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Winter 1988

## Explorations, Vol. 4, No. 2

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# EXPLORATIONS

A JOURNAL OF RESEARCH AND PUBLIC SERVICE  
AT THE UNIVERSITY OF MAINE

*Cover: Maya — painted clay figure from Jaina Island, Campeche, Mexico, 500-700 A. D., approximately 100 percent. The clay figure is from a superb assemblage of pre-Hispanic materials from Mexico and Central America donated to the University of Maine's Hudson Museum from the estate of William P. Palmer III. In addition to this fine collection, Palmer donated an extensive array of objects from the Northwest Coast. Palmer earned his undergraduate degree in history and government from the University of Maine, and remained a strong, active supporter of the institution throughout his lifetime. More examples of objects from the Palmer Collection, including some pre-Columbian goldwork from Central America, may be found on page 10.*

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# EXPLORATIONS

A JOURNAL OF RESEARCH AND PUBLIC SERVICE AT THE UNIVERSITY OF MAINE

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# Editorial Reflections

During the short history of EXPLORATIONS, its pages have served to bring readers a sampling of research projects underway at the University of Maine and, to a certain extent, examples of the ways in which scientific studies have facilitated technology transfer, specific applications of results, data and methodologies suggested by those projects.

Research at Maine pursues answers to questions in many disciplines and produces ingenious applications of those studies. And as those research results are manipulated to solve problems for the citizens of Maine, and the brilliance of their promises is explored, activity begins to move toward public service.

There are other dimensions to public service: the common thread is that in each case University of Maine personnel take their skills, research results and expertise to the citizens of Maine. Their objectives include improving the quality of life; enhancing the level of prosperity which may be aspired to through a more vigorous economy, and protecting the environment in which both are enjoyed.

This issue of EXPLORATIONS introduces some of the less well-known examples of public service carried out by University of Maine people: providing a musical respite in a hospice and a creative writing workshop in a home for the elderly are two examples of public service to segments of the population less frequently remembered than many.

A long-term example of public service is intricately meshed with the story of the Hudson Museum: its first stirrings many years ago in the mind of a young professor in a discipline new to the University of Maine; the liberal amounts of elbow grease, make-do and Yankee ingenuity required by the seed museum on the hot, top floor of an old classroom building, and its flowering into the fine facility we know and enjoy today. It is a long story, and it is a worthy story based on the vision and commitment of bringing the classroom to the community.

Molly, our young friend pictured to the right, has discovered the Hudson Museum at age four. The excitement, the mystery, the wonder, will always be part of her life. Please join her on page 5.



*Carole J. Bombard*

Carole J. Bombard  
Editor

# A Living Educational Experience

# The Hudson Museum

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by Richard G. Emerick

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On the 2nd of November 1986 the Hudson Museum had its official opening. Several hundred people gathered to celebrate the event. It was a very gratifying evening for the museum staff. They had worked frantically virtually around the clock for the previous thirty days doing the myriad *last minute* things involved in exhibit installation. Many months of planning and preparation had preceded those last few weeks. The work was by no means left until the last minute. However, it was only when the building had been released to the university by the contractor late in the summer that the Hutchins Concert Hall staff and the Hudson Museum staff could begin to occupy the space. The process, once begun, proceeded at an accelerated and relentless pace. The museum cases had arrived on schedule from the manufacturer in North Carolina but had to be stored in the service buildings because the carpet was not yet laid in the new building. As soon as an area was carpeted, cases were moved in.

The William P. Palmer Gallery was finished first and the cases were placed in position and exhibit installation began immediately. That gallery, at least, had to be completed with its hundreds of artifacts, labels, graphics, photographs and maps by the time of the gala opening of the concert hall in late September. The installation of exhibits in seven other galleries, however, had to be delayed until after the cocktail party, dinner party and champagne reception on the night of the opening concert. The galleries were filled with tables and serving stations for the guests. The cases were temporarily placed along walls and other out-of-the-way places.

The dinner party and champagne reception were memorable events, and the opening concert was brilliant. When at last the entire affair was over and all the guests had left and the concert hall and museum were empty and quiet, the removal of all signs of the dinner party commenced and finally, even this activity ceased. Within minutes the museum crew descended on the space and exhibit installation continued. We had a deadline to make

and it was only five weeks away.

Much of the following five weeks was a nightmare of coordination. There was the well-known domino effect. A couldn't be done until B was finished and B was dependent upon the completion of C, *etc.* The exhibit for each case had been planned and assembled many weeks and even months before. Most were planned before the cases arrived and in some instances, before they were even ordered. In the work space in South Stevens Hall mock-ups of the cases were made so the exhibit planning could be done in detail and the necessary wooden blocks, cubes and shapes constructed, painted and finished and hundreds more labels, photos, maps and graphics produced. Even with all the prior work done there were many last minute changes to be made and worked into the finished product.

A major part of the installation was the excruciatingly careful process of transporting many hundreds of pieces from the locations in which they had been stored to the new facility. Most of these were priceless and virtually irreplaceable and handling them even with the most exquisite care was a very intimidating experience. Museum people are accustomed to handling such materials but to move so many in such a short space of time was often nerve-racking. Not only did we have to be concerned about their physical care, especially when many of the specimens were extremely fragile, but there was continuing anxiety about the matter of security. When a single piece might be worth many tens of thousands of dollars one tends to become almost paranoid when they are not, even for a short period of time, under maximum conditions of security. Every case in the museum is armed with its own sensitive impact and motion detector which instantly alerts the museum staff and the University security officers if they are set off. Even the free-standing pieces on platforms and wall surfaces are secured in this fashion. In any case, each time an exhibit was completed and the security system armed it was an enormous relief—but then, there was the next one to deal with. And so it continued. Throughout this process, it should be added, the university security officers were of enormous and invaluable help and were endlessly patient with us when we frequently set off alarms by accident. These episodes, at least, made it abundantly clear that the system worked perfectly and it never let us get away with even the smallest security mistake.

While the process of case by case installation was going

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*Richard G. Emerick is Professor of Anthropology and Director of the Hudson Museum at the University of Maine. He earned his PhD at the University of Pennsylvania and taught the first anthropology courses offered at UMaine. He has remained a driving force in the development of the Anthropology Department and its adjunct museum.*

on and keeping the museum staff busy, some other work requiring heavy construction proceeded as well. Four platforms, each of which was too large to enter the building through any door all in one piece, had been constructed at the University's carpenter shop facility. These had to be transported to the museum and assembled in place and then the finish work done. When this process was completed, the exhibits planned for the platforms and the necessary lighting could be done.

The countdown to the evening of the official opening celebration relentlessly continued down to a week—to a few days—and finally, to a matter of hours. Less than one hour before the first guests arrived last minute things were being done—a label change here, a lighting adjustment there—a patch of dust or some finger marks on glass cleaned, *etc.* Everyone knows that everything—every last detail—on a task of this magnitude is never done by the deadline, but as far as the visitors could see, we were all ready. The little nagging, small undone things were known only to us and they were safely tucked away in our minds for the evening at least. The guests arrived for the opening and it was an extremely gratifying and satisfying experience for those who had worked so very hard to make it possible.

**The Hudson Museum was now a fully functioning entity set into the continuing task of providing the community, the campus and indeed all who might visit us, with a fascinating, aesthetic and educational experience. It had begun.**

When did the museum idea really begin on the University of Maine campus? It is difficult to say but there are some points in the history of the present facility that can be mentioned to get a historical perspective on the idea.

Many years ago, when Coburn Hall was built, space was provided, indeed deliberately constructed, to provide the campus with a natural history museum. It was a fairly large room two stories high with a balcony around the second story. There seem to be few who remember its existence today, but it is clear that it was intended as a natural history museum with exhibits of birds, insects, some geological exhibits and other zoological specimens in skeletal, as well as preserved form. By thirty years ago when I first came to this campus the museum space had been obliterated. The second story had been floored over and office and/or classroom space was in its place. All that remained was what was left of the ornithological collection and boxes of preserved moths and butterflies stored here and there in laboratory space in Coburn Hall which still housed the Zoology Department. It was still possible now and again to find a dried, yellowed label card that said, *University of Maine Natural History Museum*. Eventually, however, the museum idea was dead. There was no such facility and none was planned. There seemed to be little enthusiasm for reestablishing a university museum other than an occasion-

al declaration from someone in forestry or geology, *etc.* that there should be some place to *put all this stuff*. Now and again some citizen or alumnus might have a collection of materials to donate to the museum but there was no place to store such things, let alone exhibit them, and thereby put them to some educational use.

In 1958 some of the members of what was then the Department of Business, Economics and Sociology thought that perhaps it was time to hire an anthropologist. It was a discipline which had experienced a dramatic growth in the years immediately following the end of World War II. During that first truly global war people everywhere in this country were made aware that there were hundreds of other societies and their diverse cultures out there in other parts of the world. The names of exotic places and their people in Asia, Oceania, Africa and many other places had been brought into the house with the daily paper and heard on the radio for several years. When the war ended, curiosity about these other members of the human continuum did not.

Anthropology is a field that has always been associated with the small scale, non-Western traditional and tribal societies of the world. They had long been overlooked by other social and behavioral scientists. They are, of course, as much a part of the human story and the human record as is our own society or those of Europe, the Middle East or greater Asia. Even though anthropology has by no means limited itself to the study of such societies, they are the field in which most anthropologists have worked. It is what has given anthropology its characteristic cross-cultural perspective, and the social scientists at the University of Maine wisely decided that this point of view should be added to their own. In any case, the decision was made and this author was recruited from Bowdoin College to come to the department to begin teaching anthropology in September of 1958.

My graduate training at the University of Pennsylvania had been in close association with the University Museum at that institution and had given me a strong conviction concerning the importance of ethnological and archaeological collections for the further understanding and appreciation of the remarkable scope of human behavior. I brought that conviction with me. My family had been collectors for several generations and I had acquired through them a few significant pieces. My field work in the Arctic, Oceania and the American Southwest had given me the opportunity to make some additional collections. These materials, of course, came with us when we moved to Orono.

The introduction of anthropology courses to the curriculum here at the University appeared to stimulate some interest and enjoyed a measure of success. The enrollment in up to five anthropology courses per semester, a standard teaching load for those days, began to swell. Anthropology, it appeared, had taken hold and taken off. After two

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# Molly in the Museum



The Hudson Museum has seen an impressive number of visitors during the short time since it opened. Located in the Maine Center for the Arts building, more than 18,000 people have enjoyed its many offerings. And this number does not include the many tens of thousands more who have been in the building to attend performances and spent pre-event, intermission, or time afterwards visiting the exhibits.

Here we have brought you Molly, the four year old daughter of Anne M. McGovern of Garland, whose exploration of the artifacts on display evinced a variety of emotions and expressions.

years it became difficult to accommodate the introductory course in the available classrooms. On the third floor of South Stevens Hall there was a large room that had formerly been used for accounting classes. It was lined with blackboard space and could accommodate up to one hundred students if seated in regular writing arm chairs. The desirability of the room was limited to its size. It had been essentially abandoned as a classroom because of the heat build-up by noon during the warm months early in the fall and in the late spring of the academic year. However, I coveted the space and we put three divisions of the introductory course of 90-100 students in that room back-to-back during the relatively cool morning hours.

It was not only because of the number of students which that room could accommodate that I was willing to use that room. It was because of the wall space which could be used for the hanging and placement of ethnological and archaeological materials. That same feature had appealed to Professor Vincent Hartgen years before when he used it as the location for the University's first art gallery. In any case, the introductory anthropology course could now be taught in the atmosphere of things that other people in the world had made and used and exercised their ingenuity, technology and artistry on. A dimension of their lives—their cultures—was there in the classroom with the students.

In another two years the use of that room as a classroom no longer accommodated the enrollment of the introductory anthropology divisions and they were combined into two very large divisions and moved to Hauck Auditorium. That left the third floor of South Stevens Hall available for a museum at last. The presence of a small collection had provided a nucleus to which some additional contributions of small collections and individual pieces had been made. In 1962 with an annual budget of two hundred dollars the Anthropology Museum began and the trustees appointed me its director. The budget funds bought some plywood, two-by-fours, peg board, nails and a few lights. Needless to say, the two hundred dollars had to sometimes be supplemented by personal resources and a good deal of skilled scrounging. Long-handled rakes and a canoe salvaged a good deal of wood from the Stillwater River during the high water in the spring, and my family was constantly on the alert for any bounty the river might generously provide throughout the year. In the meantime, the University had replaced the old linoleum flooring with tile and had installed a light track on the ceiling. Soon thereafter, two air-conditioning units left over from a construction project elsewhere on the campus were installed on the third floor of South Stevens and the terrible heat problem was solved. We were in business.

The use of the museum by public schools in this part of Maine had already begun, and scores of youngsters trooped up and down the stairway to the museum several days each week. With no staff and with a full teaching load

it was difficult for the director to do very much in the way of an educational program, but at least it was a start. In addition, donations and loans of small collections continued. In 1964, it became clear that the space we were using had to be redesigned in order to make better use of it. One Sunday morning I went in with a crowbar, screwdrivers and hammer and, after removing all specimens, I tore the place completely apart. For the next year the space was redesigned and reconstructed to provide a great deal more room for the more suitable exhibit of ethnological and archeological materials. The following year we had a new opening and were far better able to perform a museum's function. By this time the anthropology museum was a significant facility of the University and its annual budget had increased to \$1500. In 1969 anthropology became a department of the College of Arts and Sciences and the museum director was to also be department chairman for the next eleven years. Soon after this joint responsibility was created, the museum became a separate budget line from the department and then was placed in the office of the President.

During this period the museum's collection continued to grow and Mr. J. Russell Hudson, a very successful farmer from Winthrop, Maine, had agreed to bequeath a large sum of money to the University for the establishment of a museum on the Orono campus. Some years later Mr. William P. Palmer III, an alumnus of the University, had decided to bequeath his remarkable collection of Northwest Coast Indian and pre-Hispanic Mexican and Central American materials to the University in part to supplement the museum's collections. Committees were formed to commence the task of funding and planning the construction of a wonderful new facility unlike any other in the state to be called the Maine Center for the Arts and to include a magnificent concert hall and the Hudson Museum. Because of the abundant generosity of not only the Hudson and Hutchins families but of countless alumni, corporations, businesses and other individuals, the dream became a reality and in the fall of 1986 the facility opened to serve and enrich the experiences of the people of this state.

Eaton Tarbell, the architect of the Maine Center for the Arts, brilliantly gave form to the idea of combining a concert hall and a museum. These two functions under one roof creates a special challenge and special opportunities for a museum. In addition to the regular museum visitors from the community and the many hundreds of school-children and University students who make use of and enjoy the museum's collections, there are also the thousands of people who come to the concert hall for the wide variety of events which are scheduled there. Some of these might not otherwise have or take the opportunity to experience the museum. However, the museum is open for virtually all concert hall events. When the ticket office is open an

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# Other Wonders, Other Ways

Guided tours, storyhours and films are all part of the Hudson Museum's role as a cultural resource: an extension of the classroom into the community.

More than 5000 elementary and secondary schoolchildren visited the Hudson Museum during its first three months, and one of its newest features is a gallery program called **In Good Relation to the Earth**. Appropriate for youngsters in grades three to six, the program compares the lifestyles of the Penobscot, Plains and Pueblo Indians and includes a *touch basket* of artifacts.

Teachers booking the program for their classes receive a packet of suggested classroom activities for use to help prepare youngsters for the visit. This program, as well as others at the Hudson Museum, provides many opportunities for curriculum enrichment in social studies, language arts, and the fine arts.

Films sponsored by the Museum are free to the public, while a program called **Storyhours** is open for children from five to ten years of age. Storyhours combine exhibit viewing with stories about what the children have seen; they culminate with a hands-on activity such as *African mask-making*; *Navajo weaving* or *Southwest pottery-making*.

Currently available tours include a general one which includes all galleries; a **Tour of North American Cultures**, encompassing four galleries including Northwest Coast, Southwest, Penobscot and Inuit exhibits.

Also available is a **Visit to the Palmer Gallery**, which contains an extensive collection of Pre-Hispanic artifacts from Meso-America, and the school group tour **In Good Relation to the Earth**.



"We have many visitors among schoolchildren and concert goers who visit the museum frequently, and we know it is important for them to see something new each time they come if possible. A museum that is not a renewing educational experience for visitors and scholars is merely a warehouse."

— Richard Emerick, Museum Director



# From Classroom Walls . . . to High Tech Museum



Twenty-five years have passed since the first ethnological and archaeological materials were displayed at the University of Maine. They were on the walls of the third-floor classroom in South Stevens Hall where three classes of 100 students participated in the then new curriculum offerings in anthropology. Please see photo above.

Two years after the large, uncomfortably warm room began serving as the class space for anthropology, the students interested in studying other cultures outgrew the room. The classes were moved to larger auditorium quarters.

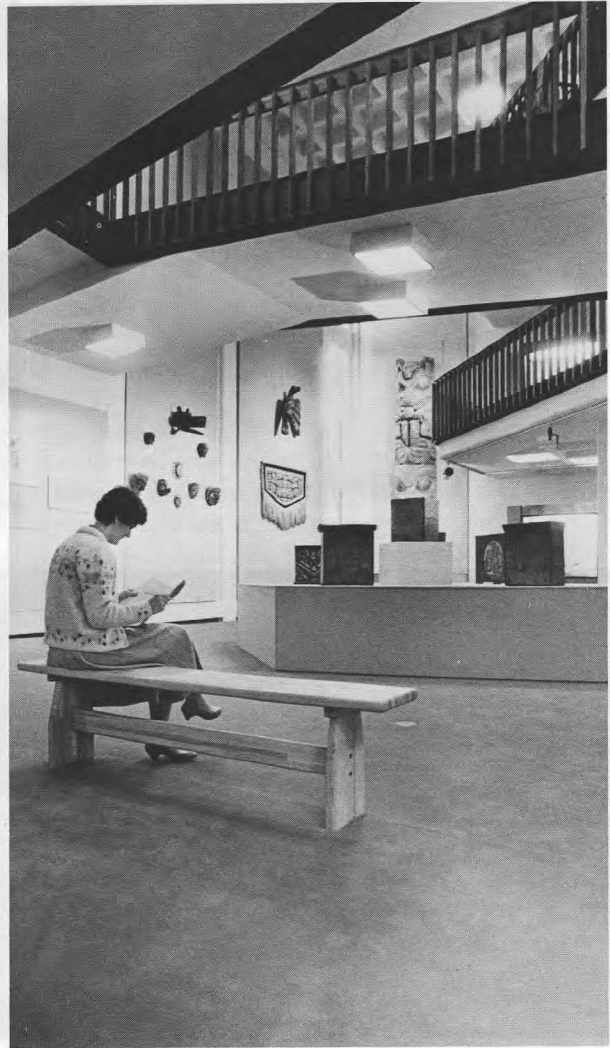
With the large room free, Richard Emerick took steps to convert the area to an anthropology museum. And it grew in concept and in popularity. Two photos, left of next page, are of that early museum experiment, and in addition to showing us ancient artifacts and artifacts of other cultures, provide a slightly more recent view of dated fashions.

