MINUTES OF THE MEETING OF THE JOINT APPROPRIATION SUBCOMMITTEE ON EDUCATION

February 12, 1981

The meeting of the Joint Appropriation Subcommittee on Education on the Regent's modifications was called to order at 7:35 a.m. on Thursday, February 12, 1981 by Chairman Donaldson in Room 104, Capitol Bldg., Helena, Montana.

All members were present including Curt Nichols and Bruce Shively, Fiscal Analysts.

GLEN LEAVITT gave the Budget Office recommendation for the modifications as requested by the Board of Regents. There are three modifications one of which the Regents did not quite request in that form. (See EXHIBIT B of 2-10-81 minutes.) That is the Operational Base Adjustment. The request that came into the Executive was for $1,200,000 for the first year and $1,300,000 for the second year for all the units. He stated that they cut them about in half and put them in a pool of base adjustment money. This recommendation by the Budget Office is for $750,000 per year and would be distributed by the Regents.

MONTS (Montanans on a New Track for Science)

GLEN LEAVITT stated that they are requesting $200,000 for FY 82 and $300,000 for FY 83. It is a program to get Montana up to par with other states in research. The National Science Foundation gave a grant to the units for $2,350,000 for five years. The systemwide request is for Library Acquisitions. This was first put forward as a request for $1,400,000 for the first year of the biennium and the Regents changed it to $700,000 for each year of the biennium.

JAMES MICHELOTTI, Director of Computer Services, gave the requests in addition to the Regents for Montana Tech. (See EXHIBIT C of 2-10-81.) He discussed the handout in regard to their computer request. (EXHIBIT A) There are close to 900 students using the computer out of 1,700 students. He stated that they had looked at all the alternatives, the first being that they could get service outside, either from the State of Montana or at Bozeman. That works for single shot types but not very well for a student. About one year ago there were from 25 to 30 students who had to use some sophisticated engineering research application and now there are over 200 who need to use this. In order to take care of the need we have requested an add-on to our existing computer. The computer they presently have is the PDP 11/70 there are over 50 terminals running off this. The add-on they are requesting is called a virtual machine. It has capability of handling engineering and research jobs.

MR. MICHELOTTI stated that in the budget they were given a certain amount for 1983. The problem exists right now and

somehow a solution to this problem must be found. He stated that they were given $177,000 in the Executive budget for the computer and based on their estimates that is not enough. They will need somewhere around $17,000 for FY 82 and $320,000 for FY 83 for this computer in order to get it. He also stated that the need for the computer is not due to the new science degree granted by the Board of Regents. It is needed because of the research and engineering at Montana Tech,

DR. VERNE GRIFFITH, Director of Research discussed the modified request in addition to the the Regents for an X-Ray Diffractometer. (See EXHIBIT C of 2-10-81 minutes.) The equipment they now have was purchased in 1948 to 1951. It is unreliable. Since 1948 there has been a great concern with radiation safety. This equipment is not fit with today's standards. This equipment is not what the graduate will encounter when he goes to work. (EXHIBIT B)

CHAIRMAN DONALDSON asked what was an X-Ray Diffractometer used for.

DR. GRIFFITH stated that is is used to tell us about crystal structure.

SENATOR JACOBSON asked how many students are involved in these courses.

DR. GRIFFITH stated that there are ten seniors in metallurgy.

COMMISSIONER RICHARDSON gave an overview of the modifications recommended by the Board of Regents and the other special issues. (See EXHIBIT A of 2-10-81 minutes.) The first special issue is the revenue estimates built into the LFA's recommendation. Several of the colleges and universities feel that those estimates are too high. Particularly on the other funds. A lot of the revenue estimates are heavily dependent upon federal funding of contract research. He stated that they are concerned about cutbacks in federal programs.

COMMISSIONER RICHARDSON stated that the second special issue is the enrollment projections. Some of the campuses are not in accord with the estimates made by the Commissioner's Office and by the LFA. This is related to the contingency fund. They are concerned that if this committee does develop relatively conservative estimates then the committee would need to consider being a little more liberal with the contingency fund.

The third special issue is indirect costs. And the fourth is computers. The Regents approved three new computers. Eastern is requesting $551,000 for a new main frame computer. Montana

Tech is requesting $337,000. University of Montana is requesting $364,000 and Western is requesting $7,250 for a printer. (EXHIBIT B)

DR. IRVING DAYTON gave a presentation of the MONTS PROGRAM (Montanans on a New Tract for Science) which the Board of Regents have recommended. This modification is directed at the need for continuing state support to develop research in the University System. The National Science Foundation gave them a grant for $2,335,000 over a period of five years. The basic idea is to use it as a developmental program. This amounts to seed money to get people started and is not aimed at long-range support. They are asking for $200,000 for the first year and $300,000 for the second year. Once these people are able to move out on the national scene and compete they can bring back additional grants and additional equipment.

DR. GARY STROBEL from Montana State University spoke in support of the MONTS PROGRAM. He stated that if they don't get the funding the program stops in 1981.

Testimony was given in support of the MONTS PROGRAM by:

Dr. Gary Strobel, Professor of Plant Pathology; Mel Ryan, Vice President of the Montana Power Company; Leland Walker, Chairman of the Board of Northern Testing Laboratories (EXHIBIT C).

CHAIRMAN DONALDSON asked if we are talking about an act of faith on the part of the state or a committment on the part of the state relative to the match.

DR. DAYTON stated that they are. They put together a proposal that had a scientific plan in it. The foundation put a limit of $3,000,000 on the five-year plan. They made a criteria in putting these proposals together; a "state committment" to the program. He stated that they felt that they should as foundation money tails off be building in state support and maintain the intent of the program. He also stated that they thought they would start and move it up year by year so it can be built in. Their proposal was accepted in the context of this proposed match.

CHAIRMAN DONALDSON asked if it is funded for $200,000 for FY 82 and $300,000 for FY 83 if it will reflect higher amounts in future years.

DR. DAYTON stated that yes, it reflects a $400,000 to $500,000 match the following biennium. That biennium would complete this program. He stated what they would like, the budgeting formula does not recognize; that is research. They would like in a long run to have some state support for this project as the National Science Foundation drops out.

CHAIRMAN DONALDSON asked if there would be any spin off for the other campuses.

DR. DAYTON stated that it would in a couple of ways. The competition is not only open to academic scientists, it is open to any scientist in the state.

REP. BENGTSON asked if they cooperate with industry.

DR. DAYTON answered that it is accessable to people in government and private business. When they developed the proposal they sent notices all over the state and got back 112 proposals from individual scientists.

REP. BENGTSON asked if the non-state scientists provide any of the matching funds.

DR. DAYTON stated no, at this point none was proposed for funding. This is looked upon as a state program to develop a state resource.

COMMISSIONER RICHARDSON stated that the second modification is for Library Acquisitions for $1,400,000.

Testimony was given in support of the LIBRARY ACQUISITIONS by:

Donald Habbe, Academic Vice President at University of Montana (EXHIBIT D); Elizabeth Morrissett, Head Librarian at Montana Tech (EXHIBIT E); Paul Dunham (EXHIBIT F); Ellen Newberg, Head of Technical Services (EXHIBIT G); Randall Collver, Professor at College of Great Falls (EXHIBIT H).

PRESIDENT VAN de WETERING spoke with regard to the modifications for Eastern Montana College. The Washington Library Network (WLN) proposal is for $368,000 for the biennium. For the first year it is for $221,000 and the second year it is $146,000. This is a proposal of all the units which benefits the entire system. It will provide membership in the WLN and the hardware to function as a member. It is not a substitute for a continuing acquisitions program. Individual collections will still be maintained. But it does provide an opportunity to share the resources of all the libraries within the system. He stated that they have talked about this problem for a long time. Their need is to share the resources

of the University System across the state. The three major areas of opportunity are: (1) link all libraries together so we can use them to a maximum advantage; (2) we will be able to selectively acquire collections and carry the acquisition budgets farther; and (3) there is real efficiency in economy in the technical side of the library.

COMMISSIONER RICHARDSON stated that there is a group called "Friends of Higher Education" who are concerned about the University System. Two of whom are present and would like to testify. They are Bill Schmidt from Helena and Ian Davidson from Great Falls.

BILL SCHMIDT gave his testimony with regard to the faculty salaries. Recently the University of Montana was involved in the review of their programs by by accreditation teams and the study by that team indicated that there should be at least six to seven faculty added to the University of Montana. Approximately 50% of the faculty members should be PHDs. There are approximately 200 PHDs coming out of the educational pipeline each year and there are 1500 jobs available.

IAN DAVIDSON gave testimony in regard to the University and the MBA (Masters of Business Administration).

PRESIDENT BOWERS gave his presentation in regard to the MBA modification for Eastern Montana College. Currently the University of Montana offers two MBA programs, one in Missoula and one at Malmstrom Air Force Base which is totally funded by the Air Force. There is evidence of a strong demand for a MBA program in Billings. The most effective way in which to offer that program in Billings is to use the combined resources of the University of Montana, Eastern Montana College, and Montana State University. (EXHIBIT I)

PRESIDENT VAN de WETERING gave his presentation for the MBA program. He stated that there has been a growing interest in Billings for this program. He stated that they surveyed all the graduating seniors and found that 56% had high interest in Billings for this program. In addition to that they have started a survey within the community and again find a high sense of need. The number of people who showed interest in the program is 203.

PAUL BLOMGREN, Dean of Business Administration for the University gave his testimony. He stated that Larry Jones, Academic Vice President at Eastern informed him that there was a strong demand for an MBA program in Billings. He stated that they put the program through the Board of Regents and they passed it.

MR. BLOMGREN stated that the degree would be offered by Billings. They would use the faculty from Eastern and Montana State University on a time release basis. Eventually the program will have to have four or five full-time faculty members. He stated that he checked how much computer time they use for the MBA Program (Masters of Business Administration) at the University of Montana and figured they would use the same amount at Billings.

CHAIRMAN DONALDSON asked why we don't just improve the situation at Missoula and if there were advantages he was not aware of taking it to Billings.

MR. BLOMGREN stated that his understanding was that in the surveys made by Mr. Jones approximately 90% who wanted the degree are already employed in Billings.

COMMISSIONER RICHARDSON stated that the last special issue he wanted to discuss was for the allocation of repair and maintenance funds. (EXHIBIT J) The LFA is recommending $1,090,000 for the first year and $1,188,100 for the second year. The Interim Finance Committee took the position that while this money should be built into the budget the Commissioner's Office should come up with a recommended approach for allocating this money to the six universities. He stated that they have done that using a distribution based on gross square footage for the state supported buildings. This does not take into consideration such factors as lawns, roads, parking lots, etc. Each President has agreed with this distribution and is presented to you at this time.

REP. KEN NORDTVEDT gave his testimony in support of the indirect costs that were incurred while doing research at Montana State University. He suggested that perhaps 85% of indirect costs should stay on campus and be earmarked for paying the legitimate indirect costs and maybe 15% sent to the state.

TOM NOPPER, Director of Administration at Montana State University discussed the indirect costs. (EXHIBIT K)

RAY MURRAY, Vice President of Research at the University of Montana gave his testimony in regard to indirect costs.

CURT NICHOLS stated that the total indirect costs for the systems projected for 1982-83 were $2,800,000.

DR. VERNON GRIFFITHS, Director of Research at Montana Tech discussed three points about indirect costs. First the validity of the indirect cost projections for the next biennium. At this time the prognosis is that there will not by any MHD research of the Department of Energy. He stated that if there are severe cuts made it looks like they won't come close to the projections. He asked the accountant what they might recover from signed contracts and based on that their recovery is about $79,509.

Meeting adjourned at 11 a.m.

REP. GENE DONALDSON, Chairman

pb

2-12-81

The Computer Center at Montana Tech is one of the busiest and heaviest used facilities on campus. On any weekday during the academic year approximately one-half of the total student body will use the computer. Tech's Spring Semester/1981 course offering include over 20 courses that teach computer concepts. In addition to regularly scheduled day classes, computer courses are taught on every weeknight except Tuesday. These evening courses are heavily attended by local business people, teachers, etc. who are beginning to utilize computers in their work. Needless to say, the computer is an integral part of a students education today especially an engineering student's. However, on Tech's campus this was not always the case.

In the early-to-mid 1970's Tech had less than 5% of its total student enrollment utilizing the computer (Illustration 1). At that time a representative group of Tech's instructors, administrators and researchers, called the Computer Committee, was assigned the task of improving the Computer environment on campus. A detailed study resulted, specifying needs, objective, goals, etc. In January of 1976, after over a year and a half of efforts by this group, a new academic oriented computer arrived on campus. The main selling point of the computer was that it would provide hands on experience to the student via computer terminals. The machine cost $106,000.00, was equipped with 3 terminals and according to the vendor could be expanded to handle the needs of Tech campus for at least 5 years.

Fortunately, the vendors promises were true. On the fifth anniversary of this machine's arrival, January 1981, the machine has grown to support 45 terminals (Table 1, lists on and off campus terminals).

Terminals are located in most every building on campus and several departments (Mining, Computer Center) have more terminals today than came with the original machine. Today, Tech has approximately $250,000.00 worth of equipment. The machine still has some room for expansion and probably will continue to serve the college for at least 3 to 5 years.

Tech has seen one major change in its computer usage over the past 5 years and this is the main reason for this paper. Tech's present computer is a mini-computer, a very powerful mini-computer, which is very good at handling many simple jobs at the same time. Until recently, the majority of users of the computer were the novice type, with simple requests. However, the novices are now becoming sophisticated. Tech's present computer cannot handle sophisticated large jobs. The problem is especially noticable with the engineering users and in Research activities. Engineering sophisticated computer usage has grown more rapidly than that of any other group of users. (Illustration 2). The applications that engineers run on computers, such as simulations, and models are very sophisticated and will not run on Tech's present computer. Almost every engineering department on campus is making complex use of the computer. As of this writing, Mining, Petroleum, Environmental, Metallurgy and Engineering Science people are at a standstill with computer applications beyond the capacity of Tech's existing computer. These applications are practical, every day activities that todays modern engineers are using on the job. This situation has been building. A year ago, only one department had this problem. Today, there are five departments with

approximately 130 to 200 students effected.

There are 2 possible solutions to this problem. The first, which has been attempted, is to purchase computer service from an organization which has this computer capability (Dept. of Ad - Helena, MSU). The cost of providing computer solutions to sophisticated engineering problems through contracted services is expensive and has resulted in one time shots which in a student educational environment is impractical.

The second alternative is to enhance the present computer resources to handle this type of activity. Tech's present computer is modular in design with tremendous expansion capability. However, it cannot handle without some assistance, large sophisticated jobs. The key words here are "without some assistance." This solution then is to couple Tech's existing computer with one that can handle these jobs (Illustration 3). The computer that handles sophisticated jobs (labeled Virtual Machine) is a stand alone computer that can run independently of Tech's present Computer (PDP 11/70). This solution would enhance Tech's present operations and permit it to handle complex engineering applications. Tech's present computer would continue to handle all users. The PDP 11/70 would determine whether or not a users request needs its own services or the services of the new computer. This concept of connecting computers is called "Networking."

