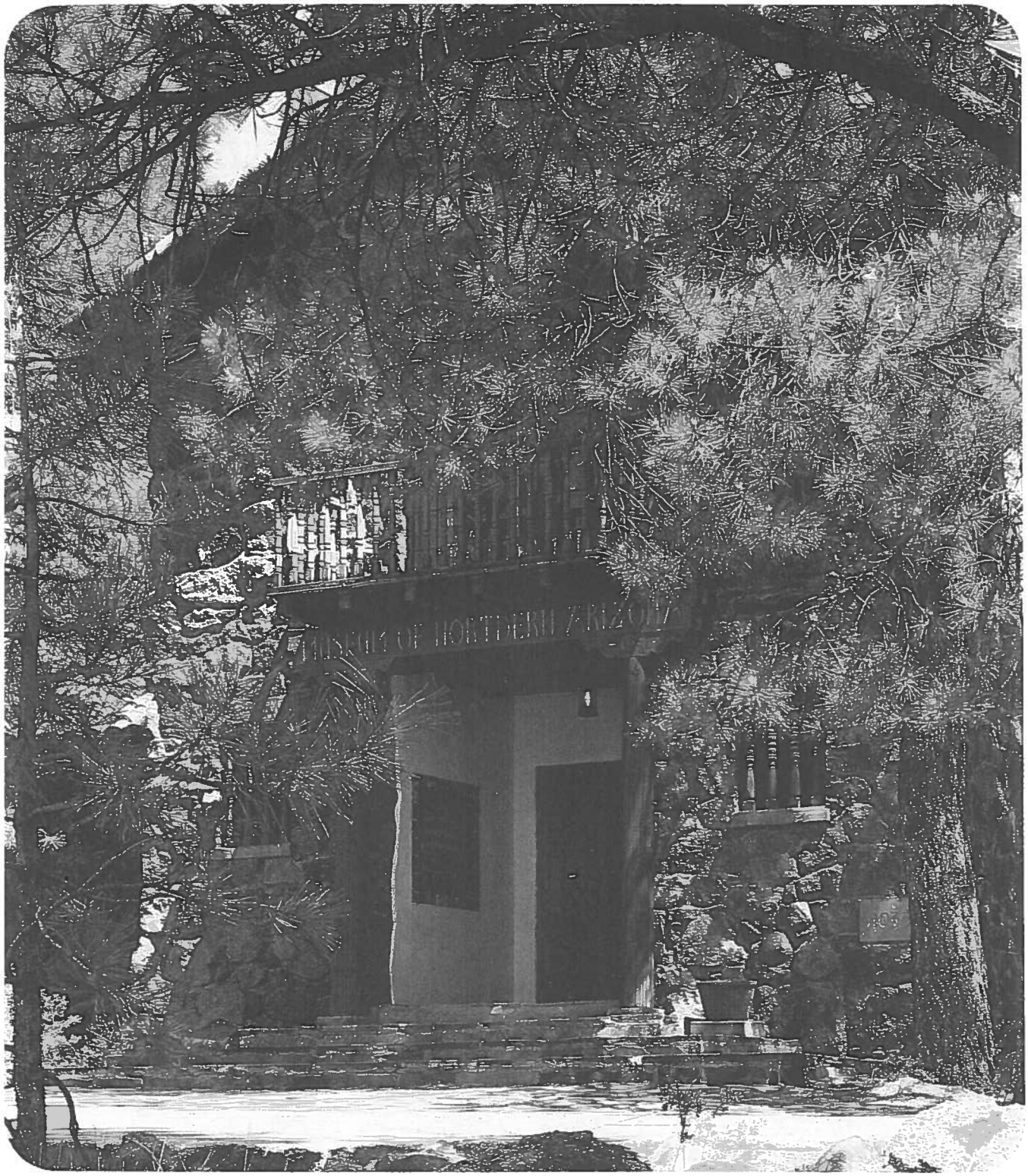
PLATEAU

THE MAGAZINE OF THE MUSEUM OF NORTHERN ARIZONA



The Museum — Fifty Years

To cover the Museum and its departments within the space of one issue is a difficult proposition, and what appears on the following pages is the small distillation of a long and complex history. Two elements which can be found running through each article, however, are an awareness of and a deep concern for both the past and future. And, as the Director notes in his introduction, the potential which the future holds is one of the great resources the Museum possesses.

Space limitations also prevented covering every department in this issue, but photography, the library, publications, and special programs, such as the solar greenhouse, are all solid contributions to the stature and growth of the Museum.

This issue of *Plateau* was a fascinating one to assemble, and we hope that it conveys the pride and enthusiasm which permeate the entire institution.

Rick Stetter

RICK STETTER, EDITOR

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FRONT COVER: Entrance of Museum exhibit area. Photograph by David Sucsy.

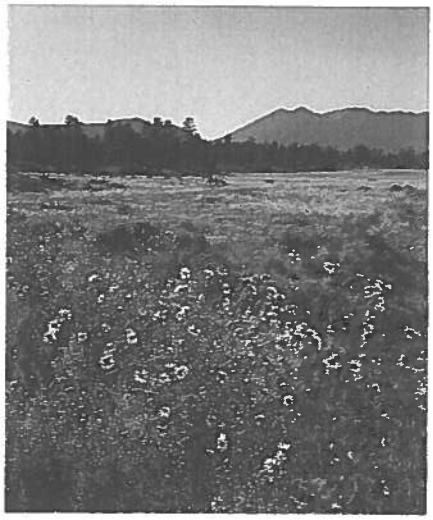
BACK COVER: Portion of Awatovi kiva reconstruction in Museum exhibit area. Photograph by David Sucsy.

PLATEAU

VOLUME FIFTY NUMBER FOUR

Reflections on a Fiftieth Anniversary

by Hermann K. Bleibtreu



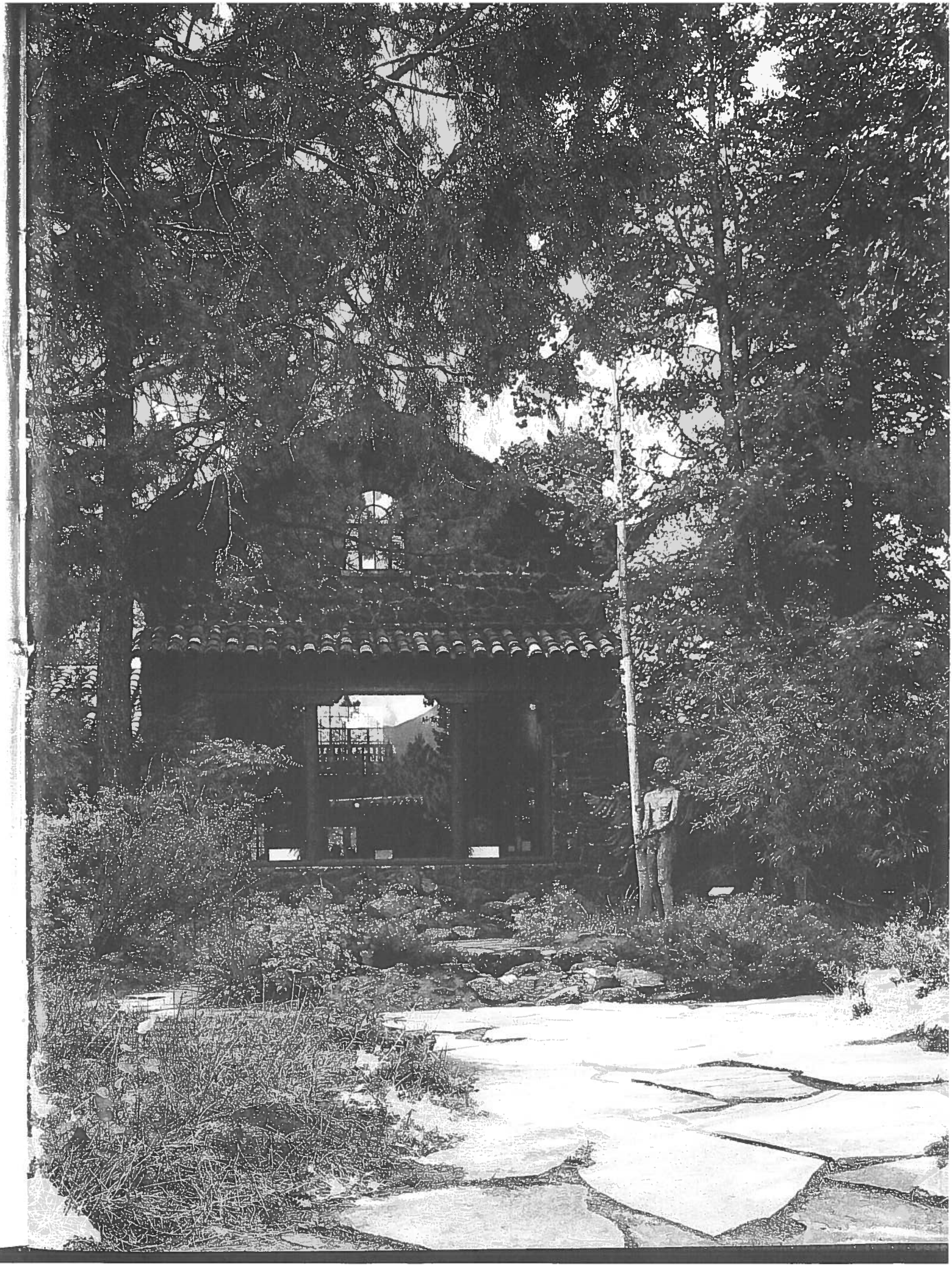
Is it justified to celebrate a fifty year survival of a "legal fiction" — as the astute Peter Drucker refers to all organizations? Survival *per se*, at least through the reproductive period, is only a positive attribute for biological, not institutional creatures. And if we agree with Drucker that organizations are merely vehicles that provide the means for the accomplishment of certain tasks and goals, then the extent of our celebration of the Museum's fiftieth anniversary should be governed by its accomplishments, not its longevity. It is simply unwarranted to assume that because the institution has existed for half a century, it *must*, therefore, be worthwhile. Surely it will not take each of us very long to compile a list of anachronistic, dated, unproductive organizations that inertially hang on and on.

Prudent people are usually reluctant to form the "legal fictions" for fear that their creation will take on a life of its own, with a consequent abandonment of original goals. I think Dr. Colton had such hesitations, and really only resorted to formal organization and bricks and mortar when a personal and simpler way could no longer achieve the goals. Thus, the Museum developed slowly as the needs arose, and he showed organizational wisdom in another way — he wrote down the goals in the form of bylaws. After fifty years, these continue to serve as the final arbiter for whether the institution is "on-track" or not.

If productivity and the meeting of needs is the measure of the Museum of Northern Arizona — rather than survivorship — how do we stand after fifty years? The articles in this issue of *Plateau* should help answer that question even though one writes laudatory rather than critical pieces for these occasions. Obviously the record is not altogether even. Opportunities have been missed, practices have been continued beyond their usefulness, professionalism and quality have not always received the highest priorities. But on the whole, I think you will find the Museum alive, well and productive, serving to enrich the lives of thousands and thousands of people. Moreover, its research, curatorial and interpretive potential continues to increase. The realization of that potential is *the* driving force in the institution. We are impelled and compelled by it. It is contagious, exciting and challenging. It is what the past has provided. I hope you will join us in reaching it and share our satisfaction as it unfolds.

The San Francisco Peaks and summer sunshine. Photograph by David Sucsy.

(Right) Museum courtyard. Photograph by David Sucsy.



THE MUSEUM OF NORTHERN ARIZONA: A BRIEF HISTORY

by Edward B. Danson

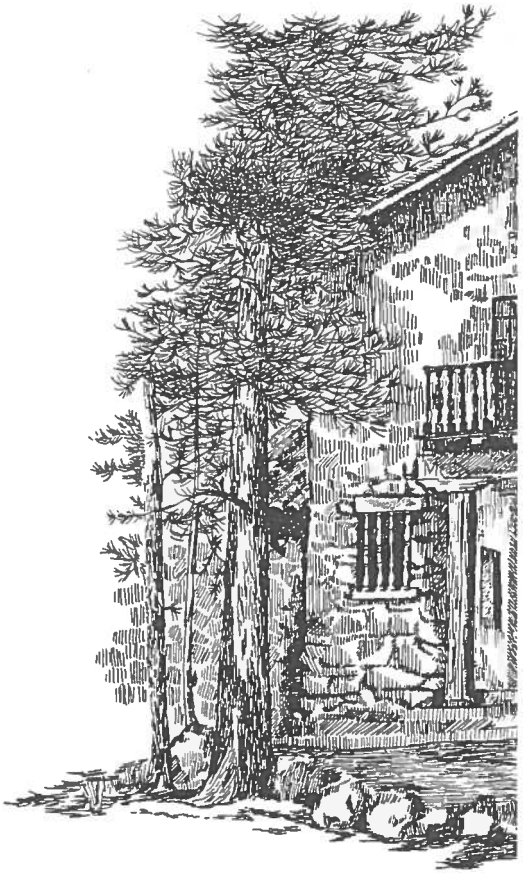
Twenty-five years ago, Dr. Harold S. Colton wrote of the history of the founding of the Museum of Northern Arizona in Flagstaff and the part which he and his wife, Mary-Russell Ferrell Colton, played in the beginning of the Museum. Today, on its fiftieth anniversary, it is interesting to note that the purposes and functions of the Museum remain much as that visionary couple and the Board of Trustees first conceived them.

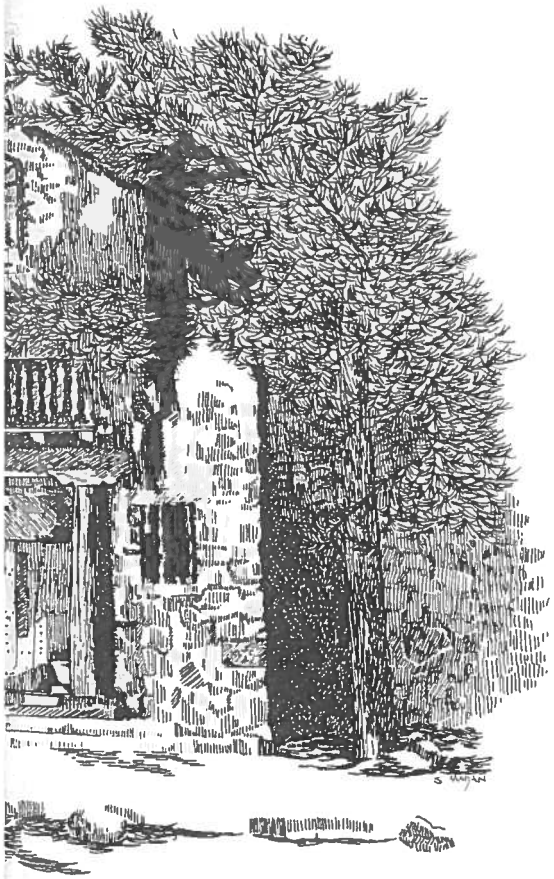
The purpose of the Museum is "to increase and diffuse knowledge and appreciation of science and art, and to maintain in the city of Flagstaff a museum; to collect and preserve objects of scientific interest; to protect historic and prehistoric sites, works of art, scenic places and wildlife from needless destruction; to provide facilities for research and publication, and to offer opportunities for aesthetic enjoyment."

