

October 17, 1971

Mr. Richard Parks
Collins-Knowlton-Wing, Incorporated
60 East 56 Street
New York, New York 10022

Dear Mr. Parks,

Since I first talked to Jack Sobel about letting my son sort out some footage that might be of use to him in his T.V. films, Charlie has gone off to collage. He does get home periodically and could go over some of the films in my files.

Before we get further involved in this, I would be interested in knowing if there is a deadline or when Mr. Sobel would like to see these films. If there is a rush, I think we had best forget it for the present. If not, we will try to review the footage and select pertinent material for Mr. Sobel's consideration. Mr. Sobel said that if Charlie did this he'd pay him for the time involved whether or not film was finally used.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

October 28, 1971

Mr. Leonard J. Grant
Associate Secretary
National Geographic Society
Washington, D.C. 20036

Dear Len,

I talked with Jules Bergman this summer and it is my understanding that he would like to do a short interview show in which we point out the present critical situation of the grizzly bear in Yellowstone and surrounding areas, and also mention the problems connected with conducting research. I believe that this is something that is very much needed, and if properly done should not only inform the public but may help to clarify a situation that needs remedying.

I agree that the best footage of the T.V. film should not be used. What I had in mind was that Jules could probably have someone select adequate footage from the "outs" in the files there at Geographic. There should be considerable grizzly bear footage adequate for his show. At any rate, if film is used from the T.V. show, it would be better to select that showing the less aggressive actions of the grizzly, such as maternal care and so on.

I plan to put Mr. Bergman in touch with some of the faculty members of the University of Montana who can provide him with other sources of information that he is seeking.

It's good to hear from you again, Len,

It's good to hear from you again, Len, and I hope all is going well. I'll look forward to seeing you the next time I visit Washington, which I hope may be this winter.

Regards,

Frank Craighead

FC/skr



John Weaver
Box 7488
Waco, Texas 76710

"IN WILDNESS IS THE PRESERVATION OF THE WORLD"

Dr. Frank C. Craighead, Jr.
President, Environmental Research Institute
Moose, Wyoming

Dear Dr. Craighead:

As you probably know, ten-thousand people are floating the Colorado River through the Grand Canyon annually now. The majority of these people go with commercial outfits and offered little but beer and forty miles a day. The obvious beauties of the inner canyon are passed by in haste, while the hidden beauties remain unexplained.

An "ecological" guidebook written in a popular manner for the average river rat is vitally needed. Such a guide would expand his knowledge, awareness, and enjoyment of the river and the canyon immensely. If the river were ever again threatened by dams, this man might well be the one who speaks out against such sacrilege.

I'm thinking of a book patterned somewhat after Hamlin and Rigby's (BYU) geological guidebook; i.e., narrating the natural history in order of mileage downriver from Lee's Ferry. What plants, birds, reptiles, fish can be seen up Tapeats Creek ? What's the story behind Bass' asbestos mine ? How old are some of these Indian ruins ? What is the relationship between the yucca and its pollinating moth ? Why does the chuckwalla do "pushups" ?



"IN WILDNESS IS THE PRESERVATION OF THE WORLD"

I want to broaden the reader's awareness to absorb the total ecosystem of the canyon intellectually. The canyon can handle its own aesthetics in a most magical way.

I will finish a honors degree in journalism, minors in wildlife and botany, at Utah State University this coming year.

I have been involved in scientific expeditions down the river the past two years. In 1970 I was a field assistant to Arthur Holmgren, curator of the Intermountain Herbarium, who is doing a six-volume Flora of the Intermountain Region. In 1971 I helped Paul Holden, a doctoral student at USU, with his work on the native fish of the Colorado River. In these two trips we explored most of the side canyons, including some of the more inaccessible ones such as Clear Creek and Shinumo.

Much of the basic identification studies in the various fields has been done already, and I am personally acquainted with many of these people. They agree that a popular publication is needed and are anxious to aid in its compilation.

I am determined to write this type of guidebook... either as a Master's project with the University of Wisconsin, or preferably, on an independent basis. Would ERI be interested in my idea? My father is very interested in contributing some money to ERI for this project and others. Your suggestions as to possible content, style, funding, and publication would be appreciated. I'm in contact now with the Grand Canyon Natural History Association about my proposal.



"IN WILDNESS IS THE PRESERVATION OF THE WORLD"

Enclosed is a newspaper article on our 1970 expedition I wrote which you might find interesting.

Sincerely,

John Weaver
John Weaver

Grand Canyon: Beauty, Plus Harmony

EDITOR'S NOTE: The author is a student at Utah State University and son of Mr. and Mrs. Frank Weaver of Waco. He plans to leave soon for Alaska on a research trip connected with his education program. This story tells of his adventures in the Grand Canyon of the Colorado River.

By JOHN WEAVER
Special Correspondent

The bearded, one-armed veteran of the Civil War turned back to the first page of his diary. The date read May 24, 1869. He had set out that day on the Green River in southwestern Wyoming with four wooden boats and nine men to explore a mystery.

Now, nearly three months later, Major John Wesley Powell and eight of his men were camped in the bottom of a great, gloomy gorge that was literally a blank void on all the maps at the time.

Powell called the place the Grand Canyon and wrote in his diary:

"We are now ready to start our way down the great unknown. Our boats, tied to a common stake, are chafing each other as they are tossed by the fretful river . . . we have an unknown distance yet to run; an unknown river yet to explore. What falls there are, we know not; what rocks beset the channel, we know not . . ."

Now it was just a little more than 100 years later — April, 1970. Standing on those same rock ledges, where the milky-blue waters of the Little Colorado River flowed into the brown waters of the main Colorado, I knew what Powell meant. Downstream, the canyon

walls seemed to pinch together, the river disappeared, and the roar of the rapids rolled back to us like thunder.

This was the third night of the 1970 Colorado River Botanical Expedition, and my ticket for the adventure was a little plant that went by the Latin name of *Euphorbia rossii*. It was a brand new species that Dr. Aaron Ross of Ogden, Utah, an amateur botanist and river runner, had discovered on a previous float trip through the Grand Canyon.

HE BROUGHT the plant to Arthur Holmgren, curator of the Intermountain Herbarium, and professor of botany at Utah State University. Right then they began planning a unique and exciting expedition, and I was to go along as Arthur's field assistant.

There were 13 of us in the party which included both men and women, ornithologists and ichthyologists, retired mailmen and nextdoor neighbors. All of us shared a common enjoyment of the wilder things of life.

We slid our two bright silver, 33-foot-long rubber rafts into the water at Lee's Ferry in northern Arizona. Historically, this was one of the few places on the river for 400 miles where the canyon walls were low enough to permit crossing by covered wagons.

The owner, John Doyle Lee, however, had the misfortune to become involved in the 1857 massacre of immigrants from Arkansas and Missouri. Lee was executed by a firing squad 20 years later as he sat on his coffin at the site of the alleged crime near Mountain Meadows, Utah.

A STIFF WIND from the north ruffled the river as we

began our 12-day, 291-mile journey, but the warm morning sun and blue sky promised a good day. Soon we were drifting downstream, watching the violet-green swallows soaring above, gazing at the myriad rock formations.

As we approached Badger Creek Rapid, Dr. Ross yelled, "Here's our first big one. Let's pull in, tie the rafts up, and have a closer look."

So we beached above the rapid. Here a side stream had deposited huge boulders in the channel to create the stretch of white water. We studied the tongue, that V of smooth water projecting into the head of the rapid . . . we looked for barely submerged rocks, hidden underneath the surface . . . we watched a jagged wave explode into fragments of fury.

THEN, BACK into the rafts, doing the only thing a river man can do, heading for the tongue of water, and hoping for the best.

Suddenly, we were in it. Bucking high and hard, wild water crashing all around us. Up and down, lunging back and forth, our puny rafts diving for the very bottom of the river one moment, leaping for the sky the next.

"Wow! What a ride!" I screamed to Arthur above the boom-boom-boom of the rapid. When we were through it. Gliding peacefully down the river once again, watching the swallows and the swifts, shivering for a while in wet clothes.

Rapids weren't the only excitement on the trip. Some of the side canyons that we explored, searching for new plants, staggered the imagination.

TAKE KANAB CREEK can-

yon, for instance. Here the walls were sheer for 800, 1000 feet, casting giant shadows over boulders that make one cringe at their very size.

Powell's words struck hard and tough . . . "away to the west are lines of cliff and ledges of rock — not such cliffs as you may have seen where the swallow builds its nest, but cliffs where the eagle's lost to view ere he reaches the summit."

I SPENT MY 21st birthday in a special place called Havasupai Canyon, home of the most isolated Indian tribe in North America. The Havasupai — People of the Blue-Green Waters — take their poetic name from the stream that marks their beautiful valley. The tiny village of 300 is nestled in the red-rocked canyon, 12 miles up from the river and seven miles down from the south rim of the Grand Canyon.

Three gorgeous waterfalls, Navajo, Havasu, and Mooney, cascade over the travertine deposits, dropping white plumes for hundreds of feet . . . form-

ing deep pools of blue-green water. It's a paradise that the Indian children miss very much the nine months of the year they are shipped away to boarding school.

WE SPENT a full day in Havasupai Canyon, hiking 25 miles. We examined the delicate maidenhair ferns, the red monkeyflowers, the yellow columbines, and Arizona grape leaves. Then, we, too, had to leave.

Back on the river, we continued our float, shooting more rapids, more than 165 in all, with names like Nankoweap, Vulcan, Unkar, Separation, and Sockdolager. We hiked up more side canyons, collected specimens of unique plants to send to other herbariums and botanists. Arthur said he feels like we may have found three or four species never discovered before.

We also drifted past the two sites on the river where the U.S. Bureau of Reclamation proposed building dams. I thought about the dam at Glen Canyon that buried one of the

most beautiful canyons on the earth forever and sapped much of the power that once belonged to the river . . . and I wondered about the kind of society that ferments such dam-building.

IT WAS TIME and the river flowing that created the Grand Canyon.

The river was the Colorado, slicing its way through the arid bedrock plateaus of Utah and Arizona, carving out deep canyons with little grains of sand.

Time was two billion years of slow, enduring erosion combining with naked rock surging upward from the depths of the earth.

Sitting around the dying campfire one quiet night, listening to the song of the waters, I heard that "vast pulsing harmony — its score inscribed on a thousand hills, its notes the lives and deaths of plants and animals, its rhythms spanning the seconds and the centuries."

I knew then that man had no right to destroy that harmony.

June 29, 1971

Mr. John Weaver
Box 7488
Waco, Texas 76710

Dear John,

I read with interest your letter describing the "ecological" guide book you would like to write on the Colorado River. I also enjoyed your well written newspaper article on your 1970 expedition. Through ERI we would certainly be interested in helping you with your book project.

ERI is a non profit organization and at the present time our funds are quite low so we could not help you financially. We attempt to utilize our funds to initiate research projects and after getting sufficient information we submit proposals to funding agencies. In this way we get research grants or contracts to do the work proposed.

It would certainly be possible to have funds contributed to ERI for your specific project. I see no problem in doing this and would be glad to help you.

Perhaps we could get together in Logan when you return or if you get to Jackson Hole we could discuss the subject in greater detail.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh



John Weaver

Box 7488
Waco, Texas 76710
July 4, 1971

"IN WILDNESS IS THE PRESERVATION OF THE WORLD"

Dr. Frank C. Craighead, Jr.
Box 156
Moose, Wyoming 83012

Dear Dr. Craighead,

Received your letter of June 29th. I am very excited about the whole thing and looking forward to working on the book.

My wife and I will be in Jackson Hole about the first ten days of August for our honeymoon. If this is convenient with your schedule, perhaps we can get together then to discuss the project in detail. My address after the fifteenth will be 478 E. 7th N., Logan, Utah 84321.

Sincerely,

John Weaver
John Weaver



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

October 20, 1971

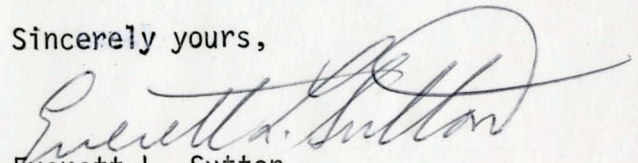
Dr. Frank C. Craighead
Box 156
Moose, Wyoming 83102

Dear Dr. Craighead:

In reviewing our eagle loan files, we find a permit authorizing you to receive and hold two live golden eagles obtained from Dr. John Craighead. This permit expired December 31, 1970.

Do you still have these two eagles? If so, we will renew your permit No. 2-EA-2. If you have returned the eagles, our Regional Office in Portland, Oregon, should be advised.

Sincerely yours,


Everett L. Sutton
Regional Supervisor
Management and Enforcement



MONTANA COOPERATIVE WILDLIFE RESEARCH UNIT

UNIVERSITY OF MONTANA
MONTANA FISH AND GAME COMMISSION
WILDLIFE MANAGEMENT INSTITUTE
FISH AND WILDLIFE SERVICE, UNITED STATES DEPARTMENT OF THE INTERIOR

UNIVERSITY OF MONTANA
MISSOULA, MONTANA 59801

December 10, 1971

Dr. Frank Craighead
Box 156
Moose, Wyoming 83012

Dear Frank:

I can see nothing wrong with just going ahead and asking Sutton to renew your permit and we will keep the eagles here until you want them. We seem to keep getting more. I wish somebody would take a whole bunch of them.

Have some good holidays.

Sincerely,

A handwritten signature in blue ink, appearing to be 'Bart', with a long horizontal flourish extending to the right.

Bart

BWO/kr1

Mr Everett L. Sutton
Regional Supervisor

Management and Enforcement

Bureau of Sport Fisheries and Wildlife

US Dept of the Interior

PO Box 1306

Albuquerque, New Mexico 87103

Dear Mr. Sutton:

Thanks for informing me that my permit to hold
two live golden eagles expired December 31, 1970.

My brother, Dr John Craighead, now has these eagles
at the Wildlife Research Unit at Missoula and will
be keeping them throughout the winter

I expect to be doing some work with eagles in the
spring so would greatly appreciate it if you could
renew my permit # 2-EA-2. For varying periods of time
eagles will be kept either at the wildlife research
unit at Missoula or here at my Laboratory setup at
Moose, Wyoming.

Thank you.

Thank you,

Sincerely,

*(I think
you mean
1971)*

Lesson 150 - loop antenna - 25 mi at 1 to 3000 ft.

May 17 left Refuge

Signal Mt 28 antine Km following day

Moved on Spind creek 25 May & crossed over to
Slack Creek (Summer Range) Dried snowbound

Circumvent route to summer range 65 km rather than 20

May 30 - June 10 - averaged 1.1 antine Km per day
reduction over previous daily travel - calving

June 8 - Elk in good condition - no longer pregnant

Late Sept - calf & cow observed close to Refuge ?

movement possible close to calving

Example of bear - intermittent signals

July 25 - lighted in Cottonwood Drainage east of Slack Creek

Daily Movement before migration av. 3.7 Km based
on 41 movements

From to April 24 elk averaged 2.6 antine Km / day

April 25 backtracked 14.6 Km - longest single
movement prior to migration

possible response to approaching storm

Perhaps an ability to detect infrasonic waves

Example of gurgling

Results of feasibility study indicate that behavior
and migration of individual elk can be studied
in detail with the aid of radiotracking and
barometric ground-satellite systems & provide
info of value for management - also better
understanding of the phenomena of animal
behavior & migration

Ultramarine

Body temp 38.5°C normal, streptokin, antagonist M-285

Immobility 27 min.

rubbled hay, encounter with another elk.

Number 38 & both monitored elk. (April 8) 3 adults

Accuracy of Locations

20 locations by satellite

ground sightings & fixes

Comparisons made

mean error ^{latitude} 4.8 km (3 mi.), longitude 6.2 km (3.9 mi)

accuracy improved with new antennas

Coverage of 45° with respect to the horizontal

most accurate locations sat. between 10° & 50° above horizontal

Analysis of Sensory Data

Increase of voltage lot 3 days - solar panels OK

Battery temp. remained above ambient temps.

Previous studies - battery warmed av. of 15°F by animal's body

Skin & Ambient Temp.

Readings 1.5 min. intervals

movement of collar apparently altered its insulating effect, producing more regular temp. readings when the elk was at rest.