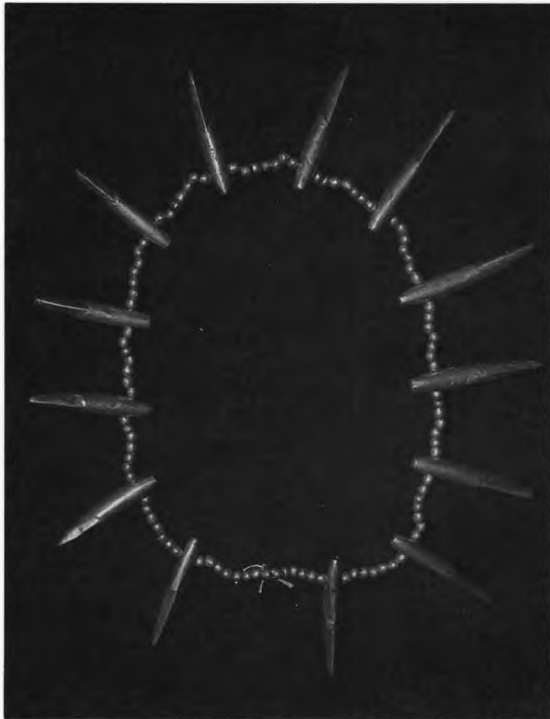
The Hudson Museum, the culmination of many years of effort by diverse people, opened in the fall of 1986. Photos to the immediate right and those on the top and right of next page, show some of the angles and details of that positively evolving project.

According to Museum Director Richard Emerick, "The museum staff will continue its efforts to be sure that this facility is a significant educational entity in itself. . . . It must always be a place where people can come to renew and expand their awareness and appreciation of the luxurious variety of things people in cultures the world over proudly and ingeniously make and use and love and through which . . . they inform us about themselves."









The William P. Palmer Gallery in the University of Maine's Hudson Museum includes pre-Hispanic materials from Mexico and Central America. Samples here are of pottery and figures as well as goldwork. This issue's cover is also from the Palmer Gallery.

# Sharing Our Strengths:

## the development of youth conservation clubs in Pakistan

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by James A. Sherburne

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The Government of Pakistan has turned to the University of Maine for help in developing a nationwide system of Wildlife Clubs. Why? Myriad problems face Pakistan today - significant international indebtedness, a continuing struggle for economic, religious and social stability, high rates of illiteracy, widespread disease and poverty, a variety of direct and indirect threats from several quarters along her borders with India, Iran, and Afghanistan, current uncertainty surrounding future United States economic assistance because of the nagging questions concerning Pakistan's nuclear plans and capabilities (*Are they being developed for peaceful power or for 'the bomb'?* - or - *do they already have 'the bomb'?*) In the face of these and many more problems confronting this developing country located in a most volatile part of the world today, why would Pakistan turn to the University of Maine for help? And why seek assistance in a seemingly insignificant effort, *to wit*, the development of a nationwide system of Youth Conservation Clubs?

For centuries Pakistan has been an area steeped in social, political, religious, and economic strife. Today it is little different, but with a relatively new set of problems stemming from a phenomenon not atypical of so many developing nations: overpopulation.

Burgeoning populations have created even greater socioeconomic chaos in Pakistan, as in other less developed countries. Greater and greater divisions have been incised between the well-to-do and the vast majority, the poor. The rapid increases in human populations have primarily increased the numbers of rural poor. One devastating effect this has had in Pakistan, as seen elsewhere, is an enormous increase in the demand for already scarce renewable natural resources.

Unlike many developing countries, however, Pakistan has recognized and has asked for help in addressing this critical situation: the conservation and management of its natural resources on a sustainable basis. This request for help goes

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*James A. Sherburne is Cooperating Professor of Wildlife and Coordinator of International Natural Resources and Agricultural Programs at the University of Maine. He earned his PhD in Ecology at Cornell University, and his major research interests focus on terrestrial ecology, predator ecology, and international conservation policy and development. He also serves as Commissioner of the Maine Land Use Regulation Commission.*

beyond the acceptance of foreign assistance programs such as reforestation, dam construction, and field research. Commonly promoted by donor agencies and countries, these assistance programs are usually aimed at strengthening organizations and bureaucracies which aren't effective before or after such assistance.

Pakistan has asked for help in developing a conservation education program. **Conservation education is an approach aimed at involving the very people who use the bulk of the renewable natural resources and can most directly influence how those resources are managed for the long-term.** To understand better why the Government of Pakistan and those of us involved with the development of this program feel this approach can be effective, it is useful to take a brief look at Pakistan's history, its culture, geography and economics, and its natural resources.

### HISTORY

For the past seven to ten thousand years Pakistan has been a melting pot for many ethnic strands, different languages, and great religious movements. Beginning with one of the world's earliest riverine civilizations and, around 2500 B.C. the builders of the Harappa civilization, Pakistan has witnessed the rise and fall of mighty powers and rich societies: Persians, Greeks, Mongols, Huns, and Turks. The Omayyad (Arab) rule of the eighth century and the small feudal principalities which replaced it were followed by the rise of the Muslim Indian Sultanate in the eleventh century. The Moghals ruled the area from the mid-sixteenth through the mid-eighteenth centuries.

Accompanying the disintegration of the Moghal empire and its centralized state, Pakistan was broken into Provinces or States and ruled for almost 150 years by the Sikhs, the Talpurs, and by vassals of the Iranian and Afghan kings. The entire region was conquered by the British in the nineteenth century and annexed as part of their vast Indian empire. Muslims, who had maintained their integrity throughout the myriad reigns, now found themselves in a minority in the region. They still cling to the desire to establish a separate homeland.

In 1940 a resolution supported by the subcontinent's Muslim populations led in large part to Pakistan gaining independence from the British in 1947. Independence, however, brought with it turmoil, the division of its two main Provinces (Bengal and Punjab), large-scale communal violence, and eventually the transfer of two basic religious populations between India and Pakistan that represented the largest transmigration of people in the world's history.

Pakistan was not then, and is still not without its sociological, religious, and economic problems of great magnitude. Its two main territorial regions, East and West Pakistan, were separated by more than a thousand miles of unfriendly territory. Continuing disputes with India erupted into two large-scale and bloody wars in 1965 and 1971. Following the second war East Pakistan became the independent country of Bangladesh. Political and international disputes over Pakistani territories continue today, most notably in the Kashmir region.

Internal politics since 1947 have been no less interesting and changing. To begin with, just one year after independence the country's founder and freedom movement leader died. Political stability was not sustained, many changes in leadership were seen, and in 1958 the armed forces assumed control of Pakistan's administration. Pakistan has endured martial law, regimes which have held general elections, new constitutions, rule by the majority party, political and Provincial polarizations, and upheavals leading once again to military rule in 1977. General elections were again finally held in 1985. The opposition alliance which boycotted those elections has been pressing the current Government led by Prime Minister Mohammed Khan Junejo and President General Zia-ul-Haq for new elections to be held sooner than those scheduled for 1990.

In addition to all this, Pakistan for the past eight years has had to deal with a crisis with which we are all familiar and on which the United States has taken an international stand: the Russian invasion of Afghanistan. Not only is Pakistan a principal recipient and vehicle for international support to the Afghan peoples resisting the invasion, but Pakistan is currently housing literally millions of Afghan refugees who have fled from their nation across the border. Thousands more refugees arrive every week.

Despite this history of turmoil and prospects of an unsettled immediate future, Pakistan remains a country upon which the multitude of subcultures, powers, and societies with their separate interests have left their marks. Pakistan's cultures are held together by their common religion, Islam, which has survived thousands of years of upheaval, and by the blends of central Asian influences over time.

### CULTURE-GEOGRAPHY-ECONOMICS

Roughly 98 percent of Pakistan's inhabitants are followers of Islam, most being practicing Muslims. Rituals, names, social customs, moral values, and norms of behavior are derived

from the Islamic religion. Through their religion Pakistanis are closely linked to cultures throughout Arabia.

The diversity of cultural patterns seen in different parts of Pakistan today, however, has its basis in influences and practices evolved in Central Asia, and has been dictated for centuries by history and geography. The cultural melting pot is most evident throughout Pakistan's rural areas, where 75 to 80 percent of the population is still concentrated. From art to languages to food habits this Central Asian influence is evident.

Pakistan is divided into four distinct provinces, Sind, Punjab, Baluchistan, and the North West Frontier Province (NWFP). In addition to individual cultures, languages, and traditions, each province has its own geography and climate.

The most heavily populated areas are the Indus Plains of the Sind and Punjab provinces. Karachi, once a small fishing village on the coast and the nation's capital and now the country's largest city, is located here. This region also contains the modern capital, Islamabad, and Lahore, Pakistan's *monumental city* filled with examples of beautiful architectural history dating back to the Moghul rule in India. Islamabad today contains all representative embassies, serves as the country's political center, and is a beautiful city blending into the natural environment of the surrounding wooded foothills of the Margalla mountains.

The northern portion of the country, with Peshawar as the capital of the NWFP, is characterized by rugged and spectacular glacial regions of the Hindu Kush and the Himalayas, rising to the second highest peak in the world known as K-2 at 8,611 meters.

The western portions of Pakistan boast mountain chains in the north containing world famous passes, including the Khyber Pass, leading into neighboring Afghanistan. These western bordering mountains lead further south into the barren plateaus of Baluchistan with its capital city, Quetta. Yet further south, bordering Iran, a series of low, rugged hills known as the Salt Range falls into the vast Indus Plains. This fertile area covers roughly one third of the country.

Pakistan is the ninth most populous country in the world with between 95 and 100 million people and has a per capita income of \$350. While low, this is roughly 30 percent higher than the average per capital income for other so-called lesser developed countries.

Agriculture comprises the largest economic sector, contributing about 25 percent of the country's gross domestic product. It provides a livelihood to more than half the country's labor force. Major crops include wheat, rice, cotton and sugar cane. Manufacturing's share of the gross domestic product has been rising in the past several years and major industries include food processing, cotton textiles, petroleum refining, fertilizers, pharmaceutical products and cement.

Pakistan has always followed a policy of attracting foreign private investments and improving the investment climate both for foreign nationals and the local private sector. The



economic development policies of Pakistan have also included seeking considerable assistance from several friendly countries (total commitments since the 1950s are estimated at more than \$20 billion), including the United States.

Like most developing countries, Pakistan faces an international economic environment which puts severe strains on the health of its balance of payments. This has been particularly so with the additional, demanding burden of providing relief assistance to between 3 and 4 million Afghan refugees since the Russian invasion of that country eight years ago.

## NATURAL RESOURCES

### WILDLIFE

Pakistan supports a wide variety of plant and animal life from the Himalayan mountains down to the Arabian Sea. Of the 6,000-plus plant species identified, many are endemic to Pakistan and many have both realized the tremendous, but as yet untapped, potential value. More than 2,000 plants have value as remedies for ailments ranging from common coughs to asthma, or as commercial exports. Medicinal plants are unused largely because of the loss of knowledge in tribal areas of their value and application. Similarly, plants such as juniper in Baluchistan Province are overlooked for their potential commercial value as a source of flavoring from the oils in the berries. Instead, they are hacked down for fuel wood.

More significantly, grasses, shrubs, forests, and vast tracts of mangroves all over the country are being overgrazed or indiscriminately cut, cleared, or destroyed creating barren wastelands. In the Indus Delta, Pakistan is home to the fifth or sixth largest mangrove area of the world. The area is declining rapidly, however, from browsing by camels, by cutting for livestock fodder, and by removal for fuel wood.

Despite harsh environments, the animal life of Pakistan is varied and in some locales plentiful. Mammals (nearly 190 recorded species) include the snow leopard, common leopard, lynx, hyena, foxes, jackals, wolves, several magnificent wild sheep, goats, deer, and the Indus dolphin.

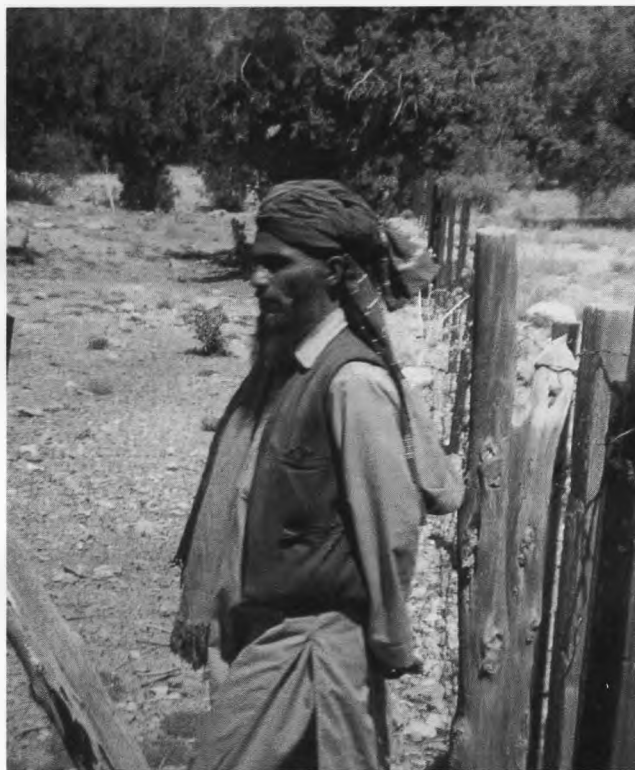
The birdlife is well represented by resident species and migratory birds, particularly waterfowl. Pakistan's wetlands are used for wintering by ducks, geese, swans, cranes, and shorebirds. Hunting and trapping pressures have increased in recent years, and some species, particularly cranes, have become rare. Birds of prey are commonly seen in Pakistan especially during migrations.

One bird of particular note succumbing to a different form of pressure is the Houbara Bustard, a shy bird about the size of a domestic hen found primarily in the Baluchistan province. Historically, the Houbara Bustard was the target of falconry as practiced as an art and only from horseback or camel. The bustards were common; the falconers few and far between.

With the recent advent of oil wealth, hundreds of Arab Sheiks and their entourages invade the deserts and plains of the province every winter in search of the bustards. They come in four-wheel drive Mercedes, in trucks, and even in planes. They bring with them expensive falcons and fancy firearms. Their goal is to hunt and shoot as many bustards as possible.

The Arab Sheiks excel at reaching their goal. In the last 10 to 12 years the houbara population has been declining more than 20 percent a year. In the process, untold thousands of these bustards are chased and shot. Perhaps ironically, the houbaras are protected from hunting by Pakistanis. The plight of this bird has quite recently drawn the concern of some government officials.

The reptiles of Pakistan include lizards, marine and freshwater turtles, tortoises, crocodiles and gavials, and snakes. In addition to 14 species of poisonous marine snakes, Pakistan hosts some of the most deadly terrestrial species including the Indian Cobra, Russell's viper, and the common krait. They are fairly numerous. Extensive trapping of many of the 46 species of nonpoisonous snakes for their skins has led to some, for example the Indian python, becoming rare to uncommon.



**A sacred and ancient Pakistani forest of juniper trees is disappearing due to pressures from overpopulation and a great demand for scarce fuel wood. These 2,500 to 3,000 year old trees, protected within the fenced boundary of the Baluchistan Forestry Department Study Plot, are rapidly being hacked down for firewood outside the fence-line by villagers in and around Ziarat.**

For numerous reasons, Pakistan's plant and animal life has been overexploited. Lack of sound management or inadequate protection has led to the extinction of many species, including the cheetah. In addition, more than 30 mammalian species, 20 birds, four or five reptiles, and approximately 500 plant species are threatened with extinction.

Recent legislation, the designation and establishment of protected areas, (seven national parks, 72 wildlife sanctuaries, 76 game reserves) and government responsibilities newly defined during the past two decades are strong indications of Pakistan's concern about the declining flora and fauna.

Of particular concern also is the rapid destruction or decline of the marine systems, including mangroves. Commercial fishing pressures, the poaching of marine turtle eggs, industrial and urban water pollution, extensive dam construction, and fuel wood/fodder demands on mangroves have all contributed to grave concerns about overharvests, loss of traditional fishing practices, silted estuaries, and associated socioeconomic problems.

### FORESTS

The total annual consumption of timber in Pakistan is currently twice the reported production. Imports alone (30 percent) do not account for the difference. Total annual consumption of firewood is expected to double within the next 12 to 13 years. Currently, domestic energy requirements are met largely by firewood (50 percent) and cow dung (37 percent).

Pakistan is a forest-poor country to begin with. Less than four percent of the land area is forested. Quite simply, increased human demands and livestock requirements on already sparse forest lands are serious threats. The threats to major watershed covers and to the protection of fragile mountain systems from overharvesting and from redirection of natural water courses for agriculture, as well as resultant floods and droughts in the lower plains, are already grave concerns facing rural populations.

Some of the world's oldest and most famous trees, junipers, were once in abundance around Ziarat in western Pakistan (Baluchistan province). The junipers there are reported to be 2 to 3,000 years old, and have been described by visitors for generations. Worshipped by the ancient Chinese, these trees are now few and far between and, more importantly, are looking more and more like a forest of stumps.

I recently visited this ancient site with provincial foresters, who described what is immediately apparent upon entering the forest: the local villagers hack off limbs of a juniper over a period of weeks until the tree *looks dead* and then cut off the top 90 percent, leaving a stump of from two to five feet high. The reason: the population of Ziarat has expanded, the number of villages in surrounding hills has grown, and the Afghan refugee populations have swelled. The junipers represent the only source of fuel in the area.

### RANGELANDS

The current livestock population of Pakistan is between 90 and 100 million and growing rapidly: sheep, goats, horses, donkeys, camels, cattle, and buffaloes. The majority of this livestock lives on rangelands, which comprise about 70 percent of Pakistan. Clearly this represents the most intense land use in the country, and it is having devastating effects.

Due to overgrazing and lack of range management in the past, the rangelands currently supply less than half their seasonal productive capacity. Yet they are stocked with more than twice the number of animals that can be supported even in the best of times. It is obvious that livestock owned and tended by traditional pastoralists is of poor quality, but it meets traditional criteria for status. The impact on the rangelands, however, is of growing concern.

In 1947 Pakistan's population was approximately 30 million, with a growth rate of 1.7 percent. Pakistan now has a population fast approaching 100 million. If the current population growth rate continues (more than three percent), Pakistan's population will double within 25 years.