Montana Tech and its people have worked very hard over the past 5 years to provide state of the art computer concepts, tehcnology and

equipment. The Computer Center at Tech is serving the college very well. In order to continue to do so the addition of the Virtual Machine is a necessity. Thank you for your time. Please feel free to call me if you have any questions. (496-4271).

James F. Michelotti
Director of Computer Services

JFM/ms

ILLUSTRATION 1

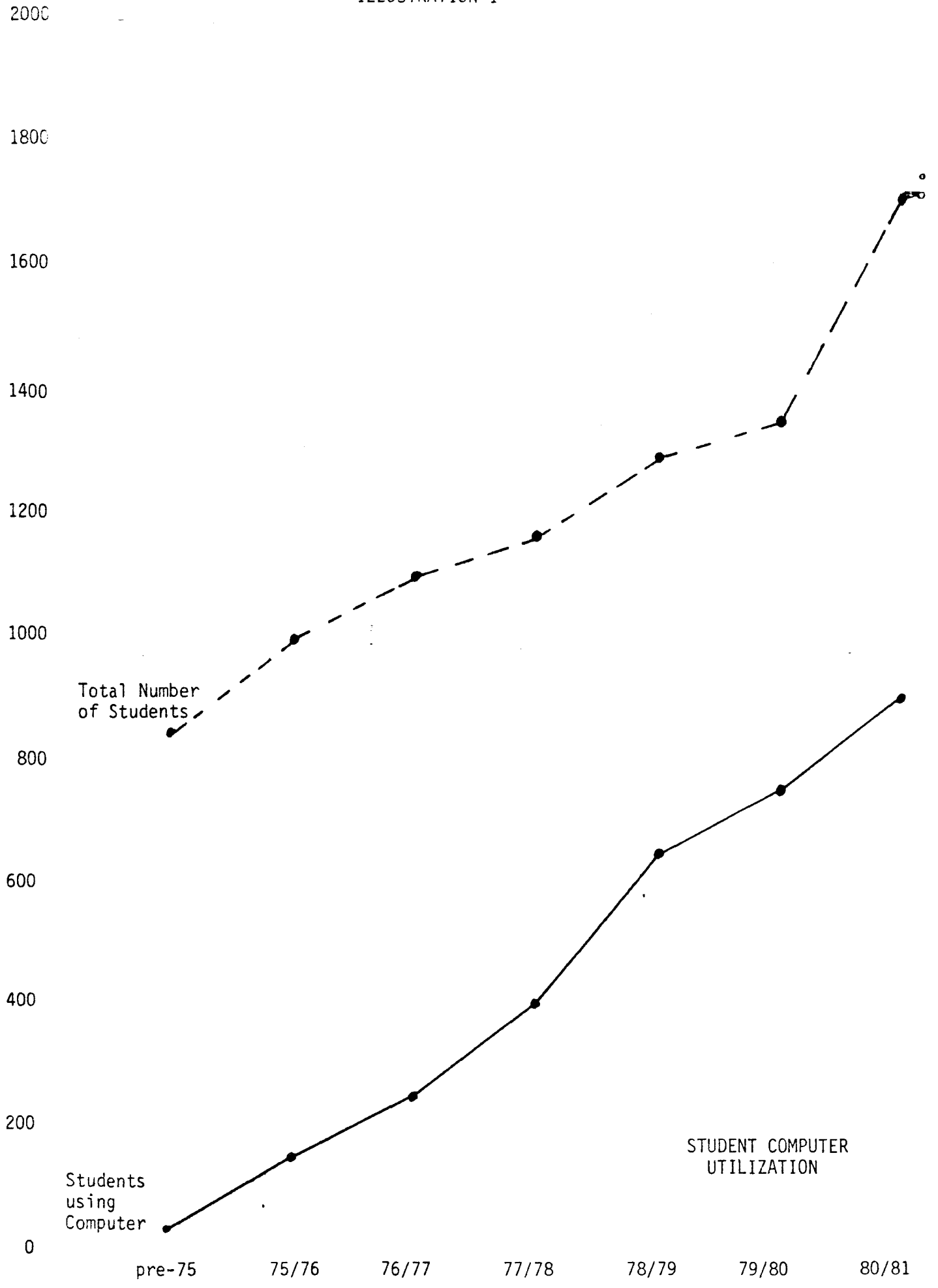


TABLE 1

TERMINAL DIRECTORY

ON CAMPUS:

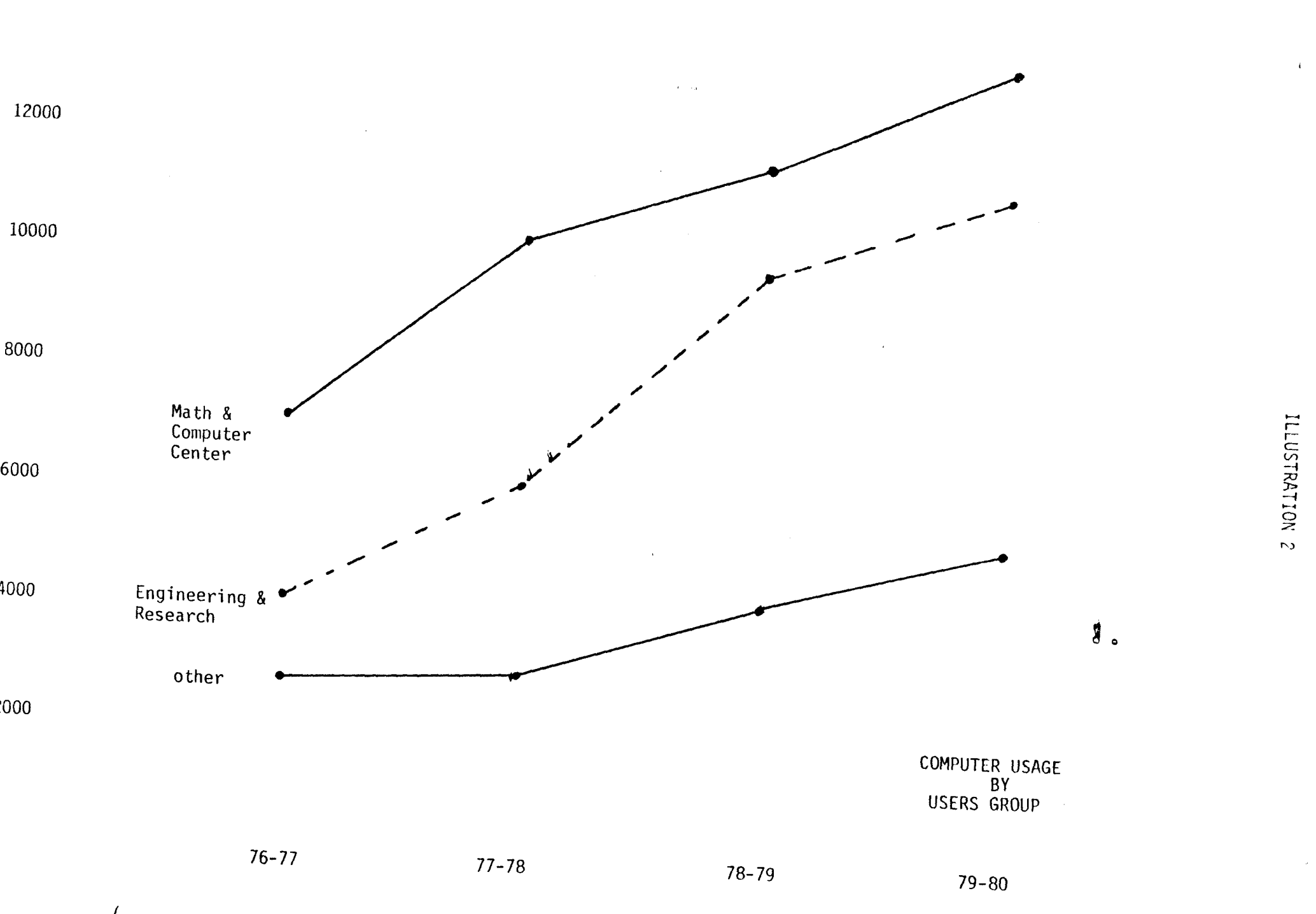
DEPARTMENT	TERMINAL TYPE	BUILDING/ROOM
ADMINISTRATION	1 LSI ADM 3-CRT	MG/109
BUREAU OF MINES	1 DECWRITER II	Main/330
	1 DECWRITER III	Main/220
	2 TEKTRONIC 4025 CRT	Main/330
	1 DEC VT100 CRT	Main/330
BUSINESS OFFICE	1 LSI ADM 3-CRT	MG/208
COMPUTER CENTER	6 DECWRITER II	MG/110
	1 DECWRITER III	MG/110
	1 DECWRITER II	MG/109
	1 DEC SCOPE VT50 CRT	MG/110
	1 TEKTRONICS GRAPHIC 4027 CRT	MG/110
	1 TEKTRONIC 4006-1 CRT	MG/110
	1 LSI ADM-3 CRT	MG/110
	1 Intertec Intertube CRT	MG/109
DEVELOPMENT OFFICE	1 Intertec Intertube CRT	Lib-Mus/207
ENVIRONMENTAL ENG/OSHA	1 DECWRITER II	Pet/10
LIBRARY	2 DECWRITER II	Lib/208
	1 LSI ADM-3 CRT	Lib/209
MATHEMATICS	1 DECWRITER II	Main/114V
	1 TI SILENT 700	Main/114B
MET. & M.P.	1 DECWRITER II	Met/016
	1 DECWRITER II	Met/115
MINING	1 DECWRITER II	MG/104D
	1 DECWRITER III	MG/104D
	1 TEKTRONIC 4006 CRT	MG/104D
	1 TEKTRONIC GRAPHIC 4027 CRT	MG/104D
PETROLEUM	1 DECWRITER II	Pet/10
	1 LSI ADM 3 CRT	Pet/10
PHYSICS	1 DECWRITER II	Pet/204
REGISTRAR	1 LSI ADM-3 CRT	MG/210

TABLE 1 (continued)

TERMINAL DIRECTORY

OFF CAMPUS:

DEPARTMENT	TERMINAL TYPE	BUILDING/ROOM
Butte-Silver Bow	1 DECWRITER II	Courthouse
	1 LSI ADM-3 CRT	Courthouse
Mineral Research Center	1 DECWRITER II	Ind. Site
National Center for Appropriate Technology (NCAT)	1 DECWRITER II	Continental Dr.
	1 LSI ADM 3 CRT	Continental Dr.
Poole, Dr. M.	1 DECWRITER II	Home
School District #1	1 NCR 299	Butte High School
St. James Hospital	1 LSI ADM-3 CRT	Butte, Mt.