High skin temp. (37.5°C) April 10 - near body temp. - pressure of

thermistor against elk's neck

Example of bear - 35.9°C (normal 37.8°C at 102°F in summer)

Inverse relationship between skin & ambient temps in about $\frac{1}{2}$ recordings could reflect a decrease in insulation of integument due to compaction of hair under collar

Light intensity readings correlated with day & night conditions

Timber area - feasibility of determining whether an animal is in

Data show ^{when a timber habitat} the potential for studying thermoregulation by monitoring movements of elk

location too inaccurate for determining local movement or refuge except in case of longer movements

over



THE **highlander**

MOTOR HOTEL - CALGARY 42 - CANADA

TELEX 038-21552 ON THE TRANS CANADA HIGHWAY AT 17th ST. N.W. TELEPHONE 289-1964

1 mi. = 1.6 Km

2.625

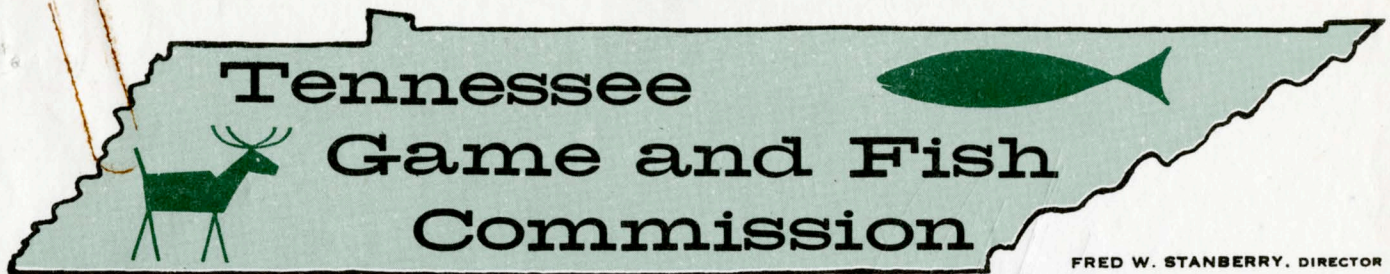
11.0000
96
40
32
80
80

4.8
1.625
2.40
86
288
300006

6.2
1.625
310
124

372
3.8756

For migration - could have yielded very useful data
if data entered May 1



Ellington Agricultural Center • P. O. Box 9400 • Nashville, Tennessee 37220

FRED W. STANBERRY, DIRECTOR
DAVID M. GOODRICH, ASS'T. DIR.
HAROLD E. WARVEL, ASS'T. DIR.

July 9, 1971

Dr. Frank C. Craighead, Jr.
Box 156
Moose, Wyoming 83012

Dear Dr. Craighead:

I am a game biologist with the Tennessee Game and Fish Commission conducting natural history and management research on European wild hogs and white-tailed deer. In 1964 Mr. James C. Lewis, then research supervisor for the Game and Fish Commission, contacted you concerning the development of a telemetry system for European wild hogs in the southern Appalachian Mountains. I believe the money for this study was to come from a Public Health Research Grant, but the grant was denied.

I was hired in 1968 as project leader for the European Hog Research Project and attempted to develop a telemetry system for hogs in the mountains. The system I chose was a 27 mc frequency. The equipment was purchased from Davidson Company of Minneapolis, Minnesota. After testing and renovating this equipment, the range I could obtain was 1/4 of a mile in the mountains.

On July 1st the Commission terminated the European Hog Research Project and incorporated the remaining studies into an east Tennessee Big Game Research Project, which includes telemetry research on hogs and deer. Another biologist, Mr. Tommy C. Hines, and I are project leaders. Before we delve deeply into this project, it's our opinion that we need some advice and suggestions regarding the development of a telemetry system for the east Tennessee mountain region. That is my reason for writing to you.

I realize you will need some background information; therefore, I will explain our endeavors to date. After the Public Health Research Grant was denied, the Commission contacted Mr. W. W. Cochran of the University of Minnesota. He advised us to purchase E. F. Johnson equipment, which we did, and the equipment was unsatisfactory. I purchased Davidson Company equipment (receiver, transmitters and antennae) for hogs. In these transmitters

MEMBERS OF COMMISSION

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DR. GREER RICKETSON
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JAMES J. BEASLEY

Harriman
Pulaski
Milan

July 9, 1971

battery life was sacrificed for range. The transmitters weighed approximately 24 ounces and were 27 inches in circumference. This equipment was also unsatisfactory, as I mentioned earlier. I then contacted Bio-Tel Electronics of Atlanta, Georgia concerning building telemetry equipment for hogs and deer. This equipment was to be a low frequency (18-19 mc) so that the signal would become more ground level. The equipment was damaged in shipment and I returned it for repair. Recently, we began a telemetry study on deer in upper east Tennessee (Grainger Co.) We ordered five transmitters from Davidson Company and only one is working to a degree that we can use it for tracking. Furthermore, we are tracking by line-of-sight, and when the deer goes behind a ridge, we lose the signal.

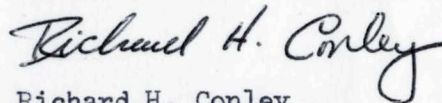
I am not casting any reflection on Davidson Company. I know their equipment is being used by other states and it is reliable. They have been most cooperative in trying to solve our problems. However, I think our situation is different in that most people do not know the difficulties of tracking in the mountains. If you could give us some suggestions and advice on a system that we could implement on hogs and deer in the mountains, we would be very grateful.

The possibility of your visiting Tennessee and looking at our situation first hand are very good if you find it convenient. The Commission would pay your expenses but would like to have from you an estimated cost of the trip.

Any consideration you could give our problem will be greatly appreciated.

Sincerely,

TENNESSEE GAME AND FISH COMMISSION



Richard H. Conley
Route 2

Tellico Plains, Tennessee 37385

RHC:h

CC: Vernon G. Henry
Tommy C. Hines

July 26, 1971

Mr. Richard H. Conley
Route 2
Tellico Plains, Tennessee 37385

Dear Mr. Conley,

I am sending you a number of reprints giving some of the results obtained with our radiotracking system. Our major papers are now being printed but will not be ready for distribution for some months yet.

We are currently preparing a pamphlet on our radio-tracking system including various applications. Along with this we are summarizing some of the results. This will not be ready for publication for some months but I am sending you a paper by Joel Varney describing our tracking and telemetry system for wildlife research. This may be of some help.

We have provided a few field investigators with items of equipment but so far we have not attempted to provide equipment for a rather extensive project. We can make available schematics and other information that may be of help to you and your engineers.

I believe that our wildlife telemetry system would be quite useful and practical in your research on hogs and deer. The reprints will give you some idea of the performance of this system. If after looking over these you feel that you'd like to utilize this system I'll see if it would be possible for our electronics engineer, Joel Varney, to provide you with transmitters and receiving equipment.

I would also be glad to visit your Tennessee research areas, look over the situation and advise you on the possible application of this system.

I would not be free to do this until sometime in late fall or early winter.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr/mh

July 8, 1971

Dr. Louis Hamill
Associate Professor
Department of Geography
University of Calgary
Calgary 44
Alberta, Canada

Dear Dr. Hamill,

I appreciated your very complimentary remarks on our pioneering work with the wild and scenic river program.

I am enclosing our file copy of the report that you requested. Please copy and return. This was done very hurriedly for the Resources Program Staff, Department of Interior, and then turned over to the Bureau of Outdoor Recreation. It was instrumental in implementing the program developed by the Department of the Interior and it started work on the bills that eventually developed into the Wild and Scenic Rivers Act.

We are still continuing with the program to get more of our rivers into the wild and scenic system. There are a number of Wyoming Rivers, such as the Clark's Fork of the Yellowstone, the Upper Green, parts of the Snake, the Gros Ventre, and the Canyon of the Yellowstone that should be included. In addition to this we are conducting some water quality studies on the upper Snake River. This is a pilot program dealing with 10 chemical parameters and quantitative studies of the macroinvertebrates. We hope to eventually expand this program.

I've been considering either looking at or floating one or more of your rivers in Alberta or British Columbia. I would appreciate any suggestions that you might have concerning a river that would be of particular interest.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh



DEPARTMENT OF GEOGRAPHY

June 22, 1971

Dr. Frank C. Craighead, Jr.
Environmental Research Institute
Moose, Wyoming

Dear Dr. Craighead:

I am directing a graduate student in a study of wild and scenic rivers in Alberta, and trying to work out procedures for a larger study in western Canada. I have benefited from the material you and your brother have written on this subject, and I would like to express my appreciation to you and your brother for your pioneering efforts.

In an article in the Naturalist (1965), you mentioned a report which you submitted to the Resources Program Staff, U.S. Dept. of the Interior in 1963: "A program to classify, inventory, and evaluate the recreational resources of our river systems". I would like to have a copy of this, available for the use of myself and students. If you do not have an extra copy available, may I suggest that you loan me a library copy. I will have a xerox copy made, and will return the original to you.

Your assistance in this matter would be appreciated very much.

Sincerely yours,

Louis Hamill
Associate Professor

LH/rmy

July 8, 1971

Charles R. Taylor
Taylor Farm Service
"The Farm Service"
Tremonton, Utah 84337

Dear Charlie,

That was an excellent letter that you wrote to Congressman Gunn McKay and I appreciated receiving a copy of his reply.

The situation in regard to research in Yellowstone and grizzly bear management has not improved. If anything it is getting worse.

What is needed is frequent public hearings on Park policy and Park plans. I believe it is essential that the American people know in advance any of the major policy decisions being made by the bureaucrats representing the National Park Service. There are many things going on that are not good and may not be in the best interest of either the people or the resource. Our approach to this problem will be to continually hammer away at the fact that we should have at least one or two public hearings a year in all of the Park areas.

We've been denied access to information on bear control measures in Yellowstone this year but are working toward getting an impartial investigating committee to look into the whole affair. I'll keep you informed. Hope to see you up here sometime this summer and will plan to go fishing.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh

Mary, Earl & Frank & John

Congress of the United States
House of Representatives
Washington, D.C. 20515

June 24, 1971

Charles R. Taylor
Taylor Farm Service
"The Farm Center"
Tremonton, Utah 84337

Dear Mr. Taylor:

I have received your recent letter and find your suggestion that the National Park Service hold more open meetings to determine park procedures to be a very interesting one. I am taking the liberty of forwarding your suggestion to the National Park Service over my signature and am requesting some information from them pertaining to this problem. As soon as they have any information for me I will immediately pass it on to you.

I am glad that you are able to enjoy America's great park system. You probably already know that I have introduced in the House this month, three bills which will create national parks in the Canyonlands National Park area, the Arches National Park, and Capitol Reef National Park. I am quite confident that the committee will report these bills favorably by the end of June and that the House may act on them by the middle of July. You also may be interested in knowing that just today I was able to receive from the House Appropriations Committee, of which I am a member, a favorable report on a request which I had made for over a million dollars to be used

Charlie said to tell you this is the first reply he has had from the Senators. I'll let you know of any further communications. Our best to you back & your sweet wives, yours

Charles R. Taylor

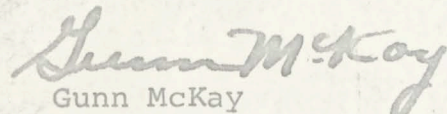
June 24, 1971

Page 2

in improving the sanitary and other aspects of the Flaming Gorge Recreation Area and also \$50,000 to be used to improve the access road into the Needles area of Canyonlands National Park. I hope that these efforts will allow you to have even greater access and more enjoyment in our great national parks.

Thank you for your interest, and I will be in touch with you when I have additional information.

Best wishes,


Gunn McKay
Member of Congress

GM:tld

June 2, 1971

John E. Craighead, M.D.
University of Vermont
Department of Pathology and Oncology
Medical Alumni Building
Burlington, Vermont 05401

Dear John,

I was glad to hear you are situated at the University of Vermont but you are actually still a long way from where I am working and operating. Although I am attached to the State University of New York at Albany I am living and working here at Moose, Wyoming. At the moment I don't know of any candidates to recommend for the director of your environmental program but I will keep this in mind and drop you a note should someone interested and suitable occur to me. I will also send you some of our Environmental Research Institute literature.

Esther and I have just returned from visiting Lance in the Fiji Islands and I am trying to catch up on a backlog of work. At a later date I'll write and give you more family news. Jana has just graduated from high school and Charlie has one more year to go at the University of Utah, Logan.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr. :mh

The University of Vermont

DEPARTMENT OF PATHOLOGY AND ONCOLOGY
MEDICAL ALUMNI BUILDING, BURLINGTON, VERMONT 05401



May 14, 1971

Frank Craighead, Ph.D.
State University of New York
Albany, New York 12207

Dear Frank,

As you see by the letterhead, I am now located north of you in Vermont. We are delighted with the surroundings and I find my work both challenging and enjoyable. Among the many tasks that fall on faculty members, is the task of chairing search committees for new faculty members. The University of Vermont recently established an Environmental Program and I am chairing the effort to find a Director for this Program.

Although the scope of the Environmental Program has yet to be defined, action-oriented study and research at the undergraduate and advanced levels will be major goals. As presently envisioned, our Program will call upon the skills and interests of many members of the University and community. We are impressed by the prospects and the enthusiasm of our faculty and student body.

I would greatly appreciate learning of any individuals whom you might consider suitable candidates for the Directorship of our Environmental Program. Obviously, the successful candidate must possess unique personal characteristics and ability as well as a deep interest in environmental problems. Although the individual need not be a professional educator, he or she should be dedicated to education as a means for accomplishing change. Our Committee believes the Director of the Environmental Program should have some understanding of such broad areas as business, government, law, social and biological sciences, arts and humanities, as well as demonstrate personal accomplishment. I am sure you have come in contact with many persons who might well fulfill our needs, and I would greatly appreciate learning about them. We are looking for a Director with outstanding qualifications and plan to search nationally as well as on the local scene.

I hope you and your family will find the time to visit with us here in Burlington. Dorothy and I often talk of the several pleasant gatherings we had with you and your family in Rockville. Please extend my best regards to your wife.

Sincerely,

John E. Craighead, M.D.

JEC:BD

OUT ?

January 21, 1972

Mr. D. B. Ozmun
1782 Country Club Drive
Logan, Utah 84321

Dear Bud:

I am enclosing a picture of a golden eagle in flight that I took several years ago. I thought that you might like to add it to your office pictures.

As you probably know, the North American Wildlife Conference is being held in Mexico City this year. I have missed the meetings the last several years and am anxious to go to this one to renew old contacts and make new ones.

I am tentatively planning to attend the conference and Charlie mentioned that you might also decide to go. If so let me know and perhaps we can get together in Mexico City or even on the flight down. I will probably go via Denver, stopping off to give a lecture and then flying down to Mexico City. I may then go over to Miami to visit the folks before returning.

Sincerely,

Frank Craighead

January 21, 1972

Mr. Ted Frome
PO Box
Afton, Wyoming

Dear Ted:

Quite some time ago I gave you some material relative to the pump house at our place here at Moose. This building was being shared equally by my brother and myself. I also gave you material on the location and position of a laboratory building that we were jointly using. I do not have a copy of this and would appreciate it if you could return the material that I sent you.

Sincerely,

Frank Craighead

2/2/72

Samuel Scrivener Jr.
1030 15th Street, N.W.
Washington, D.C. 20005

Dear Sam,

I am working up material for an annual tax return. I plan to send you something during the month of February.

There's a possibility I will see you in Washington during April, but hope that you can visit us in Jackson Hole this summer.

Regards,

February 19, 1972

Miss Mary S. Griswold
Assistant Illustrations Editor
National Geographic Magazine
Washington, D.C.
20036

Dear Mary:

John mentioned that he had talked to you by phone the other day and you had indicated that you would like to have me stop by Washington if possible, and go over some of the black bear pictures with you.

I am planning to leave for Mexico City, March 10th, and will next go to Miami to visit my folks. I will then plan to fly on to Washington and return via Chicago and Billings. I anticipate arriving in Washington in late March, but I will give you definite dates a little later.

Would it be possible for the Geographic to pay my expenses while in Washington? John indicated that he thought this could be done? Thank you.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr.:mr

March 9, 1972

Mrs. Jean George
20 William Street
Chappaqua, New York
10415

Dear Jean:

Lance is arriving home today and so I am altering my travel plans. I will leave for Mexico City Friday, but instead of going on to see the folks, will return. I then expect to come East in late April and will plan to get together with you at that time. I'll keep you informed of my itinerary.