Pressures on forests, terrestrial wildlife, fisheries, soils, and other natural resources are already seriously affecting people who have to deal on a daily basis with lack of fuel wood, overgrazed rangelands, desertification, waterlogged soils, silted streams, rivers and estuaries, contaminated drinking water, air pollution, and disease from filthy waters. In addition, people are faced with increasing contamination from chemicals applied to poor lands in an attempt to increase their productivity. *It's a Catch-22.*

The predictable, devastating effect of doubling the human population which depends on Pakistan's already strained natural resources for basic survival is alarming.

It is this alarm over the combined circumstances, *i.e.*, a burgeoning human population and rapid destruction and disappearance of the country's natural resources, which prompted the call to the U.S. for help.

### YOUTH CONSERVATION CLUB PROGRAM

In response to the Government of Pakistan's call for assistance in 1985, the U.S. Government turned to the Office of International Affairs in the U.S. Fish and Wildlife Service (FWS). During 1985 and 1986 the FWS carried out initial planning with the Government of Pakistan. The University of Maine had, at the beginning of 1987, established a professional position for coordination of international programs in natural resources and agriculture. I had had experience and involvement for several years with the development of wildlife/conservation clubs in Africa and elsewhere and had also worked with the FWS with international resource training programs. After almost two years of planning, negotiations, and field site visits and seminars, the FWS contacted this office for assistance in the development and subsequent coordination of the program.

The development and organization of Youth Conservation Clubs (in some countries, such as Kenya, referred to as Wildlife Clubs) is one strategy used in conservation education. The clubs serve to create and enhance environmental awareness among young people; identify and address natural resources and conservation issues, and influence community, regional, and national decision-makers who can do something about pressing and threatening environmental problems.

Several countries worldwide have found that wildlife or conservation clubs for school-age youth are an effective way to teach younger generations about the need for natural resources management. The clubs offer young people an opportunity to become involved in enjoyable, meaningful, and interesting activities and projects while learning firsthand about environmental concerns.

Clubs provide the opportunity for young people in turn to influence parents and other adults who hold important positions such as community, political, and religious leaders. Equally important, club members grow up, and many can themselves one day be in positions of influence to address environmental concerns they have long since learned to appreciate. Many agree it is at best difficult to change adults' attitudes and traditions in respect to the use of natural resources. As in other forms of education, the ideal audience for conservation education is young people.

The program to develop a nationwide system of youth conservation clubs in Pakistan is comprised of seven components:

- Workshops to train club leaders;
- In-country support and coordination;
- Short-term training;
- Grants and resources for clubs;
- Regional and national coordination: long-term training;
- Special workshops and seminars;
- Production of resource materials.

### **WORKSHOPS**

Five leader training workshops are to be held throughout the country over the next three years, two in Punjab and one in each of the other three provinces. These workshops are each designed to introduce approximately 30 potential conservation club leaders to the concepts and strategies of conservation education, to basic ecological principles, and to some of the pressing environmental problems of Pakistan. Through seminars, lectures, field site visits, films, and group activities, during a 12 to 14 day period, workshop participants are given the tools to organize and direct conservation clubs in their communities and schools.

Workshop participants are identified by the Government of Pakistan and include public secondary and college teachers, university professors, provincial forestry and wildlife staff, and others from the agricultural and natural resources sectors.

Instructors for the workshops include Pakistani wildlife and

forestry officials and university faculty, and American personnel selected from a core group of people with interests and skills appropriate for the program. For example, at the first workshop, held in September, 1987, in Quetta (Baluchistan) there were 32 participants and more than a dozen observers.

Instructors included myself, Mr. Latif Rao, Conservator of Pakistan's National Council for the Conservation of Wildlife, Mr. Ashiq Ahmad from the Pakistan Institute of Forestry, Mr. Afsar Miam, Associate Professor of Biology at Baluchistan University, and Mr. Gary Prosch, a secondary school science teacher from Michigan.

For the next workshop, scheduled for April in Lahore, we anticipate from 35 to 40 participants. Instructors will include myself, Mac Hunter, also of the University of Maine's Department of Wildlife, Leslie Hudson, Conservation Education Director for Maine's Audubon Society, Mr. Rao, Mr. Ahmad, Dr. Aleen Chaudhry, Wildlife Officer for the Lahore region, and Mr. Ed McCrea, Senior Staff Specialist with the U.S. FWS.

The overall objective of the workshops is to train between 150 and 180 leaders who will return to their respective schools and communities and establish conservation clubs. To do that, these club leaders will need more than the tools introduced at the workshops. They will need backup and support, communication skills, regional and national coordination, resource materials, and from time to time, short-term specialized training. Other components of the program are organized to meet these needs.

### **IN-COUNTRY SUPPORT AND COORDINATION**

Project coordination and implementation is being carried out by myself as Project Officer/Advisor, and a Pakistani graduate student who will receive his graduate degree from the University of Maine. While I am providing overall guidance for the project, the graduate student will focus on helping the Government of Pakistan identify workshop participants; maintain contact and provide follow-up support for club leaders; develop ways to ensure continued long-term support for established clubs; facilitate the establishment of regional resource centers and resource materials, country-wide newsletters, and other key elements that will help clubs operate effectively.

### **SHORT-TERM TRAINING**

In addition to the graduate program at the University of Maine for the Pakistani graduate student, also called the in-country coordinator, other Pakistanis associated with the project may benefit from more limited, short-term training. This will include short courses at the University of Maine or other U.S. institutions, study tours at relevant facilities such as conservation education centers in India or England, or in-country training in areas such as audio-visual techniques, production of resource materials, and communication skills.

## GRANTS AND RESOURCES

A key component of the success of the clubs will be the provision of initial monetary incentives and resources to get individual clubs started. This will include direct grants as well as goods and services in the form of equipment, basic educational materials and travel expenses. Evaluations of individual club activities will lead to a system of matching grants for up to two or three years. This organization should encourage clubs to become self-supporting over time.

## REGIONAL COORDINATORS AND RESOURCE CENTERS

Another key element in institutionalizing the clubs is the provision of near-at-hand resource centers and a regional coordinator who will support and encourage clubs in his or her area. The resource centers will house books, resource materials and equipment for use by clubs, and the regional coordinators will receive a stipend to coordinate the project on a local level.

Regional coordinators will be selected from among workshop participants. At the Quetta workshop held in September we asked for volunteers for this role. No fewer than nine participants were anxious to serve as the regional coordinator for Baluchistan province. After much discussion and debate, the group chose two regional coordinators, one each for clubs established at schools for male students and for female students.

The regional coordinators will be responsible to the national coordinator and through him to the Project Advisor. I have already received requests for assistance for the regional coordinators in Baluchistan province: a good sign things are happening.

## ADDITIONAL WORKSHOPS AND SEMINARS

Training for club leaders is the core element of this project. However, other audiences could be reached regarding the promise and potential which conservation clubs hold for addressing environmental concerns in Pakistan. To do this, we are planning to hold a series of special workshops and seminars in provincial capitals for key government officials, community and religious leaders, university, college, and secondary school administrators, and leaders of key nongovernmental organizations.

The program is off to a good start. We have been working closely with the FWS Office of International Affairs Project Officer, Mr. Ed McCrea, the U.S. Embassy in Islamabad, the U.S. Agency for International Development offices in Washington, D.C., and Islamabad, and Government of Pakistan officials throughout the country in the planning and development of the project. In June of 1987 I visited government and nongovernment officials and representatives in all of Pakistan's provinces to discuss and further plan for the over-

all program activities. I also planned, with officials in Baluchistan, the workshops we held two months later in Quetta.

The reception we were given, the enthusiasm expressed during that workshop, and the continued support offered by the Government of Pakistan and the Provincial Government for this program indicate strong potential success for the establishment of youth conservation clubs. Several officials, including the Ministers of Agriculture and Planning, religious leaders, and Provincial Officers, welcomed the participants and instructors at an elaborate opening ceremony. That event, as well as an equally impressive closing ceremony, was well-covered by newspaper, radio, and television reporters. Both ceremonies received broad national attention.

Such attention, support, and enthusiasm are extremely important for a project such as this, a project addressing a concern for which the Government of Pakistan asked for help. These are indications that the Government of Pakistan is genuinely concerned about the conservation of her natural resources, and that we are on the right track toward effectively helping to address that concern.

## ACKNOWLEDGMENT

The author is grateful for information to the following publication: Carwardine, M. (Ed.). 1986. "The Nature of Pakistan." IUCN, WWF-Pakistan. Lahore.

## Up Close and Personal

A native of Milo, Maine, Dr. Sherburne first became involved with international activities at the Smithsonian Institution, where he served as Deputy Program Manager, and later as Director and Program Manager of the Smithsonian-Peace Corps Environmental Program. He also worked as the Smithsonian's representative to several international commissions and committees.

During the 1970s, Sherburne worked in more than 50 countries in Africa, Asia and South America in the development and implementation of natural resource conservation projects. He and his family lived in Botswana from 1973 to 1975.

After a five-year period at the University of Maine as Leader of the Maine Cooperative Wildlife Unit and a member of the Wildlife Department faculty, Sherburne returned to Washington, D.C., as Scientific Advisor to the United States Agency for International Development. He also headed a Federal Interagency Task Force reporting to Congress on the conservation of biological diversity in developing countries.

In 1985 and 1986, Sherburne lived with his family in Kenya, where he served as Director of African Operations for the African Wildlife Foundation, covering twenty-plus countries throughout sub-Saharan Africa.

Sherburne returned to Maine and assumed his current position in January, 1987.



Rural Pakistani farmers must transport scarce vegetation great distances to use for cooking, for fuel and as fodder for nongrazing livestock at their homes.



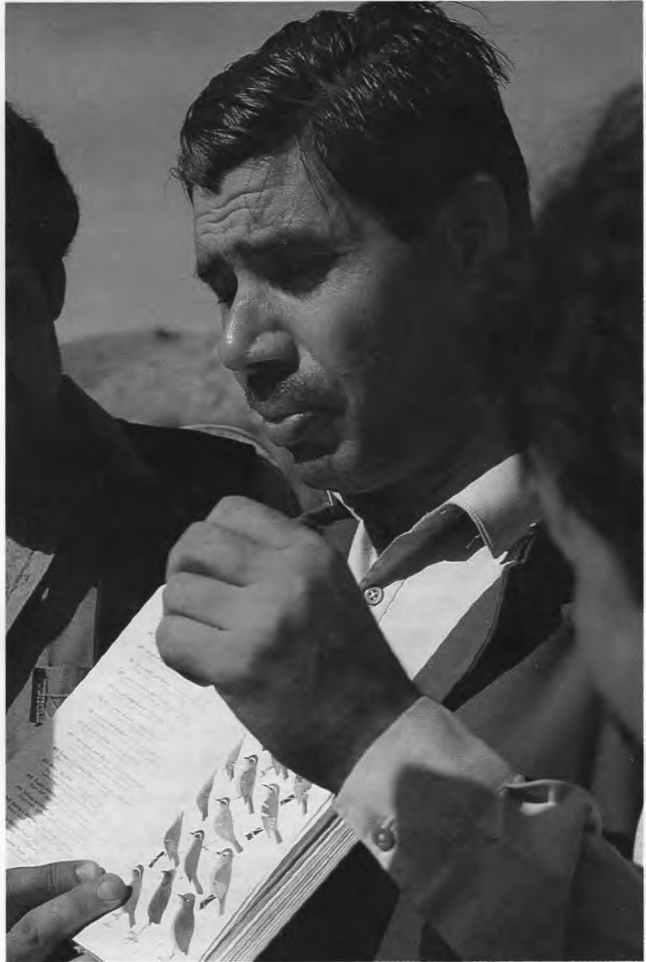
The three to four million Afghanistans and their livestock scattered in refugee camps throughout northwestern Pakistan are making increasingly heavy demands on Pakistan's natural resources for fuel wood, fodder, drinking and cooking water.



A very welcome tea break for the workshop instructors and participants following a field trip to examine environmental problems in the Baluchistan Province arid grazing lands.



Comfortable tents set up in a Provincial Forestry Department experimental watershed management area were used as a base for the Quetta workshop in September, 1987.



Mr. Ashiq Ahmad, Wildlife Officer at the Pakistan Forestry Institute, Peshawar, discussed with workshop participants birds seen during a field trip.

Percy Bysshe Shelley was born in 1792 and died at age 30. He was greatly influenced by Wordsworth who was born the same year as Hegel and Beethoven, the same year as the Boston Massacre. His immediate world heritage included the birth of Coleridge, whose influence upon him was strong; Priestley's discovery of gases and isolation of oxygen; the Boston Tea Party; Paine's Common Sense; the Treaty of Paris and the storming of the Bastille. His lifetime saw the births of Darwin, Pasteur, and Wagner, and encompassed Fulton's invention of the steamboat. During his life, the industrial revolution was incising its marks on humanity, and the Luddites were gaining momentum to scream their anger at poverty, unemployment and social injustice. In the face of these far from placid circumstances, Shelley believed in the essential goodness and perfectibility of human nature; he looked forward to the brotherhood of man in a world of freedom, beauty and love.

## Objects, Signs, and Symbols from Scafell to Chamonix: Visions of Mont Blanc

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by Robert Brinkley

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How do poems come to be written? I have been trying for some time to reconstruct the history of composition of one poem, *Mont Blanc*, a long meditative poem that Percy Bysshe Shelley wrote in Chamonix, at the end of July 1816. One of his first major works as a poet, it was composed, he noted, while he was in Chamonix, *under the immediate impression of the deep and powerful feelings excited by the objects which it attempts to describe . . . the untameable wildness and the inaccessible solemnity from which those feelings sprang*. It was also written, although Shelley does not say this, in response to other poems, in particular those written by the two great poets of the previous generation, Samuel Taylor Coleridge and William Wordsworth. Thus the history of composition of Shelley's poem must include how their poetry was written as well. What I can offer for the moment are a number of episodes from this history.

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*Robert Brinkley is Associate Professor of English at the University of Maine, where he teaches courses in Romanticism and Literary Theory. He earned his PhD at the University of Massachusetts (Amherst), and his publications include essays on Romantic and Renaissance Literature and the influence of philosophic traditions on literary theory. Brinkley is Secretary of the American Friends of Wordsworth; his current work includes a book on the composition of Mont Blanc and collaborative studies with Joseph Arsenault on the limits of formalization.*

### Climbing Scafell: Coleridge in 1802

On August 5, 1802, during a nine day ramble in the Cumbrian mountains of the Lake District, Coleridge climbed to the summit of Scafell, the highest peak in England. He recorded his impressions in a letter for Sara Hutchinson:

*O my God, what enormous Mountains these are close by me, & yet below the Hill I stand on . . . . [O]n a nice Stone Table am I now at this moment writing to you — between 2 and 3 o'Clock as I guess/surely the first Letter ever written on the Top of Sca.Fell! But O! what a look down just under my Feet! The frightfullest Cove that might ever be seen/huge perpendicular Precipices, and one Sheep upon it's only Ledge . . . . [B]ut for the haziness of the Air I could see my own House—I see clear enough where it stands . . . . I must now drop down, how I may into Eskdale . . . .*

This letter was written from the summit of Scafell.

A letter on the following day, also to Sara Hutchinson, describes Coleridge's descent. Dropping down a series of small precipices (*when I find it convenient to descend from a mountain . . . I wander on, & where it is first possible to descend, there I go*), Coleridge found he was cragbound:



*I began to suspect that I ought not to go on/but then unfortunately tho' I could with ease drop down a smooth Rock 7 feet high, I could not climb it . . . I had only two more to drop down/to return was impossible—but of these the first one was tremendous.*

At that moment, according to the letter, Coleridge experienced a blessing, the sense of a time without limits:

*My limbs were all in a tremble—I lay upon my Back to rest myself, & was beginning according to my custom to laugh at myself for a Madman, when the sight of the Craggs above on each side, & the impetuous Clouds just over them, passing so luridly & so rapidly northward, overawed me/I lay in a state of almost prophetic Trance & delight—& blessed God aloud, for the power of Reason & the Will, which remaining no Danger can overpower us! O God, I exclaimed aloud—how calm, how blessed am I now/I know not how to proceed, how to return but I am calm & fearless & confident/if this Reality were a Dream, if I were asleep, what agonies had I suffered! what screams!—When the Reason & the Will are away, what remain to us but Darkness & Dreams & a bewildering Shame, and Pain that is utterly Lord over us, or fantastic Pleasure, that draws the Soul along swimming through the air in many shapes, even as a Flight of Starlings in a Wind.—I arose . . .*

Attempting to continue the descent, Coleridge noticed a chimney in the rockwall:

*I glanced my eye to my left, & observed that the Rock was rent from top to bottom—I measured the breadth of the Rent, and found that there was no danger of my being wedged in/so I put my Knap-sack round to my side, & slipped down as between two walls, without any danger or difficulty—the next Drop brought me down on the Ridge . . .*

As far as we know, this is the first written account of rock-climbing in the Lake District.

About a month later, in a September 10th letter to William Sotheby, Coleridge refers to an event that he had not mentioned in either letter to Sara, a poem composed *when I was on Scafell*:

*I involuntarily poured forth a Hymn in the manner of the Psalms, tho' afterwards I thought the Ideas &c disproportionate to our humble mountains—& accidentally lighting on a short Note in some swiss Poems, concerning the Vale of Chamoury, & it's Mountain, I transferred myself thither, in the Spirit, & adapted my former feelings to these grander external objects.*

[I]n the manner of *Psalms* means, Coleridge adds, in the manner of the Hebrew Poets, for whom each thing has a life of its own, & yet they are all one Life. In God they move & live, & have their Being. By his own account having transferred himself in spirit from the Lake District to the Alps, having adapted his former feelings, Coleridge entitled the result, *Chamoury; The Hour Before Sunrise A Hymn*. It begins:

*Hast thou a charm to stay the morning star  
In his steep course—so long he seems to pause  
On thy bald awful head, O Chamoury!  
The Arve and Arveiron at thy base  
Rave ceaselessly; but thou, dread mountain form,  
Resist from forth thy silent sea of pines  
How silently! Around thee, and above,  
Deep is the sky, and black: transparent, deep,  
An ebon mass! Methinks thou piercest it  
As with a wedge! But when I look again,  
It seems thy own calm home, thy crystal shrine,  
Thy habitation from eternity.  
O dread and silent form! I gaz'd upon thee,  
Till thou, still present to my bodily eye,  
Did'st vanish from my thought. Entranc'd in prayer,  
I worshipp'd the INVISIBLE alone.*

Eighteen years later, Coleridge would insist that in these lines he was addressing himself to *individual* Objects actually present to his Senses.

