, RRM.
- Carolind Scholarship—Catherine Jacobs, freshman, FR; Terry Doyle, junior, FS; and Harvey Tjader, senior, FR.
- Augustus Searles Scholarship—Karen Dahl, senior, FR.

The T. Schantz-Hansen Fellowship of \$4,000 per year was awarded to Sue Pflager for 1977-78.

Forestry Club Awards

- Tony VanRossum, junior FP; Mike Wadman, senior FR; Rhonda Kellam, junior Textiles and Designs; Kathy Feldkamp, junior FS; Melody Himanga, junior FR; Nancy Williams, junior, FR; Duncan Ferguson, senior FR.



U of M FORESTRY CLUB

"You have created a new profession of the highest importance, of the highest usefulness to the state, and you are in honor bound to yourselves and the people to make that profession stand as high as any other profession, however intimately connected with our highest and finest developments as a nation. You are engaged in pioneer work in a calling whose opportunities for public service are very great. Treat that calling seriously; remember how much it means to the country as a whole.

"The profession you have adopted is one which touches the republic on almost every side — political, social, industrial, commercial; to rise to its level you will need a wide acquaintance with the general life of the nation and a view point both broad and high."

President Theodore Roosevelt

The Forestry Club was created at the University of Minnesota in the same decade President Roosevelt spoke these words to the newly formed Society of American Foresters. Charter members recorded their signatures March 4, 1907. On this day was born a tradition which would help prepare students to become professionals of high stature.

"The attainment of a proper professional attitude is in my opinion the greatest single thing you can get out of your college courses. It is based upon knowledge of and belief in your profession . . . Forestry is a profession which makes you deal with people. It necessarily follows that to deal with people it is essential to know people. The four or five years you are in college will offer the most splendid opportunity you will ever have to study human relationships. Make the most of it.

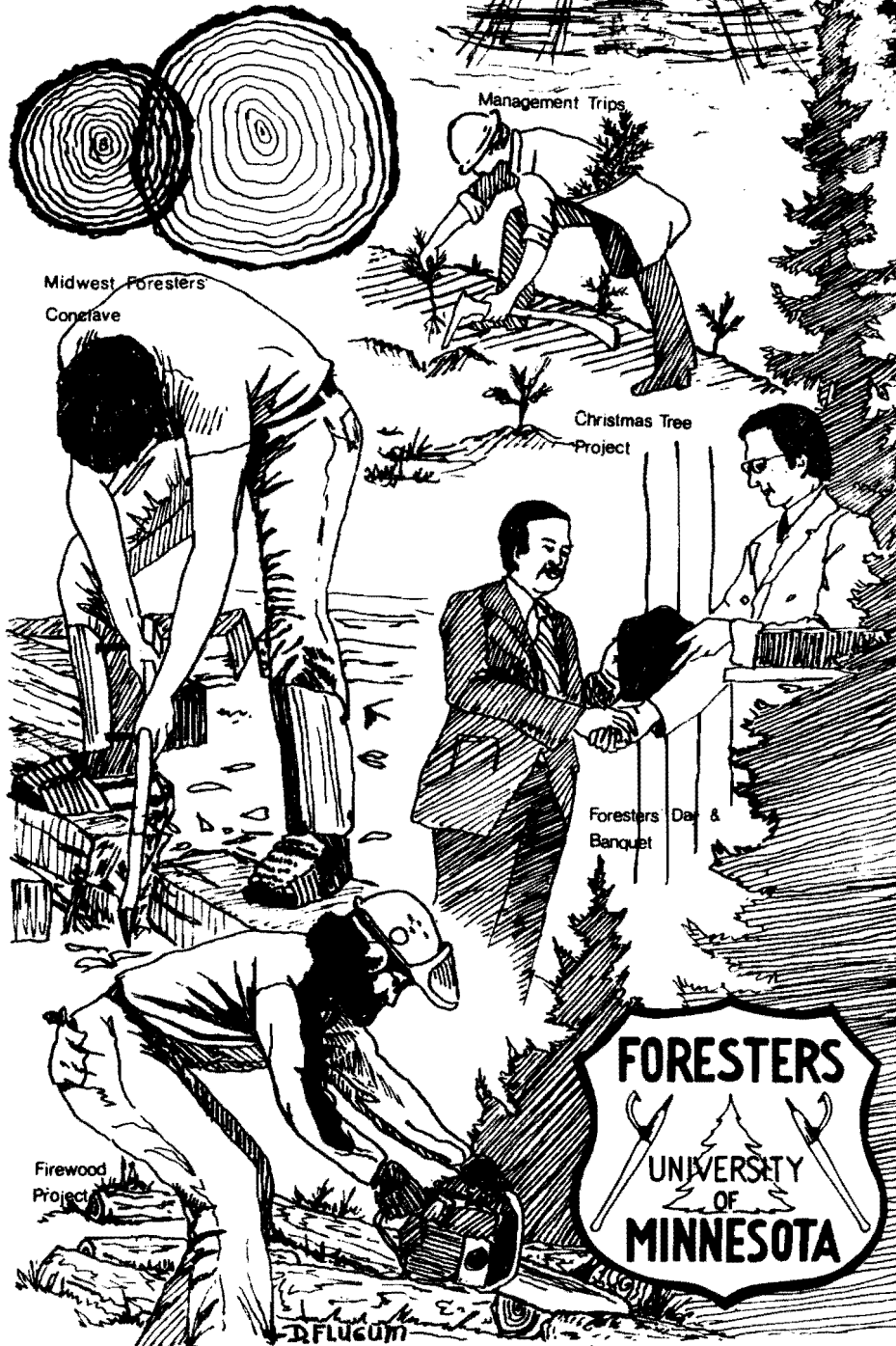
"Don't worry too much about the future. It is far better to worry about properly preparing yourself while at college for the bigger and better opportunities to come later. Work hard, take a pride in your work, take an interest in your surroundings and your fellowman, keep your feet on the ground, develop loyalty to an ideal

and to a cause, make your vocation your avocation. People who develop these characteristics while in college need have little concern about the future. It will take care of itself."

These words were wisely written to the incoming students of 1930. The recording paper is old and brittle but the thought is still very much alive. and active in today's Forestry Club.

We, the members of the Forestry Club, encourage you to participate in our long tradition of fellowship.

Drawings by Debra Flugum



CONCLAVE SPIRIT REMAINS TOPS
by Rene Needham

The strains of "Back Home Again in Indiana" could be heard from the team captain's not-so-golden throat as the 1977 Conclave team boarded the bus October 7, 1977. Ahead of them was the long ride down to West Lafayette, Indiana. With 600 miles ahead and a mere week and a half of practice, team and spectators were in high spirits as the bus pulled away from Green Hall. The back half of the bus retained their high spirits with the aid of some questionable brands of beer. Others slept, played cribbage, sang or waved to other motorists stranded in Chicago's rush hour traffic.



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*The 1977 Conclave Team,
questionable beer, and
600 miles to West Lafayette, Indiana.*



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Will Ralph split the log or his pants first?

"Neither rain, nor sleet, nor snow, . . ." could keep us from reaching the camp although the rain tried it's darnest! Arriving 10:30 on Friday night we found our reservations for over thirty sleeping accommodations delegated to two other schools. Finally, by 11:30 we were scattered throughout three different cabins and attempting to get some sleep for the competition ahead.

Saturday began as an overcast and cool day but it quickly warmed up. The muddy trek up and down the great hill was unbearable. The competition began with tobacco spit, dendrology and traverse. Perhaps Purdue's engineers had gotten ahold of the proposed course because it was computed incorrectly the first time and had to be re-run after lunch. A full stomach apparently didn't do Marty Wiley any



"Back Home Again in Indiana."



I'm the one with the golden throat.

harm as he ended a mere ten feet from the finishing point to give Minnesota a first place.

Our spitters were thwarted by tricky wind currents while our dendrologists made a respectable showing for a northern school, but couldn't quite place. Having managed to correctly guess every hickory, oak, and tulip tree, Rene Needham was still in the running until missing (gulp) POISON IVY!

Match split yielded no points, but in one man bucking, Duncan Ferguson and Tim Kennedy turned in excellent times with second and fourth place respectively. Two women bucking counted for competition points, but none of the Minnesota teams were able to place. The eventual high point winner from Missouri heaved the bolt far enough for first place while no Minnesotan placed.

After lunch, Missouri continued its traditional dominance of log rolling and walked off with the top three places. Choppino was a sight to behold as a Michigan Tech entrant went through his cant in an incredible 26.8 seconds. Duncan Ferguson narrowly missed second, but the team gained points for his third place finish. It wasn't Minnesota's year for the pulp toss or two-man bucking, but in the chain throw, Rene Needham avoided disqualification and finished in fourth place.

This years special event was rail splitting!!! A three man team was to make eight evenly matched rails out of one ten foot log. Both rail uniformity and amount of time taken were important in the judging. The team of Cayce Halvorson, Duncan Ferguson, and Ralph Greiling managed to avoid hitting each other's hands with mauls and axes and tied for third.



At the awards ceremony, Missouri ran away with top team honors, while Minnesota finished in a tie for fourth place with Michigan a mere half point out of third. Duncan was our top point man and prize-getter, collecting for three events. Ralph Greiling walked away with the bonfire honors with Marty Wiley a close second for his attempted stroll through the fire where Minnesota was once again the winner.

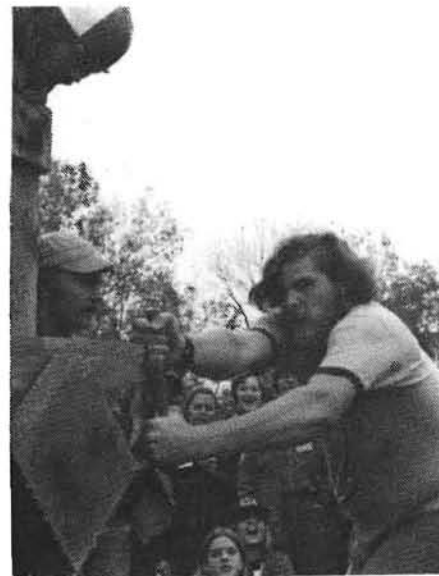
This year's team and spectators were enthusiastic, competitive and met everything in that spirit of enjoyment which has become a trademark of the Minnesota Conclave teams. Many thanks to all who participated, cheered, or helped in any way. I have a special thank-you for Tom Haughtaling who served as our faculty advisor and judge and met all of our antics with an unperturbable good humor that is hard to find.



Poison Ivy Rene!



Let's get this over so I can find the bonfire.



Watch me burn this off!



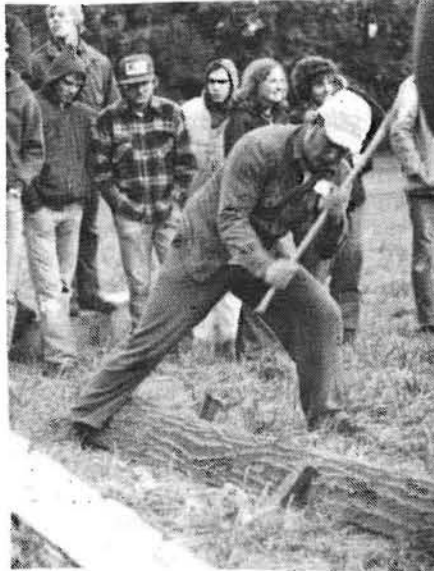
It's upside down Sue.