The directors and board members of the Museum have always followed policies that would encourage research by staff members and by visiting students and scientists. Collections have always been maintained for use in comparative studies, and gradually, over the years, a library has been developed for reference and the institution has published the results of the studies in a quarterly, *Plateau*, and in special reports and monographs. Over the years the staff and the facilities have grown, but essentially the purposes as expressed fifty years ago remain the guiding principles of the Museum today.

There have been changes in the twenty-five years following Dr. Colton's report; changes from seasonal work to year round research; an increase in contract studies instead of basic research; an increase in the number of such studies carried out by Museum staff instead of by visiting scientists; an increase in the size of the acreage and in the number of buildings owned and an increase in the number of staff from three to over one hundred and thirty on the payroll today, approximately one hundred of whom are involved in contract studies or working on grants.

How this growth came about is, of course, the story of what happened at the Museum. Originally a small operation with much of the research being done by a small staff and by the Director and his wife, the Museum grew by encouraging other institutions to make use of its facilities as they did their research in this scientifically rich area. Within one hundred miles a wide section of the history of the earth's rock formations could be studied. Within a hundred miles elevations ranged from two thousand to over twelve thousand feet





with a concomitant wide range in plant and animal life. Within a hundred miles man's history could be traced back nearly eight thousand years. Today seven native American tribes live within that one hundred mile radius with their varying languages, customs and crafts.

Gradually the collections that were accumulating through research and gifts demanded more space than was available downtown, so in 1936 the present Museum building was built. This and the Museum Annex near the home of Dr. and Mrs. Colton housed the collections, provided the necessary office space, and in two galleries the results of the scientific research were shown to the public. In 1948, Mrs. Colton donated a portion of her ranch and its buildings to the Museum. The Geology Department, under Dr. Edwin D. McKee, was then the busiest research group and they moved over into the old cow barn.

In 1952, a large gift was given to the Museum making it possible to build a new research center building and to move the research staff, all of their collections, and the library and photography departments from the Museum building to the research center. This move was completed in 1954 and many new exhibits were then built at the Museum. Each division had its own gallery, and there was room for a special exhibit gallery and office space for the Museum's exhibition staff. The Museum was ready to grow.

In 1955, by a fortunate chance, a botanical ecologist, Dr. Walter B. McDougall, retired from the National Parks Service and, after discussion with Dr. Colton, became the first full-time — though unpaid — Curator of Botany. It has been because of his foresight, planning and wisdom that the Biology Department has grown to become recognized as a center for ecological studies.

During the first half of the 1950s another important research study drew to a close. But it was one that had far reaching and important implications for the anthropological program in particular and for the entire Museum in general. Shortly after the war, the El Paso Natural Gas Company made plans to dig a ditch and lay a pipeline from Texas, across New Mexico to Arizona to California. Mr. Jesse Nusbaum, then with the National Park Service, realized that the line would be excavated through state, Indian and federal lands. Because of the State and Federal Antiquity Laws, he was able to persuade the company to fund an archaeological survey and the resulting excavations along the route of the ditch. The work was done by staff specially hired for the job by the Laboratory of Anthropology in Santa Fe and by the Museum of Northern Arizona. This was the first large scale salvage archaeological program funded by private industry and was the forerunner of many future projects. Without the financial support generated by this kind of work the growth of the Museum would have been far slower.

Geology had long played an important role at the Museum. Dr. Colton was interested in the San Francisco Mountains volcanics, and in particular the cinder cones and their basaltic flows. In 1941, a definite program of studies was started under the direction of Dr. Edwin D. McKee. He and graduate students systematically studied the earth history as represented by the remarkably good exposures of sedimentary rocks, and the events that uplifted the Colorado Plateau and resulted in the erosion of the Grand Canyon. Economic geology studies, especially those concerned with subsurface water, oil, coal and uranium deposits, were also pursued.

By 1953, this research program had run much of its course, but in 1955 a new study began in a field of geology that was to have worldwide implications. Dr. Keith Runcorn, then at Cambridge University and now at New Castle University, began his studies at the Museum on the magnetic properties of the various formations in the area. This work eventually led to the publication of his geological studies of the wandering magnetic pole. They confirmed the studies he had made in Europe. This research had tied in closely with the acceptance of the hypothesis of moving continents and an understanding of plate tectonics. Later, Dr. Edwin Colbert's work in Antarctica confirmed the fact that continents do move.

By the mid 1950s the Museum of

Northern Arizona was ready to launch into a new period, a period marked by growth in the number of research projects being worked on in the major fields of interest. Anthropology and biology had full-time curators, there was a full-time librarian, Katharine Bartlett, who had been Dr. Colton's assistant in his archaeology and meteorology studies; Milton Wetherill was in charge of buildings and grounds; there was a comptroller and a Curator of the Museum. Only geology lacked a curator. The new period would also see growth in staff, in collections and in buildings. All of this growth was based on the sound principles set down by the founders, all was based on the previous research, and all was presaged by the developments in the early 1950s.

With the completion of the move to the Research Center, only art and exhibits remained at the old Museum building. In 1955, upon the death of Alexander Brodie, Curator of Art, Barton Wright became the Museum Curator. Mr. Wright's special exhibits on complicated scientific subjects were of great interest and covered many fields. In 1969 funds were raised for a new ethnology wing and soon afterwards a museum shop.

Although Mrs. Colton had instigated the Junior Indian Arts Exhibits, held the first all Arizona Artist Exhibition, and started the Hopi and Navajo craftsman shows, the collections of art were never an important part of the Museum's activities until the 1960s. Then with the aid of funds made available to the Director by members of the Collectors Club, and through some important gifts of art from generous donors, the Museum's western art and Indian collections began to grow rapidly. With the gifts of the late Katherine Harvey's Indian art collection, the Clay Lockett collection and the Woodard collection, the Museum's Indian art collection, thanks to these large gifts and many smaller ones, is an important one. The art collections are continuing to grow, and there is now a real need for an art wing at the Museum.

With the move to the new building, the library under Katharine Bartlett began to grow rapidly. Large collections came from Dr. Colton, Dr. Mischa Tetiev, the late Earle R. Forrest and the late Dr. Gladys Reichard. Over the years, gifts from Watson Smith, Dr. and Mrs. Goin, Don Neff, Dr. Sherman Wengerd, Dr. Robert Black and many others began to fill the stacks.

Dr. Leland Wyman's file of Navajo sandpaintings and the historical archives which he organized, where original notes of scientists who worked on the southwestern plateau are kept, and the map collections, are all of great and growing importance. The growth has been so great that in 1972 and 1973 a new addition was added to the library, now called the Harold S. Colton Library in honor of the founder and first director. Dorothy R. House is now librarian, and Miss Bartlett is in charge of the archives.

The publication program was of primary concern from the beginning of the Museum. This program became so important that in 1956 the first full-time editor was appointed. The publications' program expanded into the Museum Press in 1978, and currently has over seventy titles in print with eight more due by the end of the year.

Along with publication went the development of the Photography Department which has grown to need two full-time staff. Large important collections of early photographs came to the Museum, particularly those of Ansel Hall, Earle R. Forrest and Kate Cory, which number in the thousands. Seventeen hundred glass plates taken by the fathers at Saint Michael's Mission at Ganado were cleaned and copied by Paul Long. Thanks to these and other gifts our collections of the Plateau area and its occupants are of increasing importance.

One other important part of the Museum's activities from its beginning has been in education. In 1921, Dr. Colton brought out from Pennsylvania a young student, Frank Bacter, to help him in his research. Well over one thousand students have worked at the Museum since that date, as paid summer assistants who work in their special field of interest with scientists from our staff or with visiting scientists. In the 1960s funds became available to help graduate students with grants to enable them to work on dissertation projects that were also of interest to the Museum.

Hermann K. Bleibtreu. Photograph by Mark Miller.

This program and the number of field schools that made use of the Museum's facilities, scientific staff and knowledge led, in the 1960s, to a number of universities and colleges signing cooperative agreements with the Museum. The University of Indiana paid to establish a Linguistic Field School headquarters on the Research Center grounds and the Atmospheric Sciences Research Center at the State University of New York, Albany, received a grant from the Fleischman Foundation to build and equip a building for their field work. The culmination of this type of use of the Museum's facilties was the Lake Powell Project, under the direction of Dr. Orson Anderson. This was a study to try to determine what the building of the Glen Canyon Dam with the resultant lake, power plants, communities and changing economy had done to the area and its people. These studies were undertaken by teams under Dr. Anderson's leadership. They came from fourteen universities and other agencies. The

Financial officer Jimmy Wood. Photograph by Mark Miller.

sixteen projects were supported by grants from the National Science Foundation's R.A.N.N. division and twenty-six scientists were associated with it in its first year, including Museum atmospheric scientist Dr. Eric Walther.

The increased use of the Museum and its facilities by other universities, combined with the ever growing contract research work in biology, geology and especially archaeology, produced a need for more space. A geology building was added in 1967 by means of a National Science Foundation grant. In 1972, the library was doubled in size and, in 1974, the Biology Department began to take over part of the original geology building in addition to the biology wing built in the 1960s. The addition of the large Butler building more than doubled the anthropology storage space, and still the need for adequate laboratory and storage space remains to be satisfied. An art wing at the Museum is as yet but a dream, although thanks to the new Museum Curator, Robert Breunig, the Curator of Art, Katherin Chase, more wall space is now available.

Mr. John G. Babbitt became the President of the Board in 1971 after the death of Dr. Colton, Director and President of the Board since 1928. All of the history of the Museum would have been impossible without the wisdom and patience of this gentle man of science, who, with his wife, established the goals and purposes of the Museum. Dr. Colton was a scientific generalist, and he authored over two hundred books and articles covering studies in cultural anthropology, archaeology, geology, biology, meteorology, history and art.

By 1975, it was apparent that the Museum had become a big business as well as a respected research and educational institution, and its director had to be a strong and capable administrator as well as a scientist. Dr. Hermann K. Bleibtreu filled all of these requirements, and had over a long period been aware of the Museum and its activities.

Since Dr. Bleibtreu's arrival, the finances of the Museum have been put into the hands of an experienced financial officer with the appointment of Jimmy Wood as Director of Business Affairs. There has been increased public involvment in the Museum's educational projects, expeditions, photographic and art workshops, and the docent programs. All have proved popular and have resulted in an increased interest in the Museum by our members.

A planning grant from the National Endowment for the Humanities has resulted in an exciting plan for new exhibits in the anthropology wings. A planetarium, to be located near the Museum building, has been approved by the Board and the future looks promising for other new exhibits.

I should not end this review of the developments of recent years that have made the Museum of Northern Arizona an important research institution, with a competent staff, important collections and with, for a museum, a better-than-average financial picture, without mentioning some of the people and ideas that have been responsible.

Thanks to an outstanding group of trustees, the Investment Committee has been able to see that our small endowment produces at a remarkably high return and with sound investment policies. Clay Lockett's insistance that only high quality, genuine Indian arts and crafts be sold in the Museum Shop at reasonable prices has made the shop one of the best known in the Southwest, and one which returns needed income. The income derived from contract archaeological, biological and geological studies is important.

Thanks to the early start in contract archaeology and to the programs developed by Dr. Alexander Lindsay, and by Dr. Steven Carothers in biology, the Museum of Northern Arizona has today one of the largest contract research staffs in the country.

The Geology Department continues to bring interested scientists from throughout the world to review our collections and to learn of important locations for study. Some contract work is now being done and Curator William Breed's publications and maps are drawing attention to the Museum. Dr. Edwin Colbert's work on fossil finds in South Africa, South America and Antarctica have helped prove the hypothesis of drifting continents and has been of international importance.

The greatest growth in the past five years has been in the Biology Department under the dynamic leadership of Dr. Steven Carothers. It has moved rapidly toward becoming one of the centers of ecological studies in America.

Our collections are vitally important for anyone wishing to work in the Plateau area in any field of natural science, history or art.

Although it is easy in a report such as this to mention the highlights and the persons who have contributed, the fact is that almost everyone who has worked here has left a contribution to our growth. The everyday small discovery, the minor accomplishments and the single items donated to the Museum have helped to produce the highlights that mark this anniversary issue of *Plateau*.

The Director has said in his 1977 annual report that 1978, the fiftieth anniversary year of the Museum, would be the best yet. I invite all of you to share in making this a reality.

Museum Interpretation

by Robert Breunig

In 1978 planning began on an entirely new set of permanent exhibits at the Museum of Northern Arizona. At the same time, new special exhibits and educational programs were being developed. It is appropriate that these new beginnings were started in our fiftieth anniversary year, for if all these plans and dreams are realized they shall be part of the most ambitious set of interpretive projects yet undertaken by the Museum. While the new designs and the programs will give a fresh look to the inside of the Museum, we are mindful of our beginnings, and a look back to the goals and directions established by our founders has been an important part of the planning process.

In the area of exhibits, the Museum has always had a mix of permanent and "special," or temporary, exhibits. Dr. Colton believed that the permanent exhibits should not be simply a collection of artifacts, but rather that they should always tell a story or illustrate a concept. He also believed that the exhibits should be presented at a variety of levels so that there would be material of interest for everyone from the casual visitor to the serious scholar. In the early days of the Museum, before there was a physical and mental separation between the exhibit area and the research areas, everyone at the Museum had a hand in the exhibits. Katharine Bartlett reports that when anyone had an idea "we just tried it out" in an exhibit. Someone interested in a particular project got out the appropriate material and wrote the label copy; and from 1932 to 1948, Virgil Hubert painted the backboards of the cases and did the graphic work. These earliest displays consisted of a set of interchangeable, standardized cases and tables, many of which are still in use today.

For roughly the first twenty-five years the special exhibits program was directed by Mary-Russell Ferrell Colton, who developed the first special exhibits policies at the Museum. Her ideas were far-sighted and are useful even today as a guide to the future. She felt that the Museum's special exhibits should fulfill three basic objectives: to bring outside art influences into northern Arizona, to encourage the artistic potentials within the community, and to stimulate the Native American arts of the region.

To meet the first objective she brought in a number of special exhibits, many sponsored by The American Federation of Arts, which were designed to end the "cultural isolation" of Flagstaff.