I have partially written the first chapter of the book and hope to complete it when I return from Mexico City.

We had a nice visit with Craig and the kids last week-end. I took a few pictures of Craig that might interest you.

Love,

Frank

FCC,Jr.:mr

March 9, 1972

Mrs. Jean George
20 William Street
Chappaqua, New York
10415

Dear Jean:

Lance is arriving home today and so I am altering my travel plans. I will leave for Mexico City Friday, but instead of going on to see the folks, will return. I then expect to come East in late April and will plan to get together with you at that time. I'll keep you informed of my itinerary.

I have partially written the first chapter of the book and hope to complete it when I return from Mexico City.

We had a nice visit with Craig and the kids last week-end. I took a few pictures of Craig that might interest you.

Love,

Frank

FCC,Jr.:mr

March 9, 1972

Mr. Mike Edwards
National Geographic Magazine
Washington, D.C.
20036

Dear Mike:

I have had to make some changes in my schedule since talking to you over the phone. I will not get back to Washington in early April but am still hoping to make it some time during that month.

I will keep you informed.

Regards,

Frank C. Craighead, Jr.

FCC,Jr.:mr

March 9, 1972

Miss Mary Griswold
National Geographic Society
Washington, D.C.
20036

Dear Mary:

I have had to make some alterations in my plans and will change my itinerary. It does not now appear as though I will get to Washington in early April, but I am still hoping to get back some time before May.

I will keep you informed of my schedule.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr.:mr

March 9, 1972

Mr. Sam Scrivener
1030 Fifteenth Street, N.W.
Suite 520
Washington, D.C.
20005

Dear Sam:

I have had to somewhat alter my schedule and it does not now appear as though I will get back to Washington until some time in late April.

I am still planning this trip, however, and hope to get together with you. I will keep you informed.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr.:mr

5005 Wapakoneta Rd.
Washington, D. C. 20016

April 6, 1972

Dr. Frank Craighead
State University of New York
Albany, New York

Dear Frank,

It has been some time since I have seen you and your family and frequently wonder how all of you are.

I have recently finished a year at Virginia Wesleyan College in Norfolk, Virginia and decided not to return for the present but instead get a job for a few years in any of the environmental fields.

My preferences would be the Forest Service or Park Service. In view of your background, we thought you might know someone who could help me locate something in one of these agencies. If you do, or if you have any suggestions I might follow, I would be most grateful.

We have very much enjoyed your National Geographic television programs. They were great.

Please say Hello to the boys, Jana and Esther from all of us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Fred", with a stylized flourish at the end.

Fred Sisler, Jr.

May 4, 1972

Mr. Fred Sisler, Jr.
5005 Wapakoneta Road
Washington, D. C. 20016

Dear Fred,

I have just returned from a three week trip east, and so am only now getting around to catching up on back correspondence. I was glad to learn from your letter that you are interested in an environmental field, and that you are looking for work in either the Forest Service or Park Service. It is often a good idea to get experience in the area of your interest before going on and completing college.

I am afraid I cannot help you in your application for jobs with the Forest Service or the Park Service this year. They have already hired all of their seasonal help, and it is difficult to get permanent jobs with these organizations unless you have your college degree. My suggestion would be that you get the names and locations of specific forests or parks and then write to the superintendents or supervisors. You should do this well in advance of the summer season. A few of the forests in this region include Teton National Forest, Targhee National Forest, Shoshone National Forest, Bridger National Forest, and others. The two large parks in this area are Yellowstone National Park and Grand Teton National Park. The Wildlife Refuges under the Fish and Wildlife Service also hire summer student biologists.

If I hear of any job opportunities for this summer or in the not-too-distant future, I will drop you a note.

I will tell Jana, Charlie and Esther that you said hello. Lance is in Western Samoa, and spent the previous two years in the Fiji Islands with the Peace Corps doing marine biology research.

Please give my regards to your mother and father. I often think about them, and have wondered where your father is and what he is doing at present. I will give him a call the next time I come to Washington. I hope all is going well for you and the rest of the family.

Sincerely,

Frank Craighead

Washington

National Geographic

Mary Griswold Smith-	Bear article and pictures (202)296-7500
Ralph Gray-	River article
Mike Edwards-	Wilderness article
Paul Ahser	67 Report
Joanne Hess-	Movie
Mel Payne-	World Wild River, Telemetry Bulletin
Dr. Carmichael-	Raptor Study - 9AM, April 10 Research
Gil Grosvenor-	Articles
Carl Harmon-	Colorado and Green River movies
Dennis Kane-	T.V.

Sam Scrivener	(202)296-2950
Hal Buechner	(202)628-1810, ext. 5058
George Jacobs	Office: (202)962-4944, Home: (202)530-1924
Jim Lynch	Office: (302)982-9000, ext. 4955 Home: (301)424-6284
Mr. Glen Ruh	U. S. N. Institute, Annapolis, Ind.21402
Mrs. P. Hoffman	(301)652-8469

March 27, 1972

Mr. Barry Franciscus
Colonial Savings Association
Wrightsville, Pennsylvania 17368

Personal

Dear Barry,

I am enclosing slides of a couple of dudes that dropped by one day. During your visit you mentioned that you still had a number of bearpaw bookends. I wonder if you would do me a favor and send a set of these to Mr. Curtin Winsor, Pres., Pennsylvania Environmental Council, Inc., 313 South 16th Street, Philadelphia, Pa. 19102, with my return address on the box. I am enclosing several dollars to pay for postage. I definitely plan to come east in April, and hope that I can get to see you. I will at least try to call.

Regards,

FRANK

May 10, 1972

Mr. Ed Reid
5002 San Vicente Blvd.
Los Angeles, California 90019

Dear Ed,

I would have answered your letters a long time ago if Nancy had written them instead of you. That's a great idea to send Golden Eagle primaries to recognized conservationists. You can gather a large supply of feathers up in this country. Even though they have been shooting a large number of the eagles from airplanes and poisoning them there are still lots of golden eagles nesting in both Wyoming and Idaho and a good population of balds.

I've been doing some research with birds of prey, with black bears, grizzly bears and wild rivers.

I haven't heard from Hersh in a long time but that's perhaps because he's panning gold in Yellowstone. The last time I talked to him he had some such wild idea in mind.

You no doubt heard about Charlie Ridenour's death. He shot himself (suicide) several years ago. I hope that you really will get up this way. We will look forward to seeing you. I can't understand how you can exist in that megatropolis!

Regards,

Frank

FCC,Jr/mh

March 27, 1972

Mary Griswold
Assistant Illustrations Editor
National Geographic Magazine
Washington, D.C. 20036

Dear Mary,

I am planning to arrive in Washington April 8 or 9,
and expect to come up and see various people at the National
Geographic on the 10th. I hope that I will be able to see
you and review the black bear pictures at this time.

Sincerely,

Frank Craighead

March 27, 1972

Mr. Mike Edwards
Project Editor
Book Service
National Geographic Society
Washington, D.C. 20036

Dear Mike,

It now appears as though I will be coming to Washington and be at the Geographic April 10 and probably the 11th. I will give you a call, and perhaps we can arrange to discuss the chapter on wilderness areas. I haven't seen John recently, so don't know whether he made any final decision as to a deadline on this manuscript. I'll be seeing him on March 30.

Sincerely,

Frank Craighead

March 27, 1972

Joanne Hess
Secretary Lecture Committee
National Geographic Society
16 and M Street, NW
Washington, D.C. 20036

Dear Joanne,

I am planning to be in Washington April 10 and 11, and look forward to seeing a number of people at the Geographic at that time. I would like to discuss the movies we have been taking, and will call to see when we might arrange a convenient time.

Sincerely,

Frank

March 27, 1972

Dr. Melvin Payne
President
National Geographic Society
Washington, D. C. 20036

Dear Mel,

I am planning a trip east in April, and expect to come to the Geographic April 10 or 11 and discuss our work and articles with a number of people. I would like very much to see you at this time, and hope that we can arrange a meeting. I will contact you by phone after I arrive in Washington. I look forward to seeing you again, and hope that all has been going well for you.

Sincerely,

Frank Craighead

March 27, 1972

Mr. Jim Lynch
Office of Public Information
Goddard Space Flight Center
Greenbelt, Maryland 20770

Dear Jim,

I am enclosing a photograph that I took out of the front window at my cabin. It shows the early morning light on the mountains and the reflection of the fire from within the house.

It now appears as though I may get to Washington during the first half of April. If so, I will contact you by phone and hopefully we can get together.

Sincerely,

Frank Craighead

March 27, 1972

Mr. Sam Scrivener
1030-15th Street, NW
Suite 520
Washington, D.C. 20005

Dear Sam,

I now appears as though I will arrive in Washington about April 9, and will be seeing people at the National Geographic, Smithsonian and NASA. I will give you a call and hope that we will be able to get together. I am looking forward to seeing you.

Regards,

Frank

HARRY & Pat
Blue-grey Saab
station wagon
belongs to:

Bobbi Meyer
% Bruce ^{Haughton} Haughton
Architect
Hickox, Kyd.
733-4677

Has all of Harry &
Pat's stuff

Leaving 5/1 for ^{Calif.} ~~Calif.~~
will return

Key on thong w/ 2 rocks &
coin-in pantay
2 or 3 days on 4

Dear Dwight,

I thought

1. Capture equipment
2. Phosphate analyzer
3. Maps - order
4. Bear Den maps

Order: 5 | 10cc darts
 6 ~~14~~ | 5cc darts
 15 | 4cc darts
 2 | 3cc darts

~~NE 2~~

NE 2 = large collar 1 1/4 in.

NM 2 = small collar 1 1/4

arrow adapter
 silicone lrb.

Call John Morgan & give
him Lynn Mc Adams

name & address 3600
Lynn Mc Adams 3866
804 1/2 E. Front St., Merivale

Write letter re Little
Rock reimbursement.

Call Postman Tues. 8:30 a

Call John Morgan about
Lynn Mc Adams

Write Bd Dir. - saying
Frank will be absent
during April on vacation
as I do not see

11 6. 4. 1 (Doppler frequency
shift
scintillation
- - - - -
- - - - - F₀ - - - - -

Prospectus -
bring up to date
- include status qual.
study

Get Monte H. Hughes' address
in I. F.

Letter with brochure
showing the Doas - 2
6. 2. 1, Geo. 1. 10 3
- 6. 1. 1 - 1. 1. 1
2 - snow-mobiles - 1. 1. 1 and
of satellite monitoring
of bear den

John - Bart
Bear Den
Elk - satellite project
Bear article - George
W.Y. Dump

✓ White

Bear - Man Relationship

Statement - rec'd 5/4/71

Nal

Program. Dev.
Detail for Joel Harvey

Definitely can't go on with elk
Harvey - April 15th

use some funds for planning proposal
Dorner on polar bear etc.

Sec. help - Nal

Details of polar bear research

Travel to Alaska

Cross from State of Alaska etc.

Test for year on animals in captivity etc.

When do tests

Info. for proposal

Satellite - 1974

- for animals
doppler

April 15th

contract April 15 expires - Sec. help
reaction of polar bear to collar

Went

Order from capture group. - called Jay 4/8/71

Monan - mileage & per diem - Missouri trip

Budget figures

new collar - use as station

John - Buechner

~~Bear Paper~~

~~Set of photo for~~
~~Henrico~~

~~John 18th~~
~~20-25th~~

Jim White

collar redact wt. - reconsider

Late notice

Read papers? Harry didn't - sent him one

86	60
86	60
726	240
8640	

assumption of cruelty - hate letters

Do elsewhere

Meeting 6-7 - Letter March 16

Park Service present in earlier joint meeting

Write & summarize for White

Talk with Harry

Send Sam Sorrentino
FBI stationery

Get address of Sport
Yak - Bill Belknap
Don Smith
Salt Lake

To send pic of Sport Yak
Gander Mountain, Inc.
P.O. Box 248 - Hilmet, Wisconsin
53192

Acknowledge mail
in his absence

U. of New York at Albany
Article is now kept in 7th
Y Field Research Exped. p. 61

Letter with brochure
showing ski doos. He are
preparing

to send him of about 10
D.O. Box 248 - Wilmet. Illinois
33192

Bobrovsky
in this reference

U. of Tenn. Post at Albany
Article is in Vol. 1 of the
U. of Tenn. Post at Albany

Send pictures to
Encyclopedia Britannica

Write letter of transmittal
also asking for 2 wk return
after making their selection.
Also - they are for 1 time
use - not exclusive use.

La Motte

Thanks for equiv.

He are going to try to
sup W. G. Study going
but are not getting any
funds from Frank An.
until end of June - if they

Look for bird band-
miller info.

✓ Phone Harrington 733-2586

Movies of collar, lab, raven

~~Get Rupp~~ Phone John Harrington - R/Sk-doo

Phone John Turner

~~Write Mel Payne - Rivers~~
~~Biotechnology~~

~~Phone Weaver~~

Director

✓ Work on Smith. Budget

Wyr. 7 & D. 6 am.
House of animal in
Wyr. for animal

Look over movies

~~Get river material for Karen~~

~~Write Prince on Ski-doo~~

Write concerning research building

Work out trip itinerary & cost

~~Phone Lance~~
~~Income tax~~

~~Bozeman meeting on 18th~~

~~Ben Mgt. Actvty~~ ^{Prince} send to McBratton

~~Write to Mel White Jim Lynch~~

~~Russula trip - refund~~

Smith bill - Sec. Sum-mobily, wheel

✓ Statement on Natl. En. John Art - Cossatot River

✓ Order - Water quality books

Water Quality Studies

raffles put out - date - late March

Water analysis - date - April

Phone Zeitenbech

THINGS TO DO UPON RETURN FROM FIJI:

Meet with Pete Haden.

Make a trip to the Clark's Fork of the Yellowstone.

Make a census of the Canada geese on the Snake River.

*From
Buffalo &
Astoria-70*

Have a discussion with John Turner.

~~Arrange a trip to Washington to discuss satellite
tracking with Hal Buechner.~~

Shoot some water quality movies if we decide we need
them.

1 — Check on arrangements for having a well dug.

Get plans for duplex housing. ~~done~~

Check on blueprint of laboratory. (*micro mated prints rec'd*)

~~Complete draft of ERI Prospectus, showing budget and
projected needs.~~

✓ — Edit the winter film on biotelemetry and satellite
tracking.

Look over material relative to Carnivore Committee.

Check on funds for water quality study--VanGuytenbeek.

✓ — Check on payment of bills from Smithsonian.

✓ — Get license for horse trailer.

Check, label and file the different slides.

Take filing boxes and file much of the stuff in the
Library.

Go through our regular files and eliminate material
that is not current and file in boxes.

✓ — Write about ski door

Get Reg. (Don paper) returned from John

get address of Shortgate - Ron Smith
Bill Bellman

Jeff Jones from Pacafells -
wanted talk to Sierra Club group
of Pacafells — Frank will talk.

208-233-4448
Call - Grizzly Bio - tele.
call us again in 6 wks.

Wife Lynn McAdams
804 1/2 E. Front St.
Missoula, Mont.
about Dike Doo

Slides returned from John Fred Bork To Mc Gee
Land plot outlines
Well dug
✓ List of activities for River
✓ Files to Lance
Baffles - Don Tribble
Set together with Joel
Salmon program this
copy of drug paper

The following are projects for 1971 to be studied and some eliminated after assigning priorities

1) Preparation of book on grizzly bear

2) Wild Rivers educational film

3) Biotelemetry film for National Geographic

✓ ~~4) Biotelemetry and satellite tracking of elk~~

5) Wild River evaluation and water chemistry analysis

6) Miniaturized micro-wave bird transmitter

7) Preparation of manuscript on grizzly bear ranges and movement

~~8) Yellowstone Field Research Expedition January~~

9) Vacation -- one month

Biotelemetry & satellite tracking article for Geog.

