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ABSTRACT

This document presents a technical report on faculty research to the Montana Commission on Postsecondary Education. Recommendations suggest: (1) There must be recognition of the fact that faculty members of the Montana University System are users and communicators of a vast array of existing knowledge developed within the larger regional national educational system. (2) The research function of the university system must be recognized and appreciated as one of the major resources available to the state of Montana. (3) Users of the research resources and services of the units of the system must be charged for the full cost of all such services unless the individual system unit has been specifically and fully funded by the legislature for each such service. (4) The different research missions of all units of the Montana system, designated by the Board of Regents, must be defined and periodically reviewed so that the research activity appropriate to each and the special needs and problems involved can be ascertained. (5) Indirect cost reimbursements from sponsors must be retained by the respective university system units. (MJM)

TECHNICAL GROUP REPORT NO. 3

FACULTY RESEARCH

Prepared for

COMMISSION ON POST-SECONDARY EDUCATION
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May, 1974

This is one of a series of reports by technical consulting groups which are advisory to the Montana Commission on Post-Secondary Education. The data and recommendations presented in these reports reflect the work of the technical group and its members and not the views of the Commission itself.

The primary purpose of these reports is to provide the Commission with information relevant to its task of developing plans for the future of Montana post-secondary education. Each report will be reviewed by the members of the Commission and used in the Commission's deliberations.

The Commission is indebted to the many individuals from institutions of post-secondary education, state agencies and professional organizations who served on the technical consulting groups, and to the institutions and agencies which contributed the data and personal services which made it possible for the technical groups to carry out their charges.

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FACULTY RESEARCH

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FACULTY RESEARCH

Charge

1. What are the past and future benefits of university research to the State of Montana (economic, cultural, etc.)?

2. What is the volume in dollars, or other measures, of research activity in the Montana University System?

   a) Show expenditures for, and describe the activities of, internally funded research for FY 1971, 1972 and 1973 of formally organized bureaus, institutes, centers, experiment stations and other separately budgeted research from institutional or foundation funds.

   b) Show expenditures (not awards) in externally sponsored research projects for FY 1971, 1972 and 1973, with subtotals for 1) capital equipment, 2) salaries, wages, and fringe benefits, and 3) other operating expenses.**

   c) Show and describe research performed by faculty members as part of their assigned work load but not separately budgeted or financed.

   d) Show and describe the voluntary (non-funded) research of faculty members not included in a), b) or c) above.

3. What is the volume of externally sponsored training and public service programs? Show subtotals for 1) capital equipment, 2) salaries, wages and fringe benefits, and 3) other operating expenses.**

4. What are the past and future benefits to the State of Montana of the programs reported in item 3, above.

**No distinction need be made between grants and contracts. FY 1974 figures to date may be supplied as well if they are available. The statistical summaries should identify individual sponsors and provide subtotals by federal, state, and other sources.

5. Describe the process by which external funds are acquired including the procedures for institutional approval, and the role and organization of foundations associated with individual campuses and their legal and fiscal relationships to the campuses.

6. Explain the process for developing indirect cost rates for sponsored programs.

7. For units having buildings primarily used for research, show:

   a) The costs to the state for construction and operation of these facilities.

   b) The relationship of the activities associated with these facilities to the missions of the respective schools and state research activities.

8. Describe the governance and control of university research stations. What is their role in education and their service to the state and society?

TABLE OF CONTENTS

INTRODUCTION

The Commission on Post-Secondary Education requested that each unit of the Montana University System appoint one or two members to the Technical Group on Faculty Research for the purpose of preparing a report which would answer questions contained in the Commission's Charge. Most institutions appointed two members: an administrator and a faculty member. The Group (hereafter referred to as the Committee) thus established held several meetings, the first of which was devoted to clarifying its Charge, establishing an agreement on procedures, and defining and standardizing the concepts and terms to be used in the report. At that meeting each team or representative was given the responsibility for developing a report on research at his[1] particular institution. The Committee held two subsequent meetings to review drafts of the individual institution reports which had been circulated to members of the whole Committee before each meeting. Using these individual reports, along with each member unit's suggestions and recommendations, a subcommittee met to draft the Montana University System Report. The entire Committee then met again to review, amend, and approve the final System Report now herein presented to the Commission on Post-Secondary Education.