The very first special exhibit at the Museum of Northern Arizona in 1929 was a collection of costume drawings and stage settings for Shakespearean plays. That exhibit was followed by displays on Dutch art and contemporary American prints. In succeeding years Mrs. Colton sponsored such diverse exhibitions as "Japanese Prints" (1930), "Original Christmas Cards" (1930, 1932), "Peruvian Textiles" (1937), "Arts and Crafts of Bali and Java" (1937), "Watercolors of Guatemala" (1938), "Spanish Colonial Design," from The Metropolitan Museum of Art (1943) and "Understanding the Child Through Art" (1947). Given the size of both the

The Museum of Northern Arizona occupied this structure, the Flagstaff Women's Club, between 1928 and 1935.

Museum and Flagstaff, this range of exhibit material seems remarkable.

To stimulate local art, Mrs. Colton organized several annual shows as well as a number of special shows for local artists and photographers. From 1929 to 1936, Mrs. Colton put together The Arizona Artists Exhibition designed "to give the widely distributed artists and craftsmen of Arizona a feeling of unity and common purpose." This show was, evidently, the first regular state-wide showing of Arizona artists. By 1936 Mrs. Colton felt that the original purposes of the exhibit had been accomplished, and that with the rise of local arts and crafts centers throughout the state such a show was no longer needed. It was discontinued that year.

Mrs. Colton's interests also extended to children's art, and in 1931 she started a Junior Art Show — a competitive show containing works collected from children in the fourth through eighth grades from all over northern Arizona. To her, the show was not only "charming and lively," but it represented the results of a campaign to foster art education in area schools. In a phrase echoed by some child psychologists today, Mrs. Colton maintained that art education was "not a frill, but a basic necessity." World War Two forced an interruption of the show, and after the war it was reactivated as The Junior Indian Art Show when the local Flagstaff schools decided not to participate, leaving only reservation schools involved. Happily, in 1977 all of the area schools joined in a revival of the original show concept, and the show has been renamed the Student Art Exhibition of Northern Arizona.

Mrs. Colton had been intrigued with Hopi art from the time she first arrived in the Southwest. Upon the founding of the Museum, she went to work to organize a Hopi Show. After surveying the state of Hopi arts and crafts, Mrs. Colton lamented what she considered to be a decline in quality due to the introduction of commercial materials and to market pressures for curios rather than fine arts. She felt that Hopi art could be preserved by promoting traditional techniques and by encouraging a more sophisticated market.

In the fall of 1929, Dr. and Mrs. Colton made a trip to the Hopi mesas to discuss their ideas for a show with the Hopi. There was some initial skepticism about the show — the idea of sending items to Flagstaff on consignment was novel to most of the craftsmen. Still, enough were persuaded to do so that a Hopi Craftsmen Exhibition was held in the summer of 1930. So began a tradition that has continued every summer since, except during Word War Two. Today, annual collecting trips are made in May and June, and over a thousand items are submitted by the Hopi for the exhibit and sale. Many of Mrs. Colton's hopes for the show have been realized. The quality of many of the crafts has improved since the late 1920s, and a demanding and sophisticated market eagerly awaits the opening of the yearly Hopi Show.

A similar project was undertaken for the Navajo beginning in 1936. The Navajo Show proved to be much more of a challenge, for the textile weavers were difficult to collect from given the size of the reservation and the condition of the roads. Eventually, much of the material was collected from The Navajo Arts and Crafts Guild and, later, from reservation trading posts. Like the Hopi Show, the Navajo Show has become a standard part of the summer exhibition schedule.

Mrs. Colton's active participation in the exhibits process declined in the early fifties, and most of the exhibits work was handled by Alexander Brodie, who had become Curator of

Art in 1949. A marvelous painter in his own right, he created the mural of Oak Creek Canyon now on display in the Geology Gallery.

In the last few years of Mrs. Colton's involvement and after, there was a narrowing of focus in the area of special exhibits, and for the past twenty-five years almost all have been restricted to themes of the Colorado Plateau or the Southwest.

As the Research Center grew on the acreage across U.S. Highway 180, fewer of the research personnel were involved in the Museum's exhibits, and the exhibits became the work of specialists. In 1957 the Curator of Art and Exhibits, Barton Wright, became Curator of the Museum, and in that position assumed full responsibility for the exhibition area on the south side of the highway. Mr. Wright continued the Hopi and Navajo show traditions, redesigned all of the archaeology exhibits, and installed the ethnographic exhibits in the ethnology wing which was constructed in 1959. He also organized many interesting special exhibits, including an exhibit on the Navajo community of Shonto, a Nampeyo retrospective, Grand Canyon paintings by Wilson Hurley, and many other shows of Southwestern art, science and ethnography. In 1977 Mr. Wright took a position at the Museum of Man in San Diego.

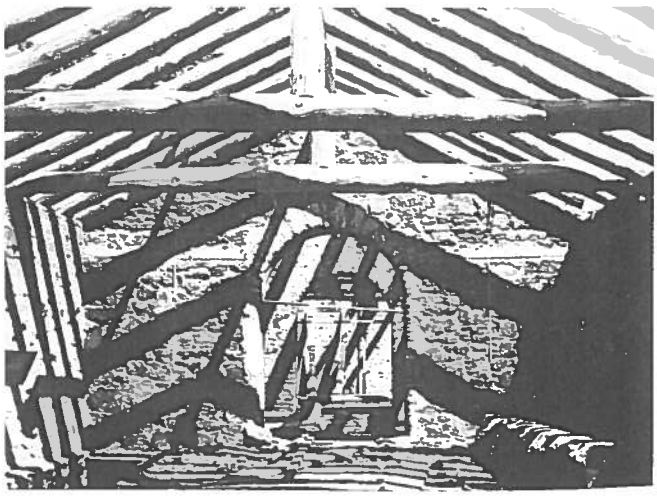
In 1977, the Museum received a planning grant from the National Endowment for the Humanities to update all of the Museum's permanent anthropology exhibits. The grant funded a conference of Southwestern scholars of anthropology in December, 1977, who discussed with the Museum staff various approaches and concepts the exhibits might take. These ideas were developed into a general outline for new exhibits, which were then designed on paper by Ms. Dextra Frankel and Mr. Thomas Hartman of Laguna Beach, California. The details of this design fill three large design books and are represented visually by a 1/24 scale model. The new exhibit will be a survey of the major archaeological and ethnographic traditions of the Colorado Plateau, with an emphasis on the Anasazi, Hopi and Navajo. More material in the Museum's outstanding anthropological collections will be displayed, and the exhibit will emphasize utilization of the environment, technological change and world view. Although the design is modern, care was taken not to disturb the character of the current building. Soft, earth colors, a wooden floor, and retention of the beams and sky lights are all features of the new plan. In addition, the latest techniques for the conservation of the material will be employed. The design has been incorporated into an implementation proposal which, at this writing, is being considered by The National Endowment for the Humanities.

Planning is also going ahead on new exhibit areas for art, geology and natural history. All of the new

(Left) Crafts demonstration at the 1932 Hopi Show held inside the Women's Club building.

(Below left) Construction of the present Museum structure, 1935.

(Below right) Construction of main galleries at the Fort Valley Road Museum, 1934.



exhibits will attempt to do what Dr. Colton wanted, to tell a story and communicate basic concepts. They will also give the public more specific information about the Museum's own research activities, so that the interesting work of the Museum's scientists will be more quickly available to the public.

In the area of special exhibits, we hope to move towards Mrs. Colton's original plan. Southwestern themes will predominate, but ideas and themes from outside the Plateau will have a place here too.

The Hopi and Navajo shows will continue, but in the future, the works of these two tribes will be displayed more as the fine arts that they are, in appropriate gallery settings. Also, the works of individual artists will continue to be featured.

Mary-Russell Ferrell Colton also spearheaded some of the first educational endeavors at the Museum. She arranged public lectures to accompany exhibit openings and taught art classes for children. Over the years there were periodic programs for children and some lecture series, the most notable and recent series sponsored by the Friends of the Museum, but a sustained, full-time educational effort did not commence until 1975. In the fall of that year a regular Saturday morning children's series began, followed in the spring by adult education classes, and in the following summer by a children's science day camp. In the same year, a regular volunteer docent program was established to provide tours and other interpretive programs for school groups. In 1977, the Expeditions program began — a set of interpretive backpacking and river experiences. In 1977 and 1978, the Museum actively participated in the production of two educational television programs produced by the Public Broadcasting Service affiliate in Phoenix. *Thieves of Time* was a program on pot hunting, and *Museum Backroom* is a children's program on biology. The current Museum Educator, Gail Vogt, has many new expansion plans for educational programs, including the re-introduction of a lecture series, a "Discovery Club" for children, and an extensive series of Saturday art classes for children.

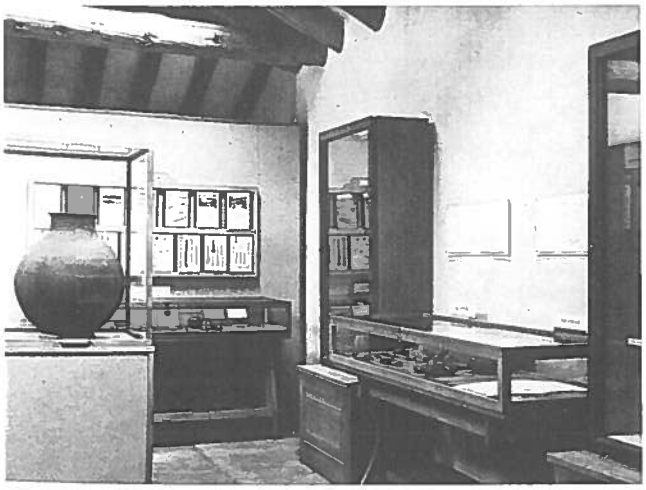
Today all of the educational efforts are directed towards communicating information about the Plateau, and the Museum's research role in it, and at the same time these programs are drawing the community closer to the Museum.

It is hoped that as we begin the next fifty years of interpretive effort at the Museum we shall, in new and exciting ways, do what Dr. Colton enjoined us to do in 1929 — "encourage appreciation of science and art — and offer opportunities for aesthetic enjoyment." These are our goals.

(Below left) An early archaeology exhibit.

(Below right) Patio during the 1940 Hopi Show.

(Right) Barton Wright, Clay Lockett and Mary-Russell Ferrell Colton at the judging of the 1959 Navajo show.



GEOLOGY

by William J. Breed

The Colorado Plateau is an ideal place for the study of geology. There is no other place where earth history can be so clearly deciphered from the exposed rocks. At Grand Canyon the story of what happened here during the first three eras of geologic time is exposed. The fourth era can be deciphered on the Navajo Reservation; and the fifth era is revealed all over the Plateau, by further deposits, evidence of uplift, volcanism and glaciation.

The general story of the development of the Plateau has evolved through the work of numerous geologists over the last century and a quarter. But at the same time the Plateau seems always to offer the opportunity for present-day geologists to refine this story in greater and greater detail. There are few geologists who can not find something of interest to study on the Plateau! This fact was recognized by Edwin D. McKee, Assistant Director of the Museum from 1941 to 1953, for in 1941 he inaugurated a "definite and intensive program of detailed studies to determine systematically the facts relative to certain outstanding features of the region. These features include especially (1) the reconstruction of earth history as represented by the remarkably good exposures of little disturbed sedimentary rocks and (2) the sequence of events involved in the uplift of the Colorado Plateau and the resulting erosion by the Colorado River and its tributaries."

This program initiated by Mr. McKee gives a broad base to the activities of the Geology Department. It is a broad program that continues to this day, and could include the early work of Major L.F. Brady who was Curator of Geology at the Museum from 1930 until 1954 and then Curator of Paleontology until his death in 1963 at the age of 83. Some of the "Major's" contributions to the geological knowledge of the Plateau include: the study and analysis of volcanic bombs with sedimentary cores; the preparation of numerous vertebrate fossils including the sloth that is currently on display at the Museum; the discovery of the Devonian section and the associated fish and molluscs on Mt. Elden; experimental work on trackways; and the etching of silicified marine fossils from numerous Kaibab Formation localities.

Major Brady was remarkably imaginative and inventive and produced many gadgets and special equipment both for his own research and others, including a self-feeding rock saw for cutting large slabs containing fossil tracks, a gadget for rapid measuring of ripple index, and a sun compass for establishing directions where magnetic anomalies make an ordinary compass useless. The Major's keen wit and joy of living were a delight to all who came in contact with him, and although he never considered himself a specialist in any one field, his depth of knowledge in some fields such as ichnology and the study of tracks was such that he was consulted and visited by leading experts.

Eddie McKee, who set up the early direction of the department, was a colleague of Major Brady in the early years of geology at the Museum. Eddie's interests were more sharply

(Above) Geology Curator Bill Breed on the Antarctic expedition.

(Below) Edwin D. McKee, Assistant Director of the Museum from 1933 to 1941.

Fossil beds near Burnham, New Mexico, where Pentaceratops *was found.*

oriented toward stratigraphy, sedimentation and paleontology and he pursued these aspects of geology by detailed study of each of the rock layers present in the Grand Canyon vicinity. He initiated his first study of a formation in Grand Canyon while a Park Naturalist at Grand Canyon National Park, continued working on various formations while at the Museum and as a professor at the University of Arizona, and is at present finishing up investigation of the Supai Group while employed in Denver by the U.S. Geological Survey. McKee has written a major monograph on all the formations in and near the Canyon from the Tapeats to the Moenkopi with the exception of the Temple Butte Limestone and he has initiated work on this formation. While at the Museum, McKee also pursued work on cross-bedding and dunes, and the continuation of this work has taken him to practically every continent. The staff, researchers and grantees of the Geology Department are still pursuing lines of research that were originally suggested by McKee.

The first major steps that the Geology Department took in the direction of vertebrate paleontology came in 1954 when Dr. John Lance from the University of Arizona was hired as Assistant Director. Previously, both Dr. Edwin H. Colbert of the American Museum of Natural History and Dr. Sam Welles of the University of California, as Research Associates of the Museum, had collected in the Triassic formation, but with the exception of the collection of the sloth near Springerville by Major Brady, Lance initiated the first systematic collection of Cenozoic mammals by the Museum.

In the mid-fifties, significant discoveries in the field of paleomagnetism were made by S. Keith Runcorn of Newcastle University in England, a Research Associate of the Museum. He studied the red beds of the Grand Canyon and England to determine the magnetism of these rocks as revealed by tiny iron particles deposited in the sediments that later turned to rock. From these particles ancient pole positions and latitudes could be worked out. However the results of these studies only made sense if England and North American were once adjacent and then drifted apart through geologic time. This was the first good evidence that revitalized Continental Drift — a theory that previously had been scoffed at except by southern hemisphere geologists.

In 1960, the Museum hired the author, a recent graduate of the University of Arizona, as its first full-time Curator of Geology. He has continued orienting the department in the direction originally set by Eddie McKee, but there are several recent landmarks in the history of geology at the Museum that should be mentioned

In 1963, Major Brady passed away, and this cut off one tie with the past. A Museum bulletin with articles relevant to his work by various authors was brought out. In the same year, Dr. Stanley S. Beus came to Flagstaff to teach at Northern Arizona University and was appointed part time Curator of Paleontology. Dr. Beus is interested in Paleozoic paleontology and has brought out many papers, including one Museum bulletin on the Devonian formation, during his association with the Museum.