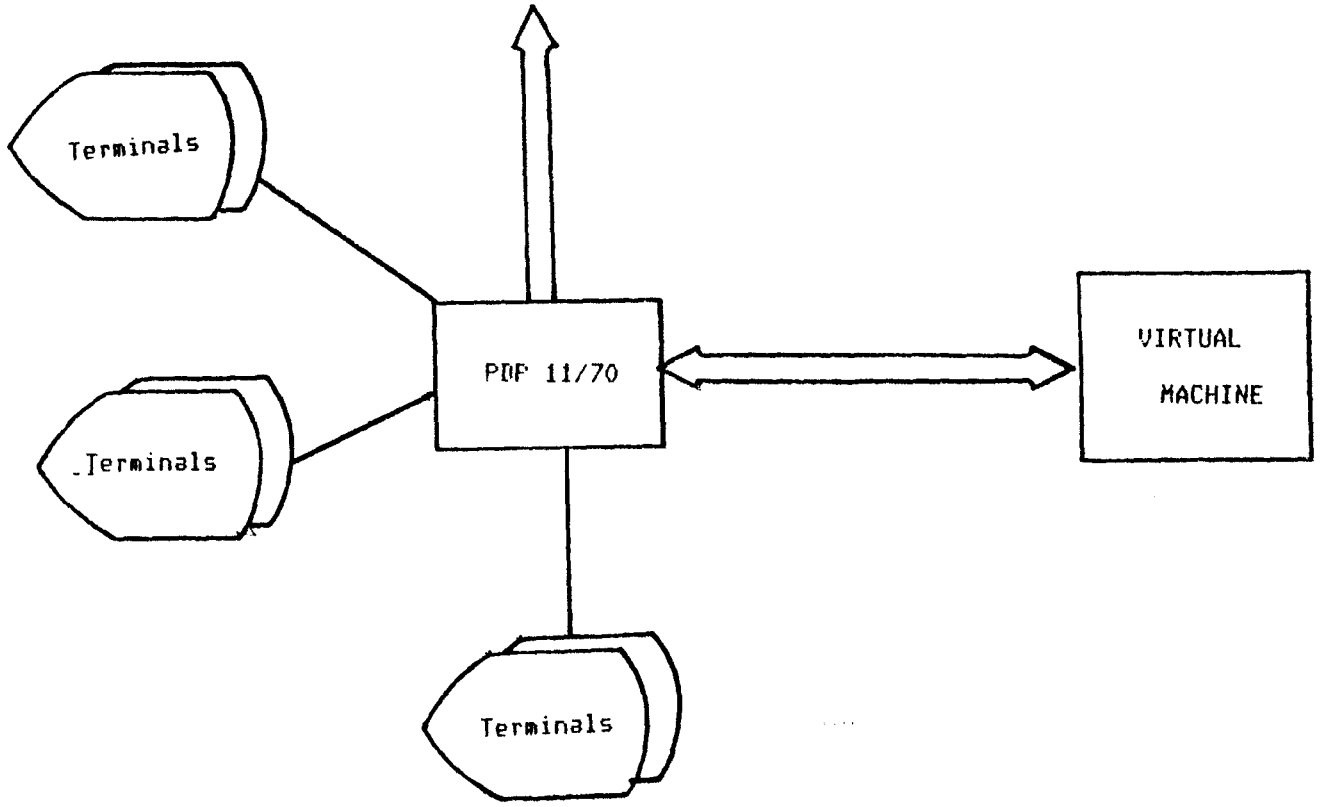


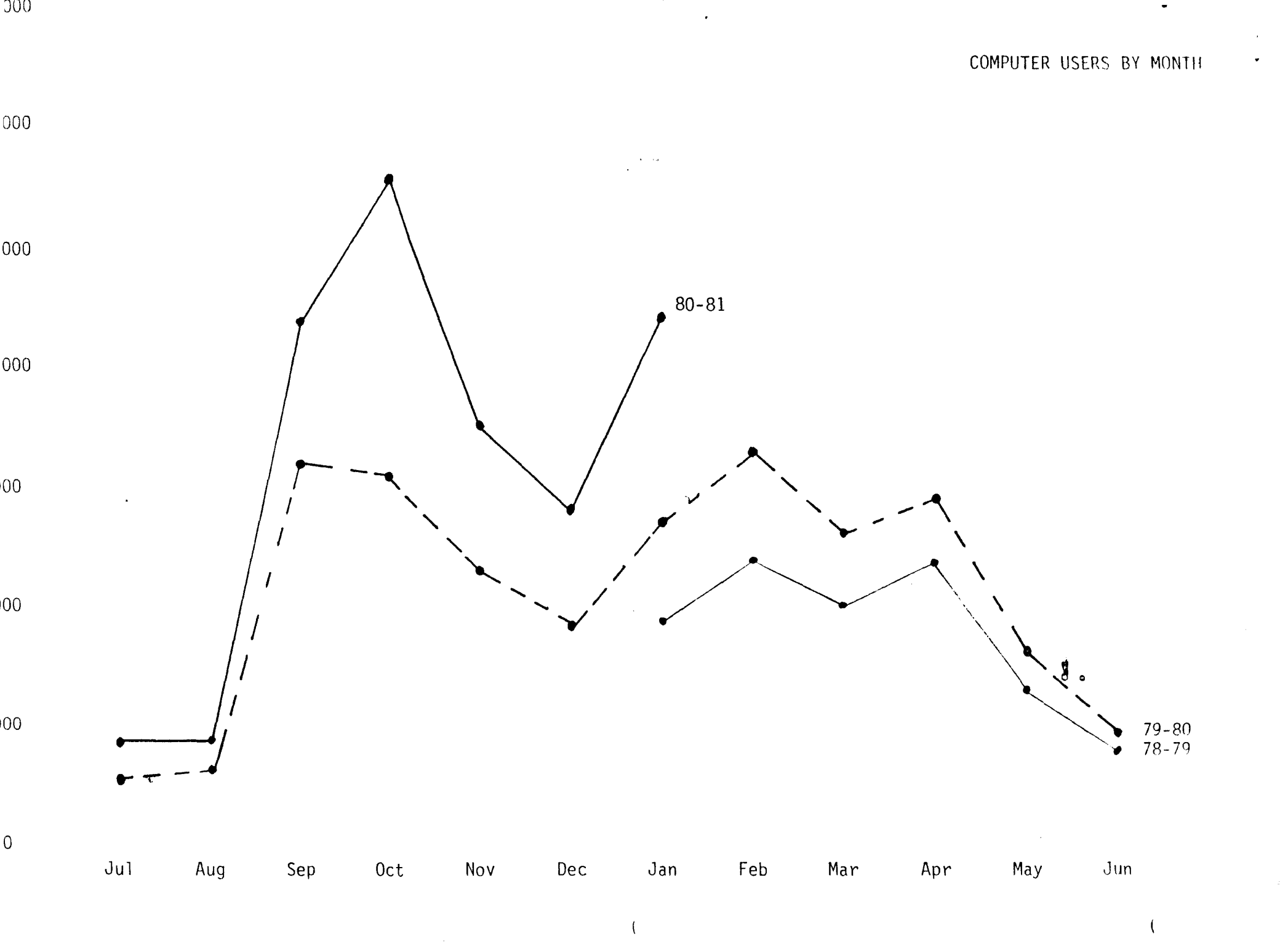
COMPUTER USAGE
BY
USERS GROUP

ILLUSTRATION 2

ILLUSTRATION 3

UNIVERSITY SYSTEM NETWORK




COMPUTER USERS BY MONTH
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80-81
79-80
78-79
Jul
Aug
Sep
Oct
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Mar
Apr
May
Jun

Personnel

Instruction:

Computer Science - - - - - - - - - - -		Math	6
Engineering - - - - - - - - - - - - -		Mining	3
		Met & M.P.	4
		Osha & Env.	3
		Physics	3
		Chemistry	2
		Geology	1
		E.S.	1
		Petroleum	2
Arts & Science - - - - - - - - - - -		H.S.S.	2
		SUB TOTAL	27

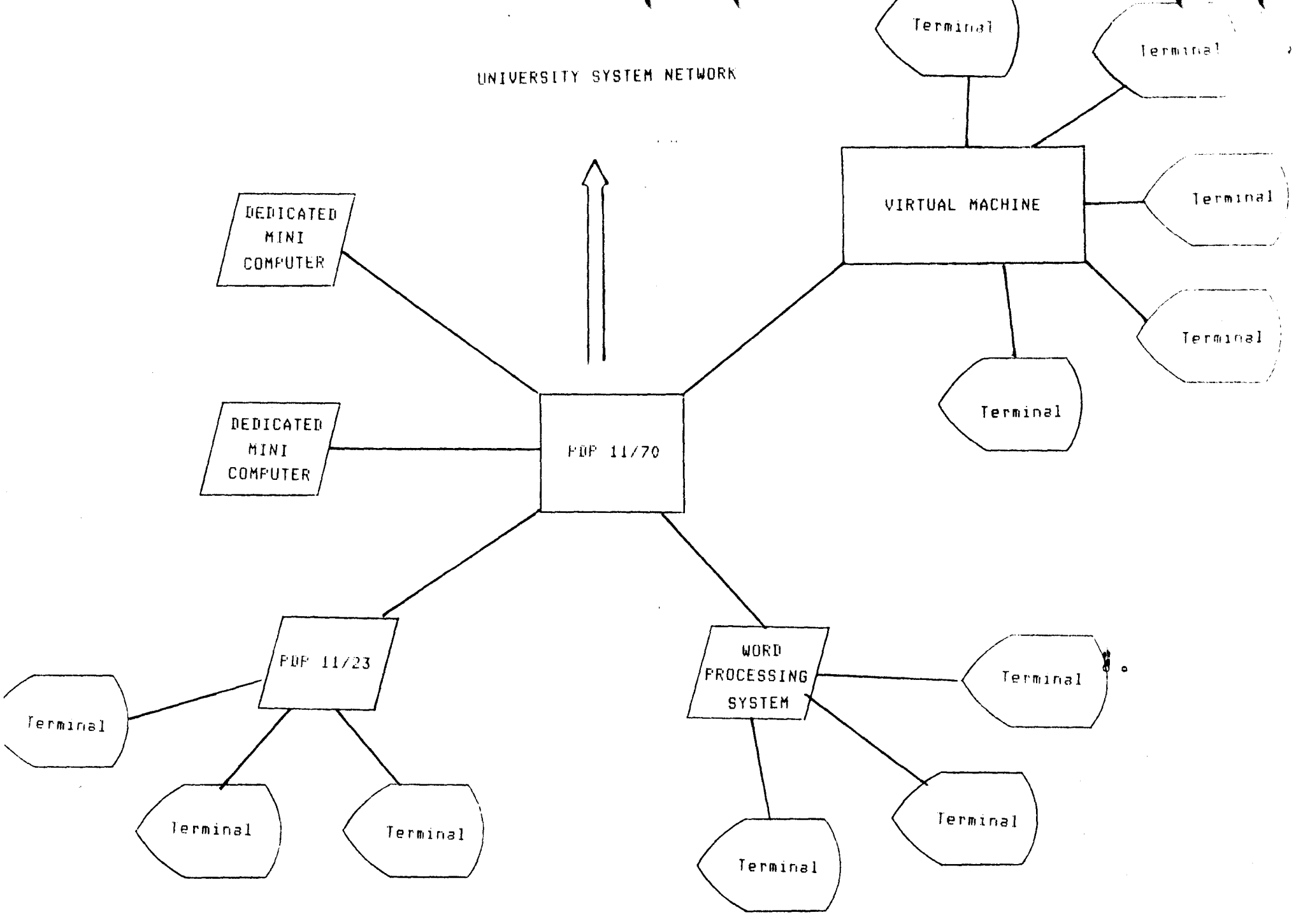
Administrative

Computer Center	2.5		
Bureau	1.5		
SUB TOTAL			4
		TOTAL	31

Computer Courses Evolution

		Credits
1963 - 65	Physics 305	1
1967 - 69	Physics 426	1
1969 - 71	Math 227	1
	Math 426	1-4
	Math 480	1-5
1975 - 76	Math 140	2
	Math 227	2
	Math 228	3
	Math 250	1-5
	Math 480	1-5
1980 - 81	C.S.	Proposed Computer Science Degree

UNIVERSITY SYSTEM NETWORK



As Students Flock

to Computer-Science Courses, Colleges Scramble to Find Professors

e its rise by 20 pct. a year at some institutions, while industry lures graduates with heft

Jack Magarrell

e ollments leveling off, hter, and graduates jobs, computer science ving more success than it

d r computer scientists eater than the supply, ac- sti ate.

computer-science rapidly—by 20 per cent at some institutions.

ro industry are grabbing th alary offers that have 0 per cent in the past three

of culty members in the u versities to scramble d part-time teachers.

ity regon, enrollment nc courses is up 34 per ago.

looding into computing," H letniemi, head of Or- nt computer and infor-

r-science departments ry e says, "as much as af re temporary or part- nly way we can deal with

i s s his department has ll-time faculty members embers hired on a part- y l sis.

rs, e has been looking people—consultants or vate industry—who have te science and might be cl s.

Teaching

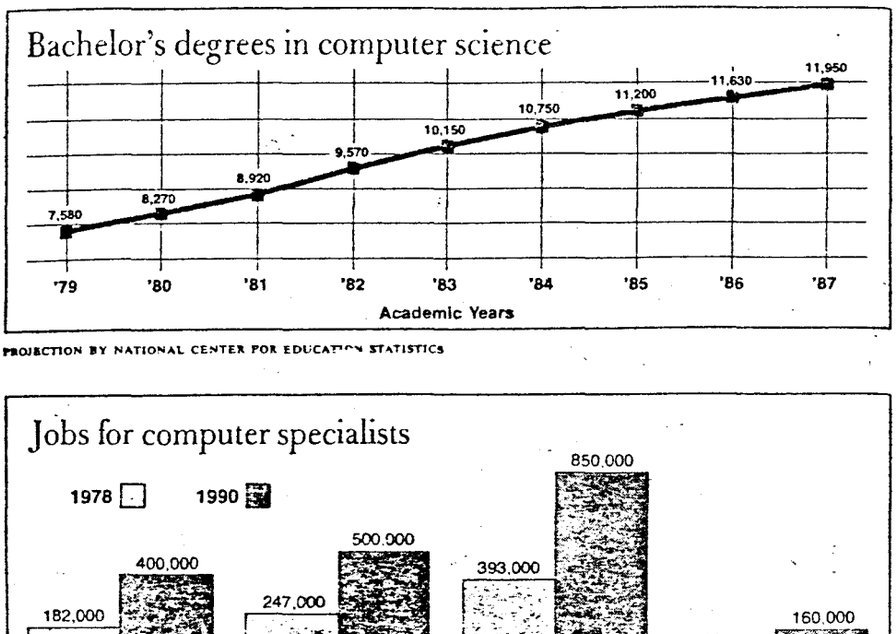
sc ntist on the Oregon Wang, left last month to job with General Tele- tro ics Corporation at he received as an r.

Oregon with a faculty ff lt to fill, Mr. Wang of the National Science e with him the $22,000 00 esearch grant he re- iversity.

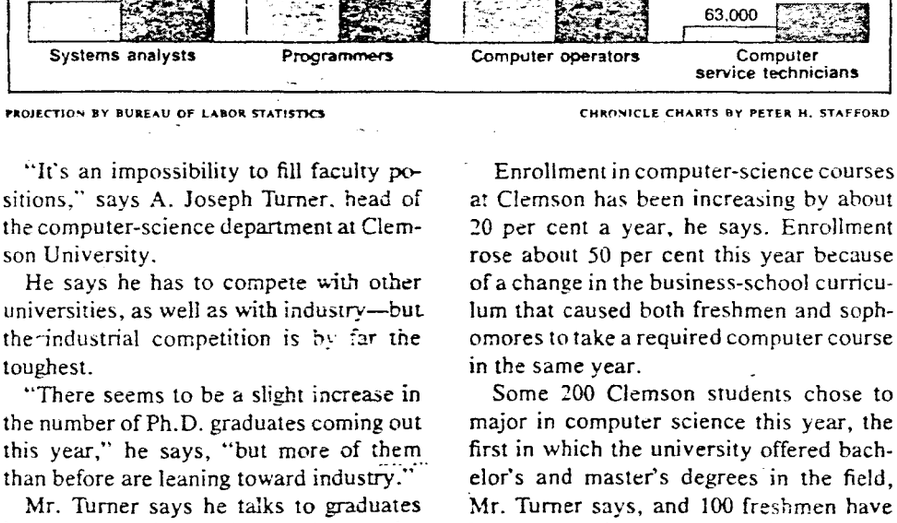
ys his job at the G.T.E. ham, Mass., will allow my time and effort for the fall quarter at Or- ught two classes, each hours a week for four of the classes had 120

pulation has increased s decreased," he says. emendous."

e also received job of- ial Business Machines national Telephone and Texas A&M Uni- ty of Brown Co-



PROJECTION BY NATIONAL CENTER FOR EDUCATION STATISTICS



PROJECTION BY BUREAU OF LABOR STATISTICS

CHRONICLE CHARTS BY PETER H. STAFFORD

"It's an impossibility to fill faculty positions," says A. Joseph Turner, head of the computer-science department at Clemson University.

He says he has to compete with other universities, as well as with industry—but the industrial competition is by far the toughest.

"There seems to be a slight increase in the number of Ph.D. graduates coming out this year," he says, "but more of them than before are leaning toward industry."

Mr. Turner says he talks to graduates in computer science who say they are interested in academic jobs, but they often change their minds and accept higher-paying jobs in industry. There's no use even trying to attract the graduates who list themselves as looking for jobs in industry, he says.

'The Funds Aren't There'

In seeking more money to expand their programs and compete with industrial salaries, Mr. Turner says, computer-science departments run into stringent budget limits—set by either the university or the state—that were based on an earlier expectation of little or no growth.

"We're in a period of rapid growth and the funds aren't there," Mr. Turner says.

Enrollment in computer-science courses at Clemson has been increasing by about 20 per cent a year, he says. Enrollment rose about 50 per cent this year because of a change in the business-school curriculum that caused both freshmen and sophomores to take a required computer course in the same year.

Some 200 Clemson students chose to major in computer science this year, the first in which the university offered bachelor's and master's degrees in the field, Mr. Turner says, and 100 freshmen have been accepted as computer-science majors for next fall.

"Before it's over we may be one of the two or three largest majors on campus," he says.

At the University of Illinois at Urbana, the number of company recruiters looking for graduates in computer science increased from 35 in 1971-72 to 60 in 1975-76 and 196 in 1979-80, according to David R. Opperman, placement director for the college of engineering.

The College Placement Council reports that the average monthly salary offered to new graduates with bachelor's degrees in computer science rose from $915 in 1974 to $1,123 in 1977 and $1,558 in 1980. That's an increase of 70 per cent in six years.

> "Students are flooding into computing. As much as one-third of the staff are temporary or part-timers; it's the only way we can deal with it."

In coming years, the lu higher salaries may attra dents to computer-scien forecasters have anticipa

Projections by the fede National Center for Edu show the number of stu each year with bachelor's puter and information s from 7,580 in 1979 to 11, yearly increases averagi

Employment to Double by

Computer science will of study for a growing sh during the 1980's, acco projections. In 1970, or thousand bachelor's degr puter science. That share thousand last year. By 1 thousand bachelor's degr U.S. are expected to be ence. By 1988, it will be el thousand, according to t tistics center.