This final Report consists of a discussion of the benefits of faculty research as set forth in the Commission's Charge, a summary display of data collected, definitions of crucial terms, recommendations to the Commission (including assumptions on which the recommendations are based), and an appendix which contains the faculty research reports from the in-

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1 No male chauvinism is intended; to avoid the awkwardness of his/her and he/she pairings, which only obstruct the communication process, the male pronoun is intended to be generic.

dividual institutions within the System. It is a long report for the sole reason that the Committee has conscientiously attempted to answer, as fully as is practicable, each of the questions posed by the Commission. The Committee feels that a knowledge of the scale, complexity, and diversity of research at the various units of the Montana University System is necessary to an understanding of the System Report; the Committee therefore urges that the individual unit reports contained in the appendix be read first. Indeed, the Committee feels that unless the unit reports have been read first, the System report will be difficult to comprehend and less valuable than it might otherwise be.

The Commission members will recall that training and public service sponsored programs were not mentioned in the original Charge to the Technical Group. Since these important and extensive activities would not otherwise have come to the attention of the Commission, they were incorporated in the amended Charge to the Committee.

The Technical Committee is willing to meet with the Commission, formally or informally, or with individual members of the Commission, to explain and interpret the data. The Committee respectfully asks that questions or requests for clarification be addressed to it. It would be very difficult for someone to summarize or to paraphrase the contents of this report who had not participated in its writing.

REVIEW AND SUMMARY OF DATA COLLECTED

DEFINITIONS

Research: Careful and diligent search; a studious inquiry or examination; critical or exhaustive investigation or experimentation having for its aim the discovery of new facts and their correct interpretation, the revision of accepted conclusions, theories, or laws in the light of newly discovered facts, or the practical applications of such new or revised conclusions, theories, or laws, and the presentation (article, book, performance, showing, et cetera) incorporating the findings of a particular research.[1]

Institutional research: The application of research techniques in the development of data and hypotheses relative to internal (institutional) decision-making and in response to requests for information by selected external authorities (auditors, regents, commissions, and so on). The description of institutional research was not included in the Charge to the Faculty Research Technical Group.

Indirect costs are those expenses necessary for the performance of some activity which are joint costs, and, therefore, difficult to assign directly to a discrete undertaking; they are, however, real costs verified and determined from actual expenditure data and the rates are established for reimbursement only after thorough auditing. Examples would include: accounting, payroll, and similar record-keeping expenses; supervisory and administrative personnel costs; utilities, janitorial services, and normal maintenance expenses of the space assigned to a given project;

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1 Webster's Third New International Dictionary of the English Language Unabridged. Springfield, Mass.: G. & C. Merriam Company, 1961.

library and similar support services; and use allowance for equipment employed but not provided by a sponsor.

Funded research: Sponsored program grants and contracts are restricted funds, i.e., they can be spent only for the purposes for which the grant or contract has been awarded. It would be illegal to divert these funds to pay institutional operating expenses.

Internally funded research: those activities paid for from local funds; i.e., appropriated money, sales and service income, foundations.

Externally funded research: those activities paid for by sponsors including local, State and Federal governments, private foundations, business firms, individuals, and charitable organizations.

Training and public service programs include organized educational programs at the graduate and undergraduate levels as well as short courses, workshops and conferences through the total continuing education role of the University System.