Since 1963, Dr. Richard Wilson of the University of Arizona has been the Coordinator of Geological Research here at the Museum. During that period he has set up a grant program at the Museum which has awarded over forty grants of one thousand dollars to students working on their graduate degrees. This program has given many students the impetus needed to continue on their geological careers.

In 1964 a symposium was held with twenty-one participants on the evolution of the Colorado River in Arizona. This symposium attemped to synthesize all the work on the Cenozoic history of the area, particularly that which pertained to establishing the sequence of events that resulted in the formation of the modern Colorado River and Grand Canyon. Out of this symposium came the idea that the ancient Colorado River flowed into Arizona and then out into the Rio Grande drainage by a route similar, but in reverse direction, to that of the present Little Colorado River. Another drainage system working up from Lake Mead eventually captured the Colorado and diverted the drainage through the present Grand Canyon. This theory fitted the facts available at that time and is the current best answer to a problem that is still controversial.

In 1965, a proposal to the National Science Foundation for a new building for geology was approved. With these funds, along with matching funds from friends of Major Brady and the Museum, a new building called Brady Hall was constructed. This gave the Geology Department a permanent location and much needed space in the Research area of the Museum. The building was named Brady Hall in keeping with the Museum's policy of naming buildings for prominent scientists who have worked in the Plateau.

A symposium on the Chinle Formation of the Triassic age was held at the Geology Department during the summer of 1968. This eventually resulted in the publication of a Museum bulletin on the Chinle Formation that covered the paleontology as well as the stratigraphy and

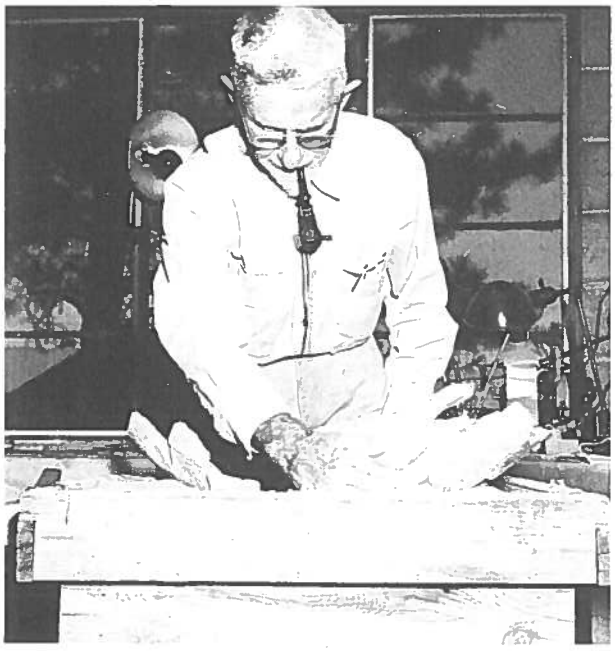
(Top) Preparator Will Downs. Photograph by Alistair Cook.

(Middle) English student Paul Nixon IV and Hugh Rieck in the geology lab.

sedimentation of that formation. This volume was the definitive work on the Chinle Formation at the time and is still in print.

In 1969, Edwin H. Colbert of the American Museum of Natural History retired to Flagstaff with his wife Margaret. Ned was the Curator of Fossil Reptiles for forty years at the American Museum. Among the projects that he brought with him was a field trip to Antarctica to search for additional fossil land-living vertebrates in the Triassic strata there. One bone of an amphibian had been found on a previous expedition, but Ned hoped to find more. In the fall of 1969, in a roaring ground blizzard, Colbert, the author and Jon Powell, a summer assistant at the Museum, set out from Flagstaff for Antarctica. Their trip met with great success and one fossil in particular, identified by Dr. Colbert as *Lystrosaurus*, had previously been found in South Africa, India and China. This was important evidence that the theory of continents drifting about during geologic time was a valid one, for a reptile such as *Lystrosaurus* could not possibly exist in Antarctica under the present climatic conditions. It was obvious that when this reptile existed, Antarctica, South Africa, India and China all must have been part of one connected land mass that slowly drifted apart some time after the Triassic — some two hundred million years ago. Facilities set up at the Geology Department to prepare and study the fossils from Antarctica resulted in an ever increasing emphasis on vertebrate paleontology in the ensuing years.

The laboratory facilities set up for the Antarctic studies soon came in handy, for in 1974 the Museum was given a contract to study and survey the Kirtland and Fruitland Formations in the San Juan Basin in New Mexico. This survey, conducted by Larry Marshall and the author, resulted in a wealth of dinosaur material that would have otherwise been destroyed in the planned strip mine for coal. This brought the Geology Department firmly into contract paleontology — surveying for fossils in areas that were soon to be destroyed by man's activities. This was a type of work that the Anthropology Department at the Museum had been active in for many years, but this was the first major project of this type in geology. Numerous projects along these lines have been conducted by the department since that time. In 1976, Dr. J. Dale Nations of Northern Arizona University and the Museum staff found the huge skull of a *Pentaceratops*. The seven-foot-long skull of this dinosaur was removed from its resting place on the Navajo Reservation and brought to the Museum. For awhile this specimen



(Above) Dr. Edwin Colbert, Curator of Vertebrate Paleontology.

(Left) Major L.F. Brady

Paleontologist Tim Rowe working on a Coelophysis. Photograph by Alistair Cook.

Curator of Geology, Bill Breed, giving talk to schoolchildren in the Museum. Photograph by Mark Middleton.

was prepared as a public exhibit, but the skull has been moved to the Geology Department where preparation is still going on. It is hoped that eventually space will be available for this interesting fossil to go on permanent display.

Also in 1974, *Geology of the Grand Canyon* was published. This book brought together a lot of new information with additional basic information that was published in a variety of sources, and is now in its third printing. In 1976, a companion publication to this book was issued in the form of a geologic map of the eastern part of the Grand Canyon. It was the culmination of many years of fieldwork by the various authors and paved the way for publication of other geologic maps of Canyonlands National Park and Petrified Forest National Park which are currently in the making.

Many other works of significance have been completed by the Geology Department. Beginning in 1967, Trevor Ford of the University of Leicester in England with the author began a study of the Chuar Group in Grand Canyon that eventually resulted in the publication of over fifteen papers on the stratigraphy and paleontology of this formation. These layers had not been studied since the time of Walcott in the last century, so three new formations were defined to clarify the stratigraphy and much new information about early plant life of that time was recorded. Their work eventually resulted in the discovery of what is probably the earliest animal life yet discovered in the Canyon, and these primitive animals may be the oldest animal life yet known. A major monograph on this group is in preparation.

Other significant discoveries have been made by the Geology Department, including a river channel in Wupatki National Monument that may be two to four million years old and basic research on the form of cinder cones relating to the underlying structure. Dr. Colbert is at present describing what is the oldest armoured dinosaur yet found — a discovery made within fifty miles of Flagstaff.

There is much to be learned from geology, and although the main story of the geologic history of the Plateau is now essentially known, more and more interesting features, principles and fossils are discovered each year. In keeping with the goals set out by McKee almost forty years ago, the department is now engaged in a study of the Kayenta Formation with Dr. Farish Jenkins of the Museum of Comparative Zoology at Harvard. Many interesting and perhaps undescribed dinosaurs and other reptiles have been found by this study, and it is hoped that before it is completed next year early mammals will be discovered.

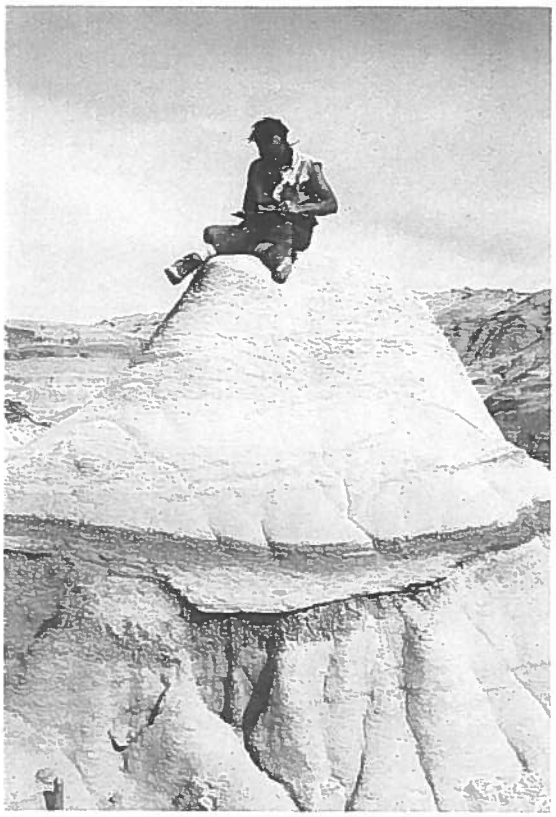
With Bruce Welton of the Natural History Museum in Los Angeles, the author and Dr. Dale Nations of Northern Arizona University are conducting a survey of the Mancos Shale. Already the largest fish ever discovered in Arizona has been excavated in this project and it is hoped that even more significant discoveries will be made.

The author and his wife are at present studying linear sand dunes on the Navajo Reservation and several years ago went to Australia to study similar dunes. The origin of these dunes has been controversial, but the wind pattern that created them has been discovered. The author is at present also studying star dunes in Mexico and the Grand Canyon — another interesting dune form.

In the future the Geology Department will work actively with the United States Geological Survey in Flagstaff on further studies of wind deposition and erosion in this vicinity. One study may even take several members of the staff to Alaska to study dunes near the Arctic Circle.

Activity in vertebrate paleontology is still increasing. Dr. Louis Jacobs, presently here at this institution on a post-doctoral fellowship, has recently found small teeth and bones in the Chinle Formation. Only larger material has been found before. In addition he has found fossil mammal teeth in the Fruitland Formation.

It seems that new discoveries in geology will continue to be made on the Plateau, and even though the main story of earth history here is known, there is much to be learned.



(Opposite, upper right) Navajo rugs on display in the Museum's ethnographic wing. Photograph by David Sucsy.

(Opposite, upper left) Robert Breunig, museum curator. Photograph by Mark Middleton.

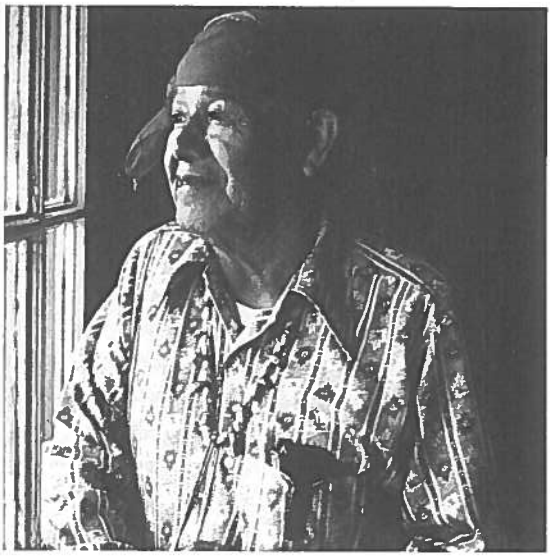
(Opposite lower right) Jessica Hagemann, museum exhibitor. Photograph by Barry Thomson.

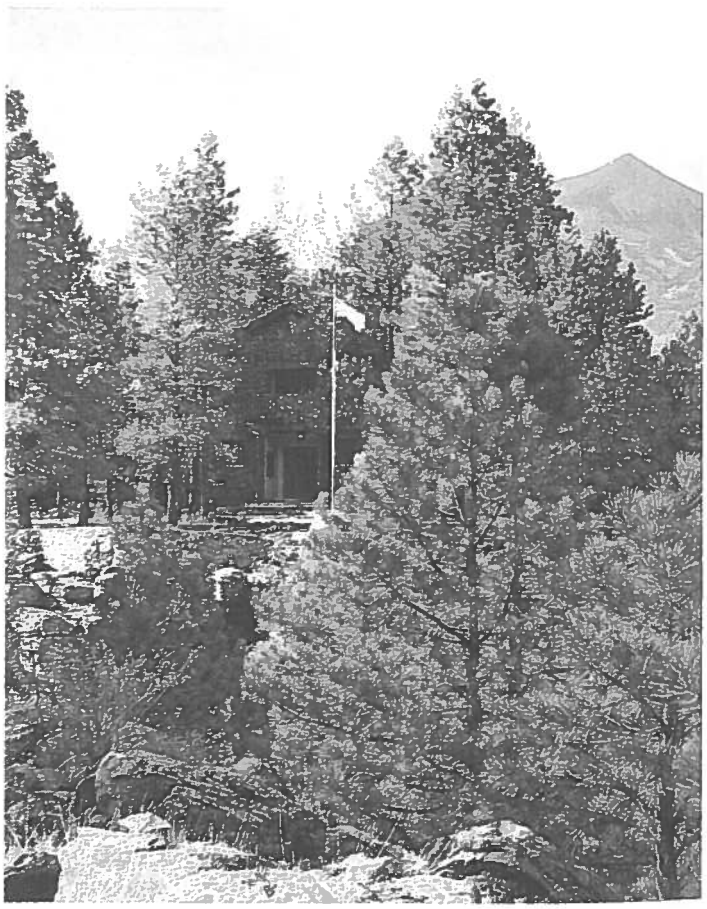
(Opposite, lower left) Summer Biology Camp. Photograph by Gail Vogt.

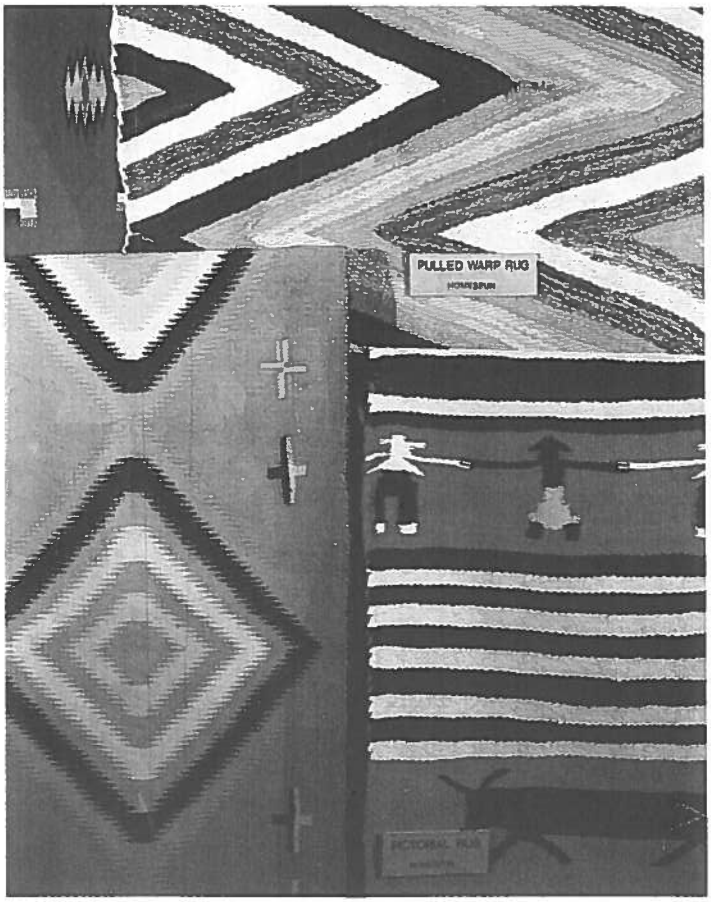
(Left) Recording site data for fossil beds near Burnham, New Mexico.