Some critics doubt that the Hymn ever had anything to do with the climb on Scafell. As Coleridge never fully acknowledged but as Thomas De Quincey was the first to recognize, the Hymn was overwhelmingly influenced by the Swiss Poem (actually the German-Danish poem) by Friederica Brun that Coleridge mentions (without identifying) to Sotheby, *Chamoury beyrn Sonnenaufgange*:

*Aus tiefem Schatten des schweigenden Tannenhains  
Erblick' ich bebend dich, Scheitel der Ewigkeit,  
Blendenden Gipfel, von dessen Hohe  
Ahndend mein Geist ins Unendliche schwebet!  
[From the deep shadows of the silent fir groves  
Trembling, I catch sight of you, summit of eternity,  
Dazzling summit, from whose heights  
My spirit, in anticipation soars into infinity!]*

Brun's poem is 20 lines; Coleridge's, four times longer, but most of the images as well as the rhetorical strategies of *Chamoury beyrn Sonnenaufgange* are repeated in *Chamoury; The Hour Before Sunrise*. Apparently Coleridge translated and expanded, but in no way altered the sense of, the German text. No impromptu psalm on a Cumbrian mountain, no spot of time, would have been required for what remains a very derivative exercise. On the other hand, the Hymn may in fact be a sequel to the experience on Scafell, an attempt, using Brun's poem, to produce exultant harmony out of the blessing Coleridge felt.

From the Scafell letters to Sara Hutchinson, if not from the Hymn, it is fairly easy to recreate this feeling: a sense of renewed strength, a release from nightmare and a pervasive sense of failure. An entry in Coleridge's notebook from earlier the same year offers this self-portrait:

*a man, disappointed in marriage, & endeavoring to make a compensation to himself by virtuous & tender & brotherly friendship with an amiable Woman—the obstacles—the*

*jealousies — the impossibility of it. — Best advice that he should as much as possible withdraw himself from pursuits of morals &c — & devote himself to abstract sciences —*

The *amiable Woman* here in Sara Hutchinson, with whom Coleridge in fact was desperately in love. To this portrait one might add Coleridge's growing sense of failure as a poet (*all my poetic Genius, if ever I really possessed any Genius . . . is gone — and I have been fool enough to suffer deeply in my mind*), and a crippling opium addiction. The failures in his emotional and imaginative life seemed connected to Coleridge; in a verse letter to Sara of April 1802, he attributes both to an unhappy marriage (Coleridge's wife, whose name was also Sara, is rarely portrayed sympathetically by her husband):

*Ill Tidings bow me down to earth —  
Nor care I, that they rob me of my Mirth —  
But oh! each Visitation  
Suspends what Nature gave me at my Birth,  
My shaping Spirit of Imagination!  
. . . my coarse domestic Life has known  
No Habits of heart-nursing Sympathy,  
No mutual mild Enjoyments of its own,  
No Hopes of its own Vintage. . . .  
For not to think of what I needs must feel,  
But to be still & patient all I can;  
And haply by abstruse Research to steal  
From my own Nature all the Natural Man —  
This was my sole Resource, my wisest plan!  
And that, which suits a part, infects the whole,  
And now is almost grown the Temper of my Soul.*

It is in connection with these troubles that Coleridge wrote and that Sara would have read the Scaffell letters. They seem intent on reassuring her that he is strong again. The Hymn, in turn, can be read as an attempt to reaffirm this strength.

But if both were written with the verse letter in mind, the verse letter in turn was also written in connection with a particular text, the opening stanzas of Wordsworth's *Intimations Ode* (stanzas 1-4 were completed in Spring 1802; stanzas 5-12 were not composed until Spring 1804):

*There was a time when meadow, grove, and stream,  
The earth, and every common sight,  
To me did seem  
Apparelled in celestial light,  
The glory and the freshness of a dream.  
It is not now as it has been of yore;  
Turn wheresoe'er I may,  
By night or day,  
The things which I have seen I now can see no more.*

Wordsworth's poem plays back and forth between a sense of renewed strength (*To me alone there came a thought of grief: / A timely utterance gave that thought relief, / And I again am strong*) and pervasive loss (*Whither is fled the visionary gleam? / Where is it now, the glory and the dream*). Coleridge responded to both in the verse

letter. Of the Cumbrian mountains: *oft I seem to feel, & evermore I fear, / They are not to me the Things, which once they were*. Of his loss of imaginative vision: *And still I gaze — & with how blank an eye!* And of its cause: *O Sara! we receive but what we give, / And in our Life alone does Nature live*. In a subsequent version, when the verse letter is rewritten as an ode, these lines, the poem as a whole, will now be addressed not to Sara but to Wordsworth: *O Wordsworth! we receive but what we give, / And in our Life alone does Nature live*. While the poem will continue to express Coleridge's dejection, it will transform what had originally been a prayer for Sara into a celebration of Wordsworth's creative power:

*Calm steadfast Spirit, guided from above,  
O Wordsworth! friend of my devoutest choice.  
Great Son of Genius! full of Light & Love!  
Thus, thus dost thou rejoice.  
To thee do all things live from pole to pole,  
Their Life the Eddying of thy living Soul!*

Coleridge's attraction to Sara may always have involved Wordsworth. In the Spring of 1802, Sara's sister Mary became Wordsworth's fiancée, and both sisters became part of Wordsworth's domestic world, which included his sister Dorothy. Coleridge's passion for Sara also involved a desire to be included in that world. Thus, again from the verse letter:

*To visit those, I love, as I love thee,  
Mary, & William, & dear Dorothy,  
Is but a temptation to repine . . .  
My own peculiar Lot, my house-hold Life  
It is, & will remain, Indifference or Strife —  
While ye are well & happy, 'twould but wrong you  
If I should fondly yearn to be among you —*

A notebook entry for 1805 contains this erotic fantasy:

*[I]f I were sleeping with the Beloved these kind and pleasurable feelings would become associated with a Being out of me . . . [T]o feel pleasure made more pleasurable, in legs, knees, chest, arms, cheek — all in deep quiet, a fountain with unwrinkled surface yet still the living motion at the bottom, that with soft and even pulse keeps it full . . .*

The object of this fantasy is Sara, however, the concluding image is first associated with Wordsworth's domestic life. Thus, a notebook entry for September 1801: *The spring with the little tiny cone of loose sand ever rising & sinking at the bottom, but its surface without a wrinkle. — W.W. M.H. D.W. S.H.* And, with reference to the same scene and himself: *Item — Murmur of a stream — Item — well with Shadows. Item — Why aren't you here?*

Coleridge's letters to Sara are to a large extent addressed to Dorothy, Mary, and William as well. What seems hopeless to him is any realization of the passion to be fully a part of their circle, and this hopelessness has deprived him of any realization of imaginative power. To what extent opium addiction was a cause or effect of failed hopes is unclear, but



what resulted were opium-induced nightmares in which any sense of external reality faded. In an 1803 letter to Sir George and Lady Beaumont:

*While I am in possession of my will & my Reason, I can keep the Fiend at arm's Length; but with Night my Horrors commence . . . I have fallen asleep struggling & resolving to lie awake, & awaking have blest the Scream which delivered me from my reluctant Sleep.*

In an 1805 notebook entry:

*years have passed to a man in the prime of manhood/on every night of which he had dreaded to go to bed or fall asleep.*

Another entry—this from December 1802—defines the character of Coleridge's dread: *Take away from sounds & the sense of outness—what a horrid disease every moment would become, what Coleridge in a later poem will call a Spirit-jail secure/By the mere Horror of blank Nought.* On Scafell in August 1802, however, or so he writes to Sara, this disease seemed cured, at least for the moment.

Because he is not asleep, he is *calm & fearless & confident*, in a state of almost prophetic trance from the strong sense of external existence: *the sight of the Crags above me on each side, & the impetuous Clouds just over them, posting so luridly & so rapidly northward, overawed me.* The life of things empowers Coleridge. Asleep, if what he had beheld had been a dreamscape, *what agonies had I suffered, even from the fantastic Pleasure that draws the Soul along swimming through the air in many shapes, even as a Flight of Starlings in a Wind.* The simile involves an allusion to Dante's *Inferno* which Coleridge had first read in translation in 1796, to Canto V, where carnal lovers, *who subject reason to desire*, whirl helplessly in the torment of unrestrained passion: *as in the cold season starlings are borne along on their wings in wide, dense flocks, so the blast carries the sinful spirits.* Presumably the allusion characterizes Coleridge's passion for Sara. Presumably for the moment he feels free of it and, for the moment, can address her apart from fantasy. Thus, he can bless God and later, in the Hymn, attempt to turn this blessing into public utterance:

*And thou, O silent Form, alone and bare,  
Whom, as I lift again my head bow'd low  
In adoration, I again behold,  
And to thy summit upward from thy base  
Sweep slowly with dim eyes suffus'd by tears,  
Awake, thou mountains form . . .  
. . . tell thou the silent sky,  
And tell the stars, and tell the rising sun,  
Earth with her thousand voices calls on God!*

#### Visiting Chamonix: Wordsworth's recollections in 1804

Wordsworth was not much impressed by the Hymn in the Vale of Chamonix. Much to Coleridge's disappointment, he regarded it as a *specimen of the Mock Sublime*. Unlike Coleridge, Wordsworth had actually visited Chamonix as a young man in 1790, during a visit to revolutionary France. At the time,

his sentiments had been quite similar to those that Coleridge expresses. To Dorothy he had written that *among the awful scenes of the Alps, I had not a thought of men, or a single created thing: my whole soul was turned to him who produced the terrible majesty before me.* In Spring of 1804, however, when he recalls the visit with Coleridge's poem in mind, Wordsworth's response has been fundamentally revised. Writing in *The Prelude*, a long autobiographical poem addressed to Coleridge, Wordsworth denies the Hymn's assertions:

*That day we first  
Beheld the summit of Mont Blanc, and grieved  
To have a soulless image on the eye  
Which had usurped upon a living thought  
That never more could be.*

Rather than an emblem of divine majesty, the mountain produces an impression of mere negation.

Under Coleridge's influence, Wordsworth had attempted to articulate a vision of the life of things, of the motion and the spirit within us and in the world. In *The Eolian Harp* (August 1795), where *the stilly murmur of the distant Sea/Tells us of Silence*, Coleridge speculated that nature is animated by an *intellectual Breeze,/At once the Soul of each, and God of all.* In *Frost at Midnight* (February 1798), Coleridge wrote of

*The lovely shapes and sounds intelligible  
Of that eternal language, which thy God  
Utters, who from eternity doth teach  
Himself in all, and all things in himself.*

Five months later, in *Tintern Abbey* (July 1798) which begins with an allusion to *The Eolian Harp*:

*again I hear  
These waters, rolling from their mountain-springs  
With a sweet inland murmur*

Wordsworth echoed Coleridge's faith:

*with an eye made quiet by the power  
Of harmony, and the deep power of joy,  
We see into the life of things.  
. . . And I have felt  
A presence that disturbs me with the joy  
Of elevated thoughts; a sense sublime  
Of something far more deeply interfused,  
Whose dwelling is the light of setting suns,  
And the round ocean, and the living air,  
And the blue sky, and in the mind of man,  
A motion and a spirit, that impels  
All thinking things, all objects of all thought,  
And rolls through all things. Therefore am I still  
A lover of the meadows and the woods,  
And mountains; and of all that we behold  
From this green earth; of all the mighty world  
Of eye and ear, both what they half-create,  
And what perceive*

What Coleridge offered Wordsworth was an interpretation of his own experience. Of his childhood, he could now write: *in all things/I saw one life, and felt that it was joy*. By late 1798, however, as Wordsworth began *The Prelude*, he had also begun to articulate a quality of experience that this interpretation could not sustain, a *darkness* in his thoughts: *solitude, / Or blank desertion, a dim and undetermined sense / Of unknown modes of being*. By the end of 1799, he thought he had followed this experience to a source; the first moment of blankness seems to have occurred at the time Wordsworth's mother died: *I was left alone / Seeking this visible world, not knowing why*. What was involved was not simply a repetition of loss but a recurring sense of continuity, of a sustained connection between child and mother, the *great birthright of our being* that death could not destroy:

*The props of my affections were removed,  
And yet the building stood, as if sustained  
By its own spirit. All that I beheld  
Was dear to me.*

Moments of blankness recall the birthright and that birthright sustains affections.

Wordsworth's response in 1804 to Coleridge's Hymn, the rejection of Coleridge's influence that is implicit in the response, is written in the language he used to articulate the birthright. Here a soulless image causes him to grieve, but later the same spring, negating and usurping images will lead Wordsworth to radical assertions. In *The Prelude*, as he recalls another event in 1790, the day on which he crossed the Simplon Pass:

*Imagination!—lifting up itself  
Before the eye and progress of my song  
Like an unfathered vapour, here that power,  
In all the might of its endowments came  
Athwart me. I was lost as in a cloud,  
Halted without a struggle to break through,  
And now, recovering, to my soul I say  
'I recognise thy glory.' In such strength  
Of usurpation, in such visitings  
Of awful promise, when the light of sense  
Goes out in flashes that have shewn to us  
The invisible world, doth greatness make abode,  
There harbours whether we be young or old.*

And in the concluding stanzas of the *Intimations Ode*, where it is the blankness Coleridge dreaded that is affirmed:

*those obstinate questionings  
Of sense and outward things,  
Fallings from us, vanishings;  
Blank misgivings of a Creature  
Moving about in worlds not realized*

These, rather than the Coleridgean life of things, are now *the fountain light of all our days*, intimations of immortality which at once recall but fundamentally revise the opening lines of *Tintern Abbey*:

*Though inland far we be,  
Our Souls have sight of that immortal sea  
Which brought us hither,  
Can in a moment travel thither,  
And see the Children sport upon the shore,  
And hear the mighty waters rolling evermore.*

In place of Coleridge's God, his celebration of the Father, Wordsworth affirms his faith in the nurturing power of the oceanic feeling to which moments of blank desertion can return us.

### Visiting Chamonix: Shelley in 1816

When Shelley composed *Mont Blanc* in July 1816, he would not have known many of the texts from which I have been quoting, certainly not the letters or notebook entries, probably not even the published version of the verse letter to Sara, *Dejection: An Ode*. What Shelley would have known were *Tintern Abbey*, the *Intimations Ode*, and the Hymn. In *Mont Blanc* he finds ways of revising all three.

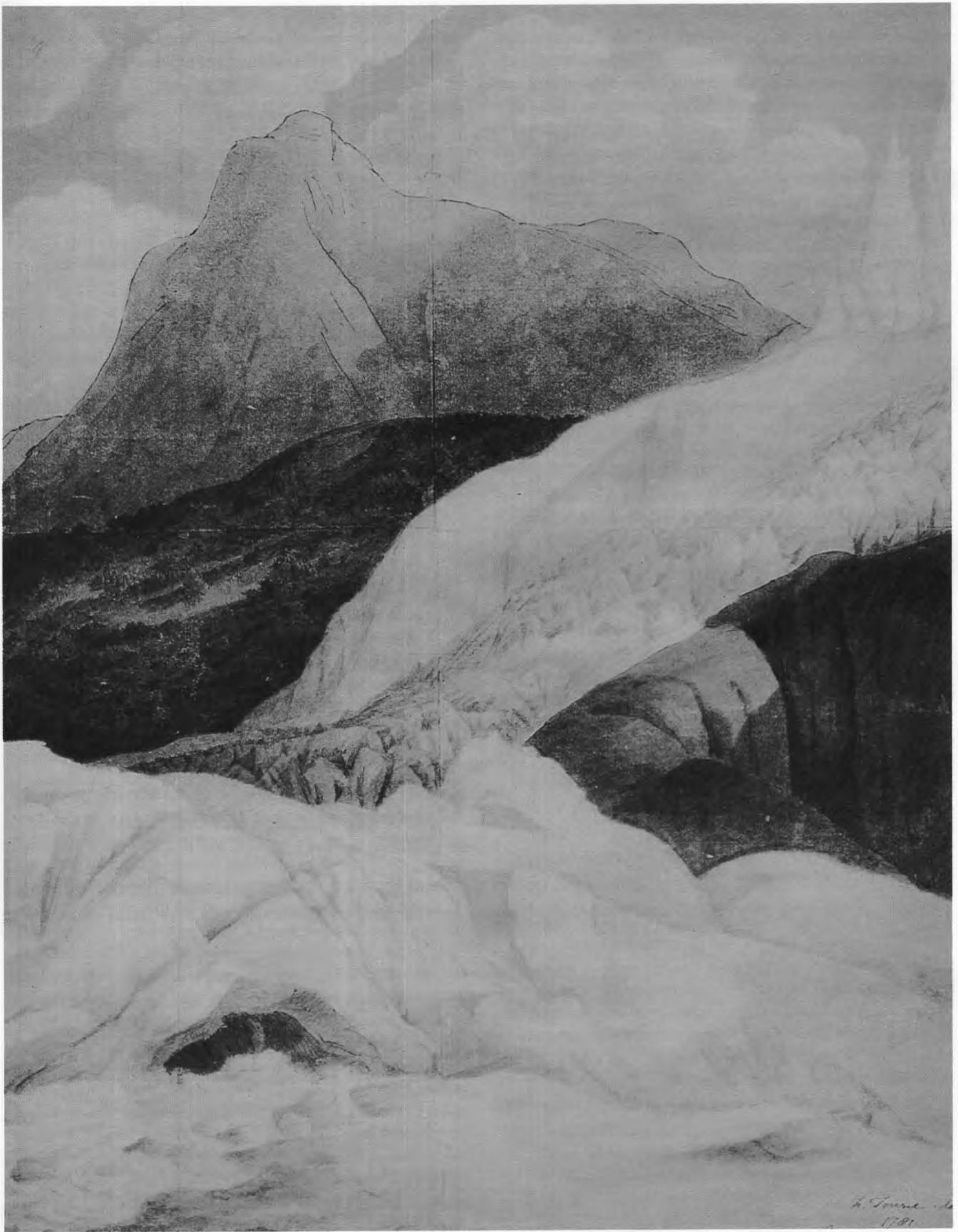
On July 22, Shelley left Geneva for Chamonix. He was accompanied by Mary Godwin (she was not yet Mary Shelley) and her stepsister, Claire Clairmont. In the journal-record Shelley made for the day, he noted that *the day is brilliantly clear & exceedingly hot*. . . . *Mont Blanc itself is perpetually in sight*. After Bonneville (*a neat little town with no conspicuous peculiarity except the white towers of the prison*), the Alps began: forests, chasms, *perpendicular mountains, pyramidal crags, untameable, inaccessible solitude*. And two waterfalls:

*Near Maglans, within a league of each other we saw two waterfalls. They were no more than mountain rivulets, but the height from which they fell, at least 200 feet made them assume a character inconsistent with the smallness of their stream. The first fell in two parts;—& struck first on an enormous rock resembling precisely a colossal Egyptian statue of a female diety. It struck the head of the visionary image & gracefully dividing then fell in folds of foam, more like a cloud than water, imitating a veil of the most exquisite woof . . . . The other water fall was more continuous & larger. The violence with which it fell, made it look rather like some shape which an exhalation had assumed—the like water—for it fell beyond the mountain; which appeared dark behind it as it might have appeared behind an evanescent cloud.*

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overleaf:

**Francis Towne, *The Source of the Arveiron: Mont Blanc in the Background*. 1781. Watercolour on four sheets, joined. 16 ¾ x 12 ½ (42.5 x 31.1). The Trustees of the Victoria and Albert Museum, London. With thanks to Rutgers University Press, New Brunswick and London, and the Wordsworth Trust, Dove Cottage, Grasmere, England.**



The party spent the night at St. Martin, where *clouds had overspread the evening & hid the summit of Mont Blanc*. The next day they travelled on, reaching Chamonix by the end of the afternoon. That evening Shelley began a letter for Thomas Love Peacock, again recording the day's impressions:

*Mont Blanc was before us. . . . Mont Blanc was before us but was covered with cloud, & its base furrowed with dreadful gaps was seen alone. Pinnacles of snow, intolerably bright, part of the chain connected with Mont Blanc shone thro the clouds at intervals on high. I never knew I never imagined what mountains were before. The immensity of their aerial summits excited, when they suddenly burst upon the sight, a sentiment of extatic wonder not unallied to madness—And remember this was all one scene. It all pressed home to our regard & to our imagination.—Though it embraced a great number of miles the snowy pyramids which shot into the bright blue sky seemed to overhang our path—the ravine, clothed with gigantic pines and black with its depth below.—so deep that the very roaring of the untameable Arve which rolled through it could not be heard—was very close to our footsteps. All was as much our own as if we had been the creators of such impressions in the minds of others, as now occupied our own.—Nature was the poet whose harmony held our spirits more breathless than that of the divinest.*

At some point on the following day, Shelley began the composition of *Mont Blanc*.