ASSUMPTIONS

The Faculty Research Technical Group shares with the Commission a sincere interest in providing high quality education within the Montana University System. In the preparation of its reports, the Group assumed that the Commission shares with us the belief that:

1. Research is a vital element in achieving high intellectual standards in post-secondary education;
2. Graduate education is not possible without providing training in research, and that such training is achieved largely through

the performance of research itself under the guidance of research scholars;

3. Undergraduate research is also essential and enhances the quality of training in most areas of the undergraduate program;
4. Scholarly and creative activities represent the research products of the humanities and fine arts;
5. Faculty members of any university or college are professionals in their disciplines with knowledge and expertise which they have a responsibility to share, not only with the educational community itself, but with the people of the State in the form of public service;
6. Externally funded training and public service grants make substantial economic and cultural contributions to the educational well-being of the citizens of Montana;
7. Higher levels of financial support are needed and justified to enable the Montana University System to meet its goals and objectives in post-secondary education. It is hoped that this support will be provided in a form and manner which will permit the freedom and flexibility necessary to respond to changing opportunities and responsibilities as they develop in the future.

BENEFITS OF RESEARCH TO MONTANA

To do justice to a description of the various kinds of research, scholarly and creative activity and to the degree of benefit of these to the State of Montana is not possible within the scope of the (Montana University) System report; a close reading of the individual unit reports themselves is necessary (see Appendices I-VI). However, the Committee

hopes that the following discussion does justice to the essential relationship between research and economic, social, and cultural well-being of the people of the State of Montana, those people who help maintain and support these institutions.

Benefits to the Educational Process. Contrary to the myth that research activity and excellence in teaching are mutually exclusive, it has been established again and again that the case is quite the contrary; it is often true that some of the very best teachers are those who are heavily engaged in research. This is true for several reasons: the teacher/researcher can use immediately his own research as an example of how one develops knowledge in a particular field; because he is often in contact with the best minds in his field, he can transmit the products of other research immediately to his students; his own enthusiasm and intense involvement often generate in his students enthusiasm for research and motivation. Most important, however, is the creative stimulation that the researcher receives from his own research and gives to his colleagues.

Many faculty members who do not engage in formal research projects are nevertheless outstanding teachers. The effective and stimulating lectures by which their reputations have been earned, are the result of extensive research in preparation for classroom activity. However, a description of this research was not requested by the Commission and, therefore, it has not been included in this report.

All of the benefits cited above ultimately accrue to students. But the benefits of research to students are even more direct. Graduate students benefit most directly through their opportunity to participate in the actual process. Less obvious, perhaps, but just as important, is the

benefit that undergraduates receive from participation in research projects: students see specifically how the knowledge they are accumulating is applied, can participate in the excitement of discovery, and are able to have close contact with the professor, thus receiving a learning experience more personal and valuable than is possible in a lecture hall situation.

Money spent for research activities is supportive of the general education process. Funds provided through research grants provide experimental equipment, supplies, and library materials which remain at the university and thus become available to future students and faculty for instructional use. Project grants provide summer employment for faculty and students with no drain on State or local funds; they provide employment for nonacademic personnel within the communities, pay for travel, and for the publication of articles and books.

Research activity has the effect of generating additional money for an institution through the personal contact of researchers with governmental and private funding agencies, with industry personnel, and from memberships in scientific, engineering, and other professional societies. Once an institution's research capabilities become known and respected, funding agencies and private corporations will look to it for help in solving problems which they are willing to support.

Benefits to Individual Communities and to the State. Research activity in the humanities and fine arts results not only in enhancing the cultural life of Montana citizens through the production of literary works, musical and dramatic performances, and such, it also generates economic activity. Activity in the fine arts, for example, has drawn people to the State who contribute to the economy in many ways, not the

least of which is the establishment of art galleries, craft shops, and other related businesses. The economic benefits from research in the sciences are much more tangible, of course, and of greater magnitude: funded research often provides jobs (secretaries, technicians, etc.) for people in the local communities; equipment is purchased from local businesses; and of perhaps the greatest economic significance, is the fact that research, through increasing the prestige of the institution, draws faculty and students who locate in the community and contribute to its economy.