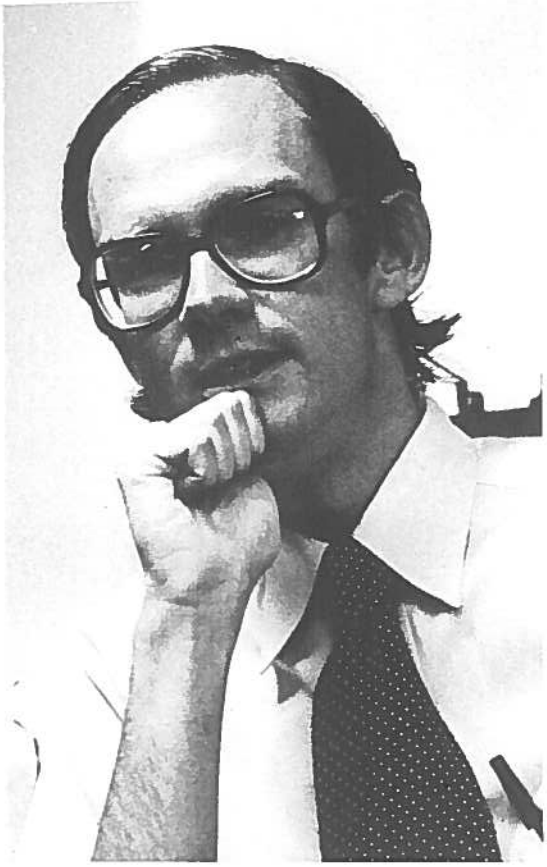
(Below, left) Willie Coin, Maintenance. Photograph by Mark Middleton.

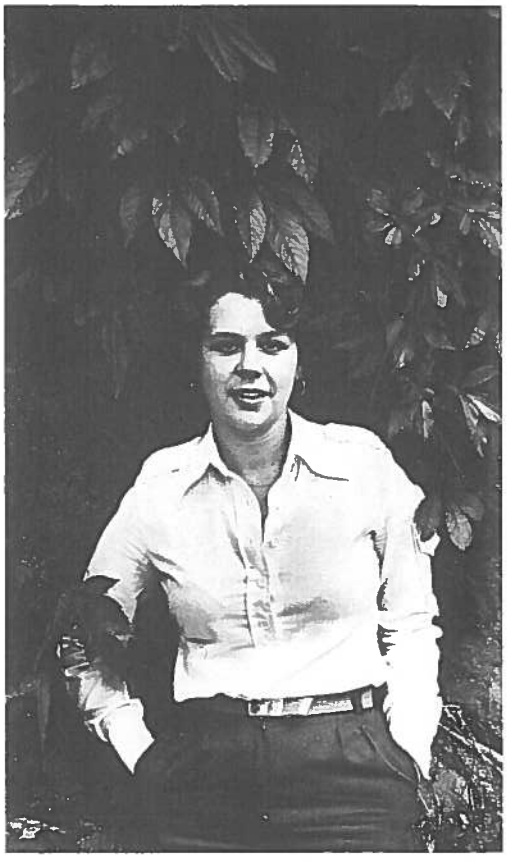
(Below, right) View of Museum entrance across Rio de Flag. Photograph by David Sucsy.






PULLED WARP RUG





ANTHROPOLOGY

by Marsha Gallagher

The Department of Anthropology can, in a way, claim to be older than the Museum itself, for the beginnings of its archaeological data base and collections pre-date the founding of the institution. There is a story about this which may or may not be true, but which has certainly become a Museum legend. Dr. Colton and his family were spending the summer of 1916 in Flagstaff on one of the many vacations they made to the area before finally settling here. Ferrell, Dr. Colton's young son, was out for a walk with his father. The child picked up a strange object, handed it to Dr. Colton and reputedly asked, "Daddy, what is this?" It was a sherd, a broken piece of plainware pottery, and that is said to have sparked a research interest that eventually resulted in an intensive study of the prehistory of the Flagstaff area, volumes of scholarly publications, and the establishment of the Museum of Northern Arizona.

Whatever the source of his original interest, Dr. Colton did begin to methodically survey northern Arizona's archaeological sites in 1916. To each of the sites he found he assigned a number, and he systematically recorded pertinent data about them, such as location and the nature of the surface remains.

Dr. Colton's interest in the prehistoric past was shared by many local residents and was the major impetus for the founding of this regional museum, and the first objective of the new institution in 1928 was to house collections and exhibits illustrating that prehistoric past.

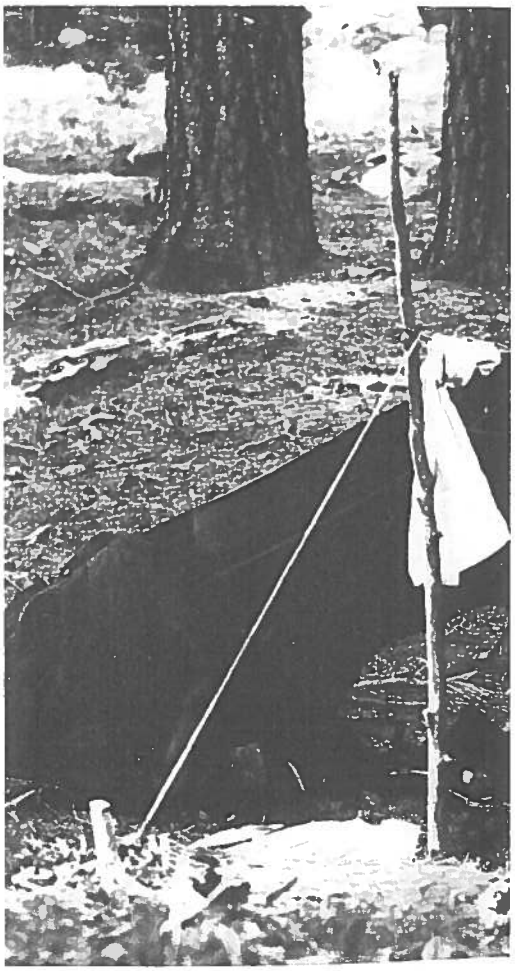
Under Dr. Colton's direction, the Museum began a long and distinguished series of contributions to Southwestern archaeology. In the 1930s and 1940s work was concentrated primarily on establishing an understanding of the prehistoric peoples of the immediate Flagstaff region, an area about which little was then known. The first excavations were carried out in 1930 in a small area northeast of the San Francisco Peaks known as Medicine Valley. Other excavations followed, and eventually a fairly clear picture emerged of the peoples who lived here prior to 1300 A.D.: the Sinagua, the Cohonina, and the Kayenta Anasazi.

One of the best known sites investigated during this period of research was Wupatki. The archaeological importance of the Wupatki area had been noted as early as 1851 by the members of the Sitgreaves expedition. By the 1880s the sites there had begun to suffer at the hands of pothunters. In order to preserve the archaeological record, in 1924 Wupatki was designated as a national monument, largely through the efforts of J.C. Clarke, a local archaeology enthusiast, and Dr. Colton. The Museum's later excavations there were a logical result of this early interest and association. Much of the material from the excavation of the main pueblo and other smaller sites remains at the Museum, where it is drawn upon frequently for research and exhibit purposes.

Although much of the research done in this time period was based quite close to home, it had a broader applicability. For example, the Museum maintained an early interest in the study of tree-ring material. Wood specimens were collected and

(Opposite) Dr. Colton at Wide Ruin in 1929. Excavated kiva, showing fireplace, screen and ventilator.

(Below) Mary-Russell Ferrell Colton at a camp site on one of the Colton's early trips to Flagstaff (1916).



study was also conducted on living trees. This work was done at the Museum in conjunction with the extensive studies being carried out at that time by the Unversity of Arizona, and eventually culminated in one of the most important contributions to Southwestern archaeology: the establishment of a continuous tree-ring record for the Plateau country. Tree-ring dating, or dendrochronology, provides a means of absolute dating. That is, archaeologlists can determine the real, rather than relative, dates a site was occupied. And, in an exciting combination of dendrochronology, archaeology and geology, Dr. Colton was able to demonstrate an eruption date of 1067 A.D. for Sunset Crater.

Another significant early contribution to Southwestern archaeology was the establishment of a ceramic laboratory at the Museum and the production of a series of publications devoted to the study of prehistoric pottery. The ancient peoples of the Southwest had produced vast quantities of pottery in a welter of colors, forms and design styles. Dr. Colton and his assistant, Lyndon Hargrave, attempted to make order out of all of this diversity, and the system they developed for the classification and description of Plateau pottery types became a model as well as a tool for Southwestern archaeology.

Those first decades in the Department of Anthropology were fruitful and productive ones in ethnology, the study of contemporary cultures, as well as in archaeology. Some studies were made on the Pai and Navajo peoples, but major emphasis was placed on the Hopi, a natural focus because of the Museum's proximity to the Hopi villages and the obvious connection between the Museum's archaeological activities and early Hopi history.

Mrs. Colton was the central figure in this research, and she was the first Curator of Ethnology as well as of art. Most of her work was in the field of arts and crafts. Her desire to encourage the Hopi people to produce their finest work, and to provide an outlet for that work, was the reason for the establishment of the annual Hopi Craftsman Show in 1930. Her name will always be associated with this show, which has

become the best known and most popular Museum exhibit.

But Mrs. Colton accomplished much more. She, and others encouraged by her, studied the techniques of Hopi crafts and investigated ways of improving the materials used to make them. She was also the inspiration for a major change in the craft of silversmithing. There were few Hopi silversmiths in the 1930s, and their work was virtually identical to that of the Navajo. Mrs. Colton had her assistant, Virgil Hubert, develop more "Hopi-like" jewelry designs based on traditional basketry and pottery motifs. Reaction was slow, and the war intervened, but the distinctive Hopi silver of today can be traced to Mrs. Colton's early encouragement.

The attention to arts and crafts did not preclude the study of Hopi customs, ceremony, folklore and history, and many important publications were produced by staff members during this same period. The collection of data and objects formed a base of knowledge which could be added to and drawn upon for future research and educational purposes.

The 1930s and the 1940s were a time of constant and exciting activity in anthropology at the Museum. Dr. and Mrs. Colton figured prominently in this activity, but they did not work alone. Their knowledge and enthusiasm attracted numerous students and scholars, and the list of people who were based at or were staff members of the Museum is an impressive one too lengthy to enumerate. Many of these people maintained ties with the Museum in the following decades and into the present.

In 1950 the department surveyed the route of a proposed gas line under contract with the builders of the pipeline, the El Paso Natural Gas Company. The intent was to discover and scientifically excavate any prehistoric or historic sites that might be destroyed by the planned construction. It was the department's first venture into what today is called "contract archaeology," an activity that has occupied much of the department's time since then and which has been the cause of its phenomenal growth.

Contract archaeology is the result of state and federal legislation that requires the consideration of the environment, including historic and prehistoric sites, when land modification is proposed. Such legislation, initiated in 1906 with the Antiquities Act, has been expanded and strengthened over the years, particularly in the 1960s. Today the location of any powerline, highway or generating station on state or federal lands must be studied in detail before construction is undertaken. Since eighty-two percent of Arizona land is under state or federal jurisdiction, virtually all major construction projects require environmental studies, which are sponsored by the construction companies involved, and which are typically contracted out to institutions like the Museum of Northern Arizona.

The major benefit of this, to science and the public, is in the scope and depth of the research that can be carried out. This is especially clear in the case of archaeology at the Museum. In previous years archaeological studies, although significant, were restricted in number and size due to limited Museum funds. Contrast this with the Glen Canyon Project, a government funded investigation of the vast areas that eventually were inundated or affected by the waters and construction of the Glen Canyon Dam in northeastern Arizona. During this project, which was jointly undertaken with the University of Utah, the Museum recorded more than one thousand sites and excavated nearly one hundred. The field work alone extended from 1957 to 1963, and the subsequent laboratory analysis of the recovered data resulted in more than fifty publications. Associated studies by this and other institutions on the history, geology and biology made Glen Canyon one of the most thoroughly studied areas in the country. The project added immeasurably to our know-

(Above) Navajo crew excavating a Basketmaker III pithouse in the Klethla Valley as part of an archaeological contract for the Salt River Project.

(Left) J. W. Brewer, foreman of the 1933 C. W.A.-funded excavation at Wupatki.

ledge of the Colorado Plateau, and it must be considered as a landmark in Southwestern archaeology.

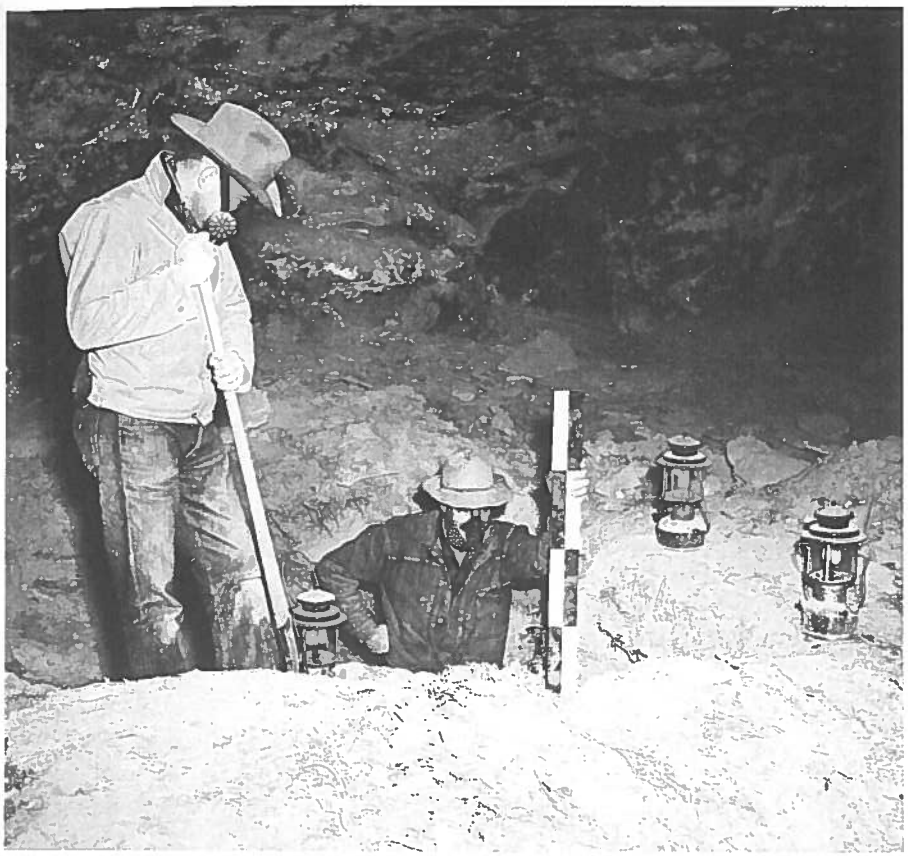
The Glen Canyon Project, although the largest endeavor, was not the only archaeological work undertaken in the 1950s and 1960s. Dr. Colton and Katharine Bartlett surveyed a portion of the Verde Valley; Robert Euler and David Breternitz, Curators of Anthropology in the 1950s, carried out several small excavations and other research projects with Museum funds. Increasingly, however, such projects were contract generated. By the end of the 1960s, under the capable direction of the former head of the Glen Canyon Project and present Curator of Anthropology, Alexander J. Lindsay, operations and staff had greatly expanded, and more growth was anticipated.