3/8/71

THINGS TO BE DONE BEFORE FIJI:

HARRY:

1. ~~GET LAND ROVER INSPECTED AND LICENSED.~~
2. ~~REPAIR AND GET TRAILER FOR SKI-DOO INSPECTED & LICENSED.~~
3. GET WATER QUALITY INFORMATION TOGETHER FOR LaMOTTE.
Methods for Phosphates
4. ~~TRASH DISPOSAL.~~
Order
5. PREPARE MAPS FOR FIELD WORK.
6. ~~FORM SHEETS--ELK SATELLITE TRACKING.~~
6. ~~CHECK IMMOBILIZING EQUIPMENT -- DRUGS.~~ ✓
7. SEND SOME STATIONERY & EVPS. TO SAM SCRIVENER.
8. ~~Send for reprint files \$15 @ .25 = 60 files~~
9. ~~Make up immobilization sheet~~
10. ~~Test receiving transmitters~~
11. ~~Letters to FS, NPS, F2G.~~
12. Remove transmitters from collars

Red collar: extended life 19 pulses / 9 sec ; 20 sec. off

Orange collar: continuous 77 pulses / min.

October 12, 1971

Mr. John Rogers
9 Beechtree Lane
Essex Fells, N. J.

Dear John:

Thank you very much for your letter of September 27.
I was pleased to learn of your interest in our work.

Unfortunately, we have no openings for assistants
at this time. We are financed chiefly by grants or
by tax-deductible gifts and the tight economy just
now makes these harder to come by.

I would suggest that you write to the National Park
Service, Washington, D.C., and inquire about their
Youth Conservation Program. And if you are interested
in an outdoor-oriented college, write to Prescott
College, Prescott, Arizona, for information.

Meanwhile, I'll keep your name and address on file and
if something should turn up will be sure to let
you know.

Sincerely,

Frank C. Craighead, Jr.

9 BEECHTREE LANE

Essex Fells, N.J.

September 27, 1971

Dear Mr. Craighead(s),

I saw the National Geographic special featuring the grizzlies and was very impressed with it.

Since you seem to have been doing research projects for many years now, I figure that you may have some projects starting or planned for the near future.

If you could use any help at all, please don't hesitate to call on me. The experience, if you could call it that, of nature study I've had, is hunting, fishing, tracking, stalking, and camping, all of which I've done for many years.

Since I'm still in high school, my free season is limited to late spring, summer, and early fall.

If you can't see any possibilities on your projects, I would appreciate your recommending to me a similar project to which I could write. Thank You.

I would like to say that your work

is one the best examples of worthwhile
work a man can do. I was curious,
though, as to how you obtained the money
for research work, Is it a grant, or
a loan?

well, thank you for taking your time.

Sincerely,

John Rogers

November 5, 1971

Dr. George Jacobs
NASA
400 Merlin Ave. SW
Room 5055
Washington, D.C. 20546

Dear George:

I was glad to hear that the elk satellite tracking paper will be out in the Proceedings in October. In your last letter you mentioned that you might be able to provide me with about 35 copies or more of the Proceedings. I would greatly appreciate it if you could do this and have these sent to me.

As you probably know, the bear den monitoring paper has been accepted by BioScience. However, we still do not have a publisher for the shorter version of the elk satellite tracking.

We are in the middle of quite a blizzard today but I am planning to drive to West Yellowstone as we are doing some work there on the black bear.

Regards,

Frank Craighead



FRANK C. CRAIGHEAD JR.

P.O. BOX 156 MOOSE, WYOMING 83012

Stimmetz Photo Shop
121 South Pitt
Carlisle, Penna.

Dear Mr Stimmetz:

I am enclosing a color transparency of a bald eagle nest. Would you please make me a black & white negative of this and one 8X10 glossy print.
Thank you. Happy New Year

Sincerely,
Frank Craighead



Environmental Research Institute

HEADQUARTERS
P. O. Box 156
Moose, Wyoming
83012

Officers and Directors

President

Frank C. Craighead, Jr.

Secretary-Treasurer

Samuel Scrivener, Jr.

Frank H. Goodyear

John J. Craighead

Gerald J. Stout

Charles R. Pihl

Nov. 15, 1971

Mr Lawrence R. Reno
Reno & Judd
attorneys at law
616 Metropolitan Building
Denver Colo. 80202

Dear Mr Reno:

I received the proposed affidavit this afternoon and have
^{and edited} reviewed it. It covers the situation very well but I have one
suggestion to make. In No. 2. you may wish to add that
I am adjunct professor of ecology State Univ. of New York
at Albany and Senior Research Associate ^(ecologist) Atmospheric Science
Research Center at the above the university.

Sincerely,

COLORADO
STATE
UNIVERSITY

FORT COLLINS
COLORADO
80521

department of range science

November 11, 1971

Dr. Frank C. Craighead
Box 156
Moose, Wyoming 83012

Dear Dr. Craighead:

Enclosed you will find a copy of the recommendations made by our Advisory Committee on September 29, 1971 at Billings.

Would you please read these for accuracy and content. If they do not precisely express the views of the committee then we should indeed change them. If they are, however, accurate and in your opinion in context with the motions passed at our meeting they should be approved. I am going to hold these recommendations until Monday, the 21st. If there is no cause to change these and resubmit them to the committee they will be sent to Mr. Burton Wilcox, Director of the Bureau of Land Management in Washington, D.C.

With kindest personal regards, I am

Sincerely,



C. Wayne Cook, Head
Range Science Department
CWC/ld
Encl.



November 15, 1971

Dr. C. Wayne Cook
Range Science Department
Colorado State University
Fort Collins, Colorado 80521

Dear Wayne,

I've just received a copy of the recommendations made by our advisory committee. I've read over these recommendations and they are to my knowledge accurate and in context with the motions passed at our meeting in Billings. I approve of them as they are without further change.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF ANTHROPOLOGY

SANTA BARBARA, CALIFORNIA 93106

October 29, 1971

Professor Craighead:

I have only recently become aware of your important and ambitious research concerning the behavior of the Grizzly Bear. Enclosed is a copy of a slightly presumptuous, short paper concerning the unfortunately extinct California species. I thought you might be interested.

Sincerely,

Jack Stuster.

Jack Stuster

November 15, 1971

Jack Stuster
Department of Anthropology
University of California
Santa Barbara, California 93106

Dear Jack,

Thanks for your paper on the California Grizzly. I am delighted to have it for my files. I am sending you a copy of one of our recent papers on the grizzly published in BioScience. I have quite a few others on the radiotracking of grizzlies and some on age determination and reproduction. If you are interested I will send you copies.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 16, 1971

Mr. Laurence R. Reno
Reno and Judd, Attorneys at Law
616 Metropolitan Building
Denver, Colorado 80202

Dear Mr. Reno:

I received the proposed affidavit this afternoon and have reviewed and edited it. It covers the situation very well but I have one suggestion to make. In No. 1 you may wish to add that I am adjunct professor of ecology, State University of New York at Albany and senior research associate (ecologist), Atmospheric Science Research Center at the above University.

Sincerely,

Frank Craighead

FCC/es

November 12, 1971

Dr. John Craighead
Montana Coop. Wildlife Research Unit
University of Montana
Missoula, Montana 59801

Dear John,

I sent the grizzly bear lecture film over to you via Jeff Heart. You said you wanted it between Nov. 7 and 15th. I will be coming over to Missoula on the 18th and 19th and will plan to pick it up as I will need it over here soon after this date.

I would appreciate it if you would forward either all mail addressed jointly to you and to me or else send me copies of the correspondence. I've been doing and will plan to do the same. Do to the fact that we have transferred most of our telemetry work to the University it is only logical to assume that most of the correspondence is now being directed to the university rather than to me here at Moose. At any rate whenever you receive letters addressed jointly I will appreciate a copy.

Regards,

Frank

FCC,Jr/mh

November 12, 1971

R. Gary Larsen, President
Programs Incorporated
65 East 400 South
Suite 210
Salt Lake City, Utah 84111

Dear Mr. Larsen,

I would appreciate it if you would send me a prospectus
of your Jackson Hole Cable Tele Communications stock.
Thank you.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 12, 1971

Department of Wildlife Technology
Montana State University
Bozeman, Montana

Gentlemen,

Would you please send me a copy of the book "Seasonal Food Habits of the Black Bear In The Whitefish Range of Northwestern Montana" by Edward L. Tish. I believe this was published in 1961. If there is a cost please bill me at the above address. Thank you.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 12, 1971

Colorado Cooperative Wildlife Research Unit
Colorado State University
Fort Collins, Colorado

Gentlemen,

I would appreciate it if you would send me a copy of
"A Literature Review On Black Bear Populations and Activities"
by Olin E. Bray and Victor G. Barnes, June 1967. Thank you.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 12, 1971

Peter Seligman
R.P.O. 5525
Rutgers University
New Brunswick, New Jersey

Dear Pete,

I received your letter as well as the information on insecticides. I will get this typed and send you a copy.

I was sorry to learn that you had picked up mono and are so far behind in your work. John's daughter, Karen came down with the same debilitating disease soon after she completed the hiking trip around Yellowstone. Charlie got it in highschool following the wrestling season and I picked it up while I was in the Navy. Looks like you are in fairly good company.

I wrote the Wyoming Game and Fish Commission on an eagle study and they indicated that they would be making a winter census not a nesting census. I've now roughed out a proposal for a combination raptor study micro-wave transmitter development project. I will go over this with people at the University of ~~Montana~~ submit it for comment to the State University of New York and eventually send it in to NSF. When I get it in final form I will send you a copy.

Regards,

Frank

FCC,Jr/mh

November 12, 1971

Steve Johnson
2023 East Spring
Tucson, Arizona 85719

Dear Steve,

It looks like we will be home during most of the Christmas Holidays. The kids will be coming back from school and we have a number of guests that will be spending some time with us.

I would be delighted to see some of your photographs so why don't you give me a call when you get to Jackson and we'll arrange to get together some evening and perhaps we can go out photographing or skiing.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

2023 E. Spring
Tucson, Arizona 85719
November 3, 1971

Dr. Frank Craighead
Environmental Research Institute
P. O. Box 156
Moose, Wyoming

Dear Dr. Craighead,

Thank you for the loan of the two Naturalist issues.
They were of much interest to me.

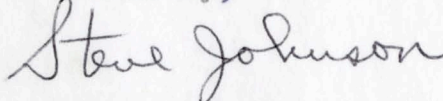
Enclosed also are four black and white prints showing
the fishing methods of a Brown Bear. While the indi-
vidual pictures themselves are not outstanding, the series
they make is very typical of the bear. I would have
enlarged them more, but I'm sure you have lots of bear
pictures already.

My wife and I are planning to visit the Grand Tetons
sometime around Christmas. We have never had an opportu-
nity to photograph the wildlife of the Jackson Hole
area.

I would like to show you some of the many slides I have
of the Pack Creek Bear Refuge on Admiralty Island.
Since our schedule is somewhat flexible at this point,
when will you be in Moose? (Our vacation begins
December 18, and ends on January 2.)

Please let us know when would be most convenient.

Sincerely,



Steve Johnson

P. S. Do you have a copy of the Grizzly article that
appeared recently in Bioscience? I took notes on it
this past summer, but would like to have a copy, if
possible. Enclosed is a stamped, self-addressed envelope.

November 12, 1971

Mr. Bill Craighead
Box 306
Newtown, Pennsylvania 18940

Dear Bill,

Lawrence R. Reno, attorney at law, is taking on the Teton River Dam case. His address is 616 Metropolitan Building, Denver, Colorado 80202. He has been trying to get in touch with you unsuccessfully. Would you give him a collect phone call at area code 303-255-4831.

Sincerely,

Frank

FCC,Jr/mh

November 12, 1971

Superintendent of Documents
Washington, D.C.

Gentlemen,

Would you please send me pamphlet No. 18 "Your Retirement System"-Federal Civil Service Retirement Law. Please bill at the above address. Thank you.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 12, 1971

Dr. Mel Griffiths
Colorado Seminary
University of Denver
Department of Geology
University Park
Denver, Colorado 80210

Dear Mel,

Thanks for the information about the Explorer's Club meeting November 23. I will not be able to attend due to a previous engagement but hope that I can be present at a future meeting. Thankyou.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

November 12, 1971

Ron Smith
Box 21021
Salt Lake City, Utah 84121

Dear Ron,

Early next week I am leaving for the Dude Rancher's Convention at Missoula, Montana. I'll probably be back around the 21st. From this date to until the first week in December I will be in and around Moose. From about December 5th to 12th I'll be in Colorado Springs. After this I will remain around Moose through the first of the year.

If you get a chance to get up here I would enjoy seeing you. We would be glad to have you stay with us.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh



UTAH STATE UNIVERSITY · LOGAN, UTAH 84321

COLLEGE OF NATURAL RESOURCES

DEPARTMENT OF
WILDLIFE RESOURCES

November 9, 1971

Mr. Frank Craighead
Moose, Wyoming

Dear Frank:

I appreciate your letting my behavior class see your splendid film on grizzly bears in Yellowstone. The photography is superb as well as the total story which it gives. I was particularly interested in the four musketeers and the fact that four single cubs would form this kind of strong tie between themselves. I can certainly see its adaptiveness against larger bears. So far we don't seem to have this kind of collaboration at McNeil River but we shall certainly look for it. I hope that in the publications that you are working on now you will discuss this role of joining of cubs from two or more litters in a cooperative way and whether they are always of the same age group or whether the cubs of two different years might even collaborate.

Sincerely yours,

A handwritten signature in blue ink, appearing to be "Al".

Allen W. Stokes

AWS:tpk

November 15, 1971

Dr. Allen W. Stokes
Department of Wildlife Resources
Utah State University
Utah 84321

Dear Allen,

I was glad to hear that you enjoyed seeing the grizzly bear lecture film. In the course of our studies we have gathered quite a bit of information on the behavior of grizzly bears. Some of this will appear in a paper on Grizzly Bear Pre-hibernation and Denning but much of it still has not been prepared in manuscript form. I'd be glad to discuss the subject with you the next time I come to Logan. I had planned to call you on my last visit but we left a day earlier than anticipated.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

Send to
Frank C.



August 27, 1971

News Bureau
Montana State University
Missoula, Montana 59801

Gentlemen:

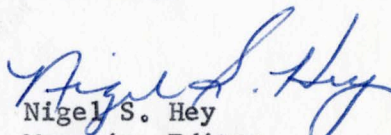
I am following up on my letter of June 29 to ask again whether you have photographs that would be of use for our forthcoming juvenile book "Science Watches Wildlife." The publisher, G. P. Putnam's Sons, is expecting material from us soon; thus we are renewing our efforts to find new and interesting photos for this volume.

We are interested in good black and white photos illustrating scientific studies of animal migration, physiology, intelligence, general behavior, ecology and census -- plus supporting verbal information. You would of course be credited for any material used.

I'm particularly interested in photos of Frank Graghead's work with wildlife, if these are available.

Thanking you for your assistance, I remain,

Sincerely,


Nigel S. Hey
Managing Editor

NSH:mg

October 22, 1971

Mr. Paul Buser
Teton Village, Wyo. 83025

Dear Mr. Buser:

My husband is in Montana for about ten days and his secretary is in hunting camp, so I have taken over some of the correspondence--to the extent that I can.

I can tell you who to write to about cougars: Dr. Maurice Hornocker, Leader Idaho Cooperative Research Unit, University of Idaho, Moscow, Idaho. He has made intensive and extensive studies of the cougar and would be able to answer questions and send you reprints of his work.

I know Frank will be happy to meet you and talk with you about matters of common interest. If you are near Moose some day, give a call or drop in. Or if you fail to get together before ski season, he'll look you up then at Teton Village.

Sincerely,

(Mrs. Frank Craighead)

Paul
Buser
Teton-
Village.



"WHISKEY SMUGGLERS CAUGHT WITH THE GOODS" by Charles M. Russell 1913

oct.17th 71

Dear Dr. Craighead,

I have recently moved to Wyoming. In the past while I was President of a substantial corporation in New Jersey I devoted my spare-time for wildlife-conservation causes in particular against predator-control activities. I decided to give up my business-career and I will now be working voluntarily for "Defenders of Wildlife" in the Rocky Mountain area, apart from my own programs. I have extensively read of your research on Bears and since I am especially interested in cougar I wonder whether you have in the past done research "on marauding cougars" such as whether such females for example teaches her young to kill livestock.

Apparently very little if anything has been written on the subject. If you have not done studies of this nature in the past do you contemplate undertaking them in the future providing the necessary funding would be made available and if so what amounts of funding will be necessary.

I thought you would be interested to know that I am also a member of the "Explorers Club" where I saw your name in the membership list. Now with my arrival in this beautiful area Wyoming "claims" 3 members of that Club, hardly enough to start a chapter!

I look forward hearing from you and hope to have the opportunity of meeting you sometime in the near future.