The Bureau of Labor ployment projections sc lication this spring, estim ment of computer spec than double between 197

In that period, says Pa bureau's occupational-o jobs for systems analysts increase by 120 per cen programmers, by 102 per for computer operators, to 850,000; and for comp nicians, by 154 per cent

One consulting organ mated that the number grammers hired by empl per cent in 1979. Comp with the previous year, tems programmers—the responsibilities than co mers—was up by 35 per tems analysts—who pla work of systems progra puter programmers—by

Demand Up 25 Pct. This Y

The demand for profes the computer field will i than 25 per cent this y a survey by another con tion.

John W. Hamblen, cha puter-science departme sity of Missouri at Rol in 1978 American college were turning out only a number of graduates ne elor's-degree level, less the number needed at th level, and less than o needed at the doctoral l

California was the s mate Ph.D.'s in comp ned. Mr. Hamblen produced

Computers

Continued from Preceding Page

Ph.D.'s it needed, followed by Maryland with 73 per cent and Iowa with 61 per cent.

"No state is even close to producing its need" at the bachelor's- and master's-degree levels, he says.

Two-year colleges and vocational schools in some states were producing more computer specialists than were needed, but problems of oversupply at that level were avoided because of "the severe shortage at the four-year level," Mr. Hamblen says.

A Massachusetts-based computer company, Wang Laboratories, has attempted to ease the problem of finding specialists in software engineering by setting up a new graduate school just for that purpose.

The Wang Institute of Graduate Studies, located in Tyngsboro, Mass., was established as an independent, nonprofit graduate school with a $3-million gift from the family of An Wang, president of Wang Laboratories. The first classes in a program leading to a master's degree in software engineering began last month.

NSF Study

The National Science Foundation's latest national survey of science and engineering personnel found that between 1976 and 1978 employment of computer specialists rose by 30 per cent. The only other science category in which employment increased during that two-year period, according to the study, was environmental science, with a growth of 20 per cent.

The study also found that:

▶ Four out of five computer specialists found jobs closely related to their degrees, compared with about one out of seven for graduates in mathematics and the social sciences.

▶ Employment of computer specialists in colleges and universities increased by more than 25 per cent between 1976 and 1978. The number of bachelor's degrees granted in computer science also increased by more than 25 per cent in that period.

▶ The number of computer specialists employed in the U.S. grew by 3.7 per cent between 1974 and 1976; in the following two years it grew at nearly 10 times that rate.

▶ The 234,000 computer specialists employed in 1978 included 40,600 women. Only 600 computer specialists—100 of them women—were unemployed and looking for jobs in 1978, according to the N.S.F. report.

▶ Of the employed computer specialists in 1978, only 17,900 were in academic posts, compared with 173,000 in business and industry, 14,600 in the federal government, and 26,800 working for various other kinds of employers.

▶ The number of employed computer specialists with doctoral degrees more than doubled between 1973 and 1977—from 2,697 to 5,767.

Universal Access to Personal Computers Is Urged for College Students, Professors

By Jack Magarrell

Richard M. Cyert wants all students at arnegie-Mellon University to have their own personal computers, no matter what their field of study.

Mr. Cyert, who is Carnegie-Mellon's esident, is working on a plan that within five years would require each student to urchase a personal computer, perhaps ith the aid of university loans. A program o provide a computer terminal for every faculty member at Carnegie-Mellon is aady under way.

Mr. Cyert's plan is one of the more dramatic examples of a move toward universal student and faculty access to computs. Among the others:

▶ At Northern Illinois University, a proposal to stop students from connecting eir personal computer terminals to the iversity's main computer raised a flurry of protests from students who had invested as much as $2,000 each in such equipment.

▶ Stanford University reported last fall at it was equipping its deans and other top administrators with computer terminso they could communicate with each er electronically.

▶ At Dartmouth College, an early leader in offering all undergraduate students cess to computers, terminals are available for use by students from 7 a.m. to 3 a.m. Dartmouth's Kiewit Computation Center has placed about 400 computer terminals on campus, and as many as 263 can be operated at any one time. They are shared by 3,000 students, whose college identification numbers permit access to the computer and also serve as an account number for allocating computer time.

JEROME N. MC CAVITT

President Richard M. Cyert hopes that, within five years, all students at Carnegie-Mellon University will be required to have computers.

▶ At the Massachusetts Institute of Technology, Fernando J. Corbato, director of computing and telecommunications resources, predicts that within 10 years every member of the faculty and professional staff who wants one will have a "personal computer of significant potency."

When Carnegie-Mellon's President Cyert talks about requiring personal computers, he doesn't mean little handheld calculators or even the Apple or Radio Shack devices sold for home use. He means computers equal in power and memory capacity to units that today cost about $150,000 and require a pickup truck to carry around.

Within five years, Mr. Cyert contends, personal computers approaching that ca-

Continued on Page 14, Column 1

Computers

Continued from Page 1

pacity will be small enough for a perso to carry and will cost only $2,000 to $4,000. Low-interest university loans could be offered to help students buy their computers, he says.

In preparation for the day when personal computers become a general requirement, officials at Carnegie-Mellon are studying how personal computers would affect educational programs and costs.

In an interview, President Cyert said that the fine arts probably would be the "most marginal" area for personal computers, but he immediately began to cite exceptions: a "great need" for computers in architecture and design, possibilities for their use in music, and, in the drama department, use of computers to control stage lighting.

It may be five years before Carnegie-Mellon students are required to have computers, Mr. Cyert says, but within the next two years the university expects to complete the installation of individual terminals for all deans and department heads.

Also within the next two years, he says, terminals will be provided for each faculty member in the chemical- ering department as a first step aving a terminal for every mber in every department. ing faculty members' acters, says M.I.T.'s Mr. should be "not gadfooling around but t of the profesers to pur-

e it an enraction," be dis-

conceptual concerns can ignore it." At M.I.T., Mr. Corbato says, high priority is being given to planning a standard method of communication among the institution's many separate computer systems.

Money for educational computers is scarcer than money for research computers, Mr. Corbato says, because research contracts include computer costs. Educational computers have to compete with a multitude of other claims on the institution's general education budget.

At Northern Illinois, more than 4,000 students use computer terminals in laboratories set up for that purpose around the campus. But about 100 students do their computer work on their own terminals without leaving their apartments or dormitory rooms.

Those 100 students protested vociferously last month when a faculty committee recommended that they not be allowed to use the university computer through their home terminals.

Faculty members had complained that they were having trouble getting access to the computer because of its heavy use by students.

Student organizations argued that the proposal would not only deprive students of the use of terminals that had cost them from $500 to $2,000 each but would also force them to use already crowded facilities in the university laboratories. As a result, the committee reconsidered and ended by recommending tighter control on computer access rather than forbidding use of the home terminals.

W. John Pembroke, assistant to the

control the growth in use of Northern Illinois's computer facilities.

The number of student-owned terminals at Northern Illinois can be expected to increase in the next few years, Mr. Pembroke says, and rules will be needed to assure students and faculty members a fair share of available computer time.

New equipment installed last spring increased computer capacity at the university by 400 to 500 per cent, he says, but increased use—due in large part to a 50-per-cent growth in enrollment in the computer-science department—caused computer performance to bog down last fall.

A DISCIPLINE IN CRISIS

A Report

November 21, 1980

On July 12 and 13, 1980, the biennial meeting of Computer Science Department Chairmen was held at Snowbird, Utah. This meeting, which is organized by the Computer Science Board (CSB),* is a forum for the heads of the 67 departments in the US and Canada that grant PhDs in Computer Science. The meeting was attended by 56 department heads or their representatives, and by 6 observers from industry and government. This report was developed during the meeting as a result of intensive discussions about the crisis in Computer Science. This report was endorsed by the entire assembly.

Respectfully submitted,

Peter J. Denning, Editor
Edward Feigenbaum
Paul Gilmore
Anthony Hearn, Past CSB Chm.
Robert W. Ritchie, Program Chm.
Joseph Traub

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*The current chairman of the Computer Science Board is George Dodd, Computer Science Department, General Motors Research Laboratory, Warren, MI 48090.

SUMMARY

There is a severe manpower shortage in the computing field. It is most acute at the PhD level: the supply of new PhDs is about 15% of the demand. The crisis has been precipitated by explosive growth of the computing field with no matching growth of university budgets in Computer Science. Unless the trend reverses, we will soon lose our lead in computer technology because we cannot train enough computer experts and because we cannot conduct the basic research to ensure a continuing supply of new concepts for the long term future. Some of the symptoms of the crisis include:

About 200 new PhDs graduated in 1979 (down from 256 in 1975) as compared with 1300 positions seeking PhDs.

Fewer than 100 new PhDs sought academic positions as compared with over 600 academic positions known to be open.

Undergraduate enrollments doubled since 1975 with only nominal increase in lab space and faculty size over the same period.

Intense competition for computer specialists has produced record salaries: new MS degree holders get offers matching full-year academic salaries for new PhDs; experienced assistant professors get industrial offers as high as $45K.

To generate a greater supply of new faculty and other researchers, we need to enlarge the pool of students in PhD programs. The department heads unanimously agreed that the required environment comprises:

Computing facilities capable of sustaining experimental research. (An appendix to this report shows that this requires a capital investment, per researcher, of $30K for good facilities to $75K for advanced facilities.)

More time for faculty to supervise graduate students in research.

Increased support for graduate research assistants.

The following report elaborates these points.

INTRODUCTION

There is a severe manpower crisis in Computer Science. There are acute shortages of well trained computer people at all levels, especially the PhD level. The PhD shortage is especially serious because it threatens our ability to conduct basic research in Computer Science and to train the next generation of computer experts. Some of the symptoms manifested among the 67 PhD-granting Computer Science Departments in the US and Canada are:

> The total number of PhD Computer Science faculty in the U.S. increased from 805 in 1975 to 825 in 1979. The net gain, 20, is 1.7% of the total of 1130 PhDs graduated in the same period. Most faculty outflux is into industry, not retirement.
>
> The total number of PhD graduates, the next generation of researchers and teachers, has decreased from 256 in 1975 to 200 in 1980;
>
> In 1980, there were 1300 jobs advertised for these 200 PhDs;
>
> In 1980, fewer than 100 of these PhDs chose academic careers, and they had over 600 academic positions from which to choose;
>
> Undergraduate enrollments have doubled since 1975, while faculty size and lab space have remained nearly fixed;
>
> Classes sizes are significantly higher than in other science departments; and
>
> Experimental facilities in most departments are obsolescent and inferior to industrial facilities.

This situation seriously threatens the ability of Computer Science Departments to continue developing the skilled people needed both by our information processing industry and

by an increasingly technological society. It also threatens our ability to ensure, through basic research, a continuing supply of new concepts for the long term future.

The crisis in Computer Science results from explosive growth of the computing industry -- the "computer revolution" -- since 1975, a period in which there has been almost no growth in Computer Science laboratory facilities or in the number of Computer Science faculty.

Experimental science is expensive. Although many Computer Science Departments have long recognized the need to strengthen their experimental facilities, the required resources have not been available. The physical plant has been frozen as it was in an era when computing was much less important; budgets are not growing beyond inflation because the total pool of college-age students is apparently not growing. Some help is now beginning to appear from the federal agencies and from industry, but much more is needed.

Sixty percent of our PhDs take careers in industry. Bachelors degree holders get starting industrial salaries averaging $20K, masters $26K, and PhDs $32K; academic annual salaries for new PhDs with summer support come to about $27K. High industrial salaries lure qualified students from graduate school, thereby depleting the pool entering the pipeline and guaranteeing that the shortages will persist. Aware of excellent career opportunities, undergraduates come in droves to our departments. Eager for researchers,

industry actively recruits our faculty. Someone has said: We are eating our seed corn.

A small shortage in an expanding field would be healthy. But a ratio of 2:13 in supply to demand for PhDs is not healthy. The Computer Science crisis results from dynamic technology pulling on static universities. Some federal agencies (e.g., NSF, DARPA, and ONR) are now allocating additional resources to experimental Computer Science. We believe this to be a crucial first step. Universities have been vexingly slow in reallocating resources. Much instructional computing still relies on punched cards; many students experience long lines for terminals and keypunches. Most Computer Science Departments are seriously cramped for space. Although industry has benefited from the research and training provided by academic Computer Science, it has not, with some notable exceptions, provided financial support. Someone has said: We are killing the goose that laid the golden egg.

Students are enrolling in record numbers in our undergraduate programs. While many are attracted to Computer Science by its excellent careers, a growing number is being encouraged by the "computer revolution" to take introductory and intermediate programming courses in order to be familiar with the computer as a tool in other disciplines. The result? Existing terminal facilities and computing centers cannot handle the load. Class sizes balloon. Lab facili-

ties are insufficient. Faculty consider industrial positions.

The next section describes the nature of Computer Science. Subsequent sections present our recommendations, which we believe will improve the national research environment and ensure a supply of computer experts during the next decade and beyond.

The Nature of Computer Science

University Computer Science research provides the base of knowledge for the nation's information processing technology. Computer Science, called "informatics" in Europe, studies the representation, transformation, nature, and philosophy of information. It encompasses both theory and experiment.

Algorithms for processing information, the complexity of algorithms, the theory of computability, and models of information handling are parts of Computer Science. These parts have a strong mathematical tradition.

Applications of knowledge representation such as artificial intelligence, data bases, graphics, image processing, robotics, and automation are parts of Computer Science.

The structure of machines and software systems to process information, algorithms and processes in such systems, and the functional relations among components of such systems are parts of Computer Science. Computer Science thus studies the efficiency of implementations and experiments with them. In areas such as Very Large Scale Integrated (VLSI) design and communications, Computer Science overlaps with Electrical Engineering and benefits from cooperative work.

Computer Science studies the processes of information flow and transformation that underlie many professions, such as medicine, economics, business, social sciences, physical sciences, life sciences, and engineering. Like mathematics, it is an indispensable tool. It is a core science whose influence is spreading across all of society.

Computer Science is both a theoretical and an experimental science. In this it is similar to the physical sciences. Computer Science is also an indispensable tool in other disciplines. In this it is like the mathematical sciences.

RECOMMENDATIONS

Computer Science Department Environment

There are two steps which could significantly improve the environment in Computer Science departments. The first is better facilities for teaching and research. This includes not only local facilities, but also network connections to other Computer Science research facilities. The second step is relief from large-class teaching loads in order to permit adequate time for supervising graduate students and for research.

The capital investment in facilities per researcher can be put in three ranges. (A researcher is a faculty member, a full-time PhD student, or a member of the support staff.) For the period 1981-85, the average department requires capital investment per researcher in the range $25K to $30K. The department that wants its research to be at the frontier of Computer Science will require capital investment at a much higher level -- about $55K to $75K per researcher. The department that chooses not to emphasize the experimental side of Computer Science can get by with a capital investment of about $10K to $15K per researcher. (Appendix 1 illustrates these calculations.) In each case, about 20% of that capital investment must be added to the department's budget for maintenance and support. The total national cost to properly capitalize PhD-granting departments -- at their current number of faculty and PhD students -- is estimated

at about $50 to $75 million (see Appendix 2). Growth by 50% in the number of PhD students raises the required investment to about $90 million.

Pressures on faculty are intense. In the US, PhD Computer Science faculty have grown from 805 in 1975 to 825 in 1979 -- virtually no growth. The undergraduate student demand for Computer Science has risen at 15% to 20% annually during the same period.