Although the research emphasis during this period was heavily oriented towards archaeology, the ethnographic collections continued to grow through purchases and generous donations. These collections, along with the archives, served as an important research resource for both staff members and visiting scholars.

Educational activities were considered of special importance. Ties had been developed with Northern Arizona University as early as 1930, when Lyndon Hargrave taught the first course offered there on Southwestern archaeology. That tradition was continued in later years, as the Museum encouraged the development of an anthropology curriculum at NAU. Several staff members have taught and do teach there.

Many other educational activities were engaged in or sponsored by the department. Various field schools, such as that of the University of Illinois, have been based here, giving

Milton Wetherill at Kiet Siel, 1942.



(Top) Robert C. Euler and Milton Wetherill at the 1954 excavation of Antelope Cave in northern Arizona. The respirators were used to protect personnel from dust inhalation.

(Above) A Pueblo II adobe structure, one of the many sites excavated in 1977 as part of the Colorado Generating Station Project.

Father Vabre, the anthropological collection has grown to over one hundred thousand individually catalogued specimens, plus hundreds of thousands of additional separately tabulated and identified fragments of archaeological material (sherds, stone tools and basketry fragments, etc.). Of equal or more importance than the objects are the half-million supporting documents: the field notes, reports, catalogue records, photographs and so on. Furthermore, the rate of growth, from a curator's viewpoint, seems geometrical — seven hundred new sites recorded each year, five thousand new artifacts catalogued and added to the collection.

The purpose of having all these objects and bits of paper is research and education, including public exhibits. They are in fact the basis for the research discussed in this article, plus much, much more. But objects and documents are of little use if they are not properly preserved and stored in a logical, readily accessible manner. Easier said than done, for the care of collections today has become a science in itself. There are so many factors to be considered: space; access; the effects of temperature and humidity and the chemicals used to stabilize a deteriorating specimen.

The department has always given attention to the care of its collections and, as they have grown, has made an effort to hire people specially educated in that care. Members of the staff have and do seek additional training and are called upon for consultation and teaching purposes by other institutions. It is indicative of the regard in which the department is held that the present Curator, Alexander J. Lindsay, was recently selected by the American Anthropological Association to head a research project aimed at designing standards of curation for federally owned archaeological collections held on repository in nonfederal institutions. The Museum of Northern Arizona is an example of this situation, for the majority of the archaeological collection has come from federal land (national parks and monuments, national forests, etc.).

And what of the future? A department as energetic and productive as this one is not likely to rest on its laurels. The level of research carried out in the contract program is not expected to abate in the near future. However, there will be an attempt to complement the contracted research with basic, grant supported research to broaden the department's contribution to anthropology. There is also a desire to become more actively involved in the planning of exhibits which will accurately reflect the nature of the extensive research now being carried out; to further publicize the immensely valuable resource represented by the collections and records so as to stimulate their use for more research and exhibit elsewhere; and especially to encourage an expanded program of ethnological research.

Finally, the department is, after all, one part of a larger, vibrant institution, the Museum of Northern Arizona. And, when one talks of the future, one can reflect that a museum, with its responsibilities of gathering, preserving and disseminating objects and knowledge, is a form of promise for the future. There can be little doubt that this Museum intends to fulfill that promise.

BIOLOGY

by Steven W. Carothers

...The Northern Arizona Society of Science and Art has been founded to maintain a museum where the story of the geological history and the prehistory of Northern Arizona can be told, where the archaeological and ethnological treasures of Northern Arizona can be preserved. The Society aims to protect our historic and prehistoric sites, works of art, scenic places, and wildlife from needless destruction; to provide facilities for research; and to offer opportunities for aesthetic enjoyment.

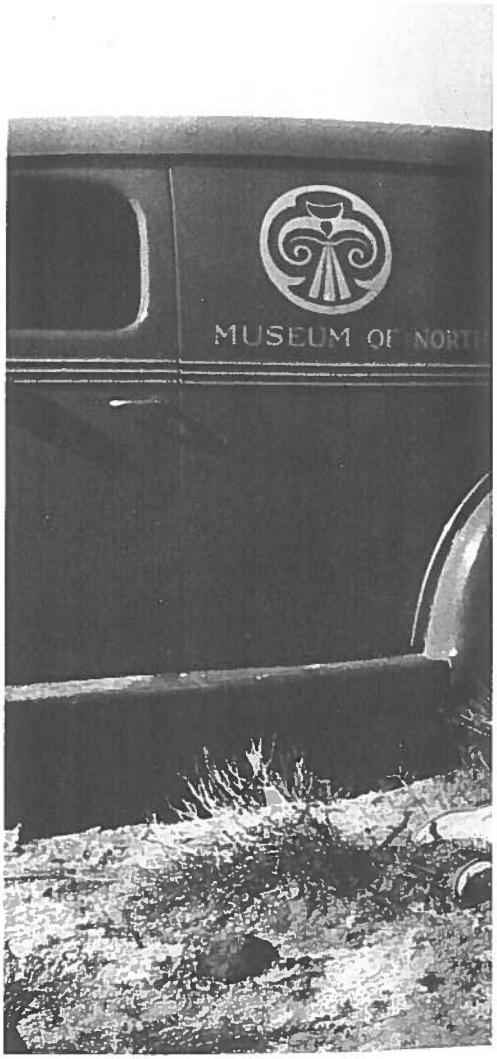
— July 1928 *Museum Notes*, Volume 1, No. 1

The above quote, outlining the goals of the then embryonic Museum of Northern Arizona, was most certainly written by the man possessed with the driving energy behind the creation and success of the institution, Dr. Harold Sellers Colton. Clearly, the emphasis is on studying the "geological history and prehistory," and the preservation of "archaeological and ethnological treasures." Near the end of the second sentence, presented as almost an afterthought to the goals of protecting "historic and prehistoric sites," we find concern for "scenic places, and wildlife." The idea that the Museum would one day become an intensely active center for biological and ecological studies was not clearly anticipated in the founding goals of the institution. At first glance, it is curious that Dr. Colton, a university-trained zoologist, did not put more emphasis on the biological sciences when he wrote the charter design for his museum. The reasons become clear, however, when the circumstances of Colton's life between 1909 and 1928 are reviewed.

From 1909 to 1926 Harold Sellers Colton was a professor of zoology at his alma mater, the University of Pennsylvania. He was twenty-eight years old when he began teaching at the university and, to that time, his publications indicated a developing and productive career in the field of invertebrate zoology. At the age of twenty-three, Colton published his first paper, "Land Shells of Mount Desert, Maine," in a 1904 issue of the *Nautalis*. The following year, two more papers appeared in the *Nautalis*, one on sexual dimorphism and the other on behavior of a little known snail, *Strombus pugilis*.

Fate began to draw Colton away from zoology and the East when, in 1910, while on a mountain climbing expedition in British Columbia, he met the woman who was to become his wife. In 1910 Mary-Russell Ferrell was one of a group of well-known professional Philadelphia artists, no mean feat for a woman of high society in the stuffy victorian attitudes of early twentieth century Philadelphia.

In 1912 the couple married, and their honeymoon travels took them over much of the West, including Flagstaff. They came for the specific purpose of climbing the San Francisco Peaks, having heard of the area through Colton's mentor and intellectual guide, Professor Edward Sylvester Morse of the Peabody Academy of Science in Salem, Massachusetts. Morse, a famous zoologist and ethnologist of the late nineteenth century, had been a friend of the Coltons since Harold was five years of age. During the 1890s Morse traveled frequently from Salem to Flagstaff at the request of Percival Lowell of Lowell Observatory. At that time Lowell was deeply involved



Katharine Bartlett, Mrs. Colton and Dr. Colton on a Lac insect expedition, 1942.

in his classic work on the planet Mars and found a sympathetic ear for his much disputed theory regarding life on that distant planet.

Many years later, Colton remarked on how, during their first visit, he and his wife had discussed what a pleasant home the Arizona mountain environs would make. Totally captured by the country, the Coltons returned to the Flagstaff area as often as the academic schedule would allow. In 1914 a son was born. The humid environment of the Colton's home in Pennsylvania caused the child serious allergy problems that seemed to all but disappear during the family holidays to the West. As a child, Colton himself suffered from persistent "hay fever" and his parents obliged themselves to take young Harold to the New Jersey beaches during their extended summer holidays. Nothing can be quite as strong a motivating influence as the plight of a suffering child. Realizing that their son Ferrell's allergies abated in the dry mountain air, Harold and Mary-Russell left families, job, and home behind, and came to Flagstaff to stay in 1926.

During their summer visits, Colton had begun surveying and cataloging the archaeological sites of the area as early as 1916. Colton found that the field of Southwestern archaeology was just beginning to attract attention and that virtually nothing was known about the early inhabitants of the Flagstaff area. Little more information was available on the southern half of the state, or in fact, the entire Southwest. The opportunities for research were too great to pass up, and by 1926 Colton had published at least five substantial papers on northern Arizona prehistory. Although he never abandoned biology completely, by the time the Museum was established in 1928, Colton was putting most of his energies into the study of Southwestern archaeology.

With a few notable exceptions, the biological publications Colton prepared at the Museum concerned work he had begun while still at the University of Pennsylvania. The most interesting project he brought to Flagstaff was the series of remarkable experiments he designed to test the Lamarkian theory of evolution. That is, characteristics acquired by differential limb and organ use during

one generation, can be passed on by heredity to succeeding generations. By artificially inducing bi-pedalism in white rats, generation after generation, Colton was able to demonstrate the fallacy of Lamark's theory. Although several papers on these experiments were published, Colton summarized the investigation in the paper "A Lamarkian Experiment" in a 1931 issue of the prestigious *American Naturalist*.

After the rat experiments, it was not until the United States found itself embroiled in the Second World War that Colton again turned his interests toward the biological sciences. In the early 1940s, it appeared as if the United States would be prevented free access to India, and at that time, the only source of shellac was the Asiatic Lac insect. Colton explored the life history and the possibilities of economically exploiting an American relative of this Far Eastern insect.

During the next thirty years, Colton addressed himself mainly to archaeological research, but it is rather fitting that his last publication in a 1970 issue of *American Antiquity*, "The Aboriginal Southwestern Indian Dog," required both biological and archaeological expertise.

Given the early emphasis on archaeology and geology, how is it that we have such a strong biology department today? Part of the reason is that the geographic area around the Museum is so diverse and rich in floristic and faunistic elements that many biologists were, and still are, attracted to the area by the unique research opportunities that surround the Museum.

The principal factors, however, that have contributed to the existence and strength of the Biology Department today can be traced to the influences of two men, the late Lyndon Lane Hargrave (1896-1978) and our present Curator of Botany, Dr. Walter B. McDougall. These two scientists are the men ultimately responsible for the early appearance and subsequent growth and development of biology at the Museum of Northern Arizona.

(Above) Lyndon L. Hargrave and redtailed hawk, 1934.

The Hargrave Years

Whereas Dr. Colton came from the East a trained zoologist and promptly

became interested in archaeology and geology, in 1929 Lyndon L. Hargrave came to the Museum as an archaeologist and almost immediately began pursuing biological research. Hargrave continued to balance the two disciplines successfully, and among many other dual-discipline accomplishments, he alone should be given the credit of establishing the field of archaeo-ornithology.

Hargrave received his formal training in archaeology under Byron Cummings of the University of Arizona, and he gained early field experience on the Hopi Mesas with A.E. Douglas during the National Geographic Society Beam Expeditions of 1928-1930. He was hired by Colton on 21 January 1929 to assume the duties of Assistant Director of the Museum. From then until his untimely resignation in 1939, he held various positions ranging from Field Director and Curator of Ornithology to Curator of Archaeology. In his position as Field Director, he was essentially the second in command over the activities of the entire institution. Although there were various other contributing "curators" in the biological sciences during Hargrave's tenure at the Museum, it is clear that he exercised a great deal of influence over what took place in the young and developing Biology Department.

Hargrave was a champion of the organized museum curator, a lost art among most comtemporary curators. It was to him the task fell of building the collections in the various branches of vertebrate zoology; he devised and carefully maintained the specimen and observation files; and it was he who insisted on organizing and pursuing biological field research at the Museum. In his ten years of museum work, Hargrave's published contributions were many and diverse. Dividing his time equally between two main interests, archaeology and ornithology, he published sixty-one papers from 1929 to 1939. Although it is difficult for me to judge the value of his archaeological contributions, they seem more conceptual than his zoological work which was primarily descriptive in nature. However, of his combined contributions, Dr. Albert H. Schroeder writes — "Lyndon Lane Hargrave [is] a man recognized for his taxonomic approach to Southwestern ceramic classifications, for his role in helping to close the gap in Southwestern dendrochronological sequence of prehistoric times, and for his development of the field of archeo-ornithology in the Southwest beyond the restricted limits of identification."

It was Hargrave who sparked Allan R. Phillips' initial interest in ornithology. Phillips, later to become one of the foremost authorities on the classification and distribution of North American birds, writes of Hargrave — "One hot August afternoon in 1933 I first met Lyndon L. Hargrave. This man, while directing archaeological excavations at Wupatki...was also (with no encouragement whatever) enthusiastically collecting the birds of that rather desolate area. I could not understand this, nor why on my next visit in March 1934, he at once put me to work skinning birds that he had kept frozen outside his north window in Flagstaff since the preceeding November. Yet his enthusiasms, misguided as they seemed at the moment, somehow attracted me; so on graduating from college...I at once come to Flagstaff to help him band birds and curate the collections he was forming at the Museum of Northern Arizona."