Sincerely yours

Paul Buser

August 25, 1971

Marian Jenkins
Montana Cooperative Wildlife Research Unit
University of Montana
Missoula, Montana

Dear Marian,

Would it be possible to send me a few copies of the memorandum of understanding on the grizzly bear research? I want the one which has section 3...mentions that we cannot publish without the approval of the director of the Bureau of Sports Fisheries and Wildlife and also contains number 11, that no member of or delegate to congress or resident commissioner etc. I would like to send one of these back to the State University of New York and perhaps distribute a few others. The people I have so far talk to concerning this have been flabbergasted and unable to believe that such an agreement would be forced upon us. Thanks. See you soon.

Sincerely,

Frank

September 8, 1971

Dear John,

If you have additional correspondence on the revision of the survival book please send it on to me. I think that we should start thinking about this revision and decide just what we want to do.

I have looked over our negatives and some photographs and I could go ahead with having enlargements made for incorporation in the revised text.

Is there any agreement yet as to whether we will pay for the illustrations or will we be reimbursed for this?

Am progressing slowly on the National Geographic black bear article and the telemetry paper.

Regards,

Frank

September 8, 1971

Montana Coop. Wildlife Research Unit
University of Montana
Missoula, Montana 59801

Dear Bart, Joel, Marian et. al:

I can't keep up with correspondence so I've been slow to write and let you know that I received copies of the NSF report. I got a short but nice reply from NSF. The purpose of this letter is just to thank all of you and to let you know that I think you did an excellent job in working up and assembling this report. I appreciate all of the effort and time that went into it.

If there are additional copies save me a few and I'll pick them up when I get over to Missoula. Thank you.

Sincerely,

Frank

FCC,Jr/mh

October 12, 1971

Dear Malinda and Yvon,

Thanks for the pictures. We all enjoyed them. Charlie and Janaa came home from Logan for the last weekend so they had a chance to see them right away.

Frank has been busy with meetings and field trips--is over in Cody at the moment so I'm trying to help catch up on correspondence.

He hasn't been on the Gunnison, but there must be some people at the College there who have. The trip sounds great and I wish some of us could come along.

Hope you'll be back here again before long and that I'll have a chance to get better acquainted.

Sincerely,

Malinda & Yvon

Dear Grigheads -

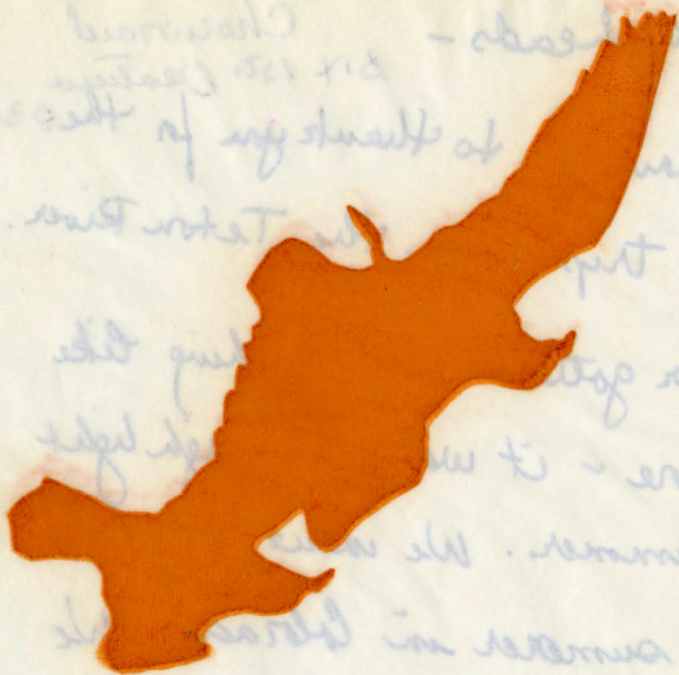
Chouinard
Box 150 Ventura
93001

I wanted to thank you for the

fantastic trip down the Teton River.

I've never gotten to do anything like that before - it was the high light of our summer. We want to float all next summer in Colorado! We thought ~~we~~ might try inner tubing the Black Canyon of the Gunnison. No one has told us if its possible - I hope so the fishing is incredible and so is the climbing. If you know anything about that river, like it would be suicide let us know. If you - any of you would like to give it a try let us know and it will be on for sure - we could trade our climbing knowledge for your river guidance. Thank you so much.

Malinda & Yvon



P.S. I enclosed any picture
we couldn't use - thought
you might be able to.

Answered earlier

ROD RUTH
620 VINE AVENUE
PARK RIDGE, ILL. 60068

Sept 25 1941

Dear Esther —

When Janet La Salle returned from Jackson Hole she said she had told you I'd send along an Alligoto book. I fully intended to do so, but it slipped my mind.

Tonight, watching GRIZZLY and all the Craigheads on T.V. (I'd like to see it once a week at least!) I was reminded of Janet's promise. This time I'll not procrastinate.

This time watching GRIZZLY I made some quadraction sketches which may prove useful in a book I am illustrating called Glacier Grizzly (Glacier Park) by John May who wrote Alligoto Hole. I have many books + photos of Grizzlies + have have studied them at our two zoos and the one in Milwaukee — but something about the wild free action of your bears on TV is far more exciting than all my other data. I hope I can get a touch of that into the book.

I was most interested to see your father-in-law on your alter TV. Special and learn of his connection with the Everglades.

Many joins me in very best wishes to you and Frank, to Margaret + John and to all your marvelous children.

Rod Ruth

October 12, 1971

Mrs. Ede Schenkel
3859 G Miramar Street
La Jolla, San Diego, Calif.

Dear Mrs. Schenkel:

In my husband's absence (at a meeting of the Wild Horse Committee, which is trying to protect the wild horses and their range) I am answering some of his mail. We both thank you for your lovely letter of Sept. 25 and hope, too, that you can eventually move to a less-inhabited environment.

I guess we can all do only small things, like writing letters, but they will help.

Sincerely yours,

(Mrs Frank Craighead)

3859 El Miramar St.
LA JOLLA, SAN DIEGO
Sept 25, 1971

Dear FRANK AND JOHN CRAIGHEAD,

I have just viewed
a television special about
you and "your" grizzlies.
I can not describe the
feelings I have for you
and the subjects of
your research — a mixture
of awe, love, and
sadness to the point
of tears. I find
myself increasingly
deeply disturbed by
the exploitation of this

earth, (our mother to me.)
So, here, from the intensity
of my feelings I am
prompted to communicate
to you my support,
hope and prayers that
there will be many
more people such as
you so that we may
rescue our vanishing
wilderness brothers.

I was born and
grew up on a farm
in Montana near
Yellowstone. Now, here,
I am miles and

ages removed. Here, amid
Track homes and concrete,
I mourn the loss. My
link to that lost world
includes pet rats, a dog,
and ground squirrels
who scurry as I
bicycle to class on
the U. C. Campus,
San Diego.

When my husband
finishes medical school
here, we hope to move
away from here, places
like here, to a place
where we can be a

a part of Life, nature —
as Robinson Jeffers
put it "... not man
apart."

But moving will not
ease my conscience nor
solve the problem of
the cancer spreading
across our globe.

But I ask, what
can I do?

God bless,

Ede Schenkel

October 12, 1971

Mrs. Leo D. Roberts
PO Box 1365
Rancho Santa Fe, Calif. 92067

Dear Mrs. Roberts:

Thank you very much for your letter of September 25
remarking about the Gizzly film on television.

None of the bears has minded the collar--it is sort
of like putting a collar on a dog: they might
scratch at it a minute but very soon become accustomed
to it. And it is no more hazardous to them than a
dog collar is to a dog.

I am glad to know of your interest in wild animals and
hope it will continue.

Sincerely yours,

Frank Craighead

Rancho Santa Fe, Calif.
Sept 25, 1971The Drs' Craig head
of National Geographic Magazine -

Have just viewed the film
on the Brazzilian television, and
would like to know why such a
powerful animal ~~does~~ does not
tear the transistor collar off around
his neck in a year's time, also
if it could be a hazard for him
by catching on something. I highly
approve of this entire procedure,
and look at all the wild animal
films possible, but the layman
is in ignorance on many points!

Thank you.

Mrs. Geo. D. Roberts PO Box 1365 Rancho Santa Fe, Calif. 92067.

an example -

We also wrote Martin Perkins
asking why a cougar was
hunted with dogs, traps, and
lascod instead of being tranquilized.
So now we know.

October 15, 1971

Mr. Nigel S. Hey
Managing Editor
Photo Books of Science
2618 Aspen Avenue Northwest
Albuquerque, New Mexico 87104

Dear Mr. Hey:

Dr. Craighead has been away periodically on trips throughout the summer and fall. There is a great deal of accumulated correspondence that he has been unable to attend to. Perhaps your letter of June 29 is included in this category.

Dr. Craighead has in his files most of the type of pictures that you are requesting. However, the majority of these are in color, not black and white. In most instances where black and white are needed, we have had black and white negatives made from the color transparencies. I will bring your letter to Dr. Craighead's attention as soon as he returns from a trip to Logan, Utah. Perhaps you could inform me of just how much information you would need and what he might expect in the way of payment or reimbursement for the pictures. I know that he would only want to provide one-time publication rights with the understanding that he can use the photographs in any way he sees fit in the future.

Sincerely,

Mary Hutz, Secretary

JON A. JOURDONNAIS, D.D.S., M.S.D.

ORTHODONTIST

2511 6TH AVENUE SOUTH, DENTAL PARK, GREAT FALLS, MONTANA 59401

454-1101

September 15, 1971

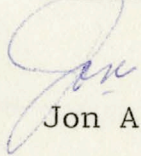
Dr. Frank Craighead
Environmental Research Institute
Moose, Wyoming

Dear Dr. Craighead,

Thank you for your confirmation letter regarding the Rocky Mountain Society meeting at Teton Village September 26th. The dinner will begin at 7:30 Sunday evening and will be a buffet. Please let me know what projection equipment you will require as soon as you have decided on your planned program. As I recall, you were undecided as to the movie or a slide sequence. I will be in Teton Village on Thursday and will have ample time to visit with you prior to Sunday evening.

I am looking forward to our visit to Jackson Hole country again and hope everthing is going well with you and your family.

Sincerely,



Jon A. Jourdonnais D.D.S. M.S.D.

JAJ/sh

*Mr Elwood Berkeley
P.O. Box 1481
Pompano Beach
Fla. 33061*

October 6, 1971

Dear Elwood,

I was delighted to receive your very fine letter bringing me somewhat up to date on your activities and inquiring about our family and mutual friends.

I am sending a copy of your letter on to John in Missoula, Montana; to Morgan Berthrong; and also to my father in Homestead, Florida. I have told him that you might drop by to say hello one of these days.

I am now living and working permanently in Moose, Wyoming, though I am attached as Professor of Ecology at the State University of New York at Albany. About a year ago while visiting the campus, I got a call from Gates Slattery. I was out at the time but wrote Gates a letter when I returned home. I am hoping to see him the next time I go to Albany. I have just looked for his address, but have not turned it up. I will send it on to you when I find it.

One of Morgan's daughters, Mary, spent a winter with us here. She is about the same age as my daughter Jana, who is just now starting to college. My oldest son, Lance, is out of college and is in the Fiji Islands. The next youngest boy is finishing up his schooling at the State University of Utah at Logan.

My father's address is: Frank C. Craighead, Sr., Box 825 Homestead, Florida. Morgan's address is: Dr. Morgan Berthrong, 9 Cragmore, Colorado Springs, Colorado.

We enjoy living here at the base of the Teton Mountains. It is lovely country and the winters are particularly beautiful even though the temperatures drop low and the snow is quite deep. We generally get snow depths that reach to the eaves of the roof. However, it is easy to travel back and forth to our automobiles by means of snowmobiles.

If I get down your way I'll be sure to get in touch with you; and please do the same if by any chance you should get out into this Jackson Hole country of Wyoming.

I hope all is going well for you. Drop me a line again when you get time. I recently came across pictures of you, Jack

Higgins, John and myself taken after running a relay for
E.V. Brown. If I can find a negative I'll send you a copy.

Regards,

Frank Craighead

August 31, 1971

Dr. Jon A. Jourdonnais
2511 6th Ave. South
Great Falls, Montana

Dear Dr. Jourdonnais,

I am planning to meet with your group September 26th at Teton Village and will either show a movie on the grizzly bear or give a slide lecture on bio-telemetry research with grizzly bear, black bear and elk.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

Note: Agreed to \$150.00 honorarium

June 5, 1971

Dr. Charles L. Taylor
Associate Professor
Department of Meteorology
Naval Post Graduate School
Monterey, California 93940

Dear Charles,

We have submitted four different manuscripts for publication on the tracking and monitoring of animals from satellite. At the present time this copy of one of the manuscripts is all that I can send you. This has been somewhat shortened over the original but I think may serve your purpose. I will send you reprints as the articles are published.

We hope to monitor another bear den via satellite in Yellowstone Park this coming winter.

Sincerely,

Frank C. Craighead, Jr.

FCC, Jr.;mh

June 5, 1971

June 5, 1971

Mr. A. Heaton Underhill
Assistant Director for State Grants and Resource Studies

Associate Professor
Department of Meteorology
Naval Post Graduate School
Monterey, California 93940

Dear Charles,

We have submitted four different manuscripts for publication on the tracking and monitoring of animals from satellites. At the present time this copy of one of the manuscripts is all that I can send you. This has been somewhat shortened over the original but I think may serve your purpose. I will send you reprints as the articles are published.

We hope to monitor another bear den via satellite in Yellowstone Park this coming winter.

Sincerely,

Frank C. Grignani, Jr.

FCC, Jr.:mh

June 5, 1971

Mr. Ron Smith
P.O. Box 21021
Salt Lake City, Utah 84121

Dear Ron,

I suppose I should address this letter to Shelia as I doubt if you will be reading it. I plan to send some sport-yak pictures into the Gander Mountain company but I would like to know the name of someone there to whom I could address a letter. I have pictures showing the useses of sport-yaks that I thought they might like to have. If you do not have this information perhaps Bill Belknap will.

Hope to soon talk to you about your trip to the Blue Nile. I am slowly shaping up plans for rafting some unusual foreign river-would like to discuss it with you. I'll look you up next time I come to Salt Lake. Have a good summer on the Colorado.

Regards,

Frank C. Craighead, Jr.

FCC,Jr.;mh

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA - 93940

IN REPLY REFER TO:

26 April 1971

Dr. Frank C. Craighead, Jr.
Box 156
Moose, Wyoming

Dear Frank:

I would like to request from you a copy of a reference to your work concerning the instrumenting of elk and the collection of data through the Nimbus Satellite system.

I certainly enjoyed my week in Yellowstone in January, and might get up there this summer. If you can come by Monterey at any time, please let me know.

Sincerely,



Charles L. Taylor
Associate Professor
Dept. of Meteorology

June 11, 1971

Dr. Allen W. Stokes
Utah State University
Logan, Utah 84321

Dear Al,

Thanks for the invitation to attend the Animal Behavior Society meetings. I would very much like to have attended but I have meetings June 15 and 16 that cannot be postponed.

I will look forward to getting together with you at some other time, either here in Jackson or at Logan. It might be that we would find mutual interest where we could collaborate from time to time.

Sincerely,

Frank C. Craighead, Jr.

FCC, Jr;mh

June 29, 1971

Garrell E. Nicholes
4217 Coral Street
Salt Lake City, Utah 84117

Dear Garrell,

Under separate cover I'm sending you a copy of our survival book.

I'm also sending you information on our Environmental Research Institute and some of the popular publications put out by the National Geographic Society. If you are interested in our technical papers as well, please let me know and I will send some of these along.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh

Mr. Garrell E. Nicholes
4217 Coral Street
Salt Lake City, Utah 84117

June 14, 1971

Mr. Frank C. Craighead, Jr.
ENVIRONMENTAL RESEARCH INSTITUTE
P.O. Box 156
Moose, Wyoming 83012

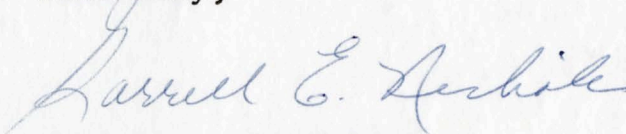
Dear Mr. Craighead:

Reed Rasmussen of Ski-Doo West discussed with me your unusual and interesting outdoor research activity. For the last three years, I have been working closely with Ski-Doo to help them in areas of consumer education and promotion. I was greatly interested in your focus on our environment.