Thus overburdened, faculty cannot find adequate time to conduct research or to supervise graduate students in research. This atmosphere is a strong incentive for research oriented faculty to seek positions in industrial research groups. Departments must find ways to give faculty more time for exploring new ideas with their graduate students while continuing to fulfill teaching commitments. Limiting or cutting back enrollments would be counterproductive given the societal need manifested in the rising enrollments. The only way in the long term to meet this need is to train, hire, and retain new faculty.

Departments, universities, federal agencies, and corporations all have roles in solving this problem. Departments must make hard choices within strained budgets to find more time to lessen the large-class teaching burden on faculty and to allow them to supervise graduate students properly. A special commendation goes to the National Science Foundation for instituting the New Investigator

Research Program to assist in this purpose. The government and corporations can provide financial assistance through fellowships, traineeships, and programs to build up experimental facilities.

Universities must contribute a greater capital investment for experimental research, including adequate laboratory space as in other sciences, and must increase the size of the Computer Science faculty. In general, facilities and teaching positions must be allocated recognizing the inherent laboratory nature of the field, as they are in the physical sciences and in engineering.

Students

In 1980, 200 PhD computer scientists graduated from colleges and universities in the US and Canada; this number has declined steadily from 256 in 1975. More than 100 of this total were absorbed into industry and government, leaving fewer than 100 for academia. Studies conducted by the Computer Science Board and others have revealed that colleges and universities seek 650 PhD computer scientists to meet their present educational needs, and that industry and government seek an additional 650 PhD computer scientists. The supply is about 15% of the demand. Our inability to produce the needed PhDs threatens our ability to conduct basic research and to train all other computer specialists.

Increased production of PhDs is essential.

The Computer Science Department heads agreed that the environment for educating PhDs should be the same as the environment in which the faculty conduct their research; this environment should contain facilities comparable to those in high-quality industrial research labs. Such an environment would be a significant factor in attracting and retaining graduate students and faculty alike. The facilities must have capacity sufficient to support all student research. The faculty must have time sufficient to supervise the students properly.

An appropriate experimental environment is not the only factor in attracting and retaining students; financial support is also important. There is a consensus that each PhD student should be supported by a combination of research and teaching funds at between one third and one half the starting salary of a new BS degree holder. (This starting salary in 1980 averaged about $20,000.) Although a few department have stipends close to this, most need to make adjustments to reflect recent rises in salaries.

There is a consensus that the pool of Ph.D. students can only be enlarged through an increased number of fellowships and traineeships with stipends sufficient to reduce the attraction of immediate industrial employment among BS recipients. (A $10,000 annual stipend may be required.) Both NSF and corporations can contribute to this goal.

There is also a consensus that, to increase the pool of identifiable PhD candidates, departments should increase their efforts to contact the best students in the undergraduate program. These students should be given special opportunities as research assistants to experience first hand the excitement of research.

Industry

The Computer Science Department heads noted that relations between industry and academia have improved during the past five years. They supported two proposals for further improving the quality and quantity of industrial support for Computer Science.

The Computer Science Board will act as a research clearing house to make more information available to industry about sponsored research under way in Computer Science Departments.

Although there are many philanthropic grants to universities from major corporations, few of these have come to Computer Science. In search of new funds to support students and more research time for faculty, the Computer Science Board will send a letter to major corporations. This letter will set forth the special problems of Computer Science and argue that it is in the best interests of these corporations to contribute to the solution. It will suggest

demand for these professions is rising. Unless "faculty erosion" is reversed, says the report, we will see the day when educators of computer professionals will be forced to curtail enrollments. Although it generally favors letting the marketplace remedy shortages, the report specifically recommends government intervention to help the problems of the computing profession. "We simply cannot afford to wait for the slow workings of the marketplace to correct these shortages," it says.

The NSF-ED report independently corroborates the findings of the CS Department Heads and implicitly supports their recommendations.

APPENDIX 1 -- INVESTMENT IN RESEARCH COMPUTING FACILITIES

Low Level -- $10K to $15K per researcher. For example:

One 80 char. x 24 line B&W Display with modem	$ 1.0K
5% of a small memory midi computer (e.g., VAX) or suitable microcomputer based terminal	10.0K
Share of file server (1 megabyte) plus share of low-cost printer server	1.5K
TOTAL	$12.5K

Medium Level -- $25K to $30K per researcher. For example:

8.5% of a 4-megabyte midi computer	$20.0K
Medium-resolution frame-buffered B&W terminals	2.0K
Share of local network and network interface for terminal	2.0K
Share of file server, low-cost printer server, and other miscellaneous common services	3.0K
TOTAL	$27.0K

STATEMENT IN SUPPORT OF FUNDING OF THE MONTS PROGRAM
THROUGH THE UNIVERSITY SYSTEM APPROPRIATION

My name is Leland J. Walker, and I am a civil engineer and chairman of the Board of Northern Testing Laboratories, Inc.,, a firm of consulting geotechnical and construction materials engineers headquartered in Great Falls, with offices in Billings and in three other states.

I have been involved in the MONTS Program since its inception, having been one of the two non-educators appointed to the original ad-hoc committee by the National Science Foundation. This opportunity to be a part of the effort to Stimulate Competitive Research was particularly attractive to me against the background of more than ten years as a member of the Board of the Endowment and Research Foundation at Montana State University, and as a member of several advisory committees of the National Science Foundation.

Furthermore, I am completely convinced that a continuing strong research program is essential to the well-being of our country, the State of Montana, and to each of us individually. Nationally, we must develop the processes and products to improve our productivity, to expand our energy base, to deal with environmental concerns, and to learn more about alternative materials to take the place of those being depleted or of sources which might be foreclosed to us by political considerations. Research is important to the State, as is continually being demonstrated by the work of the Agricultural Experiment Station in adopting the results of basic research to development of new plant strains, and to development of new uses of agricultural products. I need go no farther than my own firm to illustrate the importance of research on the individual level. My profession is a dynamic one, in that we are constantly pushing back the frontiers of knowledge, experimenting with new ideas, materials and techniques, to better resolve the problems you bring to us.

As we worked to develop the MONTS proposal and program plan, a new spirit of cooperation and understanding among the units of the University System and the representatives of the non-academic sector emerged and flourished, and continues to this day. Some very good things happened in the process:

1) While our major emphasis continued to be to identify individual researchers and to assist them in preparation of competitive proposals, we discovered a renewed interest and positive attitude about research, on their part.

2) We found some institutional and other kinds of barriers to a healthy research environment, and were able to remove or mitigate them.

3) We early perceived that the program could be a catalyst for, and a means to:

a) involve students with intellectual and research promise;

b) involve nationally recognized science researchers in colloquia, seminars, and consultation--not only with the researchers, but with practicing scientists and engineers in the State;

c) purchase special items of scientific equipment--with multiple use potential;

d) develop communication mechanisms to disseminate the results of the research to the people of the State;

e) provide, through this integrated system, assurance to oppropriately trained persons that there will be continuing opportunities for them in the State, and there will be a mechanism, with the attendant resources, for their continuing professional growth and development to meet the challenges of change.

Strangely enough, all of us who worked on the program would have felt that our time and effort was worthwhile, in view of the new enthusiasm, attitudes, and statewide cooperation generated, even if we were not selected for a grant from NSF! But we were--$2.4 million over five years. That's, conservatively, 100 to 150 very clean one-year jobs!

I strongly urge you to act favorably upon this request for matching funds for the NSF grant--as you do so, you will be planting the seeds which will, in the future, bear the fruit of a more productive, efficient economy for the State of Montana. My own firm, Northern Testing Laboratories, has contributed $2100 to the first year matching fund. Others have also contributed, so I am not asking something we have not done.

Thank you for this opportunity to present this statement.

Ernest J. Holden

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MR CHAIRMAN: Members of the committee.

MY NAME IS DONALD HABBE, I AM ACADEMIC VICE PRESIDENT AT THE UNIVERSITY OF MONTANA. I AM HERE TODAY SPEAKING ON BEHALF OF THE BOARD OF REGENTS PROGRAM MODIFICATION REQUEST FOR LIBRARY ACQUISITIONS IN THE AMOUNT OF 1.4 MILLION DOLLARS. ~~THUS, I AM SPEAKING~~ my testimony is ON BEHALF OF EACH OF THE SIX UNITS OF THE UNIVERSITY SYSTEM AND SPECIFICALLY THE LIBRARY ~~NEEDS OF EACH UNIT~~ at Montana State University, Montana Tech, Eastern Montana College, Western Montana College, the Rotland Regional Library at Montana State and the Montana Tech and Forest Libraries at U of M.

JUST AS EACH OF THE SIX UNITS WITHIN THE SYSTEM IS UNIQUE ~~AND PRESENTED WITH A PARTICULAR SET OF RESPONSIBILITIES~~, ALSO, EACH OF THE LIBRARIES ON THE SIX CAMPUSES HAS PARTICULAR AND SPECIAL FUNCTIONS. THESE RANGE FROM THE LARGE RESEARCH ORIENTED LIBRARIES ON TWO and services major ~~UNIVERSITY~~ CAMPUSES TO THE MORE SPECIALIZED BUT NONETHELESS important ~~CRUCIAL~~ INSTRUCTIONALLY RELATED FUNCTIONS ON THE OTHER CAMPUSES. WHILE THE SIZE AND FUNCTION ~~OF EACH~~ OF OUR LIBRARIES VARY THE ADEQUACY OF THE COLLECTION ~~IN EACH LOCATION~~ IN each campus IS CRUCIAL, IN THAT A SOUND LIBRARY IS CENTRAL TO THE ACADEMIC CORE OF EACH OF THE SIX INSTITUTIONS, ~~BOTH~~ FOR STUDENTS, FOR FACULTY, AND INDEED FOR THE HEALTH OF EACH OF THE ACADEMIC PROGRAMS. YOU HAVE HEARD MUCH IN THE LAST SEVERAL DAYS ABOUT NEW DEVELOPMENTS IN EDUCATION: THE NEED FOR MORE COMPUTERS AND STUDENT ACCESS TO THEM, OUTREACH PROGRAMS, OFF-CAMPUS PROGRAMS, CLINICALLY ORIENTED PROGRAMS. YOU WILL HEAR SOON ABOUT THE IMPORTANT DEVELOPMENT IN LIBRARY NETWORKING. AS SIGNIFICANT AS ALL OF THESE DEVELOPMENTS ARE, NONE REALLY REPLACE THE NEED FOR A SOLID ~~AND SOUND~~ CORE COLLECTION AT THE HEART OF EACH CAMPUS, ~~SUPPORTING THE ACADEMIC PROGRAMS LOCATED THERE. WHATEVER THE CHANGES IN EDUCATIONAL TECHNOLOGY, THE UNIVERSITY SYSTEM WILL ALWAYS HAVE AN OBLIGATION TO PROVIDE, AT EACH CENTER OF LEARNING, A SOUND COLLECTION FOR EACH OF OUR LIBRARIES~~.

in addition

THE REGENTS SEEK 1.4 MILLION DOLLARS, TO HELP MAKE OUR LIBRARIES WHOLE. A FAVORABLE RESPONSE TO THIS REQUEST AS WELL AS THE NETWORKING PROPOSAL AND FUNDING OF THE new FORMULA WOULD BE A VERY MAJOR STEP TOWARD THAT GOAL. I RESPECTFULLY ~~REQUEST~~ last summer's request THAT THE COMMITTEE ACT FAVORABLY ON THIS IMPORTANT ~~MATTER~~, request. Same request.

To the more [illegible]

THE LIBRARY AT WESTERN MONTANA COLLEGE NEEDS AN IMPORTANT INFUSION OF FUNDS TO ~~ELEVATE~~ raise THE COLLECTION up TO THE MINIMUM STANDARDS SUGGESTED BY THE AMERICAN LIBRARY ASSOCIATION. NORTHERN MONTANA COLLEGE HAS A NEW LIBRARY STRUCTURE BUT FINDS ~~THEIR~~ its COLLECTION DEFICIENT IN A NUMBER OF RESPECTS. MONTANA TECH, WHILE EXPERIENCING A BURGEONING ENROLLMENT IN ENGINEERING, FINDS STATE RESOURCES INSUFFICIENT TO MAINTAIN CURRENT SUBSCRIPTIONS TO SCIENTIFIC JOURNALS. EASTERN MONTANA COLLEGE HAS BASIC COLLECTION DEFICIENCIES IN TERMS OF ITS AUTHORIZED PROGRAMS IN BUSINESS, HUMAN SERVICES, EDUCATION, AND LIBERAL ARTS. MONTANA STATE UNIVERSITY HAS EXPERIENCED A 63% INCREASE IN INTERLIBRARY LOAN REQUESTS in the last few years as faculty and students at MSU find all too often the collection resources inadequate for their needs. At the University in Bozeman [illegible] of Professor [illegible]

[illegible] matter. [illegible] programs which offer the doctoral [illegible] [illegible] the utility problem [illegible] special [illegible] is about 44%. While the [illegible] problems [illegible] this period sees the pattern of accumulating [illegible] at [illegible] [illegible] is an [illegible]

LIBRARIES ARE ~~CLASSIFIED~~ reviewed AS A PART OF ACADEMIC SUPPORT IN INSTITUTIONAL BUDGETS AND AS THE INTERIM FINANCE COMMITTEE FORMULA FUNDING STUDY SHOWS, MONTANA HAS AN HISTORIC PATTERN OF UNDERFUNDING IN THIS AREA. THE long term CUMULATIVE EFFECT OF THIS UNDERFUNDING FOR OUR LIBRARIES RESULTS IN BASIC COLLECTION DEFICIENCY. THESE DEFICIENCIES HAVE BEEN EXACERBATED BY THE RAPID ESCALATION OF PERIODICAL ~~AND CONTINUATION~~ COSTS. THOSE COSTS now EAT UP AN INCREASING SHARE OF ~~THE~~ a library ACQUISITION BUDGET UNTIL IT ALMOST LITERALLY BECOMES IMPOSSIBLE TO BUY ANY BOOKS OR MONOGRAPHS AT ALL.

WE ARE AWARE THAT THE PROPOSED LFA BUDGET WILL PERMIT SUBSTANTIAL INCREASES IN THE ACADEMIC SUPPORT CATEGORY. THIS WILL HAVE A CLEAR BENEFIT FOR LIBRARIES AND EACH OF THE UNITS HAS ~~SHOWN~~ proposed MAJOR INCREASES FOR LIBRARY ACQUISITIONS FOR THE NEXT BIENNIUM ~~IN THE PRESENTATIONS TO YOU~~. WE RECOGNIZE and applaud THIS IMPORTANT ADVANCE BUT AT THE SAME TIME MUST POINT OUT THAT THE NEW FORMULA DOES NOT ADDRESS THE DEFICIT OF THE PAST. THOSE LONG YEARS OF NEGLECT HAVE TAKEN THEIR TOLL AND THAT IS THE PROBLEM THE REGENTS REQUEST FOR ACQUISITIONS ATTEMPTS TO ADDRESS. — the need to make retrospective purchases to bring collections closer to a standard of basic adequacy.