When Hargrave left the institution in 1939, temporarily retiring from biology and archaeology, Allan R. Phillips took over as Curator of Ornithology. Although Phillips held this title until 1954, his work at the Museum was interrupted from 1942 until 1950 by Army service and post-war graduate studies. Although virtually absent from the Museum during this period, Phillips continued to publish prolifically in both the Museum publications series and all of the major American ornithological journals.

As the zoological collections and field research were being initiated during the early 1930s, some attention was also given to the local flora. It is not clearly indicated in our records whose idea it was to start a herbarium at the Museum, but as early as 1925 Dr. Colton and his family were preserving samples of local flowering plants and trees. In 1934, Mr. Clifford M. Armack, a school teacher in Williams during the academic year and Curator of Biology during the summer, was assigned the task of organizing the scattered plant collection into a herbarium. When Mr. Alfred F. Whiting arrived in 1935 as the first Curator of Botany, he found a small herbarium of some six hundred plants. During his first year, Whiting more than tripled the number of plants in the collection, established plant exchange relationships with several larger herbaria and initiated the first program of botanical research at the Museum. Whiting was Curator of Botany from 1935 to 1943 and during that time published several papers including his impor-

O.J. Reichman and friend. Photograph by Mark Middleton.

tant book *Ethnobotany of the Hopi*. The war years interrupted Whiting's stay at the Museum, but only temporarily. Accepting positions at the University of Oregon and Dartmouth College after leaving the Museum, he retired here from Dartmouth in 1975 and remained on the staff with a joint appointment in biology and anthropology until his death in 1978.

After the war and up to the early 1950s, there was little activity in the department of biology at the Museum of Northern Arizona. When Dr. Allan R. Phillips returned to the Museum from graduate school, there was a brief flurry of activity in ornithological research, but this was short-lived. In 1954, Phillips left the Museum for the University of Arizona and his leaving marked the end of an era in biological research that had begun a quarter century before with Lyndon Lane Hargrave. Before Phillips left, however, he summarized the first twenty-five years of biology at the Museum and unknowingly set the stage for the Museum biologists of the future. Writing in the Silver Anniversary issue of *Plateau*, Phillips reflects:

"We may take pride in some aspects of the Museum's first twenty-five years' contribution to biology. Real progress, despite a strictly limited budget, has been made, particularly in the fields of ethnobotany and of the distribution and ecology of birds; and some specific projects in other fields have been completed. Complacency, however, would be a grave error. If destructive abuses of Northern Arizona lands are permitted to continue, with consequent erosion and falling water-tables, many plants and animals will be completely exterminated here. Our predicament is, of course, faced by most of the Southwest. If we are to preserve for posterity at least a picture of Northern Arizona, as we know it today, we must make greater efforts. Otherwise many habitats, especially the aquatic and semi-aquatic, will disappear unrecorded. The area of our swamps and seepages may be small, but their biological importance is great. If, in the next decades, we explore them properly while it is yet possible, we may be confident that the Museum will take the first rank in the annals of biology."

Phillips had a premonition of the potential for biological excellence at the Museum, and an understanding of the environmental damage that could be wrought by misuse of natural resources. Little did he anticipate, though, that it would be another generation before Museum biologists became the standard bearers for perserving Southwestern riparian habitats, and that these biologists would accept nothing less than first rank in the annals of biology.

Dr. Allen Phillips, Curator of Ornithology, 1939-1954.

The McDougall Years

By 1955, biological research had almost come to a standstill at the Museum of Northern Arizona. With Dr. Phillips gone, there was no ongoing zoological research and in botany, Mr. Horace Haskell and Mr. Chester Deaver were only just beginning to work together during the summers on various field projects. These summertime field trips later resulted in a number of publications in the regional flora. Mr. Deaver, a botany professor at Arizona State College (now Northern Arizona University), had been appointed Curator of Botany in 1954, but his teaching duties prevented any serious work at the Museum. There had been no regular staff members in the Biology Department for many years.

Then, in October of 1955 a knight in shining armor, astride not a great white horse, but a '53 Buick, rolled through the Museum gates, unaware that it would be his task to rescue the neglected Biology Department from its sure stagnation. Since then, under the leadership of Dr. Walter B. McDougall, there has not been a day of backsliding. The department has continued to move forward in ever increasing leaps and bounds toward that goal of "first in the annals of biology."

Walter Byron McDougall was born on a farm in Washenaw County, Michigan, on December 10, 1883. Education for a farm boy was something of a luxury and only to be enjoyed after the chores had been completed. Because of the farm work, Walter was twenty-one years of age before he held a high school diploma and twenty-eight when he received the A.B. degree from the University of Michigan. As a youngster, Walter had an insatiable interest in the natural history that surrounded his daily life. In season, he knew where to look for wild plums, blackberries, raspberries, strawberries and many kinds of apples. Today, Dr. McDougall well remembers the day when at sixteen, with sufficient money finally saved, he walked barefoot in to a Ypisilanti book store to purchase his first biology book. Incredibly, this boŏk was none other

than Darwin's *Origin of Species*. His next purchase, months later, was another classic, Grey's *Manual of Botany*. Fortified at an early age with the teachings of two of the greatest biologists ever, McDougall earned his Ph.D. in botany from the University of Michigan in 1913. Following graduation McDougal was delighted to receive an appointment as an instructor of botany at the University of Illinois at $1200 per annum. He remained at Illinois until 1929, publishing several major works including a book on mushrooms and the first North American textbook in plant ecology. After Illinois, Dr. McDougall taught botany for three semesters at the University of Southern California, working summers for the National Park Service. In 1935 he joined the Park Service full-time and for the next nineteen years, Dr. McDougall worked in national parks throughout the east and west. As a ranger-naturalist, and former teacher, Dr. McDougall delighted thousands of park visitors with unusually informative lectures and campfire talks. In addition to his normal park duties, he also published , among many other academic papers, floral guides to Grand Canyon, Yellowstone and Big Bend national parks.

In 1955 Dr. McDougall was seventy-two years of age, mandatorily retired from the Park Service, and ready to go to work. In his own words, Dr. McDougall relates how he came to the Museum of Northern Arizona:

"When I came to MNA in October of 1955, I thought that I was coming to be a helper in the herbarium. I had written to Dr. Colton suggesting a modest employment as a botanist. The reply was that there were no funds at that time for the employment of a botanist. So I wrote to him again, telling that I would have to live somewhere and asking if he had a small house that I could rent. He then said that if I would do a small amount of work in the herbarium he could give me a place to live. So I moved here and at once began working full time. A few months later, he offered to pay me a small salary, but I told him I was getting along O.K. and did not really need a salary. That has been the status ever since."

When Dr. McDougall arrived, unpacked his personal belongings and put his office in order, he began assessing the Biology Department. He was "astounded" to find that he was the only biologist on the staff: *"After I had been here several months, Mr. Deaver of Arizona State College came to Dr. Danson* [Danson had been appointed Museum Director in 1955 on Colton's retirement] *and said, 'Look, I don't do much at the Museum, McDougall should have the title.' So Danson, without consulting me, went to the Board of Trustees and had the title, Curator of Botany, transferred from Deaver to me. Well, I was faced with an accomplished fact so I began to act like a department head and worked toward building up the entire department as well as the herbarium."* Although he came here for retirement, the twenty-three years Dr. McDougall has dedicated to the Museum represents the longest period of time he has spent in any one job. Most mortals find difficulty making a mark in one career per lifetime, Dr. McDougall is well into his third and still, at ninety-four, gives no indication of slowing down.

Since 1955, Dr. McDougall has, with loving care, guided the growth of the herbarium from six thousand seven hundred specimens to well over twenty-six thousand carefully mounted and curated specimens. The MNA herbarium contains *the* most complete assemblage of plants from the Grand Canyon region and its coverage of northern Arizona is unsurpassed.

One of the first research projects Dr. McDougall undertook at the Museum was to do something about the lack of a good plant guide for Northern Arizona. For several years one could consistently find Dr. McDougall laboring over his typewriter from eight to five, taking only parts of weekends and Christmas off. By 1970 the manuscript had grown to eighteen hundred pages, and in 1973, *Seed Plants of Northern Arizona* was published. In addition to his research and herbarium interests, Dr. McDougall took it upon himself to do something about the lack of research activity in the other sections of the department. He enthusiastically encouraged visiting scientists to contribute to the department and his gentle admonishments on the need for research were well known in the administrative branch of the Museum. With Dr. McDougall's encouragement Ms. Inez Haring, a bryologist, spent a considerable amount of time in the late 1950s establishing our collection of mosses and liverworts. The bryophyte collection was substantially increased from 1963 to 1975 by Dr. Ardith Brask Johnson, who held the title Curator of Bryophytes for the twelve years she worked under Dr. McDougall's direction.

By the mid 1960s, Dr. McDougall was beginning to show serious concern over the lack of activity in the zoological section of the Biology Department. Mr. Milton A. Wetherill had been appointed Assistant Curator of Mammals in late 1956, a position he held until his retirement from the Museum in 1972, but Milt could only spend a small amount of time working in biology. Other duties as the Superintendent of Buildings and Grounds occupied Wetherill's time fully. Many was the daybreak, though, that I can remember Milt ploughing through a pile of bones, identifying the remains of some archaeologist's latest dig. I'm positive that in later years, as his eyesight was failing, Milt could correctly identify many bones by touch alone.

In 1966, Mr. Harry O. King was appointed Curator of Ornithology, but his interests in biological research shifted to archaeology before anything substantial had been accomplished.

Other than the botanical research, there was another interesting accomplishment in biology during the mid and late 1960s, and that was the development of a sophisticated freeze-dry apparatus. Mr. Norman G. Sharber, a local businessman and friend of the Museum, perfected a means by which mushrooms and other biological specimens could be permanently preserved in a state remarkably similar to their natural living condition. Throughout the years since, Mr. Sharber has willingly and successfully applied his talents to various biology projects by frequently building a piece of equipment that had not yet been invented.

In 1965, while an undergraduate student at Northern Arizona University, I wanted nothing quite so much as to be able to work at the Museum of Northern Arizona. For months I pestered the Curator of Anthropology ...the exciting life of an archaeologist is what I had wanted to live since finding my first arrowhead as a boy in Prescott, Arizona. Nothing was available in the Anthropology Department, but finally, a young geologist, Mr. Bill Breed, was kind enough to introduce me to Harry King, who then arranged an appointment with Dr. McDougall. That first year, I was a work-study student, and in spite of many obstacles, I have remained as Dr. McDougall's zoologist ever since.

Those first few years were interesting. I had no idea what a professional biologist did and as far as I was concerned, a "curator" was something comparable to a janitor only not quite as personable. But, with what I now recognize as incredible patience, Dr. McDougall cleverly molded me into his idea of a research biologist. Well do I recall many a session in the "front office" with the Doctor admonishing me for a variety of infractions; discussions of my drinking, swearing and smoking habits were not excluded from these sessions either, for above all else, I learned that a biologist is a gentleman.

In 1966, the Biology Department had an annual budget of $5,250. This sum was to cover salaries, supplies, travel and all research expenses incurred by the department. Dr. McDougall was very proud of the fact that we never exceeded our budget.

In 1968, we received our first government contract. Through the efforts and concern of the late Mr. Doug Morrison of the Coconino National Forest, we began investigating the effects of water salvage and flood control projects on native wildlife in the Verde Valley. With a $528 contract in hand, Dr. Roy Johnson, then of Prescott College, and I began to find out just how important riparian habitats in the arid Southwest are to our native populations of birds. As a result of these early riparian habitat studies, we began to attract the attention of various wildlife management agencies. In 1970, the Arizona Department of Game and Fish funded our riparian studies for three years, and with that, the Biology Department was launched into the world of bio-business.

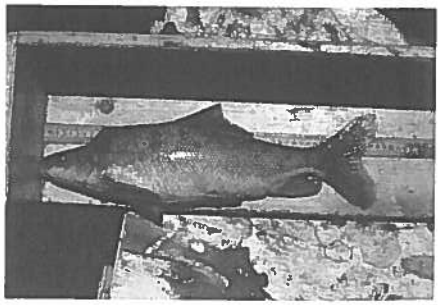
Since the early 1970s, we have accepted jobs with numerous federal, state and private concerns. One of our most important and enjoyable contracts has been with the Park Service at Grand Canyon National Park. Early in 1973, we were assigned the task of investigating the biological resources of the Colorado River within Grand Canyon. The park managers were justifiably concerned that river recreation was damaging the biological resources of the riverine habitats, and a substantial portion of our contract dealt with identifying resource impacts and suggesting appropriate mitigating measures. We are pleased that the Biology Department has had a substantial amount of input in current NPS Colorado River management plans. At present, we are still under contract with the NPS on what is known as "The Colorado River Monitoring Project." This is a three year study designed to evaluate the changes in riparian vegetation that have resulted from the impoundment of Lake Powell and the subsequently controlled river flow; measurements of the rate of incorporation of human debris in beaches; and the population structure and distribution of an endangered fish, the humpback chub.

Other recent projects include evaluations of livestock grazing impacts for the Bureau of Land Management; studies on burro damage, backcountry trail use, fecal waste disposal, and man-caused wildfires in Grand Canyon for the Park Service; fisheries studies in the San Juan, Colorado and Little Colorado rivers for the Bureau of Reclamation; and the effects of massive spruce budworm eradication projects in the Jemez Forest of New Mexico for the Department of Agriculture. In addition, we have provided wildlife resource inventories for the Apache-Sitgreaves, Coconino, Kaibab, Prescott and Tonto national forests.