Coleridge's Hymn provides Shelley with two structuring images. The first two verse paragraphs of *Mont Blanc* concern the Ravine of Arve, paragraph I concluding with an allusion to the Hymn: *a vast river/Over its rocks ceaselessly bursts & raves*. In Paragraph III, when Shelley turns from the ravine to the mountain, he again has Coleridge in mind: *Far far above piercing the infinite sky/Mont Blanc appears still, snowy & serene*. In Shelley's poem, however, Coleridge's images are not only recreated in connection with his immediate impressions of Chamonix. They are also reinterpreted in connection with Shelley's reading of Wordsworth.

From the working draft of *Mont Blanc* (now in the Bodleian Library at Oxford), it is possible to reconstruct much of the process of composition, not only the sequence of revisions, but also pauses of indefinite length when the writing was broken off. The Bodleian manuscript provides repeated indications that the poem was structured as it was composed, by intervals of thwarted writing and Shelley's subsequent response to those moments of doubt.

The first break in the writing occurs near the beginning of the second verse paragraph:

. . . awful scene  
Where Power, in likeness of the Arve comes down  
From the ice-gulphs that gird his secret throne  
Bursting thro these dark mountains like the flame

*Of lightning thro the tempest, thou dost lie  
Thy giant brood of pines around thee clinging  
[ . . . ] to the Arve Arve sound can tame (12-20; 31)*

Not all of the writing is recoverable here, but composition breaks off with *the loud lone sound* of the river, and when Shelley returns to the text, rewriting and extending the passage, composition will again break off with essentially the same image:

*Thy caverns echoing to the Arves commotion  
A loud lone sound no other sound can tame  
Thou art pervaded with unceasing motion  
Thou art the path of unreposing sound  
Ravine of Arve. (30-34)*

These lines involve a reversal of a passage in the letter to Peacock since he had written on the 22nd that the ravine was too deep for the sound of the Arve to be audible. Now, on the following day, this observation is revised. Silence is replaced by sound, presumably to fit the allusive imagery in earlier lines, a pervasive sound of water:

*In day—the eternal universe of things  
Flows thro the mind, & rolls its rapid waves  
Now dark—now glittering—now reflecting gloom  
Now lending splendour, where from secret caves  
The fountain of the mind its tribute brings  
Of waters,—with a wild sound half its own  
Such as a feeble brook will oft assume  
In the wild woods among the mountains lone  
Where water falls around it dash & fall forever  
Where woods & winds contend, & a vast river  
Over its rocks ceaselessly bursts & raves—  
Thus thou ravine of Arve, deep dark ravine—  
Thou many colored, many voiced vale— (4-13)*

A simile for *the fountain of the mind*, for the Ravine as well, the *feeble brook* provides a transition from the poem's opening lines: the fountain of the mind is like the brook which is like the ravine; each has *a wild sound half its own*, as does the *universe of things* in the mind, another allusion to *Tintern Abbey*.

This allusion did not appear in the line that Shelley initially wrote. *In daylight thoughts, bright or obscure*, the draft reads, then below: *In day—the stream of various thoughts*. Only when Shelley reworks this line does he find the beginning of his poem: *In day—the [eternal?] universe of things*, an echo of the *life of things* (TA, 50) from Wordsworth, the *motion* and the *spirit, that impells/All thinking things, all objects of all thoughts,/And rolls through all things* (TA, 101-103). In Wordsworth, as in Coleridge, spirit moves through the mind and the world; here, however, that spirit has been cancelled. Only **things** flow through the mind. A moment later, the *wild sound half its own* recalls the *mighty world/Of eye and ear, both what they half-create,/And what perceive* (106-108); the simile of the brook recalls *these waters, rolling from their mountain-springs/With a sweet inland murmur* (3-4). In *Tintern Abbey*, the image echoes Coleridge and *The Eolian Harp, the stilly*

murmur of the distant sea (11); in *Mont Blanc*, Shelley transfers the allusion to the Alps where it assumes the inland sound of its new surroundings, the *many voiced vale* where the Arve *ceaselessly bursts and raves*, the language as well of Coleridge's Hymn. It is with this allusion, however, that composition first breaks off, with the *loud lone sound* that the *feeble brook* has assumed.

What the Chamonix landscape seems to have offered Shelley was a chance to rewrite Coleridge and Wordsworth. Often the prose accounts in the letter to Peacock or the journal offer the possibility for these revisions. Thus the observation on July 21 that the immense landscape makes mountain rivulets *assume a character inconsistent with the smallness of their stream* provides the image for the feeble brook in the poem. Now, when composition breaks off, Shelley returns to the same journal entry, to the description of mountain rivulets and waterfalls, in particular to the Egyptian statue which the first waterfall veiled. *Thou art the path of unrequiring sound/Ravine of Arve*, and, Shelley adds,

*Mighty Ravine & when I gaze on thee  
Thine earthly rainbows stretched across the steep  
Of some white torrent which with its strange veil  
Robes some unsculptured image—even the sleep  
The momentary death . . . (34; 25-27)*

*Momentary death* is revised to *sudden death*, then to the *sudden pause of things*. Finally Shelley writes:

*The sudden pause which does inhabit thee  
Which when the voices [orig. "woods & winds"] of the  
desert fail  
And its hues wane, doth blend them all & steep  
Their periods in its own eternity  
I seem to gaze on my own mind*

Earlier Shelley had transformed mountain rivulets into a Wordsworthian allusion by replacing sight with sound. Now he transforms the journal's *visionary image*, cancelling the simile of the Egyptian statue, *un-sculpting* the figure of speech and reducing it to an interpretative blank. Where the brook is associated with the universe of things and the world of eye and ear, this image is associated with sleep, death, *the sudden pause of things* when the light of sensation fades. From the same realm, *Mont Blanc* will appear later in the poem as another unsculptured image. What Shelley considers first, however, is the scene of composition in which this image has been sought.

Given the break in composition, the *pause of things* may also reflect the sudden pause in the writing. When Shelley published the poem in 1817, he reordered lines to recall the figurative pattern with which the poem opens:

*Thou art the path of that unrequiring sound—  
Dizzy Ravine! and when I gaze on thee  
I seem as in a trance sublime and strange  
To muse on my own separate phantasy . . .*

Gazing at this *path of . . . unrequiring sound*, Shelley imagines that his own mind is reflected, and thus associates it with the mind

through which the universe flows in the opening lines of the poem. What this reordering obscures, however, is the association in the Bodleian manuscript between the poet's mind and the ravine **which the unsculptured image inhabits**, for which the *torrent* is only a veil. Connected with a *pause* both in the writing and in its objects, the aura of the image silences the voices of the ravine, and the Wordsworthian-Coleridgean imagery of the poem's opening. The Vale of Chamonix becomes a *desert*. Shelley is left with the effects of revision: on the one hand, a landscape whose *wonders* are cancelled and replaced with a *darkness*; on the other with the scene of composition, *in the still cave of the shade poesy*, where his poem has become a self-referential allegory:

*. . . thoughts whose wandering wings  
Now float above thy darkness [orig., "wonders"]—now rest  
In the still cave of the shade poesy  
Seeking among the shadows that pass by [orig. "shadows on high"]  
Ghosts of the things that are some shade of thee  
Some likeness—some faint image—of till they (41-47)*

In the Bodleian draft, the writing is interrupted while the search is still in progress. When it resumes (in the cave of poetry, where the search for an image has been interrupted), Shelley will celebrate the pause in the writing which has evidently just occurred:

*Seeking among the shadows that pass by  
Ghosts of the things that are some shade of thee  
Some likeness—some faint image—the breast  
From which they fled recalls them.—thou art there.*

Apparently when the search is abandoned and the writing breaks off, the pause is revelatory, and as Shelley discovers, what reveals itself here is another aspect of Wordsworth's and Coleridge's legacy.

Shelley responds to the assertion he has just made by echoing transitions from Wordsworth's poetry: *And now, with gleams of half-extinguished thought . . . The picture of the mind revives again (Tintern Abbey, 59-62); Wither is fled the visionary gleam? . . . Our birth is but a sleep (Intimations Ode, 56-58); Some say that gleams of a remoter world/Visit the soul in sleep—that death is slumber (Mont Blanc, 49-50)*. Recalling the Ode's myth of pre-existence, Shelley substitutes death for birth, evokes the realm of the unsculptured image, but then stops writing again: *for the very mind is faint/With aspiration (57-58)*. When the poem resumes, these lines are replaced with another allusion:

*Nor, perchance,  
If I were not thus taught, should I the more  
Suffer my genial spirits to decay (Tintern Abbey, 112-14)*

Shelley writes:

*. . . For the very spirit fails  
Driven like a homeless cloud from steep to steep  
Which vanishes among the viewless gales  
Far far above piercing the infinite sky  
Mont Blanc appears still, snowy & serene*



*Its subject mountains their unearthly forms  
Pile round it, ice & rock—how hideously  
They overhang the Vale! (57-63)*

By the end of this passage, Shelley has once again come upon the language of Coleridge's Hymn.

Here too, Shelley's poem seems to be anticipated by the journal, by the same description of two waterfalls. He had written on the 21st that the second fell beyond the mountain (presumably Mont Blanc) and that the mountain appeared behind it as it might have appeared behind an evanescent cloud. Thus the mountain has the same relationship to the second waterfall that the visionary image has to the first. Both waterfalls are particular appearances that the feeble brook has assumed, and in the journal it is this brook which seems to veil the mountain like a cloud. Perhaps Mont Blanc appears in Shelley's poem when this cloud is scattered and *Tintern Abbey's* spirit fails.

With the appearance of the mountain in the manuscript, another pause in the writing ensued, now to be followed by the most remarkable of the poem's revisionary gestures. On July 23, the same day that composition of *Mont Blanc* began, Shelley walked in the evening to the base of the Boisson Glacier. A day later, on the evening of the 24th, he recalled the experience in the letter he was writing for Peacock:

*[G]laciers flow perpetually into the valley ravaging in their slow but irresistible progress the pastures & the forests which surround them, & performing a work of desolation . . . . They drag with them from the region when they derive their origin all the ruins of the mountain . . . . The verge of a glacier, like that of Boisson, presents the most vivid image of desolation that it is possible to conceive . . . . The pines of the forest which bounds it at one extremity are overthrown & shattered;—there is something inexpressibly dreadful in the aspect of the few branchless trees which nearest to the ice rifts still stand in the uprooted soil. The meadows perish overwhelmed with sand and stone.*

Two days after composition on the poem had begun, on July 25, Shelley climbed with Mary and Claire to the surface of the Mer de Glace. What he discovered is recorded in the letter. The visit also provided images which made it possible to continue the poem:

*On all sides precipitous mountains the abodes of unrelenting frost surround this vale. Their sides are banked up with ice & snow broken & heaped up & exhibiting terrific chasms. . . . They pierce the clouds like things not belonging to this earth. The vale itself is filled with a mass of undulating ice . . . even to the remotest abysses of these horrible deserts. . . . It exhibits an appearance as if frost had suddenly bound up the waves & whirl[ ]pools of a mighty torrent. We walked to some distance upon its surface,—the waves are elevated about 12 to 15 feet from the surface of the mass which is intersected with long gaps of unfathomable depth, the ice of whose sides is more beautifully azure*

*than the sky. . . . One would think that Mont Blanc was a living being & that the frozen blood forever circulated slowly thro' his stony veins.*

In the poem, this description becomes:

*broad vales between  
Of frozen waves, unfathomable deeps—  
Blue as the overhanging Heaven, that spread  
And wind among the accumulated steeps  
A desert . . .  
. . . how hideously  
Its rocks are heaped around rude & bare & high  
Ghastly & scarred & riven.*

Shelley rejects the import of Coleridge's Hymn (once more, any sense of divine presence has been cancelled); at the same time, from the prose accounts of these visits, Shelley articulates more radical versions of Wordsworth's most radical images.

The mountain and its glacial world become the source of blank misgivings, obstinate questionings/Of sense and outward things. The Mer de Glace becomes Shelley's version of Wordsworth's immortal sea. The next verse paragraph will extend the revision, drawing now from the letter entry for July 24th, its description of Shelley's visit to the Boisson Glacier. With this prose account in mind, Shelley returns to the opening of *Mont Blanc*, revising his initial impressions. He recreates the opening (*All things are changed with tumult and with sound/Wave rolling upon wave in restless swell*), then alters it. Wordsworth's mountain-springs become a flood of ruin/That from the silence of the air/Rolls its eternal stream (107-109), rolling like snakes (101), slow rolling on (102). While the glacial world has become the source of the river which bears [in 1817, "rolls"] its loud waters to the Ocean waves and Wordsworth's immortal sea, while the river the glacier feeds becomes the breath & blood of distant lands, the glacial world is also a source of ruin: *Vast pines are strewing/Its destined path, or in the mangled soil/Branchless & shattered stand* (109-11);

*So much of life & joy is lost—the race  
Of man flies far in dread, his work & dwelling  
Vanish as smoke before the tempests stream,  
And their place is not known. (117-20)*

These images could be regarded as negations not only of Coleridge but of Wordsworth as well. If Coleridgean faith is cancelled, Wordsworth's affirmations of nurturing power are put in question as well.

But it might be more accurate to regard Shelley's poem as an intensification of Wordsworth's own denial of Coleridge and his faith.

*Mont Blanc yet gleams on high—the Power is there  
The still & solemn power of many sights  
And many sounds, & much of life & death  
In the calm darkness of the moonless nights  
Or in the lone light of day the snows descend  
Upon that mountain—none beholds them there*

Nor when their flakes burn in the sinking sun  
 Or the starbeams dart thro them . . .  
 . . . the secret strength of things  
 Which governs thought, and to the starry dome  
 Of Heaven is as a law, — inhibits thee  
 And what were thou & Earth & stars & Sea  
 If to the human minds imaginings  
 Silence & solitude were vacancy

As the poem concludes, the mountain may recall the *feeble brook*: the mountain assumes the power of its surroundings, *the still & solemn power of many sights/And many sounds* (128-29), *the secret strength of things* (139), *Tintern Abbey's* world of eye and ear. That world, however, has been subsumed in the mountain's silence and solitude and in the obstinate questioning of the poem's final lines.

### Bibliographical Note

My thanks to the Bodleian Library for permission to transcribe portions of the working draft of *Mont Blanc* from MS Shelley adds. e. 16. Unless otherwise noted, passages from *Mont Blanc* are quoted from this draft. My thanks as well to Lord Abinger for permission to quote from the July 21, 1816, entry in *Shelley and Mary's Journals* (Bodleian MS Abinger Dep. d. 311). I have used the following editions: for Shelley's poetry, the Norton Edition, ed. Donald Reiman and Sharon B. Powers (1977); for Shelley's letters, the Clarendon Edition, ed. Frederick Jones (1964); for Wordsworth's poetry, the Oxford Authors Edition, ed. Stephen Gill (1984); for Coleridge's poetry, the Clarendon Edition, ed. Ernest Hartley Coleridge (1935); for Coleridge's letters, the Clarendon Edition, ed. Earl Leslie Griggs; for Coleridge's Notebooks, the Bollingen Edition, ed. Kathleen Coburn.

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Hudson Museum . . . from page 6

hour and a half before performances and during intermissions audiences are able to walk through the galleries to learn and to enjoy. For many events scheduled for the Bodwell Lounge the museum is also available, as are tours for the guests should they request it.

We who work in the museum are eager to do whatever we can to keep the museum available and dynamic. We have a very active traveling and loan exhibit program in place to constantly bring new and informative experiences to the galleries. We have many visitors among schoolchildren and concert goers who visit the museum frequently and we know it is important for them to see something new each time they come if possible. A museum that is not a renewing educational experience for visitors and scholars is merely a warehouse. The museum staff will continue its efforts to be sure that this facility is a significant educational entity in itself and not just a rather grandiose lobby for the concert hall. It must always be a place where people can come to renew and expand their awareness and appreciation of the luxurious variety of things people in cultures the world over proudly and ingeniously make and use and love and through which, in part, they inform us about themselves.

## Please Note . . .

AS WE GO TO PRESS, a series of readings and lectures by contemporary poets reading their works and speaking on the influence of Romanticism is in progress at the University of Maine.

Free and open to the public, the events have been planned in conjunction with a series of national and regional programs of which *William Wordsworth and the Age of English Romanticism*, an exhibition of literature and art, is the central event.

The series will continue through mid-April and features such poets as Alicia Ostriker, Carolyn Forché, Baron Wormser, Sharon Olds, Allen Ginsberg, Howard Nemerov, Galway Kinnell, and Constance Hunting. Sponsors include the University of Maine English Department, the Lloyd H. Eliot Fund, the Distinguished Lecture Series, the Patrons of the Arts, and the Cultural Affairs Committee. For more information, please contact Robert Brinkley or Burton Hatlen, UMaine English Department, (207) 581-3822.

We hope to bring you excerpts from these lectures in a later issue of *EXPLORATIONS*.