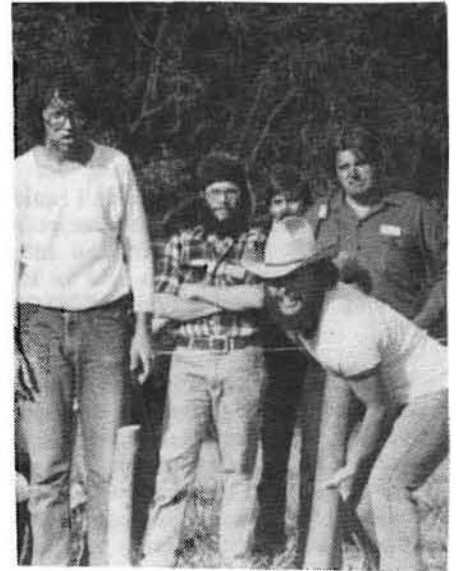
Whoops, I missed the crowd.



I can pick up fourth with Playtex Gloves.



Rail splitting was the special event.



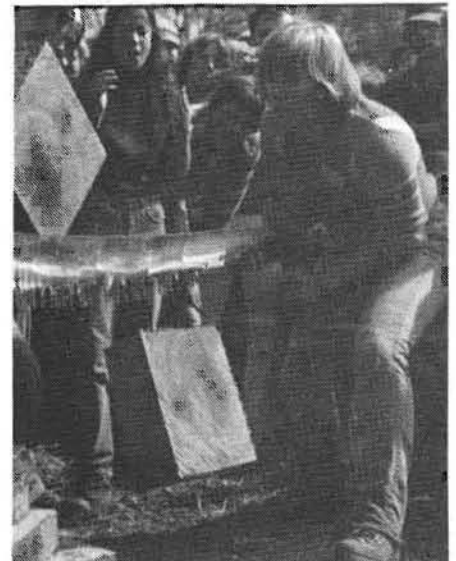
I can't get it off the ground!



Wish I could compete.



This is no match for me.



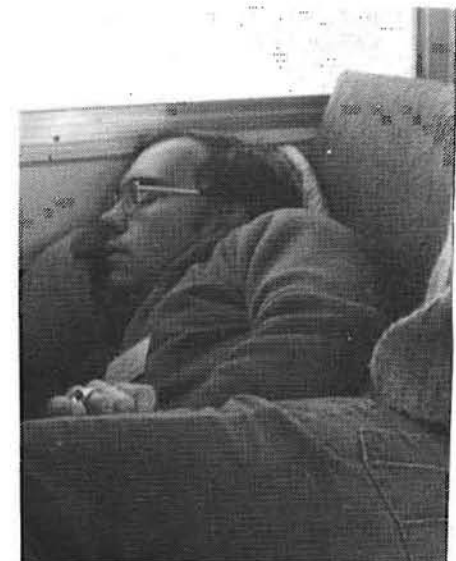
No, I'm not the cookie man.



It's stuck to my hand, I can't get it off!



Now, according to the laws of calculus . . .



It's been a long day.



Now if only I had some wood to cut.



Time to clip my toe nails.

*La, La,
Lala!*



*Rah, Rah,
Rah.*



THE 1977 CHRISTMAS TREE PROJECT

(or What makes a dozen forestry students spend a Saturday afternoon in the rain?)

By Nancy Williams

The 1977 Christmas tree project got underway when Tim Kennedy, Paul Hessburg and I got together to decide how long it would take us to go crazy. By mid July Paul and Tim were running in circles locating the 2500 Scotch, Norway, white pines, balsam, fir, and white and blue spruce. By the time Paul left for Cloquet 2000 trees were tagged and sprayed. Then Tim and brother Nancy took over the search for the elusive perfect Scotch.

November brought the overnight tree cut and cool temperatures. Half a dozen brave (?) souls went up to Levander's field to set up camp and make ready for a full weekend of cutting, hauling, and baling trees. By the time the other two dozen of us arrived Saturday morning, the first group was primed and ready with chainsaws and balers ready to work.

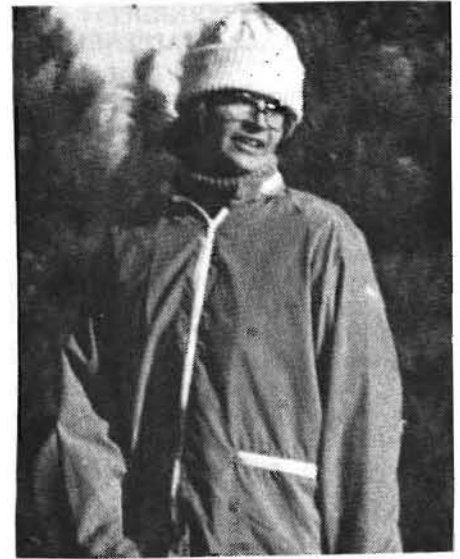
One by one the chainsaws quit working, but not before 1800 Norway and Scotch were cut. Soon all that was heard was the sound of laughing voices mixed in with the bang of deer hunters' guns and the twang of the breaking baler cables. Nine hundred trees were baled during the day with no visible drop in spirits.

After a night of good times around the campfire the crew reassembled during mornings first light for another full day's work. By late afternoon the work was done and the crew headed back to the Cities.

The next three weekends saw crews out cutting and baling in fields of other growers. Once again, Thanksgiving weekend was the time for hauling trees to the lot. The tree lot was full to its limits with baled trees when it opened on Saturday, December 3, 1977.

Club members swung into action (mainly to stay warm) and sold all trees in a record time of 14 days with a record profit of \$8000. Saturday, December 17, found several ambitious, conscientious, soggy club members selling the last of the trees and cleaning up the lot in the rain.

As usual the annual Christmas Tree Project was a huge success due to the efforts of club members.



Brother Nancy searches for elusive scotch.



Chuck is excited to the max.



We never get on each other's nerves.

THE 1977 OVERNIGHT – WHAT REALLY HAPPENED

(only the names have been changed to protect the innocent.)

by Tim Kennedy

It happened one weekend in November. Plans to attack the enemy were discussed in secrecy at Samurai Headquarters. Each man was carefully chosen for his specialty: Hitman Cayce took care of the tall ones; Small Guy Tony, the little ones; Bruce, the high ones; Mike, the smart ones; Chuck, the intermediate ones; and I took anything I could get.

We left in the cover of darkness to gather the equipment needed for the difficult task ahead. Piece by piece the equipment was gathered. Some delays kept us in check before reaching our final destination. But, being trained professionals, somehow we pulled through.

Around 1600 hours we entered base camp at Vernon's Grove. We quickly set up camp, decided to scout the area. Under the guise of foresters, we went into the small town of Cambridge to refuel our bodies and equipment. We found a desolate cafe at the end of town. Slowly, one by one, we sat down. Trying not to attract any attention we ordered, and finally after 20 minutes of careful and deliberate thinking I ordered.

Quietly, we made it back to camp. After lighting a small fire, we started to consume quantities of liquids to keep us warm. We exchanged war stories of previous campaigns. We took a team photo, for who knew what tomorrow would bring.

Finally silence. We looked out over the horizon, we knew that the enemy was close by. Early reconnaissance estimated their strength at about 1200. Six vs 1200 – even Jimmy the Greek was betting against us. But somehow, some way, I knew we could pull this off.

One by one the guys went to bed. I for one had a terrible night's sleep. I kept on hearing people moving, cars starting, and Chuck snoring, but I knew it was all a bad dream.

I awoke, a cold sweat dripping down my back. Quickly, but quietly, I woke the others. The tension was tight. The look on their faces was indicative of what was to happen.



War stories were exchanged in camp.



I take care of the intermediate ones!



Young hitmen learn techniques at headquarters.



A spy is captured!



Hang her high!



One, two, one, two, and thru and thru — there was nothing we could do!



These were part of our machines of destruction.



Our losses were heavy (before and after battle).



Slowly we checked out our equipment, everything was OK except for a little Homelite which was always breaking down.

That made five operating machines of destruction; meaning one of us had to go into battle unarmed. Hitman volunteered, no one protested. We all shook hands and charged into the battle field-



Recruits took over our jobs . . .



What a hitman!

One, two, one, two, and thru and thru, there was nothing we could do! After about 20 minutes of battle, only ten of the enemy were down. Our losses were heavy, it must have been something we indulged in the night before. Everything looked dreary for the guys. When suddenly, we saw in the distance . . . it looked like . . . yes, it was — REINFORCEMENTS!

One after another, new recruits took over our jobs and we had the enemy on the run. They were cut down in the prime of their life, dragged out to the road and stacked for everyone to see.

Victory was ours. Due to security reasons, I can't tell you what we did with the prisoners as some of the enemy got away. So next year too, some brave souls will go out and stalk . . . the elusive Christmas tree.

FORESTERS' DAY 1978

By Duncan Ferguson

This year's 43rd annual F-Day celebration followed traditions that have become a long-standing part of the Forestry Club and the College of Forestry.

To start the occasion off right, the Special Events Banquet was held at the Holiday Inn in Roseville. The turnout was large. After the meal, Paul's Bunion and the Blue Ox Handles provided a half hour's entertainment of blue grass music. Members of this group were Pete Engh, Annie Melrose Engh, Betty Winsness, Chuck Owens, Mike Wadman, and Duncan Ferguson.

Guest speaker Dr. John Haygreen, Head of Forest Products Department, presented a talk on the relationships of the energy shortage to the field of forestry. (That speech is printed in part in a preceding section of the Gopher Peavey.)

Presentations of awards followed the talk. This year the Field Forester award went to Dan Amell of Duluth, Minnesota, Son of Paul was Mike Lindgren, Forest Products. Uncle of Paul was awarded to Carl Vogt, current F-Club advisor and member of the Extension Staff. Seven Forestry Club Scholarships, each being \$300, were awarded to Tony VanRossum, junior in Forest Products; Mike Wadman, senior in Forest Resources; Rhonda Kellam, junior in Textiles and Design; Kathy Feldkamp, junior in Forest Science; Melody Himanga, junior in Forest Resources; Nancy Williams, junior in Forest Resources; and Duncan Ferguson, senior in Forest Resources.

Saturday morning came too early for some people when it was discovered that the engineers had been over to pay us a visit. As usual, green paint was applied to various sundry items in their typical child-vandal way. One sawing stand was stolen and never recovered. The F-Day banner was stolen as well but was returned in poor condition about one week later.

The Loggers' Breakfast was one of the most successful in the memories of those in attendance. More people came than were anticipated and this kept the faculty team of flap jack flippers pretty busy. Everyone got something to eat sooner or later. For the first time in several years, the program of skits included one from the undergrads, one from the graduate students and one from the faculty. The biggest production was the graduate student skit

with their excellent effort in props and puns. It was interesting to learn what really happens at faculty meetings. The large audience in attendance also got an impromptu lesson in memorization and tongue tying techniques by Paul Hessburg.