The next few years will be critical in planning programs of conservation, use and education. Any information you can send me concerning your activities would be most welcome. Could you tell me where I might obtain one of your survival manuals that Reed showed me the other day.

I hope someday to personally meet you and become more familiar with your programs.

Sincerely,

A handwritten signature in blue ink that reads "Garrell E. Nicholes". The signature is fluid and cursive, with the first name "Garrell" being more prominent.

Garrell E. Nicholes

GEN:jc

June 29, 1971

Dr. Robert Rasmussen
Department of Biology
Graduate Studies Committee
Humboldt State College
Arcada, California 95521

Dear Dr. Rasmussen,

Mr. Van G. Tribble has informed me that he is planning to take his graduate work at Humboldt State College. His main field of interest will be bio-geography and ecology. I was delighted to learn that Mr. Tribble is going ahead with these studies and will pursue this work at Humboldt State College.

I have known Van for a number of years and feel that he has the interest, motivation and background to do well in graduate work. On a number of occasions he has volunteered his help and services on research projects we have been conducting here in Jackson Hole, and has done a very good job. He has shown an unusual interest in learning and I would certainly recommend him for graduate work. If he goes ahead with this, I would be glad to give him assistance from time to time.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh

Ancho Drug

149 W. BRIDGE ST.

BLACKFOOT



Walgreen Agency

PHONE 785-0400

IDAHO 83221

June 7, 1971

Frank Craighead

Moose, Wyoming

Dear Sir:

I read about your presentation on the Grizzly Bear to the Upper Snake River Federal Executive Association and I am wondering if you could give your presentation to our Kiwanis Club.

Do you get up this far and if you can, do you think you could help us out during one of our Thursday noon meetings?

Our group is very interested in this type of thing and we would certainly enjoy hearing you.

Awaiting your reply, I remain

Sincerely yours,

Joseph G. Ancho
Program Chairman

June 30, 1971

Mr. Joseph G. Ancho
Program Chairman
Ancho Drug
149 W. Bridge Street
Blackfoot, Idaho 83221

Dear Mr. Ancho,

I'd be glad to talk to the Kiwanis Club about the grizzly bear and some of our other bio-telemetry research projects. The best time for doing this would be during winter as my summer and fall schedules are busy and I spend considerable time in the field. I usually request that my expenses be paid when making these presentations.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh

Star Route
Box 101
Morrison, Colorado 80465
June 25, 1971

Dr. Frank C. Craighead, Jr.
Moose, Wyoming

Dear Dr. Craighead:

I would appreciate a copy of the pamphlet "A Biological and Economic Evaluation of Coyote Predation" prepared by you for the New York Zoological Society & The Conservation Foundation. If you do not have this available, can you advise how I may obtain a copy. Also, if you have other material in the general area of predator control, management, poisoning, etc., I would be most interesting in receiving same.

Please bill me for any cost incurred here.

Sincerely yours,

David Sumner

David Sumner

June 30, 1971

David Sumner
Star Route
Box 101
Morrison, Colorado 80465

Dear David,

I am sending you a copy of "Coyote Predation" as requested as well as a paper on "The Ecology of Raptor Predation". A great deal more information on predation and birds of prey is contained in our book "Hawks, Owls And Wildlife", a paperback published by Dover Publications Inc. New York. The subtitle of this book is The Ecology of Raptor Predation and I think that you will find it of considerable interest.

Sincerely,

Frank C. Craighead, Jr.

FCC,Jr:mh

August 16, 1971

Mr. Trevor Greenwood
5622 Boden Street
Los Angeles, California 90016

Dear Trev,

Thanks for your nice letter of July 26 and also for the copy of the Grizzly Bear film. I showed the short grizzly film to the Teton Science School and then shipped it back to you. I imagine you've already received it. I've not yet had an opportunity to get a sound projector to look at the redwoods film but hope to do so within a few days. If you're in a hurry to get this back please let me know.

I've been working on river protection, have taken some stills and some movies so have not yet finished making comments on some of the survival material. I hope to get to it before too long.

We all enjoyed your visit here and hope to get together with you again before too long.

Sincerely,

Frank

FCC,Jr/mh

5622 Boden Street
Los Angeles, Calif. 90016

July 26, 1971

Dear Frank:

Just a short note to let you know that we're back in Los Angeles. Have made arrangements for the short version of the Grizzly film to be mailed to you this week. You should receive it sometime late next week I suspect.

Also, I've mailed to you a copy of The Redwoods, the film I did some time ago for the Sierra Club. I'm afraid the print is pretty washed out and the color isn't too good but it's the only print I could obtain right now. Anyway, it'll give you an idea of the approach I was telling you about. If you can, project the film with a large screen size, it looks better that way!

Also, have made arrangements for you to receive a copy of the Whole Earth Catalog. That should reach you in a couple of weeks. Will also send a copy of the Dolphin book I mentioned to you, but am having difficulty finding my copy.

Want to thank you and your family for all the hospitality you showed us. We had a tremendous time up in the Tetons, certainly the best vacation we've had in a very long time. We all enjoyed it immensely and were sorry that we had to leave.

Being back in Los Angeles is a real come down. I'm still having trouble adjusting. I learned a lot being in Moose. Certainly, some of the things I need to incorporate into my own life I found in Wyoming.

I hope we can keep in touch. Best wishes from us all, to you, Esther, Charlie and Janna. Regards to John, Margaret and Karen.....

Sincerely,

Levi, Jean, & David

September 8, 1971

Trevor Greenwood
5622 Boden Street
Los Angeles, California 90016

Dear Trev,

Several nights ago I had the first opportunity to obtain a sound projector. I ran your picture on the Redwoods and thought it was an excellent presentation- quite simply done, appealing and it got the message across.

Several days later Karen, Derek and some of their friends also viewed the movie and were quite impressed by it. I haven't as yet gotten around to doing any sorting or editing on the movies but perhaps will find time winter.

Thanks for sending the movie film and also for the Whole Earth Catalog. We have missed you and your family since you left and hope that you will soon get another opportunity to spend some time here in Jackson Hole.

Regards,

Frank

FCC,Jr/mh

ROUTING SLIP

STATE UNIVERSITY OF NEW YORK AT ALBANY

DATE:

7/26/71

FROM:

Mary L. Hewitt - ASRC

TO:

Dr. Frank Craighead ^{Outpost}

COMMENTS:

Can you help this woman?
I can't find such a report
in Yellowstone Report 5.

ACTION:

- _____ Initial and pass to next person
- _____ Please note and return
- _____ Appropriate action
- _____ Keep for your files

Rt. 2 Box 17

Tidewater, Ore. 97390

July 7, 1971

Atmospheric Sciences Research Center
State University of New York
Albany, New York

Gentlemen:

I am interested in obtaining a document you have in your files. This is your publication no. 31:39-46. "A Biotelemetry System for Elk, Yellowstone Field Expedition V." by F.C. & J.J. Craighead (1965). Would you please send me a copy of this as soon as possible, as I need it for immediate research. If there is a charge please bill me.

Very truly yours,

L. Hughes

(Mrs.) Larry Hughes

*Mail reprint
to*

*Send reprint
Sept 8 '71*

RECEIVED SEP 7 1971

Clare

Klaus Bung
c/o B Luther
4048 Ledgewood, Apt 13
Cincinnati, Ohio 45229

→ The Secretary
United States Naval Institute
Annapolis
Maryland

29 August 1971

Dear Sir

On p 318 of your publication 'How to survive on land and sea',
you mention a 'lightweight Army jungle hammock with mosquito net
sidewalls'

I am at present preparing ~~x~~ for a one-man expedition to South America
and am most anxious to purchase the above piece of equipment. Would
you be kind enough to inform me where it can be obtained and how much
it costs? If it is available from you would you please send me one
such hammock immediately, and I shall send you a cheque by return of
post

I look forward to hearing from you

Yours sincerely

Klaus Bung

*Fran - suggest you give him the
author's address.
B*

*Fran,
Cheque ok. J. 102*

September 16, 1971

Klaus Bung
c/o B. Luther
4048 Ledgewood apt. 13
Cincinnati, Ohio 45229

Dear Klaus,

The Naval Institute forwarded your letter of 29 August to see if I could answer your question. The light weight jungle hammocks that we mentioned in the book "How To Survive On Land And Sea" were military issue. You might be able to pick up one of these at an Army Surplus depot or at an Army Surplus store. They were available some years ago. Good Luck.

Sincerely,

Frank C. Craighead Jr.

Fcc,Jr/mh

Nebraska Wesleyan University

FOUNDED 1887



LINCOLN,
NEBRASKA
68504

September 17, 1971

Dr. Frank Craighead, Jr.
Environmental Research Institute
Box 156
Moose, Wyoming 83012

Dear Dr. Craighead:

This is a follow-up letter concerning our discussion by telephone on Wednesday of this week. As stated in that conversation, we would be delighted to have you speak at our convocation on November 19, 1971. This is a school convocation, intended for the benefit of our students and hence would be attended primarily by them. Our general theme for this semester's convocations is entitled, "Where is America going?" The convocation is held at 10:00 a.m. that Friday in our auditorium, which seats 1200. During the 11:00 hour, it is the customary procedure to move to another location and talk informally with students who may want to ask questions. It would be possible to use 16MM, as a rear screen projector can be used with a screen on the stage of the auditorium.

In addition to speaking at the convocation, we would want you to speak two times the day before to our biology majors and other interested people. The usual procedure is to hold a 3:00 p.m. and an 8:00 p.m. lecture. This would be held in a smaller auditorium, where audio-visual equipment is easily used. Thus, if you can arrange to come, you would be involved for two days, November 18th and 19th, beginning in the afternoon on Thursday, and finishing in the afternoon on Friday. You would receive \$300.00 honorarium plus travel and accommodation expenses.

I feel that your work with radio transmitters would demonstrate modern approaches to the study of large wild animals and how data retrieved is useful to man in order that he can co-exist with these large animals. The question which I feel is relevant to this general theme and pertinent to all Americans is--Will there be room for the grizzly, elk, moose, etc. in America, and if not, what will we have lost?

I sincerely hope that you can come and share with us some of your fascinating research. The area of conservation and management of big game animals is one which I feel the public is just awakening too, and realizing that ecology involves more than picking up tin cans.

Sincerely yours,

A handwritten signature in blue ink that reads "Glen E. Dappen".

Glen E. Dappen

September 24, 1971

Dr. Glen E. Dappen
Nebraska Wesleyan University
Lincoln, Nebraska 68504

Dear Dr. Dappen,

Since our phone conversation I scrutinized my schedule and went over the work plan for the next couple of months. I was hopeful that I could arrange a trip to Nebraska Wesleyan University to talk to your students on wildlife research emphasizing biotelemetry. This would follow the theme "Where Is America Going?" I even went so far as to sort slides and organize material on the subject. However, I am reluctant to state that I eventually realized that it was unrealistic for me to try to make this trip. at this time. I just must say "No". I greatly appreciate the invitation to speak at the convocation and hope that I might be able to lecture to your student body at some future date.

Sincerely,

Frank C. Craighead Jr.

FCC,Jr/mh

September 24, 1971

Mr. Jeff Webster
957 East Holiday
Pocatello, Idaho

Dear Jeff,

I had a short but nice visit with Bill Sharfman and his wife when they dropped by the cabin a few days ago. Bill said that you are in the process of moving so I hope that this letter reaches you. I've been giving some thought to various publications since I last talked with you. I have a number of things in mind that I would like to explore further. Perhaps we can get together and see if any of them are worth pursuing. The next time I drive to Idaho Falls I'll try to come on to Pocatello, but will give you a call in advance. If your'e going to be up this way let me know and I will arrange my schedule to get together with you.

Regards,

Frank

FCC,Jr/mh

THE HOWELL CO.

DIVISION OF INTERLAKE, INC.



ST. CHARLES, ILL. 60174 • (312) 584-0094

September 13, 1971
P.O. Box 1481
Pompano Beach
Florida 33061

Dear Frank and John:

I intended to write to you, as
new T.V. Stars, several years ago when
your co-star "Goose" Berthong appeared
with you in the drama of the
Colorado River boat adventures, the
emergency appendectomy, etc.

Seeing you together with Morgan
brought back happy memories of the
childhood days in Chevy Chase. We
were budding ecologists then, as we
saw to it that neighborhood cherry and
apple trees were never overburdened
with fruit.



Frank's wrestling match with Lance on the "Grizzly" show reminded me immediately of the wrestling in the back yard on 41st Street, when often even your Dad joined in. ("Grizzly" show just over on T.V.)

I next recalled the fights with the "tough guys" from Tenley Town and how we'd pair-off and have at it, from the Chevy Chase playground all the way up past Gates Slattery's house.

My wife just marveled at your likeness to each other and how I could recognize you separately instantly by voice as well as by face. (I could separate you as kids a block away when you ran, because you ran differently.)

I recall also that as youths, even



through high school you gave ~~no~~ look,
no time to the girls. But when you
finally selected, how well you did! The
children also are, handsome and healthy
and living in a wonderful home and
surrounding environment. How fortunate they
are! I'm sure that the millions of
T.V. viewers regardless of age or station,
admire and perhaps envy your life.
Remembering the old days around Seneca and
your Dad's influence toward the outdoors,
I'm not surprised that this is your life, and
I'm terribly pleased that the twins are
living it this way.

I live in Pompano Beach, Florida and
as a representative for several manufacturers
of furniture, travel frequently across the Everglades
on "Alligator Alley." I recall that your father

THE HOWELL CO.

DIVISION OF INTERLAKE, INC.



ST. CHARLES, ILL. 60174 • (312) 584-0094

had retired to live in an area of the Everglades.

If you would consider sending me his address, I'd love to pay him a short visit while on one of my trips to the west coast of Florida.

It was great to see you again on T.V.
Please stay nimble around those bears.

As ever,

Elwood Berkeley

P.S. Re some of our classmates, be sure to tell Morgan that Billy Monoran is in the retail liquor business in D.C., Bill Shelton has a Ford agency in Bethesda, Md., Paul Borden retired as a navy ^{Captain} ~~Commander~~ and lives near Annapolis, Robert Camelier retired from the Agriculture Department and is living in Florida, Nick Higgins is a dentist, and Dorothy Rice had six kids! Jean Apple (appel) and I were classmates at Oberlin.

Elwood Berkeley
P.O. Box 1481
Pompano Beach, Fla.
33061

INTRODUCING SIMULTANEOUSLY FOR THE FIRST TIME ANYWHERE, TWO EMERGING FORMS OF POLLUTION WHICH, WE FEAR, HAVE UNLIMITED POSSIBILITIES. ONE IS SOIL POLLUTION:

In the good old days, when the cattle did roam and the deer and the antelope played, most everybody manifested an earthy appreciation for a load of manure. Today, however, livestock in some Midwest states are fattened for market in feedlots with densities running as high as 130,000 cattle on a 50-acre plot. Indeed, as Ohio State agricultural engineer E. Paul Taiganides has noted, an exemplary environment has been created for the care and nurture of the "front end" of livestock. "But the other end of the animal," says Dr. Taiganides, "was either forgotten or not fully considered in the early designs of automated production units." And what an oversight. Indelicate but impossible for environmentalists to ignore is our annual accumulation of one billion tons of animal manures.

Where runoff control techniques are ignored or inadequate, agricultural wastes can cause frightful amounts of pollution. Tests by University of Iowa engineers, for example, determined that a creek in a sparsely populated rural area carried a pollution load into the Iowa River at one time last spring equivalent to that of 180,000 people. The engineers attributed this condition almost entirely to agricultural sources.

But livestock isn't even half of the soil pollution story. Consider, courtesy of Ohio State researchers, all of the other stuff that gets dumped into, or onto, the earth:

*Over 8 tons of crop residues and fruit and vegetable peelings for each family.

*Over 20 million tons of junked cars, plus numberless other tons of discarded machinery and tools.

*Untold millions of dead domestic and wild animals and birds, including 40 or 50 million chickens from commercial operations.

*150 million tons of garbage.