IN THE LAST MONTH OR SO, THIS COMMITTEE HAS HEARD EACH OF THE INSTITUTIONAL PRESIDENTS DESCRIBE THE MANNER IN WHICH THEY HAVE BEEN FORCED TO BALANCE THEIR BUDGETS AGAINST THE REAL ACADEMIC PRIORITIES AND INTERESTS. AS ONE COMMITTEE MEMBER ~~PUT~~ SAID IT, YOU HAVE BEEN ROBBING PETER TO PAY PAUL." UNFORTUNATELY, LIBRARIES HAVE TOO OFTEN PLAYED THE ROLE OF PETER IN THIS ~~PROCESS~~ EXERCISE.

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MONTANA TECH LIBRARY
February 11, 1981
Notes by Elizabeth Morrissett, [illegible] Librarian, Montana Tech Library

THE IMPORTANCE OF LIBRARIES TO MONTANA AND ITS CITIZENS

We live in an information society.
To keep up with the rest of the U.S. and the world, Montana needs to know what needs to be known. Libraries have gradually become more and more important to the build-up of our technology and our civilization. We find at Montana Tech that people are coming from around our state to look at our specialized reports on mining, petroleum exploration and operations, and geology, alternative energy production, machinery to use in their projects, and also the looking up of works in social sciences and arts areas. We send books out to libraries around the state.

The library consists of books, magazines, basic research papers which are reached through our many indexes and abstracting publications. for example, APPLIED SCIENCE AND TECHNOLOGY INDEX, ENGINEERING INDEX, PETROLEUM ABSTRACTS, METALS ABSTRACTS, AIR POLLUTION ABSTRACTS, ENERGY ABSTRACTS, SCIENCE CITATION INDEX, BIBLIOGRAPHY AND INDEX OF GEOLOGY, BIOLOGY ABSTRACTS, ETC. These indexes are extremely expensive to buy and to collect, but with their presence, it is possible for Montana Tech to act as a branch of the world university, an enormous information system which gives the most up-to-date possible information about new techniques, new ideas, and new research designs and subjects.

There are a number of on-line computer data-base searching operations available in our state. Montana Tech, Montana State and the University as well as the State Library offer subject searches of a more extensive group of subjects via computer than our indexes and abstracts can offer. This will become more and more the operating system in a short time to come. These searches at present cost from $15.00 to about $50.00 depending upon the complexity and the cost of the data base. Cost ratios will be watched to determine the point at which the indexes can be discontinued in favor of on-line searches in many libraries.

Purchasing policies in the academic community is at present closely tied to the teaching programs. Buying is also influenced by changes in technology, new subjects on the horizon, being introduced into course material and the requests for interlibrary loans from our users, both academic and Montana citizens. Faculty do most of the selecting and this is subject to negotiation since in some years some areas are publishing much more heavily and some efforts must be made to respond to important subject areas where change takes place, and limited budgets are restricting that area unduly.

Special collections in Montana exist in all libraries, academic and public. We know of many of them, and we are working toward more cooperation so that we can know each others' purchasing policies and avoid duplication. It is well known that the University at Bozeman buys in depth in wildlife study; Montana Tech's old and valuable map collection is the reason for many visits to our campus from Billings, Great Falls, Glasgow, etc.

It is especially important that these strengths be more known and recognized by wider users. It is important that the state libraries attempt to fill gaps in Montana holdings for which we must go out of state to borrow frequently. I believe we have the capability of considerable cooperation in working with both academic and- public libraries to go further in this direction. Most public libraries have specialities as well as our academic library collections. Automation is one important route which can speed up this process and make it possible to avoid using the "meetings" and "conference calls" way of exploring this kind of information..

A number of library automation systems exist now, both subsidized and commercial. These nearly all allow the cataloging of collections. With on-line terminals, it is possible for regional libraries to discover what has been added to each others collections, to use the cataloging done for their own books when duplication is appropriate, and to borrow where they do not wish to spend the money on a seldom used title. In addition, some of the systems now have, all will have, library loan functions which allow for quick verification and processing of loans, but unfortunately not yet quick delivery of the books which still come by U.S. mail. Some of the systems also -have an accounting/ ordering system which keeps track of bookkeeping and release clerical help to the public assistance desk. The tremendous advantages of these systems lies in the extension of Montana's awareness of the frontiers of information to all world publishing in the Roman alphabet at the huge data base increase to include all Australia and India as well as many German, French and other continental works.

F

ALLOCATION OF $1.4 MILLION LIBRARY FUNDING

The Board of Regents instructed the Commissioner of Higher Education to consolidate the various campus requests for additional library funding into one system-wide request for presentation to the legislature and set the amount of the request at $1.4 million. The Board of Regents instructed the staff to recognize two particular problems: (1) relative library deficiencies and (2) Board of Regents' approval of new programs.

The Commissioner of Higher Education developed information based upon an appreciation of the guidelines of the American Library Association to attempt to measure relative deficiency at each of the libraries of the campuses of the Montana University System. Based upon average current book costs, those guidelines suggest a deficiency of close to 1 million volumes. Utilizing the most recent average book cost data, the value of the deficiency ranges upward to $22 million dollars.

After the original allocation of this amount to individual campuses was proposed in September, some of the data were refined and the Commissioner and the Council of Presidents discussed possible allocation methods several times.

The Commissioner's current recommendation is to allocate the total funds based upon a uniform base amount to each unit and an amount to recognize deficiencies and new program authorizations.

The uniform amount is intended to (1) recognize that the counting of the holdings is not on a completely uniform basis at this time, thus creating some problems in determining relative deficiencies and (2) reflect different needs of the units for library materials, i.e., some needed to purchase maps, some need to move closer to the basic volume criterion of 85,000, others need more costly technical works, etc.

The second apportionment is based upon a recognition of relative deficiencies as best they can be determined currently as well as upon total program authorizations.

The allocation recommended by the Commissioner of Higher Education is:

Campus	Uniform Base Allocation	Relative Deficiency	Total Allocation
University of Montana	$100,000	$168,000	$268,000
Montana State University	100,000	416,000	516,000
Montana Tech	100,000	88,000	188,000
Eastern Montana College	100,000	40,000	140,000
Northern Montana College	100,000	40,000	140,000
Western Montana College	100,000	48,000	148,000
TOTAL	$600,000	$800,000	$1,400,000

PCD
2/11/81

MONTANA UNIVERSITY SYSTEM
Library Statistical Evaluation Per ALA Standards
as of June 30, 1980

	Volume Standard	UM	MSU	TECH	EMC	NMC	WMC
Basic collection	85,000	85,000	85,000	85,000	85,000	85,000	85,000
Allowance per faculty	100						
# FTE faculty		431	711	75	147	74	35
Volume requirement		43,100	71,100	7,500	14,700	7,400	3,500
Allowance per FTE student	15						
# FTE students (1979-80)		8,010	9,811	1,247	2,964	1,235	699
Volume requirement		120,150	147,165	18,705	44,460	18,525	10,485
Allowance per undergraduate field	350						
# of fields		58	45	15	26	25	6
Volume requirement		20,300	15,750	5,250	9,100	8,750	2,100
Allowance per master's field where no higher degree offered	6,000						
# of fields		38.5	24.5	11	4	3	1
Volume requirement		231,000	147,000	66,000	24,000	18,000	6,000
Allowance per master's field where a higher degree is offered	3,000						
# of fields		11	16				
Volume requirement		33,000	48,000				
Allowance per doctoral field	25,000						
# of fields		12	16				
Volume requirements		300,000	400,000				
TOTAL VOLUME REQUIREMENTS*		832,550	914,015	182,455	177,260	137,675	107,085
Actual volumes		626,926	405,459	72,770	129,913	87,301	50,122
Volume deficiency		205,624	508,556	109,685	47,347	50,374	56,963
Percent deficiency		24.7	555.6	60.1	26.7	36.6	53.2

*Includes FTE faculty in experiment stations and professional in the Bureau of the Mines, provision for MPA at 2 universities, MBA at EMC and WAMI at MSU.

PCD
Revised 1/22/81

BOARD OF REGENTS OF HIGHER EDUCATION
PROGRAM MODIFICATION REQUEST

Priority #3

Participation in Washington Library Network	FY 1981-82	FY 1982-83	Total
	$221,837	$146,458	$368,295

Objectives: Increase information availability to Montana students, faculty, researchers and citizens through a cooperative library network.

Description: Shared use of a very large data base of library holdings; computerized assistance in cataloging, library ordering and interlibrary loans.

Justification: Participation in the Washington Library Network will make the library resources of the participating units more widely available and, through interconnection with libraries in the Pacific Northwest and the Library of Congress, make library resources outside the state more readily available.

The Washington Library Network has invested several million dollars over a 10-year period to develop the network which is considered one of the better computerized library networks. Because of its location in the region, it is more readily accessible.

In this context, "network" refers to a group of libraries linked to a computerized set of cataloging data files and data manipulation systems that support local technical and public services, as well as the cooperative programs of the group. Such a network represents the best response to date to the need for more effective means of resource sharing, on the part of librarians and information scientists. Regional networks have proved more viable than a single national network. Rapid progress is being made toward complete interface among existing regional entities, to link up a national system. The use of centralized cataloging to provide a machine-readable record compatible in all data bases will enable member libraries to exchange data and share resources more freely and rapidly.

Over a period of ten years, and at a cost of five million dollars, the Washington State Library has developed the Washington Library Network. Its features and services parallel, and in some instances exceed, those of other networks. It now has 62 member libraries, and its software is in use in British Columbia, Australia, and in the Southeastern Library Network. Plans are underway for the assumption by WLN of some functions of the Pacific Northwest Bibliographic Center. The latter is an interlibrary loan switching center, which has been functioning for forty years, is owned currently by the state library agencies of Washington, Oregon, Idaho and Montana, and also serves libraries in three Canadian provinces. In Montana most of the University System libraries, the major public libraries, and the State Library, for over thirty years, have been contributing records of their holdings to the PNBC card catalog, which now represents over four million titles held by libraries in the Northwest region. The imminent entry of this PNBC catalog into the WLN data base effectively would enter the retrospective holdings of the six campus libraries into that network without additional cost to them.

Because of their long interaction with other libraries in the Northwest, and the participation in PNBC as the forerunner of WLN, libraries in Montana have felt that their membership in WLN would be a logical and practical development. They have sought means of participation through direct state funding, through the use of Federal funds, through grants, etc. So far, they have been successful only in having the Billings Public Library join the network through a Coal Board Grant. Membership of principal libraries in the state would enhance the sharing of resources among all Montana libraries through interlibrary loans, since the network data base would serve as a union catalog for the state, providing microfiche catalogs of all Montana holdings for those smaller libraries not on-line with the network. Also, access to resources throughout the region and beyond would be increased greatly. The role of the university system libraries as the major back-up for interlibrary loan within the state would be facilitated.

	FY 1982	FY 1983	Total Biennium
Montana State University			
Personal Services	$ 0	$ 0	$ 0
Operations	36,970	40,670	77,640
Capital	15,790	0	15,790
TOTAL	$52,760	$40,670	$93,430
Univeristy of Montana			
Personal Services	$ 0	$ 0	$ 0
Operations	31,090	34,200	65,290
Capital	27,560	0	27,560
TOTAL	$58,650	$34,200	$92,850
Montana College of Mineral Science & Technology			
Personal Services	$ 0	$ 0	$ 0
Operations	13,717	14,600	28,317
Capital	12,000	1,000	13,000
TOTAL	$25,717	$15,600	$41,317
Eastern Montana College			
Personal Services	$ 0	$ 0	$ 0
Operations	17,527	19,280	36,807
Capital	10,854	0	10,854
TOTAL	$28,381	$19,280	$47,661
Western Montana College			
Personal Services	$ 0	$ 0	$ 0
Operations	14,127	15,540	29,667
Capital	10,354	0	10,854
TOTAL	$24,981	$15,540	$40,521

	FY 1982	FY 1983	Total Biennium
Northern Montana College			
Personal Services	$ 0	$ 0	$ 0
Operations	19,244	21,168	40,412
Capital	12,104	0	12,104
TOTAL	$31,348	$21,168	$52,516
TOTAL			
Personal Services	$ 0	$ 0	$ 0
Operations	132,675	145,458	278,133
Capital	89,162	1,000	90,162
TOTAL	$221,837	$146,458	$368,295

G

WLN & MONTANA UNIVERSITY SYSTEM LIBRARIES: testimony based on fourteen months of WLN use at Parmly Billings Library, Billings. Prepared by Ellen Newberg, Head, Technical Services, February 11, 1981.

WLN is a powerful tool for research and all the library functions that support it such as book and journal purchasing, indexing, reference, and interlibrary loan. Its software, developed by Boeing at a cost of four million dollars and forty man years, is widely acknowledged to be the finest in the field, and as part of the Pacific Northwest library region, Montana is fortunate to be in "WLN country." At present, there are sixty-six members, of which over half are academic libraries. Boise State, Eastern Washington University, Evergreen, Gonzaga, Portland State, Washington State University, University of Alaska, University of Idaho, and University of Washington are a few of the participating academic libraries. Its data base consists of nearly two million books, the majority of which have been published since 1968, and tells where copies of them are located in the Northwest (see over).

WHAT IT OFFERS THE UNIVERSITY SYSTEM

BOOK BUYING SUPPORT: Offers ordering, fund accounting, claiming, and cancellation services. Makes cooperative purchasing a possibility, not just something discussed in meetings. This would be especially useful and important if a special appropriation is made for the purchase of books.

SHARED INDEXING: Would eliminate current widespread duplication of effort. Four hundred state documents are published each year. The State Library indexes and distributes them to the University System libraries who also index them (400 documents x 6 libraries = 2,400 units of work). With WLN, ONE LIBRARY indexes the book according to highest standards and the work is used by everyone else (400 documents x 1 library = 400 units of work). This same duplication of effort can be eliminated for many locally published Montana books and journals.

REFERENCE: Its searching capability compares to the card catalog in roughly the same way a Model T compares to an airliner. Coupled with a fast printer, WLN can enable a student or professor to do research in minutes or hours that would have taken days or weeks to do previously. For Montana's students and professors to stay competitive, they need this sort of tool. Makes many more books available when library users can see what each unit has, not to mention what is available throughout the Northwest.

INTERLIBRARY LOAN: Requesting a book via Interlibrary Loan used to be a little like putting a note for help in a bottle and tossing it into a river. Four to eight weeks was considered good turnaround time because first you had to find by random guessing which library had the book. WLN tells you in seconds (please see over). In a study conducted in Billings last fall using WLN to pinpoint locations of books requested, 54.18 percent of the books arrived in two weeks, and 75.18 per cent arrived in three weeks. Use of WLN will also reduce current use of PNBC, an interlibrary loan book-locating center. At present, Montana pays PNBC $5.00 per book ($70,000.00 per year) to locate books for its library users. Thirty per cent of the time, PNBC charges the $5.00 to tell Montanans that the books are located in Montana, often in one of the Universities. For an average search cost of seven to twenty-one cents, the University System Libraries can cut out this costly middle man for the majority of books published since 1968. PNBC would still need to be used for older, rare, and extremely technical publications that are out-of-print or that the University System Libraries would not want to buy.