The field events began with a tug-of-war organized by the RRM Club. Despite a valiant struggle, the forestry Club managed to beat the RRM Club. The two F-Club teams got together to try and break the rope. Naturally F-Club won, or lost, depending upon your point of view.

Coronation of Lumber Jack and Lumber Jill, Terry Doyle and Rene Needham respectively, took place at noon on top of the snow pile on the Foresters' Mall. The two winners were chosen from arm wrestling and match splitting contests.

Paul Bunyan had been newly refurbished by a team of skilled surgeons and presided over the field events. It proved to be too windy for this tall man and he fell and struck his head on the stairway causing lacerations and skull fractures. However, to demonstrate how tough he really is, he got up again.

The field events were held outdoors this year despite the cool temperatures and brisk breeze. The pole climb was reinstated as an event this year and it drew the most attention from the news media on hand. Our publicity chairperson really had done a fine job in convincing newspapers, TV, and radio to cover the events. One event new to most people was the male plus female three legged snowshoe race. By tying two legs together which had had no snowshoe and putting snowshoes on the two free legs made a rather strange looking animal. To top it off, there were about a dozen of these creatures flailing across the snow in front of Green Hall. The only casualty was a broken snowshoe which appears was not made for such usage.

The Bean Feed was hosted by Mike Lindgren and Chuck Owens. There was a fine meal served, with a little bit of ice cream, too.

The Stump Jumpers Ball was a rousing success. The band played some real footstomping tunes and during the breaks, prizes were awarded to the winners of the field events. Top point gatherer Rene Needham was presented with a handsome plaque woodburnt by Cindy Lunning. The beard contest brought out a lot of bewhiskered fellows to compete in the

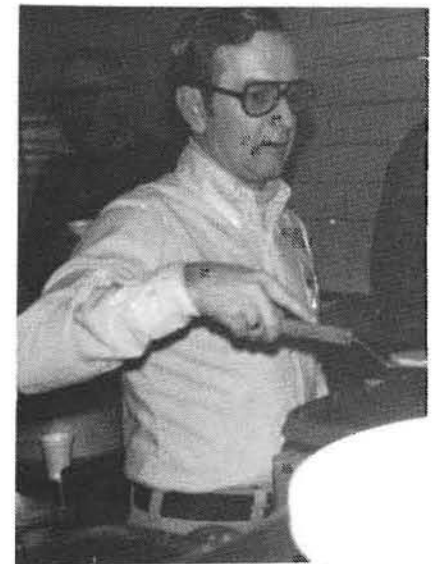
various categories of good to bad beards. Everyone had a good time.

If not for the hard work of the committee chairpersons for F-Day, this event would not have been possible. I would like to thank all the people for their help and especially:

Tim Kennedy, banquet, Tony VanRossum, field events; Melody Himanga, breakfast; Don Nast and Lynn Post, Stump Jumpers Ball; Pete Willis, tickets; Terry Brault, publicity; Katie Jacobs, awards; Mike Lindgren, bean feed; Carol Czaia and Brenda Hansen, prizes.



Oh Boy! These kids finally gave me a truck!



I hope they don't ship me Florida if the pancakes are cold.



Scholarships awarded to Mike Wadman, Tony VanRossum, Duncan Ferguson, Melody Himanga, Nancy Williams, Rhonda Kellam, and Kathy Feldkamp.



Grad Students put on one of the best skits in years.



F-Day committee: P. Willis, L. Post, B. Hansen, T. Kennedy, C. Czaia, C. Ratzlaff, T. VanRossum, M. Himanga, K. Jacobs, D. Ferguson, T. Brualt.



Paul's Bunion and the Blue Ox Handles!



F-Day was promoted on the television show Twin Cities Today.



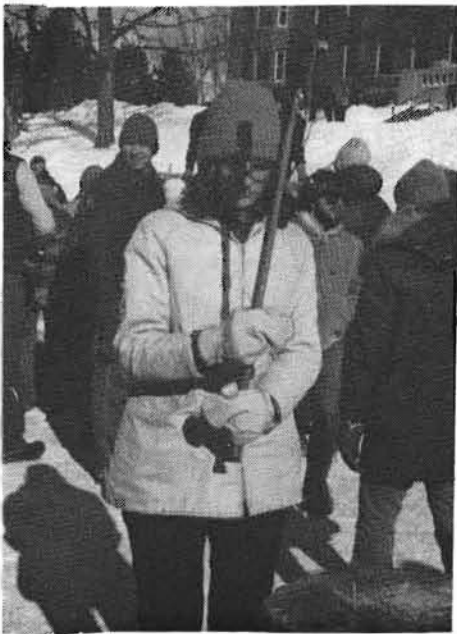
Terry Brualt did a fine job as publicity chairman.



Publicity measured up better than Tim.



Three-legged snowshoe monsters on the loose!



Rhonda in action!



Jim learned to saw backwards in Alaska.

Forester's Day Event Winners

TOP POINT PERSON

Rene Needham

TOBACCO SPIT

1. Ralph Greiling
2. Larry Himanga
3. Gary Erickson

MATCH SPLIT

1. Tom Radermacher
Brad Grove
2. John Gephart
3. Bruce Osvold

POLE CLIMB

1. Ralph Greiling
2. Herb Slechta (*Alumni*)
3. Dave Hansen (*Alumni*)
4. Mark Hansen
5. Terry Doyle

MEN'S SNOWSHOE

1. Jeff Fiskar
2. Art Soukkala
3. Dan Haig

WOMEN'S SNOWSHOE

1. Rene Needham
2. Cindy Minor
3. Kathy Priebe

ONE PERSON BUCKING

1. Mike Lingren
2. Jim Lewandowski (*Alumni*)
3. Herb Slechta (*Alumni*)
4. Terry Doyle
5. Duncan Ferguson

CO-REC BUCKING

1. Carol Czaia and Herb Slechta
2. Rene Needham and Michael Wadman
3. Tom Schnadt and Janelle Peterson (*Alumni*)
4. Cindy Ratzlaff and Marty Wiley

CO-REC THREE-LEGGED SNOWSHOE RACE

1. Rene Needham and Michael Wadman
2. Marna Butler and Terry Doyle
3. Mark Hansen and Brenda Hansen

TWO MAN BUCKING

1. Herb Slechta and Jim Lewandowski (*Alumni*)
2. Mike Lingren and Tim Kennedy
3. Eldon Farb and Tom Schnadt (*Alumni*)
4. Duncan Ferguson and Mike Wadman
5. Ralph Greiling and Steve Benson

TWO WOMEN BUCKING

1. Carol Czaia and Nancy Williams
2. Rene Needham and Mary Strutzel
3. Cindy Ratzlaff and Sue Madsen

CHOPPING

1. Duncan Ferguson
2. Ralph Greiling
3. Michael Checky

LOG ROLLING

1. Mark Hansen and Mike Lindgren
2. Dan Nast and Tom Schnadt
3. Duncan and Don Ferguson

MEN'S BOLT THROW

1. Steve Benson
2. Bud Kincaid
3. Mike Lindgren

WOMEN'S BOLT THROW

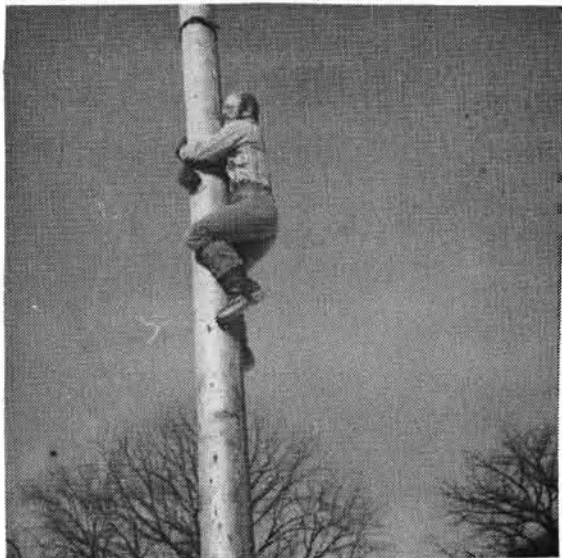
1. Sue Fuller
2. Kathy Priebe
3. Tina Jaworski



Look Ma, no gravity!



Look Ma, no feet!



Look Ma, no hope!



Look Ma, no slivers!

LIST OF CONTRIBUTORS FORESTER'S DAY

- | | |
|--------------------------------|-----------------------------------|
| Mannings Cafe | 2 Fried Chicken Dinners |
| Berman Buckskin | \$10.00 Gift Certificate |
| Red Wing Shoe Company * | Pair of Irish Setter Boots |
| Pontillo's Pizzeria | Pizza Certificate - \$12.50 |
| Tilton Equipment Co. | Precision Grinder |
| Cruise Master Prisms | 10 Factor Amber Prism |
| Ben Meadows Co. | Camping tools: ax, saw, shovel |
| Blandin | Silva Compass |
| White Shoes * | Pair of White's Boots |
| Superwood | Two Hardhats |
| Vescio's Italian Cafe | \$5.00 Gift Certificate |
| Quick Print | 3 Happenings Books |
| Natural Foods (Har Mar) | Granola |
| Cicero's | One Large Pizza |
| Campus Cobbler | Belt |
| Bridgeman's (Dinkytown) | 5 Gift Certificates (each \$1.00) |
| Arby's | 2 Roast Beef Sandwiches |
| Frostline Kits | Three T-shirts |
| Ski Haus | Backpack |
| Midwest Mountaineering | Alweather Stove |
| United Stores (Har Mar) | Buck Knife |
| Park Hardware | Draw Knife |
| Bridgeman's (St. Anthony Park) | 5 Gift Certificates (each \$1.00) |
| Harvard Barbers | Shampoo and Conditioner |
| Village Camera Shop | 110 Pocket Camera |
| Stadium Barber | Shampoo and Conditioner |
| Nordic Trading | Ski Rental Package |
| Burger Brothers | Knapsack |
| Forestry Suppliers | Two Hardhats |
| Eddie Bauer | Small Gas Stove |
| EMS Lob Pine | Adjustable Pack and Duffel Bag |
| Joe's Sporting Goods | Chamois Shirt |
| Boise Cascade * | \$50.00 Cash Contribution |
| Valli Pizza | Two Dinners for 2 |
| Perine | Sport Shirt |
| Shakey's | Pizza |
| Surdyk's | Gallon of Burgandy |
| Ski Den | Set of Long Underwear |

* Special Thanks

ROOM FOR NEW DIMENSIONS EXIST

by Duncan Ferguson

It has traditionally been the responsibility of the Forestry Club president to write an article for the Gopher Peavey listing the year's activities of the club. I would like to break from this tradition by offering my observations on where we've been this past year and where we would best be headed. I will presume that my office over the past four quarters provides me the perspective to interpret our directions.