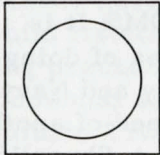
And if you think soil pollution is bad now, wait till the year 2000. Unless something truly brobdingnagian is done about those unholy twins--overpopulation and despoliation--there will be twice as many of us (let's not even think about pigs, cows and chickens!) defiling the good earth... AND THE OTHER EMERGING POLLUTION, THANKS TO AN INSATIABLE DEMAND FOR ENERGY, IS THERMAL: With the onrush of atoms for peace and all that, we're up to the same old technological game of being too late smart. To paraphrase Harry S. Truman, if you can't stand the heat, get out of the environment. For responsible experts are forecasting that by the year 2000 energy consumption in the U. S. will increase 6.7 times, and waste heat discharged from generating plants will increase 10 times. What are we going to do about controlling all of this? It is estimated that a full third of all this country's runoff will be needed merely to satisfy the cooling needs of the power industry.

The standard answer of A. E. C. spokesmen, as nearly as we have been able to divine, goes like this: "Yes, you do get a little heat in generating nuclear energy. But what about all of that pollution caused by fossil fuels?"

In most states, water quality standards have been established to provide for maximum temperatures and rates of temperature change in rivers and streams. But who is going to bet that such standards can be maintained as power demands keep rising? Indeed, the very fact of ever-increasing nuclear power facilities challenges the

William Houseman, Editor

The Environment Monthly

 3/70

A report for professionals—and concerned non-professionals—who need to know what is happening in the field of environmental design.

stability of any standard devised for today. At all events, any standard will be meaningless unless it is actually determined by environmental research that has scarcely got off the ground as yet. As Dr. Donald McDonald of the University of Iowa puts it, "The problem will not only require engineers and ecologists to work together in selecting sites for power installations. It will also call for sociologists, economists and urban and regional planners to devise a larger plan that will permit application of known principles of ecology."

HOLY MOSES: We sort of wish Robert Moses had the grace to keep his yap shut about environmentalists. Warning against the consequences of challenging "environmental Daniels just come to judgment," the architect of the world's worst world's fair recently vented his bottomless supply of spleen before the American Society of Civil Engineers. Mr. Moses fears that if we don't tone down the "crusade for instant environmental salvation from all the sins of too free enterprise and undisciplined industrial civilization... the entire subject is sure to get more and more deeply into politics and to end in cynicism and disappointment."

Where does Mr. Moses imagine the "entire subject" has been during the past half century? Right in the grip of lobbyists who have been beautifully rewarded for perpetrating environmental plunder through their machinations in every important seat of government.

The reason we wish Mr. Moses would shut up is not merely because he has been jawing dyspeptically for 60 years. Just when our free enterprisers are beginning to recognize the merits of environmental accountability, and just when our industrial civilization sees it had better discipline itself or die, Mr. Moses manifests his compulsion to show off again.

MAN-BOOMS AND GANG-BOOMS: It is said that Stanley Kubrick got the idea of doing Strangelove from reading Army and Navy periodicals. Let us plant the seed of another fantasy by quoting from William A. Shurcliff's slim and sober volume, S/S/T and Sonic Boom Handbook (Ballantine, 95 cents):

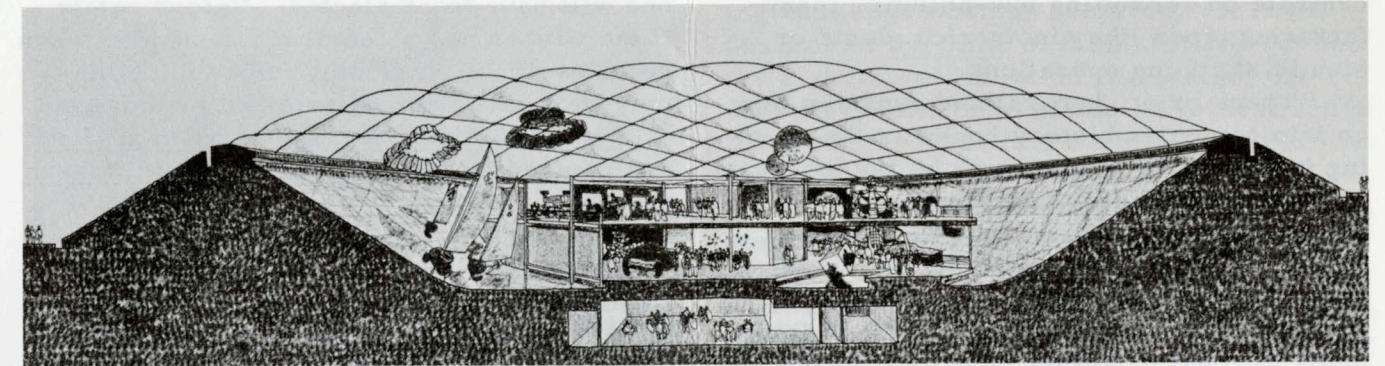
"Suppose the SST proponents' dreams come true: supersonic flight over land is permitted, the people of the world are prosperous and are willing to pay extra-high fares to travel by SST, and large numbers of SSTs are built and put into use. Specifically, suppose the U. S. S. R. sells 200 of its Tu-144 SSTs, the British and French sell 400 Concorde, and Boeing Co. sells 1,200 of its B-2707-300 SSTs (making about \$64 billion worth of SSTs in all). How much damage would these planes' boom do to buildings?

"No exact answer can be given, but a rough estimate can be made.... Suppose each of the 1,800 SSTs makes many trips a day, traveling 9,000 miles a day at supersonic speed. This makes a total of $(1800) \times (9000) = 16,200,000$ SST-supersonic miles a day. Let us assume that half of these miles--8,100,000--are over land. If the bang-zone width is 50 miles, the total number of square-mile-booms will be $(8,100,000) \times (50)$, or about 400,000,000.

"How much damage would these booms do to buildings? First, let us convert the square-mile-booms to man-booms. Then we can use the actual-damage-payments figure of \$600 per million man-booms, based on the major sonic boom tests.... If on the average there are 100 persons per square mile (which may be typical of much of the U. S. A. in 1990), the total number of man-booms per day will be $(400,000,000) \times (100) = 40,000,000,000$. At \$600 per million, this amounts to $(40,000) \times (\$600) = \$24,000,000$ damage per day."

Or, since Dr. Shurcliff stopped banging away at this point, \$8,760,000,000 per year. Pow.

CHARLES ABRAMS WAS A GREAT ENVIRONMENTALIST BEFORE THERE WERE SUCH PEOPLE: And with his death recently, this country lost the very personification of urban enlightenment. Nobody knew better that a slum is a felony committed by society against its own. Nobody knew better that a city, marshaling its best resources, can be the very core of civilization. If you would like to pay your respects to a terrific environmentalist and a fine man, we suggest that you read Charles Abrams' book, Man's Struggle for Shelter. Or if you have read it once, read it twice.



EXPO 70'S OPENING, AND WE'VE GOT THE BIG WINNER: Structures like the U. S. Pavilion at Osaka are what world's fairs are supposed to be about: opportunities for the world's bright, innovative, resourceful people to show their stuff. Comprising the American design team were three architects--Lewis Davis, Samuel Brody and Alan Schwartzman--and three designers--Ivan Chermayeff, Thomas H. Geismar and Rudolph deHarak. The oldest is 45, and they all worked hand in glove. To create an environment with the largest and lightest clear-span, air-supported roof ever built, the Americans had to be bright. To devise a structure that can carry up to 20 times its own weight and at the same time be typhoon- and earthquake-proof, the designers had to be innovative. And to build such a spectacular exhibit on a widow's mite, the team had no choice but to be resourceful. Actually the third design drawn up by the winning team on account of Congressional budget whittling, the U. S. Pavilion was actually designed and built for less than \$4 million of a U. S. I. A. budget of \$10 million. The other \$6 million was allocated for administrative and other government costs.

The section drawing clearly shows the structural concept. Earth was scooped out in the center of the site and banked in a superelliptical berm which was then covered with asphalt tiles. The enormous white roof, supported by four blowers and a crosshatch of cables, lets in light by day and radiates light outward at night. Within the cavernous 274' by 465' space, there are 100,000 square feet of floor space. A traffic pattern allows 10,000 people to pass through the Pavilion hourly--twice the number who negotiated the U. S. Pavilion at Montreal's Expo 67. Unlike many showboating world's fair structures, our Osaka exhibit has long-range environ-

mental implications. It has established the feasibility of a cable and air-supported superspan. The technique can be adapted to provide a controlled environment over stadiums, over commercial centers, even crops. It might even be copied by the Japanese.

WHITHER MAINE: As Maine seems to be going environmentally, so should the rest of the country. No state, for example, has concentrated the coming political campaign issues more tightly around the environment. For an overview of the Maine scene, we solicited a letter from John N. Cole, an in-residence environmentalist and editor of the Maine Times, a weekly newspaper growing justly famous all over the country. Following are Mr. Cole's observations:

"Maine's two major gubernatorial candidates have officially started an election race that is almost certain to be marked by the state's first environmental campaign. Incumbent Governor Kenneth M. Curtis, a young (39) Democrat, is seeking a second four-year term in one of the most environment-conscious states in the union. His declared opponent (although both men face fringe opposition in party primaries) is Maine's current Attorney General--middle-aged (49) Republican James S. Erwin.

"In their respective announcements (Erwin, Feb. 16 and Curtis Feb. 17), both men put Maine's environmental crisis at the top of their issues list, although each expressed his concern in different terms. Governor Curtis said Maine must continue to build its economic-industrial base while taking precautions to see that maximum environmental safeguards are also maintained. Candidate Erwin said Maine should stop enticing industries which are high environmental risks, like oil refineries and other potential polluters, and should instead con-

centrate on recruiting low-pollution manufacturing types like electronics plants or plastic stamping operations.

"These brief, generalized remarks may go into campaign history books as the opening verbal shots in what may be the longest exchange of environmental gunfire on record. For there is little doubt that the voters of Maine have put environment at the top of their election concerns. The January '70 special session of Maine's 104th Legislature made national headlines with its passage of oil conveyance control laws and the assigning of industrial site selection authority to the state's Environmental Improvement Commission.

"Not just another commission, this is the first appointive body in the U. S. which has the power (on paper) to tell an oil company it can't build a refinery on the Maine coast. Both of these bills got solid approval--not so much because lawmakers knew what they were doing, but because Maine voters raised such a ruckus.

"They are still raising it, encouraged more than ever by the 104th's response; and, like the aware politicians they are, the two gubernatorial candidates are trying to reply.

"But both Curtis and Erwin are afloat on relatively strange waters. Their environmental statements thus far have been vague and reflexive, and one wonders if this won't be the pattern for the entire campaign. If it is, Maine will have lost the unique opportunity to listen to its top candidates use their campaigns to outline a set of environmental goals for their state.

"A well-defined environmental plan is critical to this state, the last unspoiled coastal wilderness in the nation's northeast corner. Maine's future rests on environmental decisions that must be made during the next one or two gubernatorial terms. Yet both current candidates apparently lack the professional and technical input they must have if they are to outline even a basic environmental blueprint between now and November.

"Both men need skilled and imaginative environmental help. The one who gets it first and uses it best is also the man most likely to be Maine's next governor.

"Of course, if neither man addresses himself meaningfully to environmental issues,

one will have to be elected. Unfortunately, if the winner has no environmental plan when he takes office, a gloomy future for Maine may well have been determined by default."

We thank Mr. Cole. Needless to say, we are pleased to be sending copies of this issue to both candidates.

YES, HUD IS DOING SOMETHING RIGHT: In fact, at least several things. Heading our list this month is a critical development in Operation Breakthrough. Even if the houses produced through HUD's competition sweepstakes are built of spun sugar, they ought to be beautifully sited. The site planners who have been assigned to do the master planning are strictly quality architecture and engineering firms. Some of the best known: Caudill Rowlett Scott; Skidmore, Owings and Merrill; Perkins and Will; Eckbo, Dean, Austin and Williams; RTKL, Inc.; Wurster, Bernardi and Emmons, Inc.; and Hellmuth, Obata and Kassabaum, Inc.

Another good thing: HUD has announced that an Urban Renewal Demonstration grant of just over \$300,000 will be used by New York's Institute for Architecture and Urban Studies to find ways of making city streets serve their communities for something besides gasoline alleys. Turning the usual process around (put in the sewers and curbs, then plunk down houses), the study will examine the potential of street design itself as a means of improving the urban environment.

And if you are interested in neighborhood conservation, HUD'S got a 78-page bibliography for you which contains 600 listings of books and articles on the technical things you should know about residential and non-residential rehabilitation. The title isn't much, Neighborhood Conservation and Property Rehabilitation. But neither is the price, 70 cents; from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

THEN AGAIN, HUD ISN'T DOING SOMETHING RIGHT: Speaking before a gathering of 650 architects and engineers, Sen. William Proxmire of Wisconsin said, "It's shocking when you think of it, but we have no national policies for orderly urban growth. The Department of Housing and Urban Development has no policy on where it distributes grants. Instead, it's first come first served, and the pork barrel."



TALK ABOUT YOUR THREE-CUSHION ECOLOGICAL BILLIARD SHOTS: The black and white reproduction above fails utterly to do justice to a fabric, an idea and a cause. The pattern is "Ferns," one of 19 created for Greeff Fabrics by Don R. Eckelberry, an artist-ornithologist, and his wife, designer Virginia Nepodal. All of the patterns depict precise but colorful and imaginative treatments of plant and bird life. All are dedicated to conservation--and that dedication is backed up by the decision of Greeff Fabrics to devote royalties from the sale of these fabrics to the National Wildlife Federation's "Youth in Conservation" program. That's our idea of an entrepreneur.

TURNING THE SCREWS: Rep. John D. Dingell of Michigan, plus four other Congressmen, have introduced legislation which authorizes private damage suits against businesses or individuals responsible for air, water or noise pollution. . . . To demonstrate in unmistakable terms its rising environmental expectations, the U. S. House of Representatives is well on its way to establishing within its membership a Committee on the Environment. Over a quarter of the members to date have co-sponsored the necessary resolution. When the Committee becomes a fact, it will assume full legislative powers to oversee such environmental quality problems as air and water pollution, solid wastes, weather modification, acoustics, pesticides and herbicides. . . . Despite abuse by AEC spokesmen at a joint committee hearing, Gov. Harold LeVander of Minnesota recently threw down a potentially far-reach-

ing challenge when he declared, "It is the position of the State of Minnesota that it has the right to set limits on radioactive discharges from nuclear plants more restrictive than the standards of the Atomic Energy Commission." The inference is clear: Where environmental threats are concerned, states are reversing their historic foot-dragging role and putting stiff pressure on Washington. . . . Surely to the Administration's surprise, President Nixon's own study group on urban renewal has recommended that the Federal renewal programs press ahead "to help exorcize the specter of increasing apartheid." The group thinks more, not less, building should be carried out in the center city with the aim of bringing together people of various ethnic and economic circumstances. . . . The not-so-cruel sea may soon be treated more kindly. Sen. Gaylord Nelson of Wisconsin has introduced a bill "to end America's frontier days on the high seas." To avoid control costs, Senator Nelson says cities and industries dump nearly 37 million tons of wastes into the marine environment each year. The two-part bill will prohibit all waste disposal in the ocean and the Great Lakes by 1975--unless no feasible alternative exists, and then for only time enough to find a solution. A second part of the bill is aimed at stopping ocean disasters by establishing a broad new environmental management program in Interior. Before the Secretary of the Interior is allowed to grant a lease for undersea activity, he must hold public hearings, carry out thorough ecological studies, and get his management plan approved by the President's White House Council on Environmental Quality.

A POLITE SUGGESTION TO MR. FRED L. TURNER, PRESIDENT OF THE MC DONALD'S HAMBURGER CHAIN: If your company plans to spend \$450,000 to light the American flags outside your many outlets, as reported in the biweekly report Business & Society, how about this: Throw in another half million or so and mount an educational program to acquaint your customers with the need to eradicate visual pollution in all of the communities in which McDonald's operates. In so doing, you, sir, could be a regular American hero. At least, in our book.