"CARD CATALOG INFORMATION" which can be used by all libraries to index their copies of the book.

BIBLIOGRAPHIC DISPLAY

Doig, Ivan.
This house of sky : landscapes of a Western mind / Ivan Doig. 1st
New York : Harcourt Brace Jovanovich, c1978.
314 p. ; 25 cm.
ISBN 015190054X : $9.95
1. Doig, Ivan. 2. Doig family. 3. Meagher Co., Mont.—
graphy. I. Title.
F737.M4 D643 978.6/612/030924B
78-053897

All these libraries (thirty in all) own copies of the book.

COLLECTION ID.NET
1. Doig, Ivan. This house of sky : 78-053897
B D684@HIS POP WaS
B-DOIG DOIG WaSp WaRetV-R WaKeM WaWeN WaSpCo WaO WaV WaBr
WaPoN
B-DOIG DOIG@MONTANA MtBil
F 737 M4 D643 WaU
F737.M4D643 WaSC-S Ak IdBB WaBB WaOE IdU WaFW WaU
NW B-DOIG DOIG Wa WaTPC
NW B-978 DOIG WaMaS
NW F737.M4D643 WaWW
NW 978.6612 DOIG WaRi
SpC F737 M4D643 WaChenE
W-AUTH DOIG Wa
818.5 WaSKC
921 DOIG Id
978.6612 DOIG WaE

This line means that Parmly Billings has copies you can check out and one in the Montana Room, a research collection.

Call numbers used by the various libraries.

Board of Regents Budget Modification for funds for WLN for univ. system

NAME Ellen Newberg BILL No.

ADDRESS 925 Burlington Ave. DATE 9/12/81

WHOM DO YOU REPRESENT Parmly Billings Library

SUPPORT X OPPOSE AMEND

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

As a participant in this library automated network for fourteen months, I enthusiastically support the University Systems bid to join it. Their participation would:

1. allow cooperative buying
2. " " book sharing
3. reduce workloads
4. make research easier and faster as it relates to books

FORM CS-34
1-81

STATISTICS FOR FISCAL YEAR 1980 SHOWING USE OF UNIVERSITY SYSTEM LIBRARIES BY PUBLIC-LIBRARY USERS, STATE GOVERNMENT AGENCIES, HEALTH SCIENCE (HOSPITALS AND CLINICS) PROFESSIONALS, AND PRIVATE COMPANIES (1)

H

2/12/81

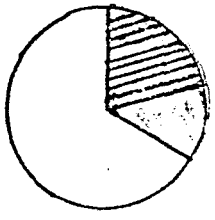
I. Lending to public library users within the federation areas - FY80 (2):

A. 13% of all interlibrary loan (ILL) requests by public library users in the Broad Valleys federation (Bozeman Public Library, headquarters, 12 counties in southwestern Montana) were filled from the collection of the Montana State University Library.
In FY80 there were 15,191 requests for books and magazine articles by library users of the Broad Valleys Federation. 1,983 of these were filled by the MSU Library.

B. 11% of all interlibrary loan requests by public library users in the Tamarack federation (Missoula City-County Library, headquarters, 7 counties in northwest Montana) were filled from the collection of the University of Montana Library.
In FY80 there were 9,359 requests for books and magazine articles by library users of the Tamarack Federation. 1,019 of these were filled by the UM Library.

II. Use of UM, MSU, and Montana Tech libraries by the Pacific Northwest Bibliographic Center (PNBC) for referrals of interlibrary loan requests - FY80 (3):

A. In FY80 Montana libraries statewide made 15,420 requests of the PNBC in order to determine the locations of books and magazine articles for the purpose of borrowing them.
1. 5,296, or 34%, of these were located in Montana libraries and were referred back to them to be lent to the requesting libraries.
2. 3,214 of the requests referred to Montana libraries, or 61%, were filled by the libraries of UM, MSU, and Tech. This is 21% of the total number of requests referred to PNBC.
3. The circle represents the total number of ILL requests sent to PNBC in FY80 - 15,420.



The white area represents Montana's interlibrary loan requests filled out-of-state - 10,124, or 66% of those referred to PNBC.
The total shaded area represents the number filled by Montana libraries - 5,296 or 34% of those referred to PNBC.
The shaded/striped area represents the number of Montana libraries' requests referred to PNBC which were filled by UM, MSU, and Tech libraries - 3,214 or 21% of the total.

III. Books and magazines borrowed from MSU, Tech, and UM libraries by requestors outside the immediate academic community, ie state government agencies, public library patrons, health science professionals, and private organizations (4):

A. MSU Library - books and magazine articles:
1. Total number of ILL requests lent to other libraries, in- & out-of-state - 8,978
2. Total number of requests lent in-state by MSU ---------- 8,016
3. Total in-state requests lent to state government agencies, public libraries, and health science professionals ---------- 7,304 or 91%
4. Total in-state requests lent to other Montana universities and colleges and private organizations ---------- 712 or 9%

B. Montana Tech Library - books and magazine articles
1. Total number of ILL requests lent to other libraries ---------- 666

C. University of Montana Library
1. Total number of books and magazine articles lent, in- & out-of-state-- 5,035
2. Number of photocopies of magazine articles ---------- 1,795
a. No. of photocopies provided for state government agencies, public library users and health science professionals ---------- 1,086 or 61%
b. No. of photocopies provided for other academic libs. etc. ------- 709 or 39%
3. Total no. of books lent to other libraries, in- and out-of-state ------ 3,240
a. No. lent out-of-state ---------- 1,124 or 35%
b. No. lent in-state ---------- 2,166 or 65%
1) to public libraries, state govt., and health sci. professionals-- 1,738 or 80%
2) to other academic libraries etc. ---------- 429 or 20%

****

1) Statistics show usage of UM, MSU and Tech libraries, the libraries for which statistics are available and which do the majority of the lending to non-academic community requestors.
2) Statistics are provided by the federation headquarters and compiled by the State Library.
3) Statistics are compiled by PNBC. 4) Statistics are compiled by the ILL Depts. of MSU, Tech, and UM. Specificity of statistical categories provided by each library varies.

NAME Randall L. Collier BILL No. Regents Modifications

ADDRESS 914 6th Ave N. Great Falls DATE

WHOM DO YOU REPRESENT Montana Library Assoc.

SUPPORT X OPPOSE AMEND

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

FORM CS-34
1-81

I

PROGRAM MODIFICATION REQUEST

Offer an MBA in Billings

The Role and Scope document adopted by the Regents charges the University of Montana to ". . . move to develop an MBA or combined MBA/MPA program in Billings, coordinating with and using resources from Eastern Montana College and Montana State University as appropriate." The degree would be conferred only by the University of Montana." There is evidence of a strong demand in Billings for such a program. In order to serve the demand and meet the responsibility under the Role and Scope document the program should be started as soon as possible. However, it can not be started without additional funding.

Accreditation requirements place certain constraints on such a program in order to assure maintenance of quality. Only a minor proportion (25% or less) of the faculty can be part-time. Seventy-five percent must have doctorates in the appropriate disciplines. Teaching load is limited to nine units per quarter. The library and other resources must be adequate to support a graduate level program.

Experience with the MBA program at Malmstrom Air Force Base indicates that a minimum of 5.0 FTE faculty are needed to cover the disciplines. This number is independent of enrollment at lower levels of enrollment.

None of the institutions has the extra resources to start the program. Under formula funding the allocation of resources is based on programs already in place. In addition, graduate programs are generally low student-faculty ratio programs. The MBA on campus runs approximately 14.6:1 and at Malmstrom 10:1. To conform to an assigned overall student faculty ratio of 24.5:1 the School of Business Administration at U of M must run a very high undergraduate ratio to compensate. Currently that ratio is perilously close to maximum allowable 26.6:1 set by accreditation standards. The School can not "carry" another low ratio program by running up the undergraduate ratio.

Finally, the timing of funding further complicates the issue and makes the costs involved more onerous. If the MBA were to be started in Billings in 1981-82, it would be 1983-84 before even inadequate funding would be generated and appropriated. Consequently, program modification dollars would be necessary to carry the program until the next biennium can bring even partial recovery of the costs.

The budget submitted below envisions 2.0 FTE faculty the first year and an additional 2.0 FTE the second year. One FTE of those employed the first year will also serve as resident administrator of the program. These faculty should provide coverage of the necessary disciplines during the first two years. An additional faculty member will be necessary in the third year. The secretarial position is necessary to provide secretarial help for the resident administrator and to communicate with and provide help to faculty coming from U of M, MSU and Eastern.

Student help will be necessary to aid the faculty. This is particularly important because of geographic dispersion of the faculty. The major two components of operating expense are communications and travel. These will be higher than normal because of the geographic dispersion of the faculty. Computer charges and rent are listed separately because they will be payments to EMC. Capital is primarily the cost of bringing the EMC library to graduate level in the business disciplines. Also in the first year there are funds to equip the offices of the Resident Administrator and secretary and an office for use by visiting faculty.

Proposed Budget Requiring
Program Modification Funding*

	FY 1982	FY 1983	Total
Personal Services			
Faculty	$ 58,560	$112,954	$171,514
Fringe	9,956	19,203	29,159
Secretarial	9,800	10,530	20,330
Fringe	1,666	1,790	3,456
Temporary & Part-time help	1,500	2,000	3,500
SUBTOTAL	81,482	146,477	227,959
Operating expense	7,500	5,100	12,600
Computer Charges	6,000	7,000	13,000
Space Rental	1,815	2,420	4,235
SUBTOTAL	15,315	14,520	29,835
Equipment	4,442	1,043	5,485
Library	66,326	7,500	73,826
SUBTOTAL	70,768	8,543	79,311
TOTAL	$167,565	$169,540	$337,105

*A tentative distribution among units (UM, EMC, MSU) is attached on the next page.

Distribution of Proposal Budget Requiring Program Modification Funding

	FY 1982			FY 1983			Total (Biennium)		
	UM	EMC	MSU	UM	EMC	MSU	UM	EMC	MSU
Personal Services									
(1) Faculty	$29,280	$14,640	$14,640	$62,074	$25,440	$25,440	$ 91,354	$ 40,080	$40,0
Fringe (17%)	4,978	2,489	2,489	10,553	4,325	4,325	15,531	6,814	6,8
Secretarial	9,800			10,530			20,330		
Fringe (17%)	1,666			1,790			3,456		
Temporary & Part-time (Student Help)	500	500	500	1,000	500	500	1,500	1,000	1,0
SUBTOTAL	46,224	17,629	17,629	85,947	30,265	30,265	132,171	47,894	47,8
Operating Expenses (2)	3,300	700	3,500	3,300	900	900	6,600	1,600	4,4
Computer Charges (3)		6,000			7,000			13,000	
Office Space Rental (4)		1,815			2,420			4,235	
Equipment (5)		4,442			1,043			5,485	
Library (6)		66,326			7,500			73,826	
TOTAL	$49,524	~~$79,283~~ 96,912	$21,129	$89,247	~~$18,863~~ 49,128	$31,165	$138,771	$146,040	$52,2

(1) The two positions in 1982 are FY to provide for resident administrator and summer faculty. The two added in 1983 are A
(2) The largest component is travel (MSU travel to teach classes and for UM it is personnel such as the RA between campuses
(3) Based on actual computer use in MBA courses on Missoula campus charged at the 1980 EMC computer rates.
(4) Presumes 2 offices in FY 1982, increased to 3 in FY 1983.
(5) Equipment for secretarial and faculty offices.
(6) To bring library to standard of Harvard Core Collection (considered minimum for accredited MBA) the first year, maintena thereafter.

THE MONTANA UNIVERSITY SYSTEM
33 SOUTH LAST CHANCE GULCH
HELENA, MONTANA 59620
(406) 449-3024

MMISSIONER OF HIGHER EDUCATION

February 10, 1981

TO: Representative Gene Donaldson, Chairman
Education Subcommittee

FROM: John A. Richardson
Commissioner of Higher Education JAR

SUBJECT: Allocation of Repair and Maintenance Funds

The attached schedule provides the suggested allocation of the repair and maintenance funds as recommended in the analyst's budget.

While we reviewed several different approaches and analyzed the formula distribution models that are used in other states, we decided to use a distribution model based on gross square footage and age of the various buildings. Our method of distribution did not take into account external building space such as acres of lawn, miles of roads, sidewalks, parking lots, etc. Our present data base does not permit adaption to any of the more sophisticated physical plant formula methods.

We have discussed the proposed allocation with the campuses and there is a consensus that the proposed allocation provides as equitable a method as our current data base permits.

The method used takes into consideration the gross square footage and age of the facilities supported by current unrestricted state funds. We excluded garages, storage facilities, greenhouses, livestock, sheds, barns, etc. The amount allocated to each campus is supported by a schedule listing the facility related square feet and the age of each building.

Attachment

MONTANA UNIVERSITY SYSTEM

Proposed Allocation of Repair and Maintenance Funds
1983 Biennium

Amount to Be Allocated			$1,090,000	$1,188,100
Campus	(000's) Age x Gross Square Footage	Percent of Total	FY 1982 Allocation	FY 1983 Allocation
Montana State University	49,205	37.48%	$ 408,532	$ 445,300
University of Montana	45,710	34.81	379,429	413,577
Eastern Montana College	9,897	7.54	82,186	89,583
Northern Montana College	6,289	4.79	52,211	56,910
Montana Tech	10,769	8.20	89,380	97,424
Western Montana College	9,423	7.18	78,262	85,306
TOTAL DISTRIBUTED	131,293	100.00%	$1,090,000	$1,188,100

MONTANA STATE UNIVERSITY

Building Inventory

Building Name	Gross Square Feet	Year Built	Age	Age x Square Feet
Montana Hall	39,725	1896	85	3,376,625
Traphagen Hall	37,014	1920	61	2,257,854
Lewis Hall	42,131	1923	58	2,443,598
Linfield Hall	65,563	1909	72	4,720,536
Romney Gym	53,074	1922	59	3,131,366
Ryon Lab	56,331	1922	59	3,323,529
Roberts Hall	49,395	1922	59	2,914,305
Herrick Hall	40,387	1926	55	2,221,285
Home Management House	2,894	1933	48	138,912
Renne Library	152,085	1949	32	4,866,720
McCall Hall	10,488	1952	29	304,152
A.J.M. Johnson Hall (Physics)	41,333	1954	27	1,115,991
Fieldhouse	131,056	1958	23	3,014,288
Reid Hall	91,167	1959	22	2,005,674
Marsh Veterinary Lab	29,426	1961	20	588,520
aines Hall	79,563	1961	20	1,591,260
ooley Lab	30,604	1960	21	642,684
Cobleigh Hall	92,741	1970	11	1,020,151
Leon H. Johnson Hall	112,011	1973	8	896,088
Museum of the Rockies	31,200	1973	8	249,600
Sherrick Hall	18,298	1973	8	146,384
Health & P. E. Building	80,325	1973	8	642,600
Reno H. Sales Stadium	45,242	1973	8	361,936
Stadium Lockers & Rest Room Building	3,614	1973	8	28,912
Howard Hall - Music	29,102	1974	7	203,714
Cheever Hall - Arch. & Ind. Arts	63,806	1974	7	446,642
Haynes Hall - Art	42,104	1974	7	294,728
Wilson Hall	84,708	1974	7	592,956
USDA Entamology Lab	4,320	1924	57	246,240
Military Science	19,994	1947	34	679,796
Hamilton Hall	27,745	1910	71	1,969,895
Heating Plant	7,814	1923	58	453,212
aint Shop	1,920	1947	34	65,280
Danforth Chapel	2,299	1952	29	66,671
Service Shop & Physical Plant Building	12,590	1952	29	365,110