This has been a successful year for the Forestry Club. The list of the year's activities grows a little bit each year. For the most part, it is a new social event that is added, but the revitalizing of the firewood sales and particularly the Pole Cut have been professionally oriented. The Pole Cut gave all those participating practical experience in a harvesting activity and product merchandizing.

The programs following the meetings have been moving more toward calling on the staff and faculty of the College to provide presentations on contemporary subjects in the field of forestry and related fields. This is a source that has often gone unnoticed. Many graduate students and faculty are involved in research problems with current issues facing forestry that sometimes never seem to get sufficient treatment in the classroom. As set forth in the Club Constitution, one of the objectives of the Forestry Club is to promote a high standard of professional conduct among foresters. We need to more fully address the responsibility of broadening our educations in our extra-curricular activities.

One need the Forestry Club could serve better is the role of a professional society. This could be approached in two ways.

The Forestry Club can continue to be social event oriented and provide more professional programs after the meetings. In doing this, those students inspired to participate in a more professional organization will be attracted to the club.

To segregate some of the social events from the Forestry Club would have an effect of disinteresting some student participation in the Club. Many students find it a common meeting place for a lot of fun and frolic. A heavier emphasis on professional subjects would necessarily cut into the schedule with current membership lev-

els. If membership included more of the serious minded individuals promoting professionalism, the Club could sponsor forums and discussions centered on current issues. Trips to legislative hearings could be sponsored.

Currently the membership favors a greater socializing nature, but room for added dimensions exists. All students are welcome to the Forestry Club. Students promoting professionalism have ample opportunity to participate in this organization.

Student membership in the Society of American Foresters is another alternative. Students pay reduced membership dues and receive the Journal of Forestry as well. Student participation is welcomed. Contact the SAF representative here in the College for more information.

Students seeking a recourse to contemporary forestry issues discussion should become more active participants in the Southern Minnesota Chapter which regularly holds its meeting in the College. An additional alternative would be to form a student chapter of the SAF.

The underlying thought, common to any of these alternatives, is the personal benefit that involvement provides. My message for the students: **GET INVOLVED!**

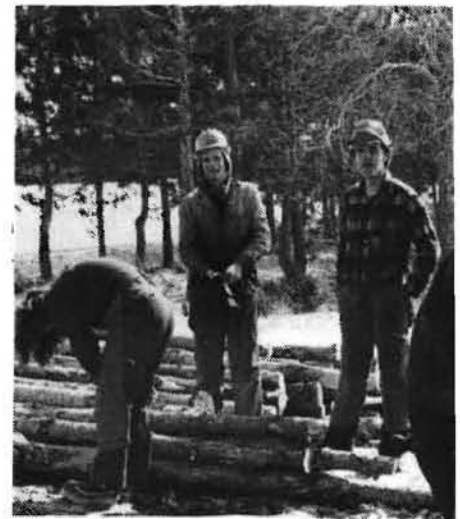
A key to one's professional success in forestry is a broad background and an involvement in issues pertinent to our profession. There are many challenges facing foresters today and the best response is a broad exposure and understanding of issues as they develop.

The Forestry Club serves as a training ground in working with and for others. For those people who take responsibility for certain events or serve as an officer within the Club, there is a great deal to learn as well as to teach. This organization undertakes large projects, such as the Christmas Tree Project, which are complex in planning, preparation, timing, and execution. When one looks at the revenues generated for the Club's operation from this project alone it is obviously the result of a large commitment of talented people that makes it come off as well as it does.

It has been my concern that the membership control the direction of the Club and that every one be given the opportunity to speak should he so desire. Unilateral decisions on club policy do not encourage the members



Log hauling at a timber harvesting workshop.



The Club should sponsor more career related activities.



Such activities would promote professionalism.

to exercise their own judgement. The sooner that we, as future professional foresters begin to develop a respect for one another and to work co-operatively to accomplish successful events like the tree sale, and Forester's Day, the better off we will be.



Intramural soccer team and other fun activities are a major part of the Forestry Club.



Forestry Club exec board: Don Nast, Kathy Feldkamp, Tim Kennedy, Melody Himanga, Mike Wadman, Mike Lindgren, Duncan Ferguson.

"We are all travelers in the wilderness of this world, and the best that we find in our travels is an honest friend."

— Robert Louis Stevenson



Advisor Carl Voght made it a very enjoyable year.

FORESTRY CLUB 1977 — 1978 ACTIVITIES

- Fall Bonfire
- Conclave at Purdue
- Spring and Winter Management Trips
- St. Paul Winter Carnival Conclave Demonstration
- Firewood Project
- Spring Dance
- DNR Fire Crews
- Canoe Trip
- Cross Country — Snowshoe Trips
- Kicks Soccer Game
- North Stars Hockey Game
- Intramural Sports Teams
(broomball, volleyball, water polo, softball)
- Spring Picnic
- Forestry Club vs Forest Products Club Softball Game
- Bull of the Woods
- Ball Room Dancing Nights
- Sleigh Ride
- Pole/Post Cutting Project
- Christmas Tree Project
- Club Directory
- Special Events Banquet
- Loggers' Breakfast
- Skits
- Foresters' Day Field Events
- Stump Jumpers' Ball
- Bean Feed
- TV Appearances
- Cambridge Nursing Home Conclave Demonstration
- Forestry Club Scholarships
- Forestry Students Leadership Awards
- Contribution to W.R. Miles Scholarship Fund
- Contribution to Forestry Library



The business portion of a F-Club meeting.

Seniors

AUBE, PETER. "Pete". Faribault, MN. FR. Intramural Sports, 1974-78; U of M Football Marching Band, 1974-76; Alumni Band Association, 1976; Society of American Foresters, 1978; Sigma Xi Pi, 1978. Tree Farm Forestry Assistant, Summer 1977, Nekoosa Papers, Port Edwards, WI. Graduate School, Industrial Forestry.



BATHEL, DAVE. Claremont, MN FR. Portage Crew BWCA, Summer 1976, 1977, USFS, Cook, MN.



DONELSON, JOHN W. "JD". Osseo, MN. FR. IM: Swimming, Track, Softball. Forestry Aide, Summer 1976, USFS, Cook, MN.



CONNOLLY, BRUCE. Bloomington, MN. FR. IM Hockey.



DAHL, KAREN. Brooklyn Park, MN. FR. F-Club, 1976-78; IVCF 1975-77/Treasurer 1976-77; College of Forestry Curriculum Committee 1977-78; Campus Committee on Housing 1978; University Senate Committees on: Research 1977-78, Biennial 1977-1978, Request and Budget Review 1977-78; Xi Sigma Pi, 1978. Forestry Intern, Summer 1977, Weyerhaeuser Co., Mt. Pine, AK; Technical Aide, Winter 1977, Blandin Paper Co. Grand Rapids, MN.



CARROLL, ROBERT. "Bob". Fridley, MN. FR. IM Broomball. Lab Technician, Summer 1977, IAFHE Remote Sensing Lab, U of M.



EHRHARDT, KATHY. Albert Lea, MN FR. U of M Women's Hockey Club, 1975-1977; IM: Football, 1975; Volleyball, 1977 & 1978; Waterpolo, 1977. Forestry Aide, Summer 1976, USFS, Two Harbors, MN.



ERICKSON, GARY M. Roseville, MN. FR. Minor: FP. Forest Products Club, 1978/ Vice-President, 1978; Forest Products Research Society. Research Assistant, 1977-1978, Dept. of Forest Products, St. Paul, MN.



FERGUSON, DUNCAN J. "Dunc". Two Harbors, MN. FR. Forestry Club/President, 1977-78; Lumberjack, 1977; Firewood Chairman, 1976; Exec. Board, 1976-78; Special Event Banquet Co-chairperson, 1978; Conclave, 1976, 1977; Spring Management Trip Chairperson, 1977; Xi Sigma Pi/Ranger, 1977-78; SPBOC/Representative from College of Forestry, 1976-77; Student Concerns Committee Chairperson, 1976-77; Athletic Fields Committee Chairperson. Assistant, 1974-75, Don Ferguson, Consulting Forester, Two Harbors, MN; Range Aide (fire control), Summer 1976, BLM, Grand Junction, Co.; Intern (Production/Logging), summer 1977, Weyerhaeuser Co., Mtn. Pine, AK.



FISKER, JEFFRY J. "Jeff". Minneapolis, MN. FR. F-Club, 1978, IM: Football, 1974-1976; Softball, 1975-78/Team Manager 1976; Volleyball, 1977-78/Team Manager; Xi Sigma Pi, 1978; Gopher Marching Band, 1974; Gopher Pep Band (Basketball/Hockey), 1975. Helitack Crewman, Summer 1977, USFS, Challis, ID.

GIVENS, GLEN. "Gipper". Virginia, MN. FR. F-Club, Fall 1976; IM: Hockey, 1977-1978; Volleyball, 1977; Softball, 1977; Bowling, 1976.



GULLIFER, DAVID. "Blue". West Springfield, MA. FR. IM Championship 1 Meter Springboard Diving/First Place, 1975.

HAASKEN, MICHAEL. "Mike". Excelsior, MN. FR. Forestry Aide, Summer 1977, USFS, BWCA.



HANSON, PETER. St. Louis Park, MN Hockey (Hammel Hawks Dynasty).

HAWES, DAVID. Duluth, MN. FR. IM: Hockey, 1976-77; Football, 1976. City Forester, 1977, City of Golden Valley, Golden Valley, MN. Tree Inspector, 1976, City of Golden Valley, Golden Valley, MN.



HESSBURG, PAUL F. "Hessman, Rambling Guy". St. Paul, MN FR. IM Volleyball, F-Club, 1976-77/Christmas Tree Chairperson, 1976-77; Xi Sigma Pi, 1977-78; Edward A. Everett Scholarship, 1977. Tree Trimmer, 1975-78, U of M, St. Paul, MN. Assistant Arborist. Graduate School, Marriage.

HOFFMAN, THOMAS. "Rolf". St. Paul, MN. FR. IM: Everything (!?!)



JOHNSON, DOUG. Minneapolis, MN. FS. IM: Volleyball, 1978. YCC Technician, Summer 1977, USFS, Chippewa National Forest.

JOKELA, CAROLE. Bloomington, MN. FR. Xi Sigma Pi, 1978. Receptionist at Visitor Center, 1974, USFS, Ely, MN; Tree Inspector/Injector, 1977, Environmental Tech, Minneapolis, MN; UGRA, U of M College of Forestry, 1978.



JORDAN, JAY. Brainerd, MN F-Club, Cloquet Cabin Rep.



KENNEDY, JAMES T. "Tim". Minnetonka, MN. FR. F-Club, 1975-78/Vice-President, 1977-78; Conclave Team, 1976-78; Bicentennial CC, 1976; IM Sports, 1976-78; SPBOG 1977-78. Tree Inspector, 1977, City of Minnetonka, MN; MN DNR Firefighter, 1977.



KRAMER, JOHN. "Little John". Redwood Falls, MN. FR. Forest Aide, 1976; USFS, Superior National Forest; Forest Tech, 1977, USFS, Chippewa National Forest.



LARSON, TIMOTHY. "Tim". Isanti, MN. FP.