For the State, research provides a general fund of knowledge that is invaluable to State and private organizations, either as specific research activity applied to the solution of a particular problem or as background knowledge on broad problems. The cost of duplicating or obtaining such information from institutions outside the State would be excessive.

As the economic, environmental, and social problems increase and become more complex in the State of Montana, as they most assuredly will, more and more research must be directed toward solving these problems. The numerous research contributions of higher education units in the past are carefully described in the individual university and college reports already reviewed in the appendices. These projects range from broad basic studies to the narrowest of applied research problems. They have dealt with many of the State's human, animal, land, mineral, and other economic resources.

Research accomplished in the Montana University System in the past, and the current research of Montana scholars, will be of value in the solution of these problems, even in areas where the problems have not yet been perceived. For Montana, research constitutes a dynamic force stimu-

lating educational improvement and economic growth. In both areas research activities are concerned with the development and application of scientific, technical, and social knowledge. The State of Montana is doubly rewarded by these undertakings: first, the cost of research by Montana's institutions is less than what is charged by other research organizations; and second, the Montana researchers are available later for consultation or for studies which continue or expand particular investigations. Traditionally, the fruits of these endeavors are freely shared for the public good.

DISPLAY OF EXPENDITURE DATA COLLECTED

EXPENDITURES
FOR INTERNALLY SPONSORED RESEARCH

Institution	Fiscal Year 1971	Fiscal Year 1972	Fiscal Year 1973
UM	$ 978,130.	$1,019,268.	$1,082,226.
MSU	3,720,181.	3,766,828.	3,919,016.
MCMST	387,307.	428,647.	443,217.
WMC	0	0	0
EMC	0	0	0
NMC	0	0	0
Montana University System Total	$5,085,618.	$5,214,743.	$5,444,456.

EXPENDITURES
IN EXTERNALLY SPONSORED RESEARCH
FISCAL YEAR 1973

Institution	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 148,742.	$1,099,142.	$ 477,036.	$1,724,920.
MSU	171,009.	1,235,860.	845,348.	2,252,217.
MCMST	10,219.	48,556.	53,840.	112,615.
WMC	0	0	0	0
EMC	2,668.06	3,092.33	21,684.07	27,444.46
NMC	0	0	0	0
Montana University System Total				$4,117,196.46

EXPENDITURES
IN EXTERNALLY SPONSORED RESEARCH
FISCAL YEAR 1972

Institution	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 219,976.	$ 902,833.	$ 457,973.	$1,580,782.
MSU	134,449.	998,451.	718,080.	1,850,980.
MCMST	5,815.	50,119.	93,430.	149,364.
WMC	0	0	0	0
EMC	10,204.27	2,686.95	5,069.08	17,960.30
NMC	0	0	0	0
Montana University System Total				$3,599,086.30

EXPENDITURES
FOR EXTERNALLY SPONSORED RESEARCH
FISCAL YEAR 1971

Institution	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 87,424.	$ 753,656.	$ 408,005.	$1,249,085.
MSU	70,809.	957,535.	605,014.	1,633,358.
MCMST	34,960.	184,352.	216,665.	435,977.
WMC	0	0	0	0
EMC	2,311.95	53,981.55	131,800.15	188,093.65
NMC	0	0	0	0
Montana University System Total				$3,506,513.65

EXPENDITURES
IN EXTERNALLY SPONSORED TRAINING AND PUBLIC SERVICE PROGRAMS
FISCAL YEAR 1973

Institutions	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 54,526.	$1,036,268.	$ 704,965.	$1,795,759.
MSU	23,952.	704,056.	706,946.	1,434,954.
MCMST	0	0	0	0*
WMC	0	0	0	0
EMC	42,967.58	432,532.04	360,337.13	835,836.75
NMC	0	47,308.24	53,990.53	101,298.77
Montana University System Total				$4,167,848.52

*Please consult the appendix for MCMST's reply to question 2(a).