Readings	Lectures
Sharon Olds March 2, 7:30 p.m. 100 Neville Hall	Sharon Olds March 3, 7:30 p.m. 100 Neville Hall
Allen Ginsberg March 22, 7:30 p.m. 130 Little Hall	Allen Ginsberg March 23, 7:30 p.m. 101 Neville Hall
Howard Nemerov April 5, 7:30 p.m. 100 Neville Hall	Howard Nemerov April 6, 7:30 p.m. 100 Neville Hall
Galway Kinnell April 13, 4:00 p.m. 100 Neville Hall	Galway Kinnell April 14, 7:30 p.m. 100 Neville Hall
Constance Hunting April 18, 4:00 p.m. 110 Little Hall	Constance Hunting April 19, 7:30 p.m. 100 Neville Hall

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# Public Service in Special Places:

## MUSIC EDUCATION AS EMPOWERMENT

by Susan Grindel

Music education and music educators are responsible for having a reasonable answer to what I call the *20 Year Question*. That is, how does that educator purpose to empower students so that 20 years or more from now music will make a difference in their lives? It is truly a *Quality of Life* issue. The following article supports the notion that in many specific ways music can and does make a difference even through the final moments of life.

11/28/85 11:30 a.m. - 1:00 p.m. 4 East - Oncology

I had called after the Thanksgiving Day Mass to find out if the morning staff would have a problem if I came in today. The person on the phone on 4 East sounded delighted and said that I would be welcome at any time that day.

422 I had barely arrived on the floor when her family, on their way out, saw me and asked if I was going to see her first, and I said that I would as soon as I tuned the guitar. Her expression was priceless. It was as if she had hoped that I would remember to visit but sure that I'd forget. I sang "We Gather Together" and her husband, daughter-in-law and daughter wept quietly. We talked a bit and I told her that I hadn't forgotten my promise to visit and bring music to her on Thanksgiving and that I was glad to be with her and the family. I played another hymn and the whole group became more emotional and closer as they held each other, and tears came easily. She asked for "Over The River" and I did a couple of verses. Even though a brighter song, the impact of the words *grandmother and grandfather* were enough to increase some of the emotions. There were many expressions of gratitude as I left, and she also had a request that I visit a friend of hers in 529 who had had an operation the day before. She was sure that she would like to have some music. I told her that I would check with staff and if possible that I'd do so.

11/28/85 12:45

529 I went to 5 East to see if staff would allow me to follow up on the 422 referral. They were delighted and I played and sang. She had been complaining of a *very sore tummy* from the surgery. I cannot prove if it helped for even a moment, but she did settle back and close her

eyes as if resting. Her husband also appeared to be a bit more settled.

Artist, therapist, educator, helping professional: all of these titles apply to the individuals who work with yet another segment of the human population toward the quality of life to which they are entitled even in the last days. As a Hospice volunteer and the Hospice Music Coordinator for COPES Hospice of the Eastern Maine Medical Center in Bangor, Maine, these are only two of hundreds of individual patient and family/patient interactions that I initiated during a 10-month residency in 1985/86.

Having experienced the deaths of three significant persons in my life within an 18-month period from 1982-1983, I needed to find support systems that would help both emotionally and intellectually. Hospice is an organization which believes in the dignity of life until death and also the variety of support systems needed by families of the terminally ill. For those readers who may not know, admittance into a hospice program includes a prognosis of six months or less to live and the patient's approval.

The timing for me in 1983 and for the next year and a half wasn't right to become involved with Hospice and learn what peace would eventually be mine. But, in the spring of 1985, I completed my Hospice training and was decidedly ready to *do something, to make a difference*. No one who teaches at the University of Maine has the kind of time that a direct care Hospice volunteer must have, the 24-hour-a-day kind of time. Yet there had to be a way. After all the years teaching that music and the arts are of the most significant means and forms of human expression, it didn't make any sense not to use them at such an important time as death.

It was nearly September, 1985, and I decided to find some way to make the arts an active part of the COPES Hospice program. Pete Briguglio, Executive Director of COPES, and Jane Dickson, Head Nurse on the oncology (cancer) wing, and I met to discuss the possibility of bringing music to the patients. We all agreed that a trial run of room-to-room music service using voice and guitar would probably be received quite well by the patients and just might provide another way to begin actively addressing the issue of *quality of life*.

September 19, 1985, was my first day and so it continued through June 24, 1986. Once a week for two hours, give or take 30 minutes, I would go from room to room, sometimes on referral from nurses, social workers, family members, friends, and, occasionally, a physician. The sessions were guitar and voice and sometimes flute. There were holiday songs, hymns, folk tunes and ethnic requests. There were even nurses singing harmony along with patients and family. Doc-

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*Susan B. Grindel works as a consultant in interdisciplinary programs and their design and implementation. Dr. Grindel's major focus is on music, and she teaches courses in the College of Education and University College at the University of Maine.*



tors would sometimes come by and sit in or even suggest that they would return since the patient seemed to be so involved. Tears, stories, laughter, and also an occasional *no thanks, no music for me today*.

It would be easy to continue a summary of the following months, but the description of a few more encounters conveys much more.

**10/8/85**

**425A** He was definitely in lower spirits, and she was looking for something or someone to reminisce with about their times together. I felt safe in interpreting this encounter since there were a number of indicators which pointed to a closure experience. He was extremely jaundiced, coughing up a great deal of phlegm, and his tears were dry. She was trying very hard to deal with the reality of his condition in the presence of the fact that their 46th wedding anniversary was only three weeks away and could I sing happy anniversary because they were *going home* and no one would be there to sing it for them then. Besides the request, I also did "Amazing Grace." This song usually gets emotional responses, but this time it was different. He cried first and then she came to him and as she held him they both cried. She seemed hesitant but strong for him, a role probably new to her since his illness. This was the closest encounter mirroring my father's illness, and I saw a parallel in actions and reactions.

**425A & B** I don't have names because of the circumstances which brought me to this room, but I want to share this encounter. I was looking for the couple with whom I had spent so many weeks, although I had a feeling that they wouldn't be there. Still I stopped at 425 and entered. The same gentleman was in bed B but a different person was in bed A. He had a friend with him and I wasn't sure if I should go in. (A strange reaction since I had been, in a sense, bold.) As I entered, the visitor said something about some music and appeared to be delighted; at the same time I caught the eye of the man in bed B and he smiled for the first time in six weeks. The visitor informed me that *We both believe in the Lord* so I knew I could use some soothing but somewhat religious material. Before I began, the visitor told me that the man in bed B was deaf; I told him that I was aware of that fact and at the same time I walked over and shook this man's hand. He knew and I knew the six weeks of history and all else of the 425 room. He didn't need to hear but the visitor did take the effort to use the note pad and wrote down the songs I was using. A firm *AMEN PRAISE THE LORD* was heard.

**11/19/85**

**427A** She was looking very tearful today and told me that it wasn't a day that she would be a very good listener. I assured her that it was all right and that I had stopped

to see her as a friend. I also explained that I had missed her the week before due to my father-in-law's passing. We chatted some more about the change in the weather that day, and that led to a discussion about a song which I had shared with her several weeks earlier, "Joy is like the Rain." I explained how that song reminded me of my mother-in-law's strength, especially over the past two weeks. There was a photo calendar beside the patient's bed and I suspected that a part of her mood had to do with memories and feelings attached to it as well as the book she was reading. As this point, she asked if I would sing for her. Off and on in the song she would sob a bit and my voice would crack from a yet unhealed throat due to laryngitis. When it did break she would give me a reassuring smile. After the song, I met her newest roommate.

**11/26/85**

**413B** An elderly gentleman who had just been married on Monday, he and his wife have been musicians for most of their lives. We shared some songs and then he tried a few *licks* on my guitar. He requested the words for "Daisy A Day" and even thought he'd like to have his guitar brought in so he could practice. His new wife looked on tearfully at times as I sang "Amazing Grace" and "Daisy A Day." The prognosis of this man was not clear to me; however, he appeared determined to be active as much as possible.

**1/16/86**

**428** As I left 434 a woman was waiting in the hall, and we began to talk. I learned that her father or grandfather was dying. She felt that he would go at any moment that afternoon. I asked if she thought the family would like a quiet song. She said *Yes please* and we went to the room. It was filled with very anxious faces and she asked if they thought I might play for them. At first there was silence. Then I spoke and asked if a quiet song like "Amazing Grace" would be acceptable. An elder woman acknowledged. I played and sang quietly. As I finished, the people were wiping their tears, and before I could turn to leave, the same elderly woman who had given the okay for the music came up to me with a hug and a kiss on the cheek and a very sincere thank-you. When I began to leave, the woman that I had met in the hall looked with very appreciative eyes and also thanked me.

**3/27/86**

**435B** As I left 436 I was debating on which stop to make next (since some of the regulars didn't see me the past week due to spring break) when I looked up to see someone leaning forward in bed as I walked by 435. I decided to stay in room sequence so I went right in. *I was so hoping you'd stop by. I've been listening to you and couldn't believe there was live music here.* More of her comments were enough to lead me to think that she would really enjoy

gospel music. After I began to sing, she gently began a harmony line and when I looked over to catch her reaction visually, I noticed that she was lying back looking quite comfortable and with a smile on her face just singing away. When the song was finished, she said to me, in an almost panicked voice, *You can't go now!* I told her that I wasn't leaving until she felt that it was enough for then and she appeared to be relieved. She was telling me a bit about her faith and her treatments and missing choir at Easter and many other things on her mind. We sang another hymn together and she really took off on the harmony to the point that nurses, aides, and visitors peered in rather curiously as they passed by the room. After another song, she seemed to be a bit more relaxed and I mentioned that I would return on Tuesday the next week instead of Thursday; she was quite pleased to know that I would be returning.

428 One of the nurses caught me near the end of my sessions and expressed a strong feeling that a particular patient who did not seem overjoyed at her hospital stay, might really appreciate music and company other than medical staff. When I entered the room the look she gave me warned me that she had little regard for most people coming through those doors. I introduced myself and asked if she would like a simple, quiet song that afternoon. Her response: *Well, if you want to.* I chose "Amazing Grace" because I could maintain eye contact, and it usually is nonoffensive to folks her age. As I played and sang she stared at me from time to time. I would look back at her directly. I think she was depending on reading my lips just a bit. When I finished I picked up my bag and thanked her. As I said good-bye she asked me if I had left something. I showed her my bag and that I had everything. Her eyes looked as if she wanted to say something more, but I touched her arm and said thank-you again, and a big smile crossed her face and she said thank-you.

610 This was about the fourth week to see this patient, one of the few Hospice patients I've worked with. When I arrived, he was asleep and I asked if he had been asleep long or had just been medicated. The nurse told me that it was about time for him to be awakened, so we went in to see him together. As the nurse tried to wake him, he more or less ignored her. She told him that someone had come to share music with him. As he turned his head, I said hello and that I had brought a special song for him. He got the biggest smile on his face and looked genuinely happy to see me. (I felt really special.) I sang the "Prayer of St. Francis." I don't know if he knew it or if he really listened to the words, but he responded in such a way that it seemed the song spoke to him. I held his hand for a moment and told him what a special

friend he was to me. He squeezed my hand, and I think that was to tell me that I was special to him.

Of all the lessons I learned over those months, two stand out most clearly. The first was *the power to say no was not a patient's right but a privilege.* They couldn't refuse lab techs. They couldn't tell nurses and physicians not to probe and touch. God forbid if that aching hurting person would tell their spouse not to hug them because of the pain. But, they could tell me *No music!*

The second lesson that was so important was that *everyone needs to have a place or time to cry.* I was learning that slowly, but one day in February, I was told in very clear words.

2/20/86

419 My first stop of the day was an older woman in much pain and very restless. Her mother and sister were at her side, and when I entered the room, I noticed how distraught they were. I asked if some quiet music would be useful. The daughter said yes and explained to the mother, who was a bit hard of hearing, what I was going to do. Much went on during the two songs. Many tears, many smiles, and a quieting. The sister found me later and thanked me so much and told me that I shouldn't feel bad if I saw her mother crying: *Sometimes people need to cry, and Mama needed to get that out of her.*

Effective September 29, 1987, I was able to resume my work at EMMC and received a generous welcome back. The hiatus of nearly 14 months increased the awareness that music indeed empowers anyone who desires this dimension of quality in their life. Whether well or sick, patient or staff, family or friend, the music becomes a means of expression, escape, respite and control. The universality of the language of music is the key to its empowerment.

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## COSSET LAMBS, FLOODS AND STARS

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by Roberta Chester

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Mr. Gardner - at ninety-seven the oldest of eight writing workshop participants and the only man - has enjoyed the hour a week we spend commenting on and critiquing each other's work, but he hasn't submitted anything. Certainly he shares the delight all of us feel listening to anecdotes and recollections from the past as we sit around the table in the activities room of the Phillips-Strickland House, a residential facility for the elderly on Boyd Street in Bangor. It's not that he doesn't have something to write about, or that he couldn't be inspired. The incidents we write about from the past are rich in detail, humor, and poignancy as well as the drama of floods and fires. Each of the women has written at least one and as many as four personal narratives since we started meeting in September.

Sometimes, when the writing is a physically impossible task

- as in Edie's case - persistence and good friends put the words on paper, convincing me that telling our stories is essential to our own and our collective well-being. And so, after every vivid description I'd find myself glancing across the table to Mr. Gardner to assess whether what he'd heard might have catalyzed something of his own we could Xerox and pass around the following week.

Assuming that he and I needed to spend a bit of time talking it out together, I'd stay a few minutes late after every session attempting to wrestle some bit of human interest from the technical, astronomical information to which Mr. Gardner devotes himself with such passionate intensity. The bridge table text to the window where he sits for hours is always piled high with astronomy magazines and pages of calculations: *Mr. Gardner is in love with the stars.*

He talked to me about passages from the Bible, namely the Book of Zechariah, and shared pictures of the constellations, the phases of the moon, and lengthy computations. He spoke about *the true astrology* and was very curious about a Jewish synogue which was supposed to have had a mystical perspective and occupied one of the corners of Boyd and York Streets before it was torn down years ago.

Still, given all this miraculous and inspiring vitality, intelligence and curiosity, Mr. Gardner would not have any submissions in the anthology we were calling "Patchwork," nor would he be able to participate in our public reading in January. I was beginning to feel the frustration of not finding in all that material and conversation any incident or anecdote, any tiny bit of Mr. Gardner's history, to which he could give the breath of life with all the vivid words at his command. Whatever it was he'd been through would continue to be one long secret. Through our written exercises, we had experienced adventures with generations of Katie's cosset (pet) lambs, taken a spring vacation with Mabelle in 1908, and watched Edie's father's new bakery disappear in the floodwaters of the Ohio River in 1916, but Mr. Gardner's past would never be that *hell of a world next door* to which E.E. Cummings said we might or might not wish to go.

So it seemed to happen just in the nick of time that Mr. Gardner explained how he became so enamored of the stars, an interest that spanned seventy years. We had just reviewed some last minute corrections when I asked, out of courtesy and habit mostly, whether there might be just one little anecdote in his own life he could elaborate on, perhaps to the tune of a page or so. I had asked him that question at least a dozen times before, but perhaps it was something we read that particular session, or maybe we were being rewarded for all our hard work, or perhaps the stars were right. Knowing he was not inclined to write an account himself, we all took pencil and paper and noted the vivid details as he spoke. What resulted was more or less a composite effort, sufficiently true to the facts of what actually happened to earn Mr. Gardner's blessing, and to save one precious bit of history from oblivion. You never know how someone gets lost

to the stars, what makes their eyes so bright you could wish on them - like Mr. Gardner's, for instance.

He was about twenty in the year 1917, a seaman in the Navy sailing the *Topeka* out of Boston Harbor and scouting the coast for submarines. He was from East Machias, Maine, and green around the ears, but the closest the crew had come to salt water was taffy, so it would have taken far less to send them reeling below deck - everyone except him and the Boatswain - when the storm came. It was the boatswain who said it was Mr. Gardner's turn to take the watch, and he whistled him up to the crow's nest, seventy-five feet up to where the clouds billowed with the ocean's black foam. They were at the tip of what would later be called *the Bermuda Triangle* where the sea might as well be quicksand for all the trace that's left of what it sucks in. Oh it was wild! Swells half a mile high were washing over him, like mountains caving in, but there was nothing to do but hang on for dear life. Mr. Gardner was up there for three days, and the sky was so black it seemed the sun had drowned. The only life he saw were the porpoises swimming far below and alongside as if they were guides. He *didn't even know enough to be scared*, so he says. Below deck, his mates were getting rid of everything they ever ate or knew, and even the captain was too sick to care about any rules. Three days after the storm had begun - in that second just before

day breaks, that split in a second, that nick in time when darkness fades - the heavens cleared. Suddenly, the whole sky was a panorama of stars, a spectacle only God would have dreamed!

Stars gleamed and dazzled and blazed clear across the horizon, and the ocean - calm as a mirror - reflected all that brilliance back again. Suddenly, Mr. Gardner, the only one left in the world, was crowned with stars, heard the heavens proclaim the glory of God and was forever hypnotized.

*Oh Mr. Gardner, I've been tempted to ask, what about your life afterwards? Did you ever travel far and wide, listen to secrets from the other side of walls, give your heart away once and for all? But what could possibly delight or surprise him when whole constellations define every synapse in his brain, that treasure he can - even as we speak - gaze upon. Oh Mr. Gardner, I've been tempted to ask, is this the fortune we can count on for giving death the slip? But there are no words.*

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*Roberta Chester is an Instructor in English at the University of Maine. She earned her MA at that institution, and her interests include conducting writing workshops in a variety of institutions, schools, and settings with a dedicated clientel.*

# Tuning the Immune System Fighting AIDS, Cancer and Other Diseases

by Anne F. Sherblom and Charles E. Moody

Medical researchers are increasingly turning to the immune system for explanations of and treatments for a wide variety of diseases. The disease AIDS, or acquired immunodeficiency syndrome, is a lethal example of what can happen when a portion of the immune system is crippled. However, many other diseases are now thought to be due to either an *underactive* or *overactive* immune response. Susceptibility to infection, and even to cancer, may result from an *underactive* immune response. One current experimental strategy in cancer treatment involves the use of substances such as interferon or interleukin 2, which stimulate the immune system. An *overactive* immune system can also have deleterious effects. Diseases such as rheumatoid arthritis, diabetes, and multiple sclerosis are thought to occur when the immune system attacks the body's own tissues or cells.

What determines whether the immune system is underactive, overactive, or tuned properly? This question is the basis for the field of immunoregulation, a field which has advanced rapidly in the last decade and which is also a major emphasis of the research conducted in our laboratories. In this paper, we will describe only some of the factors which contribute to an underactive or suppressed immune system. We will also discuss some advances we have made toward identifying immunosuppressive components associated with normal events such as pregnancy and birth along with other factors which may protect cancer cells from immune destruction by the host.