MANN, MICHAEL PAUL. "Mike". Hibbing, MN. FR. IM Hockey, 1977.



MINER, CINDY. Duluth, MN. FR. Forestry Club, 1976-78. Forestry Aide, 1975, USFS, Beaverhead National Forest, MT; Forestry Aide, 1975, USFS, Colville National Forest, WA; Forestry Aide, 1977, USFS, Green Mountain National Forest, VT. Employment with USFS in Green Mountain National Forest, Rochester District.



MONSON, LYNN. Champlin, MN. FR. IM Sports, 1976-78. Professional Guide, BWCA & Quetico Provincial Park, 1975-77, Ely, MN.



NEEDHAM, MAURINE H. "Rene." Bloomington, IN. FR. F-Club: 1974-78/Fall Bonfire, 1975, Co-chairperson; Christmas Tree Project, 1975, Co-chairperson; Program, 1977-78, Co-chairperson; Conclave Team, 1975-78/Captain, 1978; SPBOC Alternate Rep, Spring 1976; Honor Case Commission, 1976-77; Spring Picnic, 1978, Co-chairperson; F-Day Lumberjill, High Point Award, 1978; Dept Head Search & Selection Committee, 1978, Undergraduate Representative; IM Sports, 1974-78. Lab Technician, June 1976 to present (1978), Dr. Merle Meyer, Remote Sensing Lab-College of Forestry. Internship with Potlatch in Cloquet, then graduate school at U of M.



NELSON, STEVEN F. "Tuna". Minneapolis, MN. FR. F-Club, 1976-77/ Sgt. of Arms; IM Sports, 1975-78, Football, Broomball. Fire Suppression Crewman, 1976, "The CleElum Slash Jumpers" USFS, CleElum, Washington, Prevention Tech., 1977, USFS, CleElum, WA.



OLSON, KEN. Virginia, MN. FR. IM Sports, 1976-78.



POST, LYNN. St. Paul, MN. FR. F-Club, 1976-78; F-Day Dance Chairperson, 1977, 1978. Tree Inspector, 1977, City of St. Paul.



QUADY, ROBERT. "Bob". Buffalo, MN. FR.



RITCHIE, DOUGLAS. Bloomington, MN. FR. Co-Rec Volleyball, 1978. Director, Outdoor Education Program, Edmonton, Alberta, CA.



ROWE, JONATHON. "Jon". Nashwauk, MN. FR. Forest Technician, Summer 1977, Cass Lake District USFS, Chippewa National Forest. Continue to work at Chippewa.



SHEFFEL, TOM. "Rusty". Bloomington, MN. FR. IM: Football, 1977; Basketball, 1977-78; Softball, 1977-78. Crew Chief, 1977, Twin Cities, Eden Prairie; Field Supervisor, 1977-78, Tree Trust, Plymouth.



SHIMON, RON. St. Paul, MN. FR. IM: Football, 1976; Hockey, 1976-77. Trail Maintenance, Summer, 1977, National Park Service, Moose, WY. Park Worker, Summer 1976, St. Croix County, Glenwood City, WI.



STEGEMUELLER, PHILIP. Winfield, KS. FR.



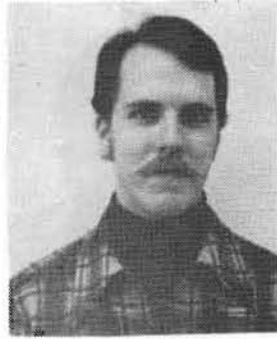
STOEFFEL, RON. "Bibs". Pine City, MN. FR. IM: Football, Hockey, Basketball, Softball.



STRUTZEL, MARY. St. Paul, MN. FR. IM: Broomball, Football, Soccer; Conclave Team, Fall 1977; F-Club, 1976-77.



TJADER, HARVEY. "Snoose". Duluth, MN. FR. Forestry Club, 1976-78; Gopher Peavey, 1977, Assistant Editor; Phi Kappa Phi, National Honor Society, 1977-78. Crew Chief, 1977, Noranda Exploration, Inc., Rhinelander, WI.



VOLPE, MICHAEL. Lake Forest, IL. FR. Tree Inspector, Summer 1977, Golden Valley, MN.



WADMAN, MICHAEL. Cloquet, MN. FR. F-Club, 1976-78/Sgt. at Arms, 1977-78; Scholarship Recipient, 1978; IM Sports, 1976-78. Fire Crew, 1977, DNR.



WESTFIELD, LEE. "Buck". Moorhead, MN. FR. IM: Football, Basketball, Hockey, Softball, 1975-78; XI Sigma Pi, Forestry Aide, BWCA Portage Crew, Summer 1977, USFS, Grand Marais, MN.



CRESCENCE WHEELER



WILEY, MARTIN. "Marty". International Falls, MN. FR. F-Club, 1977-78; Conclave Team, 1977; Inner Tube-Waterpolo, 1978.



Pokorny, Paul A.
 Post, Lynn M.
 Priebe, Kathleen M.
 Quady, Robert A.
 Quinn, Brian R.
 Rhodes, Bradley C.
 Ritchie, Douglas J.
 Rowe, Jonathon S.
 Rusinak, James J.
 Schuckert, William A.
 Schwab, Stephen E.
 Sheffel, Thomas W.
 Shimon, Ronald J.
 Sorvick, James C.
 Stegemoeller, Phillip K.
 Sterle, Craig R.
 Stocker, Timothy P.
 Stoffel, Ronald J.
 Strahl, Thomas E.
 Strom, Gregory S.
 Strutzel, Mary A.
 Sutherland, Miley A.
 Tjader, Harvey D.
 Tollefson, Timothy G.
 Tomlinson, Robert S.
 Tweedale, Jon J.
 Volpe, Michael R.
 Wadman, Michael A.
 Wannarka, Paul J.
 Wemeier, Gary P.
 Westfield, Lee M.
 Wheeler, Crescence M.
 Wiley, Martin D.
 Woods, Joyce D.
 Worms, Timothy F.
 Yokell, Larry J.

Erickson, Gary M.
 Ferguson, Duncan J.
 Fisker, Jeffrey J.
 Hughes, Charles V.
 Humphrey, Christine D.
 Jakala, Stephen G.
 Johnson, Cheryl D.
 Jokela, Carole A.
 Jordan, Jay W.
 Kehrer, Jeffrey J.
 Kennedy, James T.
 Kimball, Stephen J.
 King, Randy L.
 Kircher, Steven R.
 Koscielak, John P.
 Fitzpatrick, Daniel J.
 Foss, Juel R.
 Givens, Glenn D.
 Gullifer, David W.
 Haasken, Michael A.
 Hanson, Peter G.
 Hawes, David C.
 Hepola, Timothy J.
 Hessburg, Paul F.
 Hoffman, Thomas R.
 Holliday, Greg D.
 Hosfield, Karen S.

Kramer, John C.
 Kruse, Gary P.
 Kunze, Teresa R.
 LaFreniere, Steven J.
 Lahti, John V.
 Lamb, Jeffrey T.
 Larsen, Michael D.
 Lovejoy, Stuart M.
 Lundberg, William S.
 Lundorff, Craig A.
 Lutze, Elisabeth A.
 Mann, Michael P.
 Meyer, Charles J.
 Mielke, William R.
 Miner, Cynthia L.
 Monson, Lynn D.
 Murnane, Wesley J.
 Nauman, Jill D.
 Needham, Maurine H.
 Nelson, Steven F.
 Nightingale, William B.
 Nyman, Marc C.
 Oleson, Daniel A.
 Olson, Kenneth L.
 Pabst, Robert J.
 Pennington, Michael R.
 Peterson, Tim G.

Seniors

Aiken, Daryl W.
 Asleson, Martin D.
 Aube, Peter J.
 Bathel, Dave M.
 Bell, Douglas D.
 Berttula, Raymond E.
 Blume, Leonard A.
 Carroll, Robert L.
 Cogan, Curtis J.
 Connolly, Bruce G.
 Cundy, Terrance W.
 Cuthbert, Paul S.
 Dahl, Karen A.
 Davis, Frank N.
 Dee, Larry W.
 Donelson, John W.
 Ehrhardt, Kathleen A.

Juniors



Row One: Don Nast, Sally Brackee, Karen Deavon, Jennifer Plombom, Peggy Moreau, Melody Himanga, Gary Kincaid, Sheila Schamuhn, David Schuller. Row Two: Ed Lieser, John Daniels, Jeff Rosales, Steve Edgar, Sue Madsen, Chris Brokl, Earl (Rusty) Green. Row Three: Terry Doyle, Steve Spartz, Tom Homer, Greg Berlin, Mark Carlson, Dan Haig, Terry Tucker. Row Four: Hark Dey, John Gephardt, Greg Benson, Peter Kelsey, Steve Benson, Tom Schuster, Dave Paulson, Pete Frahm, Ron Rabe.

Forest Resources Juniors

Anderson, Lance W.
Anderson, Paul D.
Asmus, Brian D.
Barzen, Mimi J.
Beck, Laurel J.
Bennett, Gregory J.
Benson, Steven P.
Blake, Kathleen M.
Brackee, Sally A.
Brokl, Christopher R.
Carlson, Mark D.
Checky, Michael T.
Conway, Christopher J.
Countryman, Bruce E.
Daniels, John B.
Deavon, Karen M.
Dey, Mark W.
Edgar, Stephen L.
Euteneuer, Richard A.
Frahm, Peter E.
Gabriel, James T.

Gephardt, John S.
Gerner, Steven J.
Giddings, Brian L.
Gockowski, Ronald E.
Gottsch, Robert A.
Greene, Earl A.
Haig, Dan R.
Hansen, Peter R.
Hansen, Ralph E.
Hartnett, Katherine A.
Heiser, Kimberly A.
Himanga, Melody L.
Hinschberger, Bob L.
Holt, Barbara G.
Hurd, Leslie J.
Jensen, Julie A.
Johnson, Steven M.
Keeler, Terrence L.
Kelsey, Peter R.
Kincaid, Gary W.
Kock, Steven M.

Krysel, Charles E.
Levin, Joan M.
Lieser, Edward G.
Low, Kevin G.
Maass, Howard D.
Madson, Susan B.
Makey, Dean M.
McCann, Brian D.
McGannon, James C.
Miller, Shawn M.
Mital, James M.
Montzka, Thomas B.
Moreau, Peggy H.
Nast, Donald W.
Nelson, Edward P.
Nelson, James
Nelson, Jon R.
Nichols, Thomas J.
Niska, Charles E.
O'Connor, Kevin J.
Paulson, David J.

Pennington, Michael R.
Peterson, Linda M.
Pfeifer, Darryl E.
Pisarek, Brian K.
Rabe, Ronald A.
Ratzlaff, Cynthia C.
Rosales, Jeffry M.
Schamuhn, Sheila J.
Schroeder, Joan D.
Schuller, David B.
Schuster, Thomas R.
Severs, Ronald W.
Shepard, Michael W.
Spartz, Steven J.
Streeter, Stephen C.
Tansey, James P.
Tucker, Terence J.
VanSickle, Craig A.
Waller, Alan M.
Williams, Nancy L.
Zillgitt, Nancy J.