EXPENDITURES
IN EXTERNALLY SPONSORED TRAINING AND PUBLIC SERVICE PROGRAMS
FISCAL YEAR 1972

Institutions	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 99,378.	$ 899,818.	$ 787,843.	$1,787,039.
MSU	36,156.	495,505.	577,873.	1,109,534.
MCMST	0	0	0	0*
WMC	0	0	0	0
EMC	31,692.81	340,211.37	333,477.81	705,381.99
NMC	0	8,932.97	53,162.80	62,145.77
Montana University System Total				$3,664,100.76

*Please consult the appendix for MCMST's reply to question 2(a).

EXPENDITURES
IN EXTERNALLY SPONSORED TRAINING AND PUBLIC SERVICE PROGRAMS
FISCAL YEAR 1971

Institutions	Capital Equipment	Salaries Wages and Fringe Benefits	Other Operating Expenses	Total
UM	$ 842,286.	$ 140,472.	$ 945,276.	$1,928,034.
MSU	31,521.	482,157.	409,598.	923,276.
MCMST	0	0	0	0*
WMC	0	0	0	0
EMC	339,076.53	37,021.27	352,727.46	728,825.26
NMC	0	0	6,747.20	6,747.20
Montana University System Total				$3,586,882.46

*Please consult the appendix for MCMST's reply to question 2(a).

RECOMMENDATIONS

PROBLEM NEEDING FURTHER STUDY

The citizens of Montana have a substantial stake in the expansion of research within the Montana University System. They have shown their concern in many ways on the issues surrounding the development of the State's agricultural, mineral, forest, recreational, and human resources.

Although Montana is rich in natural resources, their development is becoming more complex and difficult. Resource problems are interrelated, and research can be expected to aid in resolving these problems. One positive result of research would be a more efficient use of the State's natural resources. The introduction and application of scientific and technical knowledge, making possible new and improved products and processes, will significantly and beneficially influence the growth of the total economy of Montana.

Individual units of the System have developed varied capabilities for research. All these skills, and their supportive laboratory resources, will be needed to cope effectively with the problems that Montana will be facing. Inter-institutional and State agency cooperation has been established in the important research areas of coal, water, environmental and social problems; and much more cooperation is expected in areas where such efforts are appropriate.

A public university has strong obligations to relate its research programs to the state that it serves and to cooperate with other units to bring the best resources to bear on specific problems. Similarly, the state has an obligation to provide adequate and flexible financial support to make certain that success in these projects is assured.

Many people believe that rapid and extensive changes are imminent in the State's economic, political and social circumstances. It is within our power to influence these developments so that the consequences are acceptable to most Montanans. One way to accomplish this is to make available discretionary funds to the research community. With as many as three years separating budget preparation decisions and the actual expenditure of funds, specific demands and problems of the executive and legislative branches of government are impossible to predict.

A major source of support for higher education now exists and is used extensively by nearly all states of the union. That source is federal revenue-sharing money. Of the funds expended by all fifty states, sixty-five percent of the money has been allocated to education.[1] To provide the stability needed, to address the many issues previously cited, to meet the demands of both State agencies and Montana citizens, and to do these things efficiently and promptly, the Commission is repectfully urged to investigate the allocation of revenue-sharing funds to support higher education.

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1 Total Revenue-Sharing funds expended by state governments for education: $664.3 million. Higher Education Daily, March 11, 1974.

POLICY RECOMMENDATIONS

Based upon its analyses of the unit reports and its discussion of problems relating to research activity at each of the units of the System, the Committee makes the following general recommendations to the Commission:

1. There must be recognition of the fact that faculty members of the Montana University System are users and communicators of a vast array of existing knowledge (in science and technology, as well as in the humanities and fine arts) developed within the larger regional and national educational system, and that they have a professional obligation to contribute to this "pool of knowledge."
2. The research function of the University System must be recognized and appreciated as one of the major resources available to the State of Montana in its solution of technological, economic, social, and environmental problems.
3. Users of the research resources and services of the units of the System must be charged for the full cost of all such services unless the individual System unit has been specifically and fully funded by the Legislature for each such service. Federal agencies both determine the rate of and pay the indirect costs. State agencies often do not. When a unit fails to recover all the expenses of a State agency program involving such services, some degree of exploitation of the educational institution is inevitable.
4. The different research missions of all units of the Montana System, designated by the Board of Regents, must be defined and periodi-

cally reviewed so that the research activity appropriate to each and the special needs and problems involved can be ascertained. The budgets of each of the individual units should provide sufficient funds to carry out the research activities specified in its "mission".