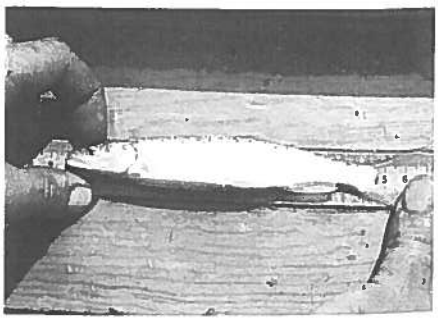
The New Frontier

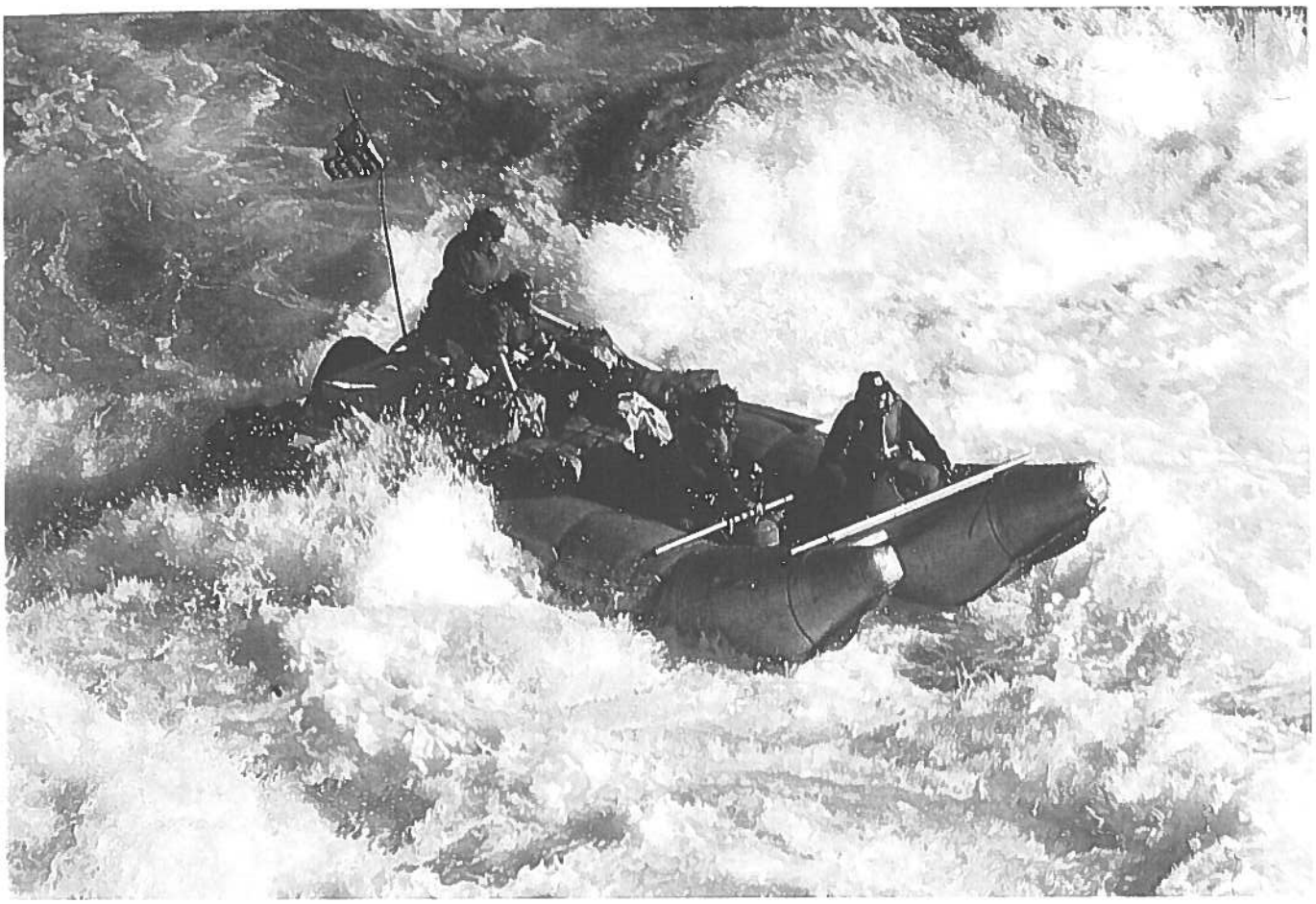
Although the challenge of contract work, or applied research as it is also called, can be intellectually stimulating and extremely satisfying, there exists an inherent danger in allowing a "science" department to become fully dependent upon the pursuit of financial remuneration. By focusing primarily on the management needs of various agencies, our department would, in time, become unaware of the continually changing horizons of innovative science and lose contact with current academic accomplishments in the area of basic

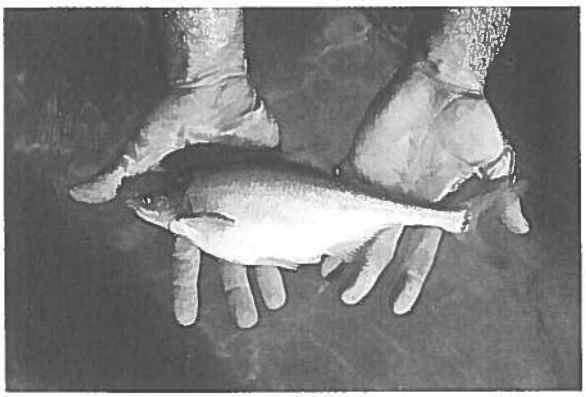
(Below) Dr. W.B. McDougall, 1956.



(Above) Caught recently in the Grand Canyon, this razorback sucker is an endangered species now being studied by the Biology Department. This specimen was the first one collected since 1963.



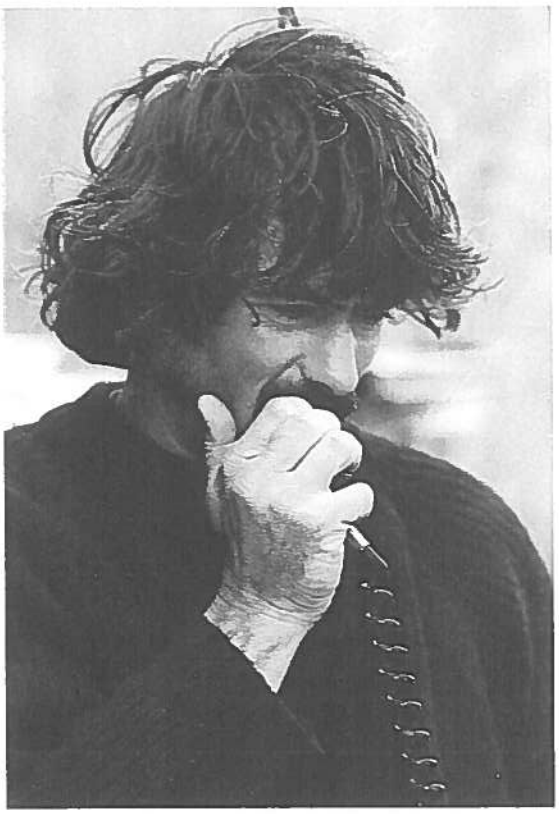




(Top) Museum ecological survey team on the Colorado River. Photograph by John Running.

(Above) The humpback chub is another endangered species being studied by the Biology Department. The hump is an adaptation to the swift water of the Colorado River.

(Right) Steven Carothers. Photograph by John Running.



(Opposite, bottom) This Colorado River Squawfish is the largest species of freshwater minnow in the United States, and is known to reach six feet and weigh over eighty pounds. This fish, once abundant in the lower Colorado, is now essentially extinct in that part of the river.

The study of riparian or streamside habitats has been a major emphasis of Museum biologists, and their investigations have documented the unique biotic features of these limited resources. Photograph by Tom Whitham.

research. Under these conditions, the danger of falling into the bottomless pit of intellectual stagnation is inevitable.

Aware of these potential hazards, and realizing that our department was becoming more and more involved in applied work, we set out to diversify our activities in 1975. We wanted to have scientists on our staff who would pursue knowledge for the pure sake of knowledge itself; a team of ecological innovators who would simultaneously challenge the applied work that the land management agencies were asking of us. Through this approach, we would insure that our clients were buying the very best applied research, we would insure for our staff the exciting lives of the intellectually challenged and we would guarantee for our institution the inevitable benefits of the serendipitous ecological discoveries that will surely result from a combined program of basic and applied research.

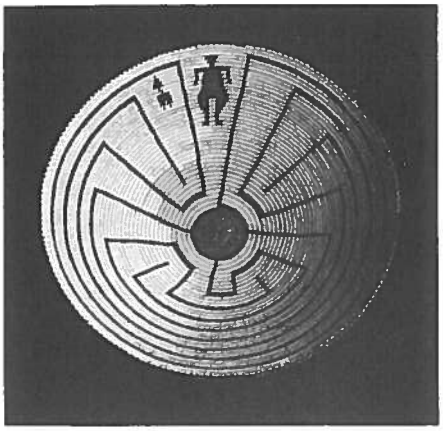
Prior to searching out the basic scientists, however, Dr. McDougall made it clear that he was eventually going to need help in the curation of the growing herbarium. This help came in the form of Dr. Arthur M. Phillips III, a plant taxonomist with considerable expertise in the flora of the Southwest, and an unfailing interest in perpetuating Dr. McDougall's careful attention to the herbarium.

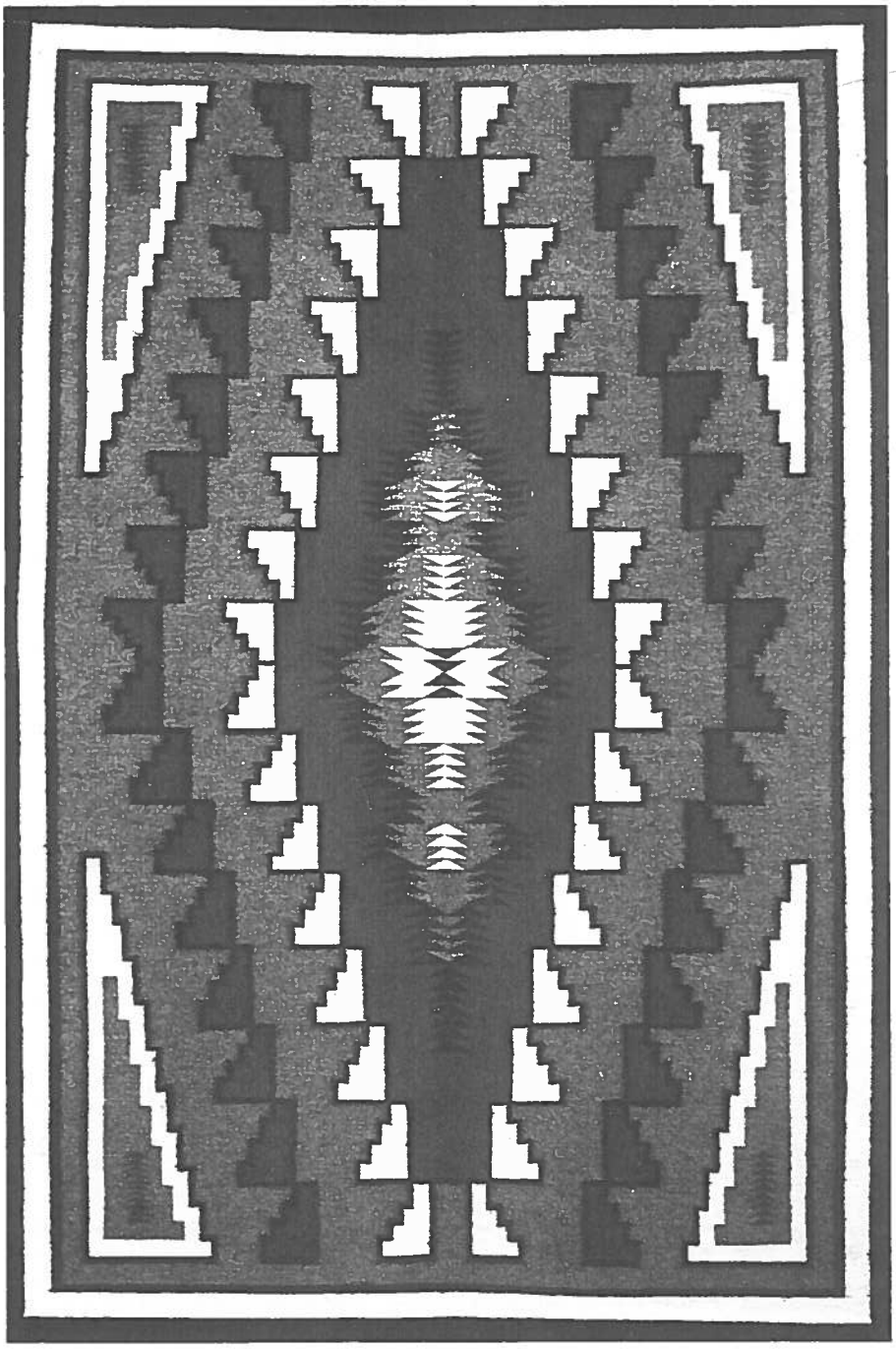
Dr. O.J. Reichman, a post-doctoral student at the University of Utah, was the first of the brilliant young ecologists to see the merits of joining the applied and basic efforts into one productive unit. Arriving in the summer of 1975, Dr. Reichman immediately organized a talent search, and within the next three years, five more young leaders in contemporary ecology accepted the feasibility of our plan, and joined the Biology Department. The results of Reichman's talent search are a sterling reflection of the excellence we have established as our goals: Dr. Tom Whitham, an insect ecologist, joined the staff in 1977 and had considerable input in convincing Drs. Ron Pulliam, Christopher Smith, Peter Price and Paul Dayton that the Museum of Northern Arizona had the perfect foundation on which to build a center for ecological studies. Drs. Pulliam and Smith, both vertebrate ecologists of international recognition, unpacked their books in July, 1978. Dr. Price, author of the recent textbook, *Insect Ecology*, will join the department in 1979. Another highly sought after candidate, Dr. Paul Dayton, a marine ecologist, will take a leave of absence from Scripps Institute in California and spend the year of 1979 exploring research possibilities in northern Arizona.

Our ecologists have wasted no time in pursuing their research programs. With a two year grant from the National Science Foundation, Dr. Reichman and Dr. James Brown, of the University of Arizona, are investigating the competitive interactions between ants and rodents in Southwestern deserts. Dr. Tom Whitham has made some truly innovative progress on his aphid and bee research as his recent papers in *Science*, *American Naturalist* and *Ecology* reflect. Dr. Ron Pulliam, our "curator of theory", has support from the National Science Foundation and the National Institute of Health to continue his work on avian behavior. And Dr. Christopher Smith has found the Flagstaff area an excellent outdoor laboratory for continuing his work on the co-evolution of conifers and tree squirrels.

The Biology Department is clearly on the threshold of a new frontier. As we move into the second half of our first century, we have gathered considerable momentum. The longer we can maintain that momentum, the greater will be the energy driving the success of the department and its staff. It is to the credit of our Director, Dr. Hermann K. Bleibtreu, that he has placed the control of this progress directly into our hands. It now becomes our responsibility to set the stage for the future generations of biologists at the Museum of Northern Arizona.

We are excited. We have been provided with the opportunity to rise to our highest levels of creativity, and it is not without some trepidation that we accept this challenge. But as we pursue our interests, we will do so with the foreknowledge that our accomplishments will ultimately be judged on how well we fill the treasure chest that has been bequeathed to us by Harold S. Colton, Lyndon L. Hargrave and Walter B. McDougall.





Three representative specimens from the Museum's ethnographic collection.

(Top) Pima basket, maze design. Recently loaned to the Chicago Art Institute for inclusion in their exhibit, "The Native American Heritage."

(Above) Jar by Hopi potter Elizabeth White. Currently on display at the Vice-Presidential Mansion in Washington, D.C. as part of an exhibit specially selected by Mrs. Mondale in a tribute to the arts of the Southwest.

(Right) Navajo rug, Tocito style, by Julia Tsosie. One of many contemporary items purchased in 1973 with funds provided by a grant from the National Endowment for the Arts and supplemented with money donated by the Museum's Collectors Club.