Sophomores

Anderson, Keith W.
 Baker, Michael N.
 Banta, David
 Bartsh, Sherie S.
 Biagi, Alfred C.
 Bigelbach, Thomas M.
 Blake, J. Wesley
 Borden, Patrick D.
 Bouchanville, Mitchell J.
 Brandenburg, John W.
 Buche, Carol M.
 Burke, Sheila M.
 Butler, Marna C.
 Callahan, Patrick B.
 Carlson, Karol A.
 Carpenter, Susan R.
 Cox, William E.
 Crowley, Margaret M.
 Crumpton, Thomas T.
 Cullen, Mark P.
 Cutler, Susan A.
 Dean, Thomas C.
 Dinesen, William G.
 Ditlev, Richard G.
 Donahue, Patrick K.
 Dose, Dale P.
 Dunne, Miles J.
 Ehrlich, Barbara A.
 Ernst, Mark A.
 Finley, David C.
 Grebner, Erich J.
 Grindy, Daniel L.
 Grogg, Ronald C.
 Grove, Brad J.
 Gumbrill, Steven J.
 Gustafson, Cheryl R.
 Haffner, James C.
 Heisel, Robert L.
 Helland, Scott P.
 Henly, Russel K.
 Highland, Timothy J.
 Hogenson, Jeffrey A.
 Hopkins, Timothy J.
 Hyams, Robert P.
 Johnson, Jeffrey L.
 Johnson, Richard C.
 Kelly, John H.
 Kiess, Jeffrey L.
 Korzeniowski, John C.
 Kuchera, Steven J.
 Kujawa, Paul R.
 Lanoue, Thomas R.
 Lee, David G.
 Lehtikoinen, James R.
 Lindemanis, Peter G.
 Loschieder, William J.
 Lukaska, Michael P.
 Lux, James D.
 Lyon, Kathryn J.
 Mattson, Stephen N.
 McKinney, Matthew J.
 Menke, James C.
 Nelson, Audrey A.
 Nelson, Dennis H.
 Oftedahl, Colleen L.
 Ojong, Ignatius O.
 Opseth, Steven R.

Owens, Charles D.
 Pampusch, Mary S.
 Peterson, Dorothy J.
 Proctor, Douglas J.
 Randa, Keith E.
 Roche, William A.
 Roth, Anthony W.
 Sakoda, David I.
 Schofield, Donald P.
 Schultz, Jeffrey G.
 Simones, James F.
 Sohm, Virgil D.
 Spatafore, Scott M.
 Spears, Rebecca J.
 Stanoch, Carol J.
 Stephenson, David J.
 Stright, John R.
 Utzman, Brian L.
 Valdez, Louis D.
 VandeVoort, Richard L.
 Vogel, Michael D.
 Waldoch, Mark D.
 Willis, Peter R.
 Winn, Frank L.
 Wysocki, Daren C.
 Youngquist, Bruce C.

Freshmen

Alness, Jon M.
 Ardolf, Nathan B.
 Bedker, Peter J.
 Benson, Cynthia J.
 Brodt, Barbara S.
 Burkstrand, David B.
 Carlson, Julie M.
 Doering, Dawn R.
 Dokka, Valerie J.
 Duehren, Dennis P.
 Edberg, Keith D.
 Ellis, Michael A.
 Frelk, Deborah L.
 Golden, Jeff A.
 Gregori, Theresa A.
 Haley, John S.
 Hall, Pamela J.
 Hill, Neil S.
 Himanga, Larry J.
 Innes, Alister K.
 Jacobs, Catherine M.
 Jacobwith, Thomas D.
 Jaworski, Martina A.
 Kegley, Gary L.
 Klatt, Robert F.
 Krantz, Christine M.
 Lucido, Samuel P.
 Merrill, Kenley J.
 Moberg, Elizabeth M.
 Nelson, Mark A.
 Petro, Anthony C.
 Sager, David M.
 Schneckenburger, Daniel E.
 Smead, Peter R.
 Stein, Richard A.
 Thompson, James E.
 Thompson, Joseph M.
 Thompson, Kelly A.
 Walker, Barbara A.
 Weber, Dawn M.
 Weirens, Donald J.
 Westlake, Janice L.

Forest Products

Seniors

Adams, Richard A.
 Banks, DuWayne W.
 Bruhn, John F.
 Carlson, Steven A.
 Carstenbrock, Jay P.
 Christenson, Kent A.
 England, James C.
 Herron, Bernie J.
 Johnson, Bruce W.
 Kask, David W.
 Kennedy, Scott K.
 King, Charlene J.
 Larson, Timothy D.
 Lindgren, Michael W.
 Maddox, Mark W.
 Martin, Craig A.
 Morrow, Bradley G.
 Olson, Barry T.
 Peterson, Gordon H.
 Rathbun, Norman L.
 Simonson, Kenneth P.
 Slevin, Michael G.
 Vogt, James R.
 Wahoske, Keith W.

Juniors

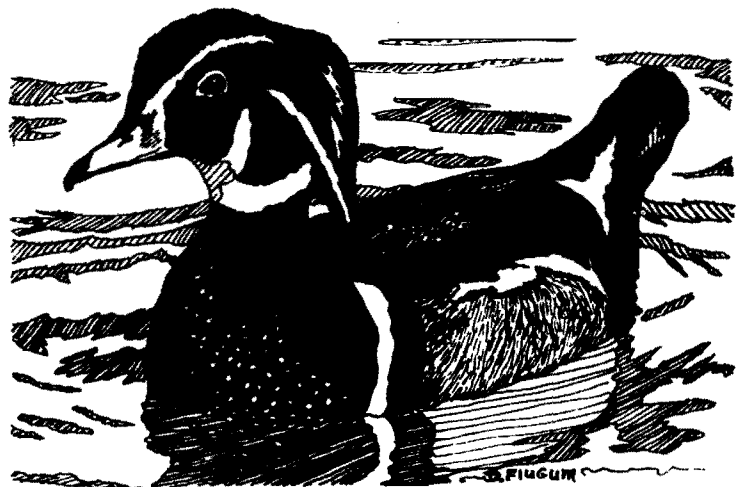
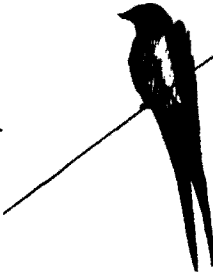
Chapman, Daniel J.
 Crowley, Mark J.
 DeRuyter, David N.
 Froseth, Blair J.
 Goad, John P.
 Gonczy, Dennis B.
 Halvorson, Cayce H.
 Hanger, Richard E.
 Haygreen, James G.
 Howell, Michael B.
 Jarvella, Jeffrey R.
 Jastremski, Wayne W.
 Johnson, Paul D.
 Kamke, Frederick A.
 Langland, Faye E.
 Lunde, Lowell B.
 Marmorine, Brian G.
 Marquardt, Rodney A.
 Monson, Carl R.
 Mozis, Steven C.
 Ogorzalek, Edward M.
 Osterberg, Douglas L.
 Peterson, Barbara L.
 Petron, Roderick W.
 Reller, Nicholas J.
 Scheer, David C.
 Singer, Alan M.
 VanRossum, Anthony G.
 Wallin, Mark A.
 Weber, Ronald J.
 Wolfe, Kurt D.
 Wollum, Gregory V.
 Zittlow, Raymond J.

Sophomores

Bard, George R.
 Gummert, Brent A.
 Karjala, Eduardo D.
 Kripotos, Thomas J.
 Lee, Bjarne H.
 McBain, Michael W.
 Murray, Brian D.
 Panning, David J.
 Presnail, Paul M.
 Rask, Michael J.
 Swanson, Michael S.
 Thompson, Brad L.
 Zylkowski, Steven C.

Freshmen

Bernhardt, Barbara L.
 Botzet, Steven J.
 Bredemus, Michael J.
 Corbin, Daniel D.
 Ericksen, Scott R.
 Gessner, Anne L.
 Schweiger, Kay D.



Forest Sciences

Seniors

Berlin, Greg T.
 Bruns, Thomas D.
 Dean, James C.
 Johnson, Douglas K.

Juniors

Doyle, Terry J.
 Feldkamp, Kathryn J.
 Homer, Thomas J.
 Plombon, Jennifer L.
 Stanton, Theresa A.

Sophomores

Hegstad, Trecia G.
 Leibfried, Robert T.
 Lenarz, John E.
 Nabbefeld, Joseph G.
 Oestreich, Gretchen L.
 Theis, Dennis O.

New Graduate Students

Twenty new graduate students have joined the College this fall. They are:

Allen Aho	BA Macalester	1975
Objective: MF	Forest Resources	
Mary Anderson	BA Minnesota	1975
Objective: MF	Forest Resources	
Carl Beyerhelm	BS Iowa State U.	1976
Objective: MS	Forest Resources	
John Clausen	MS Minnesota	1973
Objective: PhD	Forest Resources	
Carol Czaia	BS Minnesota	1977
Objective: MS	Forest Resources	
Ralph Greiling	BS Minnesota 1973	
Objective: MS	Forest Resources	
Lawrence Greene	BS Colorado St. U.	1976
Objective: MS	Forest Resources	
Phillip Grumstrup	BS Minnesota	1974
Objective: MS	Forest Resources	
James Haase	BS Fairleigh Dickinson U.	1976
Objective: MF	Forest Resources	
Mark Hansen	MS University of Wisc.	1977
Objective: Phd	Forest Resources	
Mark Hardy	BA Macalester	1975
Objective: MF	Forest Resources	
Dale Higgins	BS Minnesota	1977
Objective: MS	Forest Resources	
Rangaswamy Iyengar	MS San Diego State U.	1977
Objective: PhD	Forest Products	
Susan Kleinhenz	BA Minnesota	1973
Objective: MS	Forest Resources	
Bruce Kuplan	BS Rutgers	1077
Objective: MS	Forest Resources	
Jayne May	AB Indiana University	
Objective: MF	Forest Resources	
Melinda Moeur	BA Scripps College	1976
Objective: MF	Forest Resources	
Susan Pflager	BS Minnesota	1977
Objective: MS	Forest Resources	
Wendy Radsliff	BS Minnesota	1977
Objective: MS	Forest Resources	
Mark Springan	BS Minnesota	1977
Objective: MS	Forest Resources	



Recreation Resource Management

Seniors

Alt, Joanne M.
 Brown, Susan M.
 Holasek, Tarin J.
 Johnston, Craig R.
 Kattner, William G.
 Kleven, Michael W.
 Nelson, Mark W.
 Salisbury, Mark L.

Juniors

Arends, Kevin C.
 Hoffbeck, Randall J.
 Johnson, Mark L.
 Oesterle, James D.
 O'Reilly, Kathleen M.
 Ostrem, Craig A.
 Wichelmann, Thomas O.

Sophomores Freshmen

Brotzler, Charles A.
 Coe, Larry J.
 Danberg, David W.
 Freeman, Cynthia L.
 Laurence, Jane E.
 Rath, Marthe D.
 Remus, Charles J.
 Troost, Lawrence
 Vaughn, Virginia M.