## Immune Function, Immunosuppression, and Glycoproteins

The immune system is the major defensive response to both *self* cells which have become cancerous, and to foreign cells and viruses. The response to an *invasion* or *challenge* can be placed in several categories. Immune system cells (most notably lymphocytes) recognize the invader as foreign or different. Secondly, there may be a biochemical warning message communicated among the different cells taking part in the

immune response. Thirdly, lymphocytes may directly kill the invader or be stimulated to produce antibodies for future neutralization. In Figure 1, the diagram shows in a schematic fashion the direct killing of the invader, which is labeled *stimulus*. It is possible to measure this immune response in the laboratory by mixing lymphocytes, isolated from blood, with foreign cells or cancer cells which have been radioactively labeled. When the *target cells* are killed by the lymphocytes, the radioactivity is released into solution, and the amount of radioactivity released is related to the number of targets which have been killed. This type of assay can be used to determine *natural killer cell activity*, *i.e.*, the innate ability of the lymphocytes to kill targets without prior stimulation. This assay and others can also be used to test whether the lymphocytes have been triggered by the presence of the stimulus.

Several factors can result in immunosuppression. The number of lymphocytes produced may be low, or the lymphocytes may be incapable of responding (Figure 1). This is most dramatically exemplified by the immunosuppression which occurs in AIDS. A portion of the lymphocytes is infected with HIV (human immunodeficiency virus) and is destroyed, leaving the body open to infections and cancers. Although healthy lymphocytes are essential for an adequate immune response, our work has been directed primarily toward two other mechanisms of immunosuppression. These mechanisms involve either the release of suppressive factors which inhibit lymphocyte response or masking of the stimulatory substance so that the lymphocytes do not recognize the invading cells (Figure 1). Both of these mechanisms are believed to play a role in the unchecked growth of cancer cells.

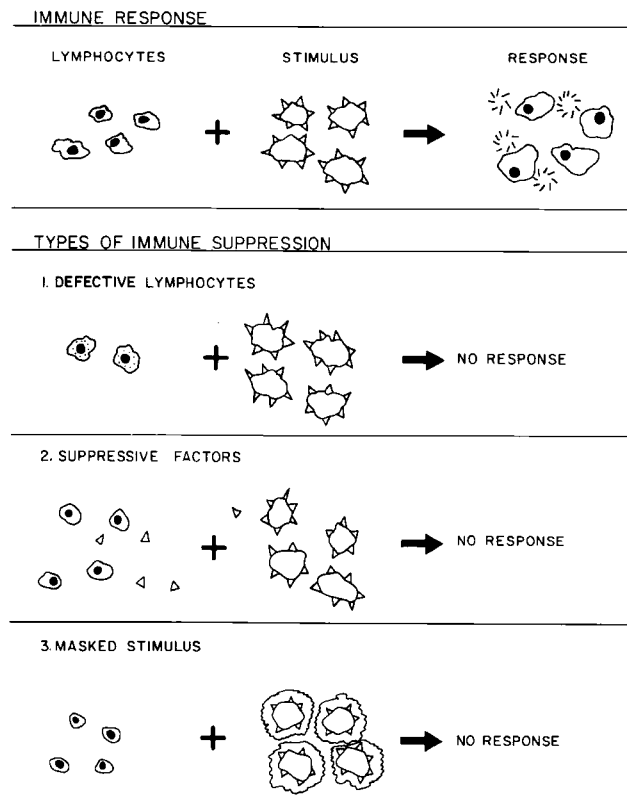
Suppressive factors can act in a number of ways. For example, cancer cells have been shown to shed portions of the cell surface which act as *decoys*, confusing the immune system by *jammed its radar* with many false signals. However, natural suppressive factors also serve to regulate the immune system in healthy individuals as well. During pregnancy, immunosuppression may be necessary to prevent an attack by the maternal immune system on the growing fetus, which is foreign to the mother. In support of this, a variety of suppressive factors have been identified in maternal blood and urine. The third type of immunosuppression shown in Figure 1, masking, is also important in health and disease. It is believed that the masking of fetal antigens also contributes to the growth of a healthy fetus, again by protecting the fetus from attack by the maternal immune system. However, masking of cancer cells may also prevent recognition and destruction

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Anne Sherblom is Associate Professor of Biochemistry at the University of Maine. She earned her Ph.D. at Dartmouth College and her research interests focus on carbohydrate biochemistry and the role of glycoproteins in immunosuppression.

Charles Moody is Associate Professor of Microbiology at the University of Maine. He earned his Ph.D. at the University of Rhode Island, and his research interests include several areas in the field of immunology.

of these cells by the immune system of the host, and may play a key role in the spreading of cancer cells throughout the body.



**Figure 1. Schematic diagram of immune response and three types of immune suppression.**

Glycoproteins, or proteins to which carbohydrate (glyco-) chains have been attached, play a critical role in immune function. Glycoproteins are present at the surface of all animals cells, including lymphocytes, and are found in serum and other body fluids. Almost all of the events involved in recognition, stimulation, and cell-cell communication in the immune system are mediated by glycoproteins. Several glycoproteins, isolated during inflammation or pregnancy, have immunosuppressive activity. Masking of fetal or tumor antigens is also due to glycoproteins. The role of the carbohydrate portion of glycoproteins is not well understood, although recent studies suggest that the carbohydrate may be critical in regulating immune function. Several purified carbohydrates are known to suppress a variety of immune assays, and substances which bind specifically to carbohydrate (lectins) are known to trigger growth in lymphocytes. In addition, carbohydrate structures are not coded for by DNA in the way that protein sequences are. Thus many different carbohydrate structures are expressed at any one time, and these structures can change with changes in growth, differentiation, or hormone levels. Recent advances in this field make it possible to analyze carbohydrate structures from small amounts of material, and structure-function relationships for carbo-

hydrates are beginning to emerge.

Our research program is aimed at characterizing factors and masking agents which result in immunosuppression during pregnancy and in cancer. In the remainder of this article we describe the results of three separate projects. Although each of these projects might initially appear unrelated, they are tied by a central theme of establishing the role of specific carbohydrates in immune recognition and regulation. The ultimate aim of this work is to decipher the messages which cells send to each other through the carbohydrates they produce and display, and to apply this knowledge to understanding the condition of immunosuppression. In the following pages we first describe work demonstrating the effects of the hormones progesterone and cortisol on the immune system of dairy cattle. Second, the characterization of an immunosuppressive component found in urine from pregnant women is discussed. Finally, we describe a masking agent in tumor cells which prevents destruction of the cells by natural killer cells of the immune system. In each of these studies, the evidence indicates that a glycoprotein may play a role in the immunosuppressive activity.

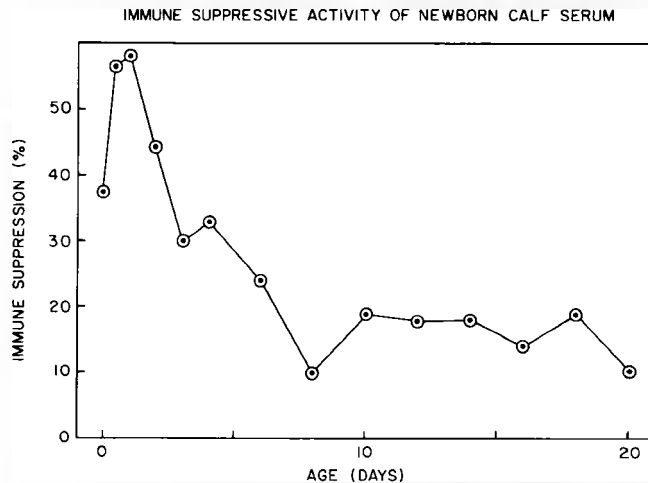
### Hormones and Immunosuppression

Previous work has shown that hormones such as progesterone and cortisol are immunosuppressive when injected into animals, although the mechanism of suppression is not understood. Progesterone is elevated during the course of pregnancy, and cortisol is known to increase in newborn animals at the time of birth. Cortisol may also increase in adult animals during times of stress. We have studied the relationship between levels of these hormones and immunosuppression in dairy cows.

In one study, animals were injected with progesterone, and serum samples were collected at various times. The serum was analyzed for progesterone content and for immunosuppressive activity. To measure immunosuppression, the serum is added to an assay which tests the stimulation of lymphocyte cell division by a substance called a mitogen. With just lymphocytes and mitogen, the lymphocytes grow and divide, and the growth is measured by the incorporation of radioactivity into the DNA of the cells. If the serum reduces the amount of radioactivity taken up by the cells, then the serum has reduced the amount of cell division and is presumed to be immunosuppressive. The results of this study showed that the sera of progesterone-treated animals was immunosuppressive when compared to sera of control animals, and that the greatest amount of suppression occurred when the concentration of progesterone was rising (1).

In a second study, we tested for the presence of immunosuppressive activity in the serum of newborn calves, which normally experience high levels of cortisol at the time of birth. The results showed (Figure 2) that newborn calf serum is very suppressive, since addition of less than 5 percent serum to the assay inhibited the reaction by greater than 50

percent (2). Both the progesterone study and the newborn calf study may potentially explain the increased susceptibility to infection which occurs in pregnant and newborn cattle. Several studies have shown that these hormones are not suppressive when added directly to the assays we have used. Thus, the way in which these hormones cause the serum to be immunosuppressive is still a mystery.



**Figure 2. Immune suppressive activity of newborn calf serum as a function of age.**

In order to determine whether other factors might be involved in immunosuppression, we tested other parameters in the serum of the progesterone-treated and newborn animals. Previous work has shown that serum of patients with various types of cancers is immunosuppressive, and that this serum also contains elevated amounts of sialic acid, a normal carbohydrate found at the surface of animal cells and in secretions. In fact, sialic acid increases dramatically with advanced stages of cancer, and can be used in conjunction with other tests to monitor recurrence of cancer. We tested sialic acid concentrations in the serum of progesterone-treated and newborn animals and found that the levels were elevated in both cases. Although the effect was minor for progesterone-treated animals (15 percent higher than controls), newborn calf serum contained a four-fold higher amount of sialic acid than adult animals (1,2). It is unclear at this time whether the high amount of sialic acid plays a role in immunosuppression. These results suggest that progesterone and cortisol have a variety of physiological effects, and that further work on sialic acid may lead to an understanding of the impact on the immune system.

### Pregnancy and Immunosuppression

A variety of studies has suggested that a suppressed immune system is associated with the condition of pregnancy. Increased susceptibility to infection has been demonstrated and suppressive factors have been found in the blood and urine of pregnant women. While on sabbatical at the National Institutes of Health, one of us (Sherblom) had the opportunity

to study uromodulin, an immunosuppressive substance originally isolated from the urine of pregnant women (3). Uromodulin is a glycoprotein, containing both carbohydrate (glyco-) and protein. Uromodulin suppresses stimulation of lymphocytes by a specific antigen, tetanus toxoid. Human lymphocytes can normally be stimulated to grow by addition of tetanus toxoid, since most humans have been immunized against tetanus. The growth of the lymphocytes can be monitored in the manner described above, by incorporation of a radioactive label into DNA. Again, incorporation of radioactivity into DNA is dramatically reduced by the addition of uromodulin to the assay.

Further studies showed that uromodulin was not pregnancy-specific, but was actually present in all samples of human urine, and was identical to a substance described in 1952 by Tamm and Horsfall (4). However, uromodulin isolated from nonpregnant sources was 30-fold less active in the immunosuppressive assay as uromodulin from pregnant sources (5). Several lines of evidence indicated that the suppressive activity of uromodulin was associated with the glyco-, or carbohydrate portion, rather than the protein. While at the National Institutes of Health, Sherblom was able to identify and isolate the carbohydrate responsible for the immunosuppressive activity. These results indicate that the amounts of uromodulin from pregnant and nonpregnant sources are similar, but that the types of carbohydrates present change during pregnancy.

### Immunosuppression and Cancer

Many types of cancer cells are effectively recognized and destroyed by the immune system. In the course of disease, however, two things may hinder the functioning of the immune system. Immunosuppressive factors, similar to those described above, appear in the blood and other body fluids. Furthermore, several types of tumor cells have the ability to *mask* themselves so that the immune system no longer recognizes them. This second mechanism, masking, is the phenomenon we have been studying in tumor cells from rats.

Masking of tumor cells was first demonstrated more than 10 years ago by a group of researchers working with mouse mammary tumor cells (6). The masking agent, which prevented recognition of cell surface markers, was isolated and named epiglycanin. Utilizing rat mammary tumor cells, we have isolated a similar substance called ASGP-1 (ascites sialo-glycoprotein 1). ASGP-1 coats the surface of these tumor cells (7), and can be seen as a *halo* around the cells if the cells are mixed with a fluorescent compound which binds to ASGP-1 (Figure 3). ASGP-1 dominates the surface of the tumor cells, since it accounts for greater than 80 percent of the cell surface carbohydrate.

The structure of ASGP-1 has been determined (Figure 4), and it resembles a bottle-brush. The protein core has a molecular weight of about 200,000, and there are approximately 400 carbohydrate chains attached to each protein core

(7). Most of the carbohydrate chains end with the sugar sialic acid (8,9). ASGP-1 is very similar in structure to normal glycoproteins, called mucins, which are found in mucous secretions and in cells which line the intestinal tract. These glycoproteins are responsible for the thick viscous nature of mucus, but also play a protective role. For example, mucins are thought to protect cells of the stomach from the harsh conditions of stomach acid, and to aid in keeping cells of the lungs free from dust and particles. In tumor cells, however, these mucins may also *protect the cancer cells* from recognition by the immune system.



Figure 3. Photograph of rat mammary tumor cells showing a fluorescent halo of ASGP-1 at the cell surface. Cells were incubated with a fluorescent compound which binds ASGP-1 and photographed using a microscope equipped for fluorescence detection.

The tumor cells we are studying were originally derived from rat mammary tissue, but are currently grown in rats' peritoneal cavities, the space between the internal organs and the skin of the belly. Since the cells are grown in this way, they are referred to as ascites cells. We have shown that the ascites cells are not killed by lymphocytes from normal healthy rats, and have hypothesized that the thick coat of ASGP-1 at the cell surface prevents these cells from being killed. If the cells are treated with an enzyme which breaks down the ASGP-1, a certain percentage of the cells become susceptible and are killed by rat lymphocytes (10). The most exciting study was performed by taking the tumor cells and growing them in culture (in a flask) rather than in the rats. During time in culture, the cells stopped making ASGP-1, so that by 6 weeks the analysis indicated the glycoprotein was not present at all. At the same time as the amount of ASGP-1 was decreasing, the cultured cells became more and more susceptible to killing by rat lymphocytes (Figure 5). This suggests that the glycoprotein plays a direct role in masking the tumor cells from natural killer cell activity. Natural killer cell activity is thought to be one of the primary mechanisms which prevents the spread of tumor cells throughout the body.

### TUMOR CELL MASKING GLYCOPROTEIN (ASGP -1)

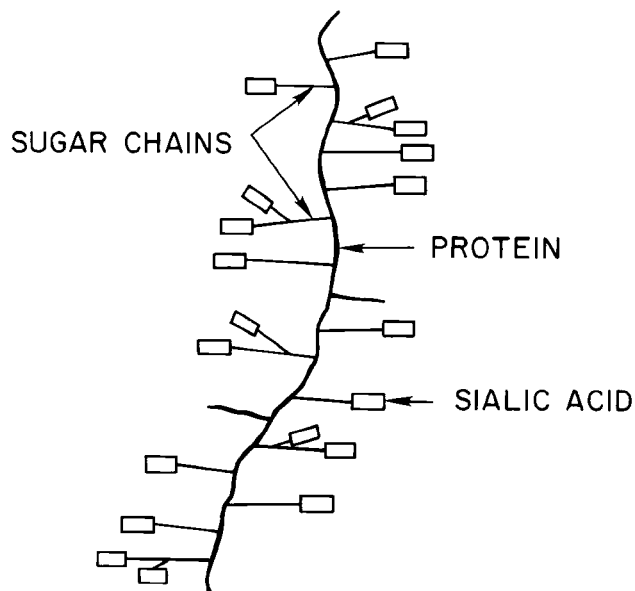


Figure 4. Schematic diagram of the structure of ASGP-1, the major cell surface glycoprotein of the rat mammary tumor cells.

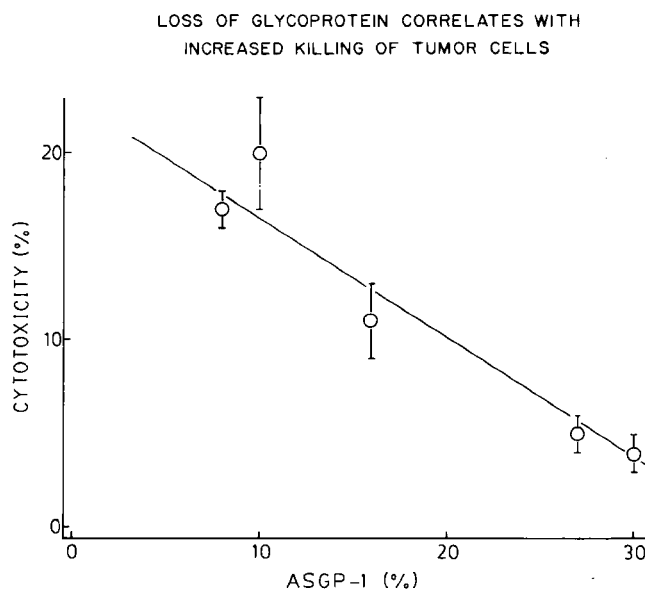


Figure 5. A graph showing the relationship of expression of ASGP-1 on rat tumor cells and the susceptibility to killing (% cytotoxicity) by natural killer cells.



Future studies on the tumor cells are aimed at understanding exactly how the glycoprotein works in protecting the cells, and at understanding why cultured cells stop producing the glycoprotein. Ideally, if methods could be found to prevent tumor cells from masking themselves, the spread of cancer throughout the body could be minimized.

### Summary

A properly tuned immune system is a key prerequisite for health. Although it has been known for years that certain hormones, conditions such as pregnancy, and even stress influence immune function, the biochemical basis for this has not been understood. The studies described above suggest that changes in immunosuppressive activity correlate with changes in the carbohydrates of the glycoproteins present. In the case of uromodulin, a purified carbohydrate from this glycoprotein has been shown to have immunosuppressive activity. We believe that pregnancy results in changes in the carbohydrate, not just of uromodulin, but of a wide variety of other cell surface and secreted glycoproteins. Ultimately it is the pattern of carbohydrates in the blood and at the surface of the lymphocytes which may determine whether the immune system is *overactive*, *underactive*, or *in tune*. The long-term goal of these studies is to *break the code* of how carbohydrates regulate the immune system, by examining the effect of specific carbohydrates on immune reactions, and by determining how hormones such as progesterone and cortisol result in changes of carbohydrate structure.