5. Indirect cost reimbursements from sponsors must be retained by the respective University System units. This is statutorily correct and administratively proper; they have borne the costs which are merely being repaid. Further, these funds are used to promote sponsored program development thereby making the process self-sustaining.

In accord with the general policy recommendations, the Committee offers these additional specific proposals:

1. Since faculty in the Montana University System have a dual role as professionals in their own fields of expertise and as educators, those most qualified should be vigorously encouraged and financially supported to pursue their research activities by providing them with:
   a. adequate released time to conduct research, training and public service programs;
   b. sabbatical leaves;
   c. increased faculty exchanges within units of the Montana University System and with other research organizations, in order to promote the transfer of ideas, information, and techniques between and within disciplines of all units; and,

d. necessary released time for the preparation of proposals for research, training, and public service; presently, faculty members have to prepare such proposals on their own time and at their own expense because sponsors do not pay pre-program costs.

2. The State must recognize the researcher/teacher as having unique requirements. If more expertise is expected of the research scholar, then he should be given more in terms of compensation, work-space, travel, and technical facilities.

3. The Commission does recognize the role of libraries in the teaching function; it is urged to support the less obvious but very important need for adequate library holdings to do effective research. The physical isolation of Montana's researchers, scholars and artists can partially be offset by the addition of current research publications.

4. State funding should be sufficient to make it possible to support faculty and graduate student seminars, symposia, and visiting scholars, and to facilitate inter-unit cooperation in common research projects.

In summary, we recommend as a matter of highest urgency and priority that a firm State funding base be established for Montana faculty research. External funding should be complementary; State support is needed to enable the individual units to serve the State and to protect Montana researchers from being entirely dependent upon the uncertainties of external funding. Funds allocated to research activity must be adequate in amount and provided in a manner which will allow freedom and flexibility necessary to accommodate the full spectrum of research activities. Further,

decisions regarding the amount of funds to be made available should be made on the basis of a thorough and realistic understanding of the complex processes and conditions entailed in research activity.

The Committee feels that it would be remiss in its duties if it did not emphatically point out that as the social and technological problems of civilization become ever more complex and resistant to solution, the research necessary to provide us with crucial solutions becomes even more essential, perhaps even to our survival. The educational system itself and the community at large have a profound stake in the quality and success of the research efforts undertaken by the Montana University System.

Montana's Governor Thomas L. Judge has forcefully and accurately stated what the Faculty Research Technical Group believes is an appropriate conclusion to its report to the Commission on Post-Secondary Education. In his speech to the Science Institute, March 19, 1974, the Governor said:

> The "Blue Ribbon" Commission on Post-Secondary Education . . . is conducting a thorough study of Montana's university units, vo-tech schools, and community colleges to determine Montana's priorities and establish the level at which we can support post-secondary schools and still maintain quality education. <u>The purpose of this study is to improve higher education in this state</u> to the point the young people of Montana will have the opportunity to work for a quality education at a cost both students and taxpayers can afford.[1]

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1 Underlining supplied.

Governor Judge also stated:

> I assure you that state government . . . will continue to direct its attention to these problems [in agriculture, tourism, wood products, minerals, manufacturing] and we will be applying the scientific and technological resources of this state to achieve workable solutions. In this regard, we must maintain and support the research program at our university units. The various units have made a tremendous contribution to our state.[1]

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1 Underlining supplied.