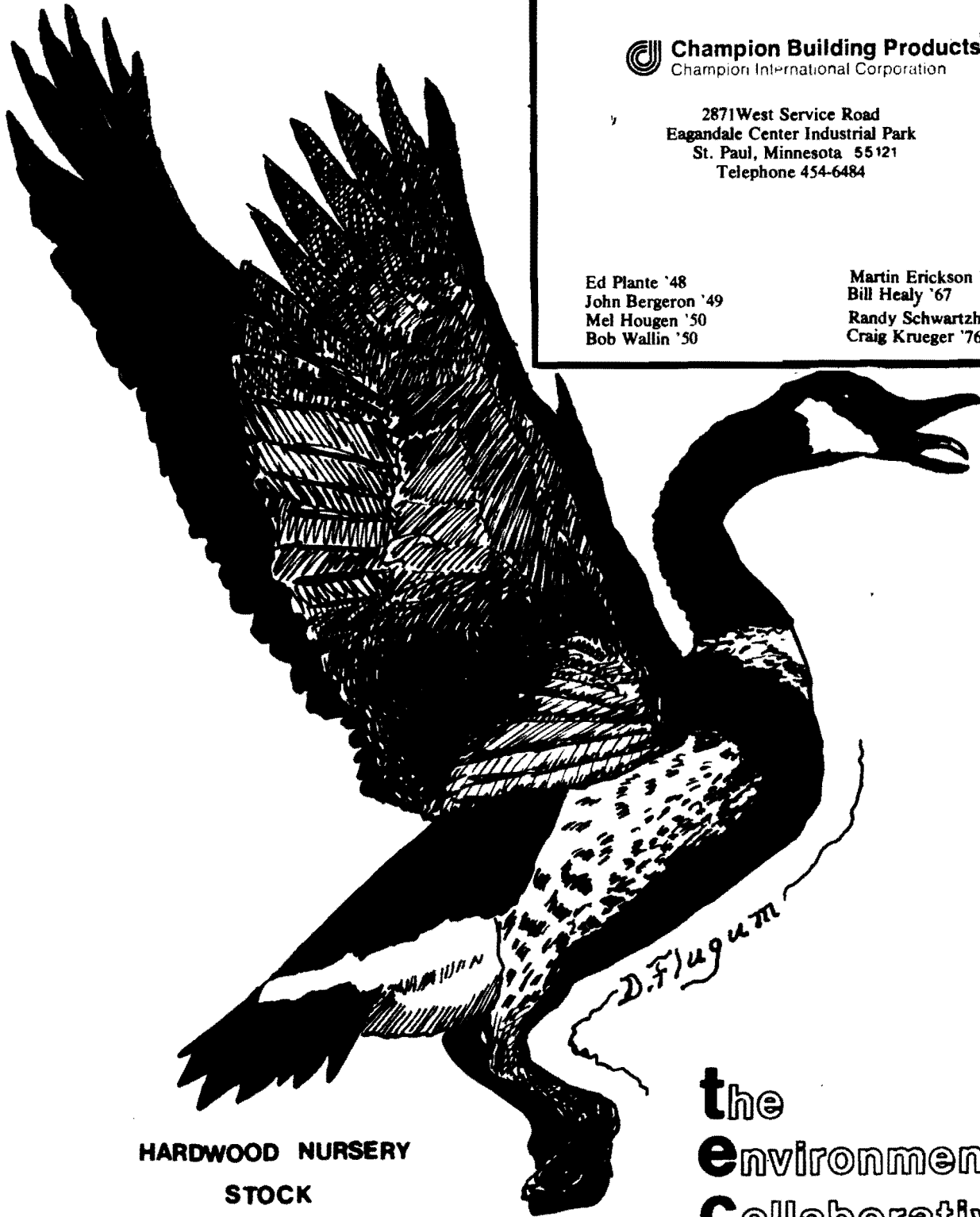
Bennett, Michael P.
 Fritchman, Henry M.
 Grogan, Steven E.
 Larmore, Joseph M.
 Peterson, Steven J.
 Poche, Susan E.

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Ed Plante '48
John Bergeron '49
Mel Hougen '50
Bob Wallin '50

Martin Erickson '65
Bill Healy '67
Randy Schwartzhoff '75
Craig Krueger '76



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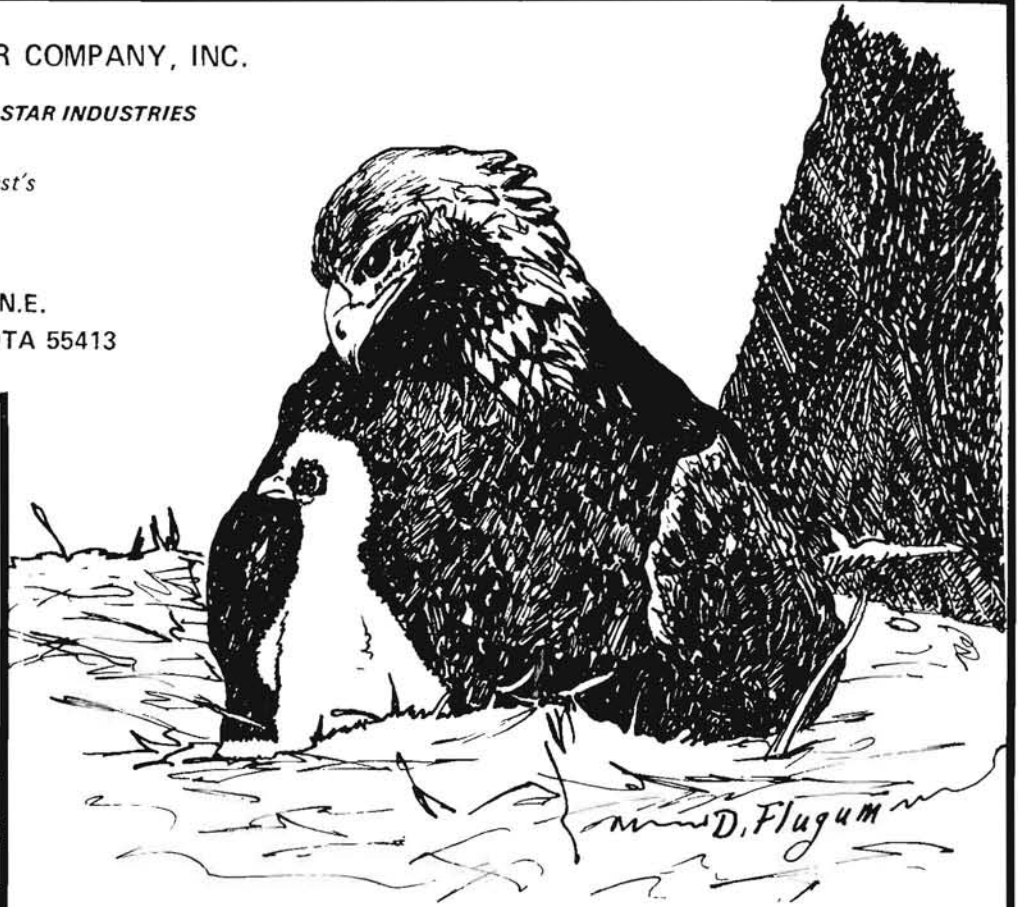
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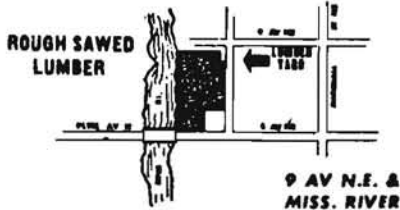
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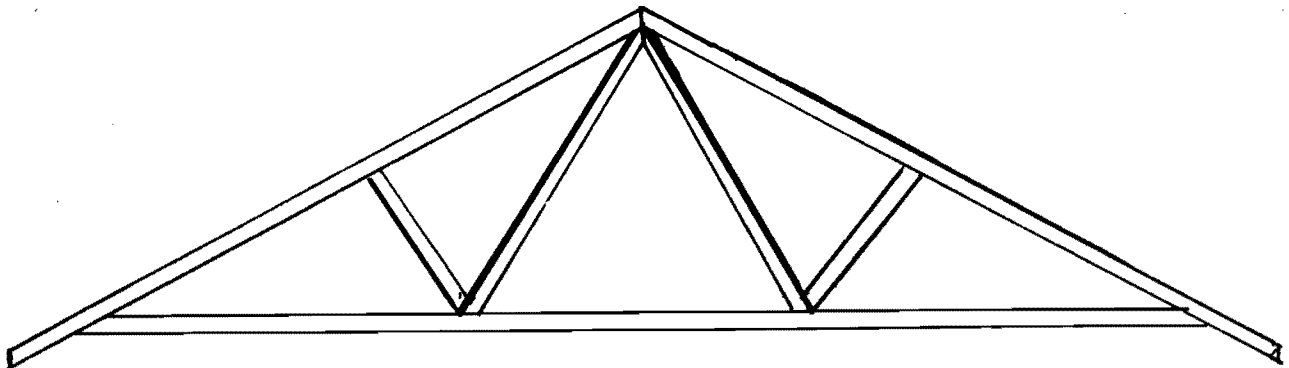


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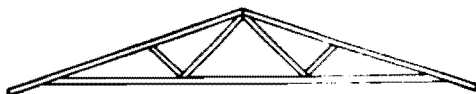
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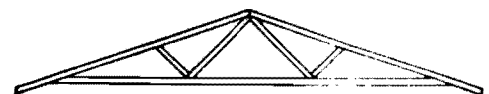


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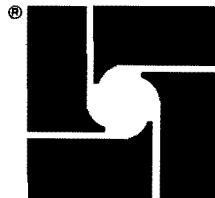
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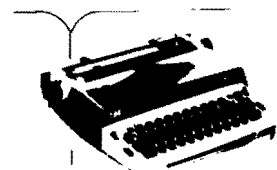