Building Name	Gross Square Feet	Year Built	Age	Age x Square Feet
Service Shop Butler Building	4,000	1958	23	92,000
tudent Health Service	21,400	1957	24	513,600
lectronics Field Building North	400	1959	22	8,800
Electronics Field Building South	500	1961	20	10,000
Research Park Building	8,478	1969	12	101,736
Civil Engr. Mobile Home Research Lab	480	1969	12	5,760
Fisheries Bio Assay Lab	4,172	1971	10	41,720
Wool Lab	7,440	1947	34	252,960
Chemistry Research Grinding Lab	960	1952	29	27,840
Chemistry Research Fermenter Lab	407	1950	31	12,617
Veterinary Small Animal Quonset	960	1950	31	29,760
Veterinary Clinic Lab	1,040	1960	21	21,840
Veterinary Isolation Building	3,006	1966	15	45,090
Nutrition Center Bull Indexing Building	5,120	1967	14	71,680
Nutrition Center Building	11,023	1967	14	154,322
Ag. Field Bob Miller Pavillion	23,607	1967	14	330,498
Insectary Research Building	2,786	1968	13	36,218
Agronomy Field House	1,300	1934	47	61,100
TOTAL	1,729,148			49,204,755

UNIVERSITY OF MONTANA

Building Inventory

Building Name	Gross # Square Feet	Year Built	Age	Age x Square Feet
University Hall	35,224	1891	83	2,923,592
Venture Center	23,187	1898	83	1,924,521
Mathematics	17,894	1903	78	1,395,732
Psychology	17,133	1908	73	1,250,709
Natural Science	23,100	1918	63	1,455,300
Social Science Bldg.	78,625	1921	60	4,717,500
Forestry	23,732	1921	60	1,423,920
Mens Gym	45,291	1921	60	2,717,460
Heating Plant	7,756	1921	60	465,360
Fine Arts	63,756	1935	46	2,932,776
Journalism	29,410	1936	45	1,323,450
Alumni Center	6,501	1937	44	286,044
Pharmacy	47,833	1938	43	2,056,819
Natural Science Addn.	4,956	1938	43	213,108
Business Administration	27,938	1950	31	866,078
Music	41,010	1953	28	1,148,280
Fieldhouse	169,449	1953	28	4,744,572
Liberal Arts	101,769	1953	28	2,849,532
Womens Center	57,185	1953	28	1,601,180
Health Service	34,770	1955	26	904,020
Art Annex	15,086	1955	26	392,236
Pool	22,630	1958	23	520,490
Health Science	61,230	1961	20	1,224,600
Law	52,280	1961	20	1,045,600
Physical Plant	50,608	1967	14	708,512
Science Complex	99,051	1971	10	990,510
Library	221,731	1973	8	1,773,848
Heat Plant Shop	2,100	1962	19	39,900
Lodge (54%)	45,496	1954	27	1,228,392
Biological/Elrod Labs	17,236	1950	31	534,316
Houses used as Offices	46,071	N/A	1	46,071
Special Observatories	577	1972	9	5,193
TOTALS	1,490,615			45,709,621

EASTERN MONTANA COLLEGE

Building Inventory

Building	Gross # Square Footage	Year Built	Age	Age x Square Footage
McMillan Hall	53,338	1935	46	$2,453,548
Science	33,907	1947	34	1,152,838
Science Addition	15,000	1978	3	45,000
Cisel	25,288	1951	30	758,640
Education	28,751	1953	28	805,028
Music	10,601	1955	26	275,626
P. E. Building	84,760	1961	20	1,695,200
P. E. Addition	28,237	1981	1	28,237
Library/Classroom	80,735	1968	13	1,049,555
Liberal Arts	97,488	1969	12	1,169,856
Special Education	43,765	1972	9	393,885
Art Annex	6,152	1978	3	18,456
Physical Plant/Office	20,099	1979	2	40,198
Houses used as Offices	11,248	N/A	1	11,248
TOTALS	539,369			9,897,315

NORTHERN MONTANA COLLEGE

Building Inventory

Building Name	Gross # Square Feet	Year Built	Age	Age x Square Feet
Pershing	15,340	1933	48	736,320
Metals Tech	11,293	1944	37	417,841
Auto Mechanics	14,480	1952	29	419,920
Body Shop	3,680	1952	29	106,720
Cowan Hall	64,968	1953	28	1,819,104
Armory Gym	57,193	1957	24	1,372,632
Physical Plant	6,414	1967	14	89,796
Math Science	41,861	1968	13	544,193
Elec. Tech	14,590	1968	13	189,670
ngineering Tech	54,378	1971	10	543,780
Davey Addition - Auto Mechanics	7,708	1979	2	15,416
Library	33,593	1981	1	33,593
TOTAL	325,498			6,288,985

MONTANA TECH

Building Inventory

Building Name	Gross # Square Feet	Year Built	Age	Age x Square Feet
Main Hall	37,000	1896	85	3,145,000
Mill Building	17,456	1908	73	1,274,288
Engineering Building	12,880	1923	58	747,040
Metallurgy Building	31,700	1923	58	1,838,600
Gym	23,600	1925	56	1,321,600
Library/Museum	32,552	1940	41	1,334,632
Physics/Petroleum	18,363	1953	28	514,164
Hper	58,162	1979	2	116,324
Mining/Geology	48,930	1976	5	244,650
Library/Auditorium	39,240	1978	3	117,720
Physical Plant	8,820	1968	13	114,660
TOTAL	328,703			10,768,678

WESTERN MONTANA COLLEGE

Building Inventory

Building Name	Gross # Square Feet	Year Built	Age	Age x Square Feet
Old Main	46,799	1897	84	3,931,116
Old Library	17,986	1924	57	1,025,202
Gym	34,294	1924	57	1,954,758
Heating Plant	4,543	1926	55	249,865
Aud. Shop	13,811	1952	29	400,519
P. E. Complex	72,792	1969	12	873,504
Library/Administration	37,768	1969	12	453,216
Office/Classroom	42,466	1971	10	424,660
House used as Offices	10,600	N/A	1	10,600
TOTAL	281,059			9,323,440

LEGISLATIVE TREATMENT OF INDIRECT COSTS

K

1. (a) Grants and contracts have both direct and indirect costs. Direct costs are those that can be identified as solely benefiting a single project such as salaries, supplies, communications, and equipment. Indirect costs are those costs incurred by the institution to benefit a number of projects but that cannot be identified solely with and charged to a single project.

   (b) Examples: Telephone: Long distance calls can be identified with a single project and are therefore direct costs, while local calls and instrument (service) charges cannot, and are therefore indirect costs. Secretarial services: When a secretary is hired for the purpose of providing service to a single project, the cost is a direct one; when the project does not require the hiring of a secretary but does require some secretarial service as administrative support, that service is a indirect cost. Recruiting Ads: These are paid by the University and reimbursed as indirect costs.

   (c) The sponsor reimburses the University for funds spent on indirect cost items at a rate determined by the government.

2. Using Indirect Cost Reimbursments as revenue is inappropriate for a system on an enrollment-driven budget.

3. No other state in the region appropriates more than 60 percent of indirect costs.

4. Indirect Costs Recovered should be used to pay for grant and contract related expenses.

LEGISLATIVE TREATMENT OF INDIRECT COSTS

Budgeting of Higher Education in Montana is essentially enrollment driven. The budgets of the various units of the university system, like most publicly supported universities, are in large part determined by the number of enrolled full-time equivalent students. When a university undertakes research or educational service agreements, resources that were originally appropriated on the basis of number of students are temporarily "sold" to an outside sponsor. The sponsor reimburses the university for these resources in the form of indirect costs. Our present budgeting system for indirect costs is based on the premise that our appropriation includes excess resources and, thus, that we can sell services and facilities to a sponsor without the need for reimbursement. Assuming that the original enrollment-based appropriation represents not an excess, but the amount necessary to meet the operating needs of the institution, then those resources sold and reimbursed must be replaced. Using an analogy, if the enrollment driven budget allocation provides for ten rooms or ten people and one person or one room is temporarily "sold" under grant or contract to a sponsor, then the reimbursement costs should be available to the institution for replacing the room or person, in order to maintain the same level of resources originally allocated on the basis of enrollment.

With our present budgeting system, where indirect costs are treated as a revenue source, institutions with large contract and grant activity provide a much higher part of their budget from the indirect cost source. In addition, our present budgeting system for indirect costs provides no incentive to increase research and educational service funded by outside sponsors because these activities drain resources originally allocated on the basis of enrolled students.

The present system of treating indirect costs has been in effect for the last three bienniums of the legislature. Prior to that time, indirect costs recovered were made available to the institutions and were used to provide replacement resources for those expended in support of grants and contracts. The documentation that resources are expended and should be replaced is implicit in the concept of indirect costs in that these costs are audited annually by a federal agency, and the appropriate amount that sponsors should reimburse the universities is determined annually.

Several of our neighboring states have maintained the principle that indirect costs recovered should be used by the grantee institution to replace resources expended on grants and contracts. Over the past two years, some of our neighboring states have moved in the direction of using indirect costs to replace resources on grants and contracts, recognizing that an institution funded on the basis of enrollment can not expend a large part of its enrollment driven resources without replacement. The following is a list of neighboring states with a summary of the current budgetary method of treating indirect costs. Several of these states have developed their present approach within the last year.

1. Idaho - 100% of indirect costs recovered are retained by the institutions in a restricted account with no closing date. Expenditures from this account must be in general relation to those budget areas that generated the indirect costs.

2. North Dakota - 100% of the recovered indirect costs are retained by the institution in a restricted account with no termination date.

3. South Dakota - 100% of recovered indirect costs are retained by the institution and placed in a restricted account with no termination date.

4. Nebraska - the first $700,000 in indirect costs recovery is treated as revenue and appropriated by the state. Indirect costs recovered above that figure are retained by the institution as replacement funds for research related activities.

5. Wyoming - 60% of indirect costs recovered are an offset to general revenue in meeting the state budget. 40% is retained by the University in a restricted account without termination date.

6. Colorado - Each institution is provided a targeted figure based on the percentage of cost incurred by grant programs. 62.5% of indirect costs recoveries above the targeted figure are available to the institutions for research related expenditures that will not be built into the budgeted base.

7. New Mexico - 20% of indirect costs recoveries are appropriated by the legislature. The remaining 80% is available to the institution for research related expenditures.

8. Utah - Certain specific overhead related costs are identified and these are paid from indirect costs recoveries. These expenditures are in addition to the normal enrollment driven budget. Indirect costs recovered above this amount are divided with 25% available to the institution for research related expenditures and 75% as an offset to the general fund appropriation.

RCM/cjt

9/3/80

VISITORS' REGISTER

HOUSE JOINT APPROPRIATION SUBCOMMITTEE
ON EDUCATION

BILL REGENT'S PROGRAM MODIFICATIONS Date February 12, 1981

SPONSOR

NAME	RESIDENCE	REPRESENTING	SUPPORT	OPPOSE
L E Dayton	Helena	Univ. System	x	
D.A. Stobel	Bozeman	Univ Syst	x	
Melvyn M. Ryan	Bozeman	Montana Power	X	
Gordon Griffith	Butte	Montana Tech.	X	
Donald Habbe	Missoula	Univ. of Montana	X	
John L. Rutherford	Billings	EMC	V	
Tom Nopp	Bozeman	MSU	X	
Paul Dunbar	Mt. Univ System	CHE	x	
Dick Bowers	Missoula	Univ Mont	V	
Elizabeth Morinith	Butte	Montana Tech	V	
Kurt F. Ingalls	Missoula	U of Mont	V	
John M Lebeger	Missoula	Missoula Business	V	
Margaret Ford	Missoula	U of M	V	
James Bunner	Whitefish	U of M	V	
Gary E. Holmquist	Missoula	Univ of Montana	V	
J.D. Holmes	Helena	Institute of the Arts Foundation	V	
Michael Magone	Missoula	U of M Advocates	V	
Mary Lou Munman	Missoula	U of M Alumni	V	
Brooke Bishop	Missoula	U of M Advocates	X	
Lesley Kellner	Missoula	U.M. Advocates	V	
John Doty	Missoula	U of M	X	
Wm Tietz	Bozeman	Mont. State Univ.	X	
Leonard W Brewer	Missoula	Legislature	X	

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PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

VISITORS' REGISTER

HOUSE Joint Appropriation Subcommittee

ILL Regents Program Modification Date 12 Feb

ONSOR

NAME	RESIDENCE	REPRESENTING	SUPPORT	OPPOS
Martha Brewer	Missoula	Self	X	
Harry R Harmon	Missoula	U of M	X	
Deanna M. Sheriff	Missoula	U of M	X	
Mace-Marie Maggard	Missoula	U of M Alum	X	
Margaret Veatch	Missoula	U of M	X	
Carl Hoffman	Bozeman	Montana State Univ.	X	
Clyde Carroll	"	MSU	X	
Alex Stefanatos	Missoula	U of Mont	X	
W. M. Schmidt	Helena	Self + Incarcerated Offenders	X	
Philip Maloney	Missoula		X	
Howard Feinland	Missoula	U of M	X	
[illegible]	[illegible]	[illegible]	—	
[illegible]	Bozeman	Montana State University	X	
[illegible]	Havre	HMC	X	
[illegible]	Havre	HMC	X	
Vilene Cooper	Helena	Mt. State Library	X	
Rob Thomas	Dillon	Western Montana College	X	
Fred W. DeMorey	Butte	Mt. Tech	X	
Vernon Griffiths	Butte	Montana Tech.	X	
Katy Delano	Helena	U of M	X	
Olivia Hangen	Missoula	U of M.	X	
Margie Donahue	Helena	U of M	X	
John Crist	Helena	UM	✓	

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VISITORS' REGISTER

HOUSE _____ COMMITTEE

'LL _____ Date _____

.ONSOR _____

NAME	RESIDENCE	REPRESENTING	SUPPORT	OPPOS
Jim Michelotti	Butte	Montana Tech	X	
Harley Lewis	Missoula	U of Montana	X	
Lynn Rasmussen	Missoula	U of M	+	
[illegible]	Bozeman	MSU	+	
Ed Stearns	Helena	Alumnus	X	
T. Briggs	Dillon	WMC	X	
[illegible]	[illegible]	[illegible]	X	
[illegible]	Missoula	Alumni		
[illegible]	MSU	U of M	X	
Dan McGee	Missoula	U of M	X	
[illegible]	MISSOULA	U of M	X	
Norma J Haber	Missoula	U of M	X	
Michael H. Kupilik	MISSOULA	UTU, U of M	X	
Kay Unger	Missoula	UTU, U of M	X	

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