By further understanding the structure-function relationship of these glycoproteins, we hope to uncover some of the molecular mechanisms which result in immunosuppression. Ultimately, this knowledge may allow us to restore immune

function in various diseases and to *unmask* and destroy tumor cells. Furthermore, many of these glycoproteins may prove to be a source of natural immunosuppressive agents to counteract an overactive immune system and reduce problems such as rejection of transplanted organs, arthritis, and diabetes.

### References

- <sup>1</sup>Sherblom, A.P., R.M. Smagula, C.E. Moody, and G.W. Anderson (1985) J. Reprod. Fert. 74, 509-517.
- <sup>2</sup>Sherblom, A.P., R.M. Smagula, C.E. Moody, and G.W. Anderson (1986) J. Reprod. Immunol. 9, 365-375.
- <sup>3</sup>Muchmore, A.V. and J.M. Decker (1985) Science 229, 479-481.
- <sup>4</sup>Tamm, I. and F. Horsfall (1952) J. Exp. Med. 95, 71-97.
- <sup>5</sup>Hession, C., J.M. Decker, A.P. Sherblom, et al. (1987) Science 237, 1479-1484.
- <sup>6</sup>Codington, J.F., K.B. Linsley, R.W. Jeanloz, T. Irimura, and T. Osawa (1975) Carbohyd. Res. 40, 171-182.
- <sup>7</sup>Sherblom, A.P., R.L. Buck, and K.L. Carraway (1980) J. Biol. Chem. 255, 783-790.
- <sup>8</sup>Hull, S.R., R.A. Laine, T. Kaizu, I. Rodriguez, and K.L. Carraway (1984) J. Biol. Chem. 259, 4866-4877.
- <sup>9</sup>Sherblom, A.P. and C.E. Dahlin (1985) J. Biol. Chem. 260, 1484-1492.
- <sup>10</sup>Sherblom, A.P., and C.E. Moody (1986) Cancer Res. 44, 1148-1152.

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We are grateful to the Editorial Office of Cancer Research for permission to reprint Figure 4 (here shown as Figure 5) which was published in Cancer Research 46, 4543-4546 (1986) and authored by Anne P. Sherblom and Charles E. Moody.

# Why do they do it? One Graduate Student Explains

## CAREER OBJECTIVES AND PLANS

When I graduate in approximately three years, I would like to become a faculty member of an animal or dairy science department. I believe my scientific background in ruminant nutrition and reproductive physiology as well as experience from my former career will have prepared me to lead a productive research laboratory. I also enjoy teaching and working with undergraduate and graduate students. My long-term goals are to become an excellent teacher and researcher in agriculture and contribute scientific knowledge to the livestock industry.

## OBJECTIVES OF GRADUATE STUDY

1. To develop competency in theories and techniques used in the study of ruminant nutrition.
2. To investigate the influence of ration components on production and reproductive parameters of ruminants on both an applied and basic level.
3. To develop research skills to be used in experimental design and statistical analysis.
4. To develop an ability to evaluate critically research results and their applications.



# Nutrition and Reproduction in Cows

by Barbara Barton and Diane Carroll

A successful dairy industry depends on two critical factors, and the degree to which any dairy operation approaches the ideal in respect to those two factors determines the health of the particular operation. The two factors are

1. high milk production and
2. good reproductive performance.

A frequent complaint of dairy producers is that high milk-producing dairy cows have poorer reproductive performance than their lower milk-producing herdmates. Some producers choose to delay breeding to continue high milk production. Both of these circumstances lead to a longer than desired interval between calvings. Prior research suggests that a twelve-month calving interval will produce the maximum economic return. Regardless of the milk-production level, profits are the highest when older cows conceive before 80-100 days after delivering a calf, and when first lactation cows conceive by 120-130 days after calving. A Canadian study indicated that even under the most optimistic conditions, delayed breeding cannot be advocated. Delayed breeding postpones the income of the peak milk production of the subsequent lactation. Maintaining an efficient level of reproductive performance is critical to profitability in the marketplace.

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**Barbara Barton, a member of the faculty in the Department of Animal and Veterinary Sciences at the University of Maine, served as advisor and principal investigator to Diane Carroll as she earned her M.S. degree. Since earning that degree, Carroll has been accepted and has begun her studies at the University of Wisconsin, a top dairy science school in the country.**

In 1981, Barbara Barton became the first woman to earn a PhD in dairy science at the University of Wisconsin; her advisee, Diane Carroll, will potentially be the second woman to earn a doctorate in the same area at the same school.

According to Professor Barton, "Seeing her (Carroll) go to Wisconsin was an interesting experience. It seemed a little like a repetition of my own experience."

Carroll maintained a 4.0 (on a 4.0 scale) grade point average while working on her master's degree. A member of the growing number of non-traditional students enrolling in university studies, "Carroll's research was clearly university-level," according to Barton.

A 1985 study compiles several ways that long intervals between calvings and/or poor conception rates affect profitability:

- \* Longer calving intervals result in more milk per lactation, but less milk per day of the cow's life. Maximum profits result from high quantities of milk produced each day of a cow's life.
- \* Long intervals between calvings result in fewer calves being born; these calves can be utilized as replacements or additions to the herd or they can be sold.
- \* Longer intervals between calvings result in an increase in culling because of reproductive failure; culling increases mean less potential for genetic progress and improvement.
- \* Low conception rates make it necessary to spend more money purchasing semen.
- \* Nonmilk-producing intervals of more than 60 days can result in overconditioned cows and poor reproductive health in subsequent lactations.

Other researchers have estimated that a dairy farmer loses between \$1.50 and \$3.00 a day for every cow when the calving interval is more than twelve and a half to thirteen months. These amounts will vary somewhat according to economic conditions, but it is appreciable in any case.

Since the heritability of reproductive traits is low, it is unlikely that there is a correlation between low fertility and high milk production. It also follows that several environmental and management factors and conditions contribute to improving reproductive efficiency. Pivotal among these factors are a diligent heat detection program, excellent artificial insemination techniques, good sanitation practices and a sound reproductive health program. Improper nutrition (such as deficiencies of energy or trace minerals, energy-protein imbalances and excessive energy or protein intakes) has also been implicated as contributing to poor reproductive performance.

Diane Carroll's research project was designed to evaluate the impact of dietary crude protein and feeding strategy on the reproductive performance of early lactation dairy cows. There is extensive evidence that increasing dietary crude protein intake will lead to increased milk production; however, some researchers have shown a decrease in reproductive efficiency with increased crude protein intake in early lactation dairy cows. By far, the most serious deterrent to meeting reproductive goals is poor estrus detection followed by the effects of reproductive health disorders.

As a result, heat detection accuracy and reproductive health protocols greatly influence the results of nutrition-reproduction studies.

A major challenge in Carroll's study was to provide ways of dealing with environmental and management factors in order to detect differences in reproductive efficiency due to differences in the level of protein supplied in daily rations. This entailed providing the best heat detection program, artificial insemination techniques and reproductive health management possible so these factors would not influence the results of the protein intake data.

A substantial review of existing research results organized the factors associated with poor reproductive efficiency. Those factors include genetics, heat detection, artificial insemination, reproductive health disorders and nutrition-based metabolic disorders. The periparturient period of a dairy cow's life is of critical importance to these studies.

The periparturient period for a cow encompasses the time and events within a few weeks prior to and following calving. This time in a cow's life is especially important because proper management can prevent high death rates and injury to both the calves and dams. In addition, problems during this time can impair future reproductive efficiency and milk production.

The most critical stage of the periparturient period is calving. Problems at this time are influenced by genetic makeup and environmental factors, the most common being the age and nutritional status of the dam. Others include twinning, physical malformations, prolonged gestation, premature breeding of young heifers and a lack of exercise.

Studies have indicated that rebreeding as soon as the first fertile period after calving has no negative effect on a cow's fertility. Indeed, successful early breeding after calving is related to an effective reproductive health program and proper treatment of cows previous to first insemination.

Proper management of the cow during the periparturient time can prevent many metabolic disorders and is clearly more positive than simply treating disorders after they occur. This focus on preventative management as well as early breeding after calving lays the groundwork for improved reproductive performance and maximum milk production during the subsequent lactation.

The combination can provide healthy cows which conceive well, thus saving on the high cost of quality semen, and at the appropriate time, become high milk producers.

To establish the effect of dietary crude protein and feeding strategy on reproductive efficiency in dairy cows – a pivotal focus of this research project – 57 dairy cows (36 Holsteins, 14 Jerseys and 7 Guernseys) were assigned randomly within breed and lactation number to one of four test rations. Of the animals, 25 were first lactation cows.

The rations differed in the level of protein each contained and in feeding strategy: crude protein was at 13 percent in one ration and 20 percent in another, and feeding strate-

gy consisted of a total mixed ration in one case and using a concentrate fed separately from forage in the other.

The animals were fed the test rations from the fifth to one hundredth days after calving. In cases where the cow was not pregnant on the hundredth day, she was fed the test ration until she was confirmed pregnant or for 126 days after calving.

The rations were composed of grass and legume silage and corn silage, ground corn and oats, soybean meal, minerals, vitamins and salt. The rations were balanced for high producing, early lactation cows.

Beginning at 21 days after calving and continuing until pregnancy was confirmed, the animals in the test were observed for signs of estrus behavior between 8 and 10 a.m. and 5 and 7 p.m. daily. In addition to the researcher's observations during these hours, the farm crew watched for said behaviors during milking parlor hours at 4 a.m. and 1 p.m. They were also observed for an hour in late morning while they were in the pasture. Animals showing signs of estrus were bred within a few hours, a decision made in conjunction with the farm manager.

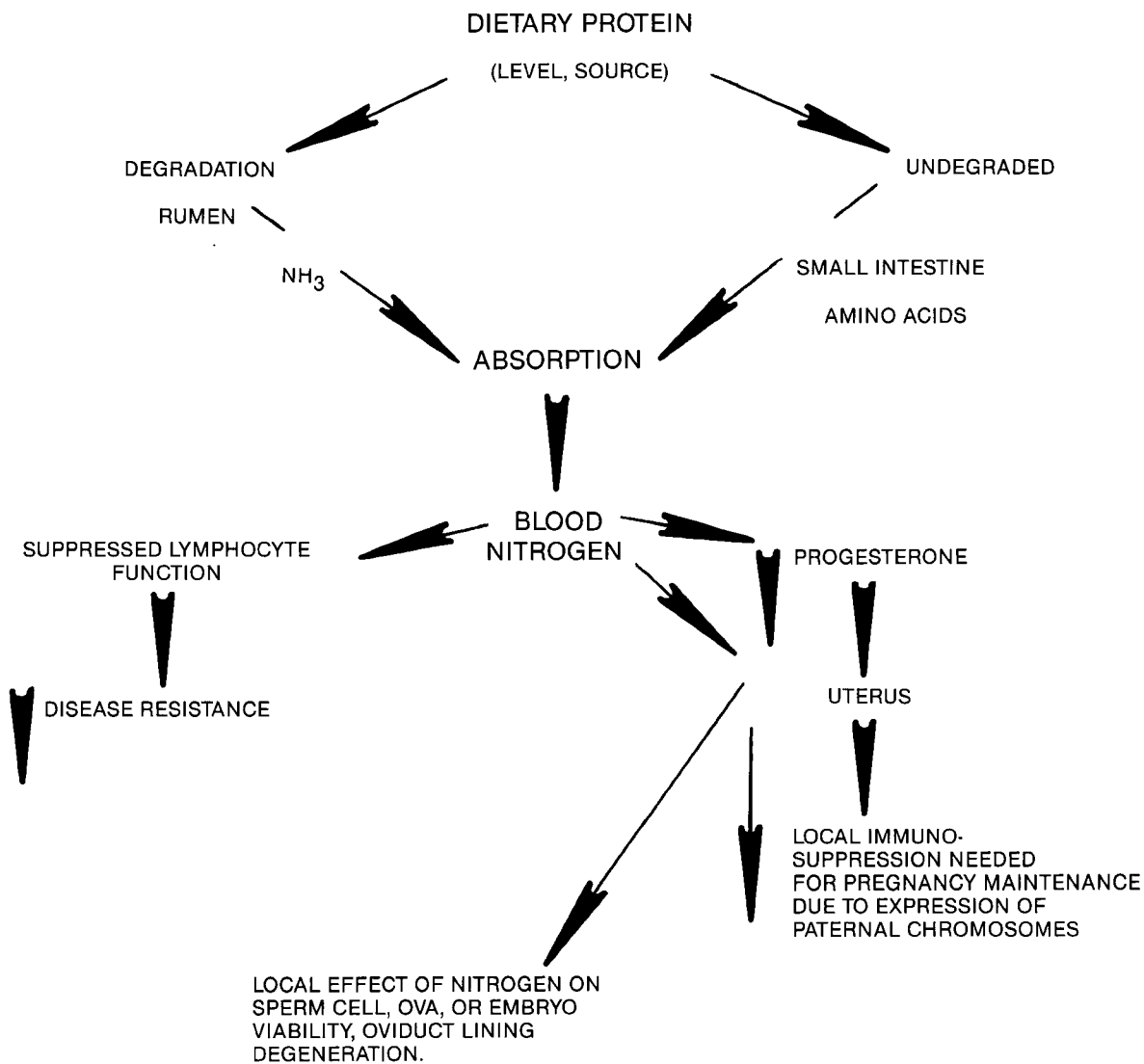
Careful records were kept of all disorders at the time of calving: milk fever, dystocia, retained placenta. In addition disorders associated with the time period after calving were recorded: cystic ovaries, uterine infection and anestrus. The reproductive health of all the animals was observed; the non-pregnant cows were monitored biweekly. Animals with uterine infections and cystic ovaries were given appropriate veterinary attention and treatments.

Reproductively healthy animals were bred at the first observed estrus after 45 days had passed since calving. Throughout the research project, rations were monitored carefully, reproductive and general health observed and treated where necessary, and blood samples analyzed at regular intervals.

One theory proposes that high protein levels in feed alter blood plasma progesterone, the hormone which prepares the cow's uterus to receive a fertilized egg and the mammary glands for lactation. The proposal is that the altered progesterone is caused by high protein and leads to lower conception rates. This research project's data did not support that hypothesis. Indeed, results indicate that the impact of the careful heat detection program and the management of reproductive health problems appears to have a bigger influence on reproductive performance than the levels of protein fed or the feeding strategy used.

In this study, high protein levels have only been implicated in lowering reproductive efficiency when interacting with a post-calving disorder such as metritis. (Cows with metritis on high protein rations had higher days to first ovulation and lower plasma progesterone profiles as compared to cows at lower protein levels.)

The intensive heat detection program and reproductive health program could have averted complications from the



**Proposed Cascade of Events Following High Dietary Protein**

high protein fed to the cows since no difference was seen in services per conception and days open. Since other studies did not report the occurrence of reproductive health problems and how they were treated, it is difficult to know if this is a possible explanation for the difference in results.

In dairy herds with a high incidence of cows with reproductive health disorders, feeding excessively high protein may lead to delays in days to first ovulation or in time

needed to recover from infection. More research is needed on cows with reproductive health disorders to determine if protein contributes to delayed recovery or lowers reproductive efficiency.

SPECIAL THANKS to Gary Anderson for his contributions to our research project.

# **Diane Carroll: former graduate student**

From 1976 to 1982, I was a medical librarian for a medical school in Duluth, Minnesota, and from 1982 to 1984 I was the Director of a medical center library in Lewiston, Maine. I had studied Zoology at the University of Illinois (1970-72, M.S.) and had decided to apply my scientific background in medical reference. I finished my M.S. in Library Science in one year (1973). On this job, I enjoyed interviewing researchers about experiments and then searching for literature by using computerized information retrieval systems. After helping other scientists for ten years, I decided I wanted to start finding information for my own experiments.

I decided to change careers in 1984. Since I enjoy studying animals of all kinds, I determined to study domestic animals this time (vs Zoology). I chose to start my work at the University of Maine because of the professional competency of my advisor, Dr. Barbara Barton, and the willingness of the faculty to help me develop my background.

I had opportunities at the University of Maine that would probably not have been available to me at a larger school. The faculty led the labs at the barn and personally taught me how to handle the cows and sheep and to take biological samples in a safe and humane way. The class size was small and the teaching excellent.

My project came about as a result of a regional interest in problems with fertility in high-producing dairy cattle. The way a farmer might state the problem is "Why are my highest producing cows hardest to settle? Is it from the high protein feed?" We took this question and designed a project where 57 cows were assigned to four groups. They were fed either a low or high protein ration (13 or 20 percent crude protein) by means of a total mixed ration (grain and forage together) vs the grain portion fed separately from the forage.

The cows were on the trial from when they calved until they were pregnant - 100 to 126 days. It is important that the cow becomes pregnant by 80-100 days post-calving. Only by having one calf a year can a cow give maximum

milk and the producer receive maximum profits in today's market. To insure this calving interval, many management aspects must be done properly. The animal needs a health check every two weeks for the first two months to make sure normal recovery of the reproductive tract has occurred. Additionally, the cow has to be watched for heat (display of estrous behavior) so timing of artificial insemination can occur.

Watching heat is an experience. A cow should be observed 20 minutes every 12 hours to see if she is showing signs of heat. The high estrogen level that occurs right before ovulation is what causes this behavioral change which can be quite dramatic. A cow who is normally quiet can become difficult to manage. The cow will mount other cows or stand still when she is mounted. There are other signs of heat which are learned with time and observation.

I watched heat at the barns almost every day (with some help from my advisor) from July, 1985, to March 1986. Besides needing reproductive performance data, the cows also had to be weighed every two weeks and blood, rumen and vaginal mucus samples taken periodically. These samples were analyzed for such components as ammonia, urea-nitrogen, glucose and progesterone.

My project helped me tremendously to fill in my background in animal science and gave me an opportunity to handle dairy cows on a daily basis. I also learned a great deal from working with the farm manager, Rick Kersbergen, and the veterinarian, Dr. Alan Corey.

I started my Ph.D. at the University of Wisconsin in January, 1987. The class size is much larger (100-300 students), and the curriculum is very difficult. The faculty and resources are outstanding. I feel that my education at Maine has adequately prepared me to meet this new challenge. Here I am working with Dr. Ric Grummer and Dr. Roy Ax from the Dairy Science Department on nutrition and reproduction interactions on a basic science level.

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## **Research News**

RESEARCH TODAY/BUILDING TOMORROW is a quarterly publication which lists University of Maine recipients of grants and awards. Each listing is accompanied by a short explanation of what the research project covers and possible ways in which technology transfer and other applications of its results, models and methodologies may be used in business, industry, medicine, agriculture, and other human endeavors. Also included are the grant amounts, the

project titles and the granting agencies.

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