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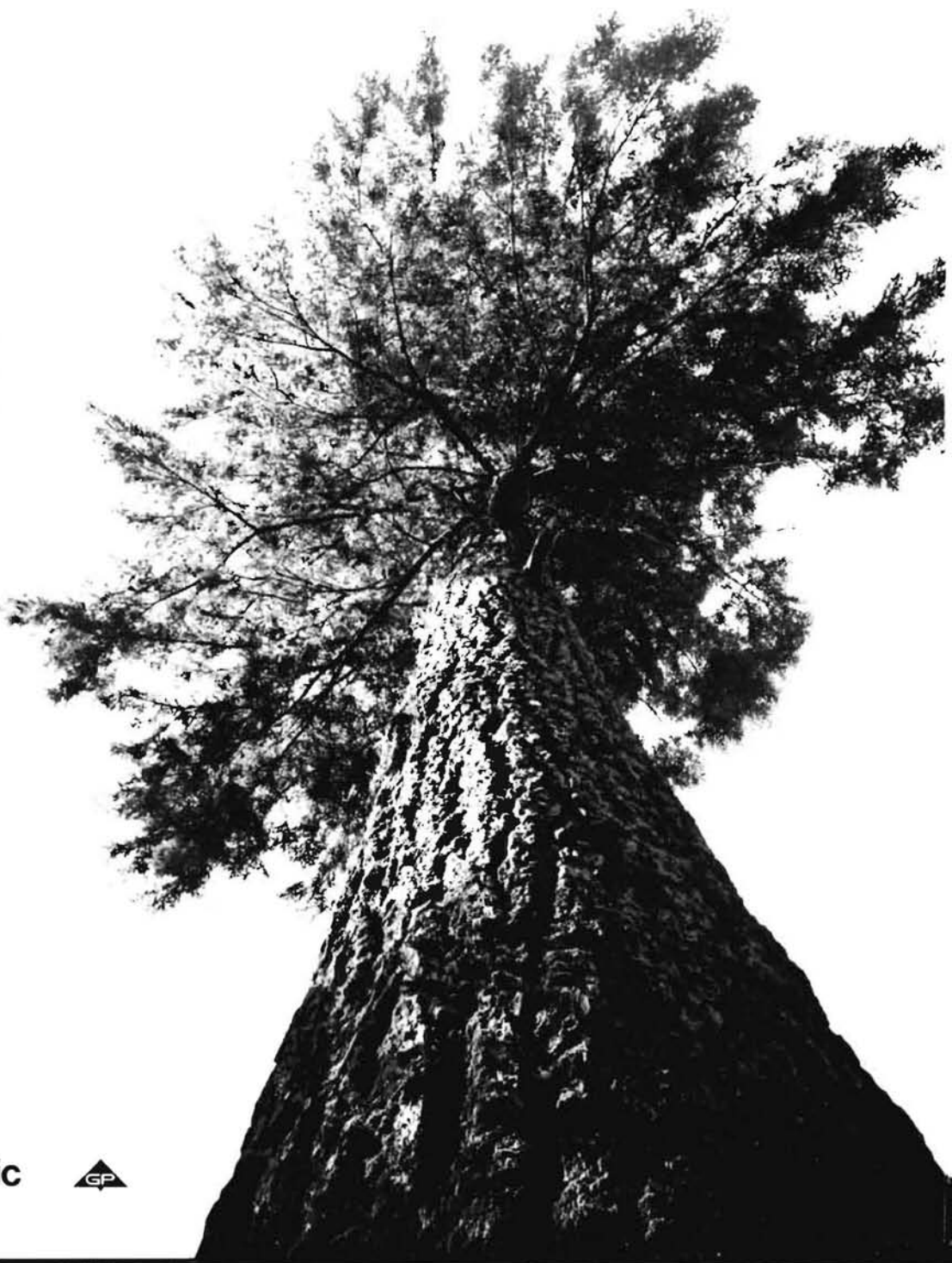
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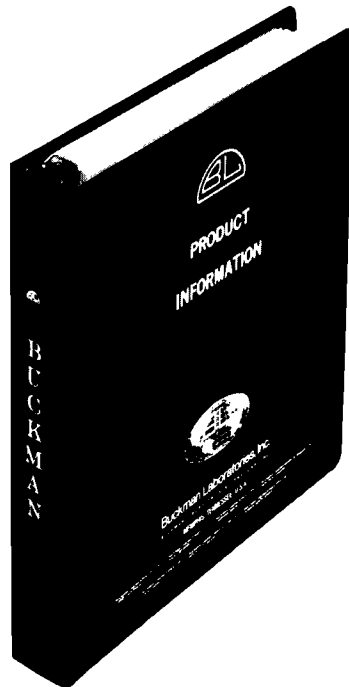
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- Fresh water quality
A1, 30, 36, 42, 44, 49, 52, 77, 79, 86, 90, 93, 881
- Boiler water treatment
28, 29, 33, 35, 36, 37, 38, 49
- Cooling water treatment
29, 33, 35, 36, 37, 38, 42, 44, 49, 77, 79, 86, 881
- Cleaning
46, 47, 57, 58, 59LO
- Pulping
46, 47, 59LO
- Chemical recovery
36, 46, 47, 49
- Air pollution
47, 59
- Recycling, repulping & deinking
36, 46, 47, 48, 49, 53, 53P, 54C, 56, 57, 59LO
- Pulp washing
36, 46, 47, 48, 49, 53, 53P
- Pulp preservation
30, 44, 52, 86, 881
- Additives preservation
11-M1, 42, 44, 52, 86, 90, 93, 881
- Slime control
25, 30, 42, 44, 52, 86, 90, 93, 881
- Pitch control
36, 46, 47, 49, 59LO
- Scale control
33, 35, 36, 46, 47, 49
- Corrosion control
26, 28, 29, 33, 34, 35, 37, 38
- Foam control
47, 48, 53, 53P, 54C
- Dispersion
36, 46, 47, 49, 55, 59LO
- Retention
A1, 32, 43, 63, 65
- Drainage
48, 53, 53P, 54C, 63, 65
- Formation
32, 43, 48, 53, 53P, 63, 65
- Strength
63, 65
- Adhesion & release
54C, 63, 65
- Wire & fabric life extension
26, 28, 33, 34, 35
- Wet felt conditioning
56, 57, 59LO, 61
- Coating preservation & mold resistance
11-M1, 30, 42, 44, 52, 86, 90, 93
- Effluent quality
A1, N4, 30, 32, 43, 47, 48, 52, 53, 53P, 54C, 63, 65, 86, 881

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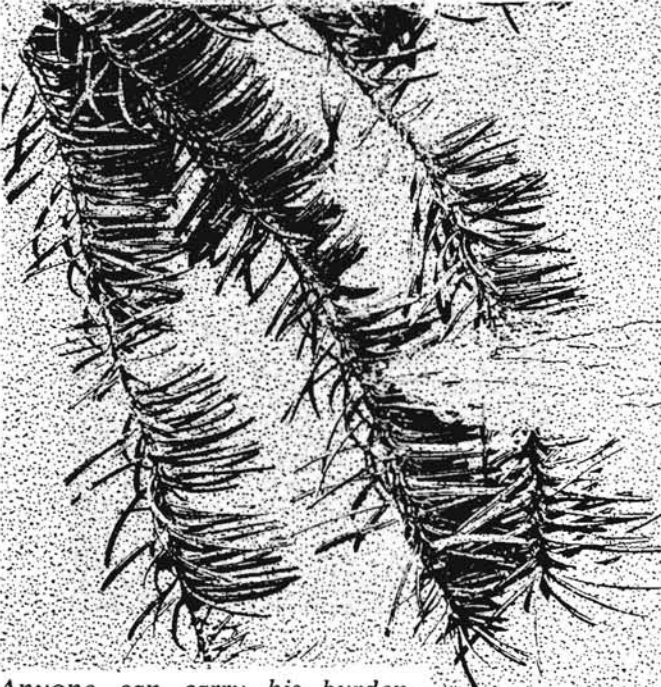
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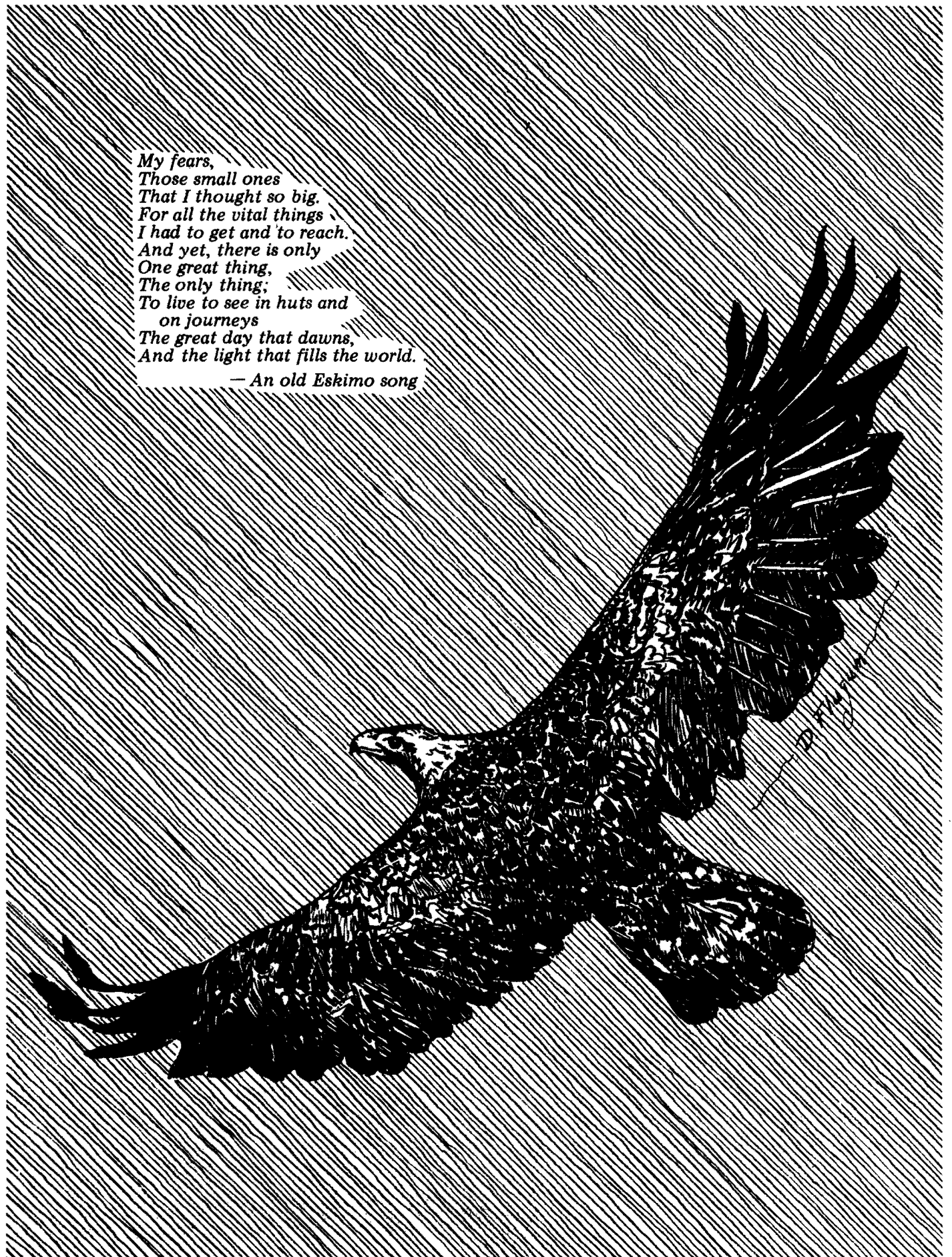


*Anyone can carry his burden,
 however hard, until nightfall.
 Anyone can do his work, however
 hard, for one day.*

— Robert Louis Stevenson



*My fears,
Those small ones
That I thought so big.
For all the vital things
I had to get and to reach.
And yet, there is only
One great thing,
The only thing;
To live to see in huts and
on journeys
The great day that dawns,
And the light that fills the world.
— An old Eskimo song*





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