HOW TO BE ECOLOGICALLY IN THE SWIM--
A SELECT CANVASS OF EFFECTIVE PRIVATE
GROUPS THAT ZERO IN ON ECOLOGY'S BASICS:

AMERICAN CETACEAN SOCIETY
4725 Lincoln Boulevard
Marina del Rey, California 90291

AMERICAN COMMITTEE FOR INTERNATIONAL
WILDLIFE PROTECTION c/o Conservation Off.
American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024

AMERICAN CONSERVATION ASSOCIATION, INC.
30 Rockefeller Plaza
New York, New York 10020

AMERICAN FISHERIES SOCIETY
1040 Washington Bldg., 15th & New York Ave.
Washington, D. C. 20005

AMERICAN FORESTRY ASSOCIATION
919 17th Street, N. W.
Washington, D. C. 20006

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES
INC., 3900 Wisconsin Avenue, N. W.
Washington, D. C. 20016

AMERICAN LITTORAL SOCIETY
Sandy Hook
Highlands, New Jersey 07732

AMERICAN ORNITHOLOGISTS' UNION, INC.
c/o President: John W. Aldrich
Bureau of Sport Fisheries & Wildlife
U. S. Department of Interior
Washington, D. C. 20240

AMERICAN SOCIETY OF ICHTHYOLOGISTS AND
HERPETOLOGISTS c/o President: W. I. Follett
California Academy of Sciences
Golden Gate Park
San Francisco, California 94118

AMERICAN SOCIETY OF LIMNOLOGY AND OCEANO-
GRAPHY, INC., Office of Oceanography &
Limnology, Museum of Natural History
Smithsonian Institution
Washington, D. C. 20560

AMERICAN SOCIETY OF MAMMALOGISTS
c/o President: Richard G. Van Gelder
American Museum of Natural History
Central Park West at 79th Street
New York, New York 10024

AMERICAN WATER RESOURCES ASSOCIATION
... P. O. Box 434
Urbana, Illinois 61801

ARTIC INSTITUTE OF NORTH AMERICA
1619 New Hampshire Avenue, N. W.
Washington, D. C. 20009

ASSOCIATION OF INTERPRETIVE NATURALISTS
1251 East Broad Street
Columbus, Ohio 43205

CITIZENS COMMITTEE ON NATURAL RESOURCES
1346 Connecticut Avenue, N. W.
Washington, D. C. 20036

CONGRESS ON POPULATION AND ENVIRONMENT
c/o President: Richard D. Lamm
555 Petroleum Building
Denver, Colorado 80202

CONSERVATION AND RESEARCH FOUNDATION, INC.
c/o President: Richard H. Goodwin
Box 1445, Connecticut College
New London, Connecticut 06320

CONSERVATION ASSOCIATES
1500 Mills Tower, 220 Bush Street
San Francisco, California 94104

CONSERVATION EDUCATION ASSOCIATION
c/o President: Clarence Billings, Superintendent
of Education, Missouri Dept. of Conservation
P. O. Box 180
Jefferson City, Missouri 65101

CONSERVATION FOUNDATION, THE
1250 Connecticut Avenue, N. W.
Washington, D. C. 20036

CONSERVATION LAW SOCIETY OF AMERICA
c/o Exec. Secy.: Robert W. Jaspersen
1500 Mills Tower
San Francisco, California 94104

COOPER ORNITHOLOGICAL SOCIETY
c/o California Academy of Sciences
Golden Gate Park
San Francisco, California 94118

J. N. "DING" DARLING FOUNDATION, INC.
c/o Central National Bank & Trust Co.
Des Moines, Iowa 50304

DEFENDERS OF WILDLIFE
1346 Connecticut Avenue, N. W.
Washington, D. C. 20036

DUCKS UNLIMITED
P. O. Box 66300
Chicago, Illinois 60666

ENVIRONMENTAL DEFENSE FUND, INC.
P. O. Box 740
Stony Brook, New York 11790

* ENVIRONMENTAL RESEARCH INSTITUTE
Box 156
Moose, Wyoming 83012

FOREST HISTORY SOCIETY, INC.
P. O. Box 1581
Santa Cruz, California 95060

FRIENDS OF AFRICA IN AMERICA
330 South Broadway
Tarrytown, New York 10591

FRIENDS OF THE EARTH
451 Pacific Avenue
San Francisco, California 94133

FRIENDS OF NATURE, INC.
Brooksville, Maine 04617

GAME CONSERVATION SOCIETY
17 West 60th Street
New York, New York 10023

INTERNATIONAL COUNCIL FOR BIRD PRESER-
VATION c/o Chairman: Roger Tory Peterson
Neck Road
Old Lyme, Connecticut 06371

INTERNATIONAL GAME FISH ASSOCIATION
2190 S. E. 17th Street
Fort Lauderdale, Florida 33316

INTERNATIONAL SHADE TREE CONFERENCE, INC.
3 Lincoln Square
Urbana, Illinois 61801

INTERNATIONAL UNION FOR CONSERVATION AND
NATURAL RESOURCES
1110 Morges, Switzerland

IZAAK WALTON LEAGUE OF AMERICA
1326 Waukegan Road
Glenview, Illinois 60025

JOHN MUIR INSTITUTE FOR ENVIRONMENTAL
STUDIES, 451 Pacific Avenue
San Francisco, California 94133

NATIONAL ACADEMY OF SCIENCES - NATIONAL
RESEARCH COUNCIL, 2101 Constitution Ave.
Washington, D. C. 20418

NATIONAL ASSOCIATION OF SOIL AND WATER
CONSERVATION DISTRICTS
1025 Vermont Avenue, N. W.
Washington, D. C. 20005

NATIONAL AUDUBON SOCIETY
1130 Fifth Avenue
New York, New York 10028

NATIONAL GEOGRAPHIC SOCIETY
1145 17th Street, N. W.
Washington, D. C. 20036

NATIONAL MOSQUITO CONTROL - FISH AND WILD-
LIFE COORDINATION COMMITTEE
c/o Secretary: C. H. Smith, Entomology
Research Div. Agricultural Research Service,
U. S. Department of Agriculture
Beltsville, Maryland 20705

NATIONAL PARKS ASSOCIATION
1701 18th Street, N. W.
Washington, D. C. 20009

NATIONAL PRAIRIE GROUSE TECHNICAL COUNCIL
c/o Chairman: Malcolm M. Exendine
Wildlife Conservation Dept., Box 56
Elk City, Oklahoma 73644

NATIONAL RECLAMATION ASSOCIATION
897 National Press Building
Washington, D. C. 20004

NATIONAL WATERFOWL COUNCIL
c/o Chairman: John R. Woodworth
Director, Idaho Fish and Game Dept.
Box 25
Boise, Idaho 83707

NATIONAL WILDLIFE FEDERATION
1412 16th Street, N. W.
Washington, D. C. 20036

NATURAL RESOURCES COUNCIL OF AMERICA
c/o Chairman: Richard H. Stroud
719 13th Street, N. W.
Washington, D. C.

NATURE CONSERVANCY
1522 K Street, N. W.
Washington, D. C. 20005

NORTH AMERICAN WILDLIFE FOUNDATION
709 Wire Building
Washington, D. C. 20005

OPEN SPACE INSTITUTE
145 East 52nd Street
New York, New York 10022

OYSTER INSTITUTE OF NORTH AMERICA
22 Main Street
Sayville, Long Island, New York 11782

POPULATION CRISIS COMMITTEE
1730 K Street, N. W.
Washington, D. C. 20006

POPULATION REFERENCE BUREAU
1775 Massachusetts Avenue, N. W.
Washington, D. C. 20036

RACHEL CARSON TRUST FOR THE LIVING
ENVIRONMENT, INC.
8940 Jones Mill Road
Washington, D. C. 20015

RESOURCES FOR THE FUTURE, INC.
1755 Massachusetts Avenue, N. W.
Washington, D. C. 20036

ROCKEFELLER FOUNDATION, THE
111 West 50th Street
New York, New York 10020

RUFFED GROUSE SOCIETY OF AMERICA
c/o President: George E. Ford
81 Indian Spring Lane
Rochester, New York 14618

SCIENTISTS' INSTITUTE FOR PUBLIC
INFORMATION
30 East 68th Street
New York, New York 10021

SIERRA CLUB
1050 Mills Tower
San Francisco, California 94104

SOCIETY FOR THE PRESERVATION OF BIRDS
OF PREY
Box 293
Pacific Palisades, California 90272

SOIL CONSERVATION SOCIETY OF AMERICA
7515 N. E. Ankeny Road
Ankeny, Iowa 50021

THORNE ECOLOGICAL FOUNDATION
1229 University Boulevard
Boulder, Colorado 80302

TRUSTEES FOR CONSERVATION
251 Kearny Street
San Francisco, California 94108

WHOOING CRANE CONSERVATION ASSOCIATION
R. R. 1, Box 323
Kula, Maui, Hawaii 96790

WILD ANIMAL PROPAGATION TRUST
Oglebay Park
Wheeling, West Virginia 26003

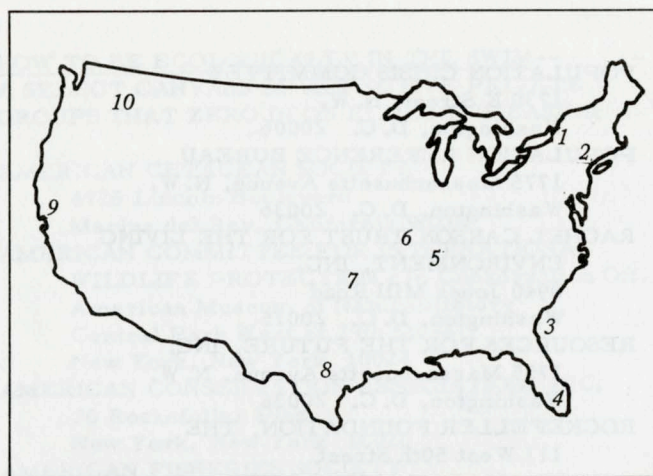
WILDERNESS SOCIETY, THE
729 15th Street, N. W.
Washington, D. C. 20005

WILDLIFE MANAGEMENT INSTITUTE
709 Wire Building
Washington, D. C. 20005

WILDLIFE RESTORATION, INC.
17 West 60th Street
New York, New York 10023

WILDLIFE SOCIETY, THE
Suite S-176, 3900 Wisconsin Ave., N. W.
Washington, D. C. 20016

WORLD WILDLIFE FUND
Suite 728, 910 17th Street, N. W.
Washington, D. C. 20009



TEN TEMPTING WAYS TO TOSS IN A TIMELY CONSERVATION DOLLAR: On the very sound theory that more people would contribute to worthy conservation causes if they knew just what their money was buying, the Nature Conservancy is putting price tags on its wares. The map above pinpoints ten projects aimed at attracting you one way or another. One way is through geographic affinity; another, your environmental predilection. As most of you know, the Nature Conservancy does a tremendous conservation job as the pre-eminent specialist in acquiring land for fully protected preserves and sanctuaries. The ecological variety found in these ten areas (the Conservancy has others, of course) is fascinating. For example, starting clockwise in New York:

1. Eldorado Shores, N. Y. Virtually the only remaining waterfowl sanctuary at Lake Ontario's eastern end. Balance needed: \$35,000.

2. Clausland Mountain, N. Y. A 500-acre mountain just below the Tappan Zee Bridge on the Hudson; was doomed to becoming a housing development until saved by citizen action. Balance needed: \$200,000.

3. Wolf Island, Georgia. An important sanctuary, largely salt marsh. Balance needed: \$75,000.

4. Fuchs Hammock, Fla. 15 acres rich in rare flora. Balance needed: \$40,000.

5. Murphey's Pond, Ky. In the state's southwest corner, 235 acres of cypress swamp filled with animals, birds and reptiles. Balance needed: \$55,000.

6. Pleasant Valley, Mo. Unusual cave south of St. Louis surrounded by a 40-acre hardwood forest. Balance needed: \$8,500.

7. Redbud Valley, Okla. Near Tulsa, 80

acres of varied habitat (river bottom, cliffs, prairies, woods). Balance needed: \$45,000.

8. Ezell's Cave, Tex. Home of the rare blind salamander and other unusual life forms. Balance needed: \$6,200.

9. Lower Tubbs, Cal. Key 330-acre tract in preservation of San Pablo Bay and San Francisco Bay. Superb shorebird and duck habitat. Balance needed: \$240,000.

10. Dishman Hills, Wash. Near Spokane, 80 acres of cliffs, ravines, woods. Balance needed: \$6,000.

Take your pick, then send your contribution to: The Nature Conservancy, 1522 K Street, N.W., Washington, D.C. 20005.

IF WE CAN SEND A MAN TO THE MOON DEPT. Chairman Clay L. Cochran of the newly organized, nonpartisan Rural Housing Coalition thinks a country that can spend \$63 million to "shoot the moon" and a cool trillion over 25 years on the military ought to be able to dig up a little scratch to help our wretchedly housed rural poor. Mr. Cochran describes current rural housing programs as "a poor joke--layer on layer of patchwork law so complex that those who want to take advantage of the law have to hire specialists to help them find their way through the maze."

We find the Coalition's logic compelling when it suggests that decent rural housing will take some of the pressure off urban ghettos, which are characteristically overcrowded with rural people who came to the city to escape rural slums.

A BILL CONGRESS SHOULDN'T BOTTLE:

Two of the most environmentally aggressive Congressmen, Rep. Abner J. Mikva of Illinois and Rep. James Scheuer of New York, have introduced a bill "to put the 'return' back into 'no-return' bottles." The idea behind the bill is to provide an incentive for both bottlers and consumers to favor refillable containers. The bottler would package his product in containers which require deposits, or to fill bottles upon which a tax is paid. The tax would be refundable when the bottle is returned.

Another laudable provision of the bill provides for non-refundable taxes to be levied on certain kinds of plastic containers

which are hard to destroy. The aim of these taxes, of course, would be to steer manufacturers to tax-free and highly degradable materials.

HOW THE DESIGN PROFESSIONALS STACK UP--RHETORICALLY, AT LEAST--ON ENVIRONMENTAL MATTERS: This past month we invited those professional organizations whose members comprise our major environment shapers to tell us what they are doing for the good of the cause. (We didn't include engineers because, though heaven knows they do a lot of shaping, we felt we'd confine the current exercise to those groups explicitly concerned with esthetics.) Here-with, a condensed interpretation of the responses:

American Institute of Planners. An AIP committee on comprehensive health planning has published a report on environmental factors as they relate to health planning, for the benefit of all members and also health administrators.... A 1970 AIP objective stresses equal concern for environmental quality and urbanization policy.... The AIP oral exam for full membership lists "environmental sciences" as one of 12 areas of concentration for planners.... In fact, an AIP survey last summer indicated that many members were practicing environmental sciences as a specialty, and many more expressed a "sizable interest" in the subject.

American Institute of Architects. Currently the most gung-ho of all, the AIA even invests impressive sums in institutional advertising of a purely statesmanlike nature.... Favors a national pollution abatement policy with real teeth.... Urges legal action by government and/or private citizens against water polluters, oil spillers, strip mine eroders and other perpetrators of despoliation to determine liability for damage to the environment.... Proposes regional or interstate "compacts" with Federal assistance to develop comprehensive regional plans.... Recommends a "National Foundation for Environment" that would complement the Council on Environmental Quality and the National Pollution Abatement Authority; the Foundation would "provide a focal point for private citizens and organizations to express their environmental concern.... Supports the Urban Design and Development

Corp., an AIA spinoff created to involve architects in getting results in urban planning and forming "new clients" who can take action.... Fosters cooperative coalition with AIP members and outside consultants to "inject into the 1972 Presidential campaign alternatives to the way most cities are developing at their fringes, plus other choices the public and politicians could make if provided the necessary information."

Industrial Design Society of America. Wide-ranging new programs go from setting up an interprofessional committee with the AIA to promoting a grassroots program to "liberate a lot" (meaning, of course, to sponsor the acquisition and development for public benefit of an odd piece of land in a community).... Among IDSA environmental programs under a head of steam: the Damon Wood Memorial Awards, established for "designers and others who contribute substantially to the improvement of the visual environment;" a roadside protection committee, presently developing a cooperative thrust with other design groups to combat roadside blight; a consumer affairs committee, established to develop ways for designers to "exert their influence and ideas for the benefit of the public."

The IDSA also has a special environmental cutting edge unique among the design professions. He is F. Eugene Smith, an IDSA vice president who has probably done more circuit riding in the battle against ugliness than anyone, anywhere. He has presented slide-talk presentations on our ubiquitous environmental mess to over 200 civic and fraternal groups since 1966. (Says Mr. Smith, "I don't usually give my show for designers and others who already agree with me. My audiences are the Rotary, the P. T. A.--people who have really never seen the visual pollution all around them.")

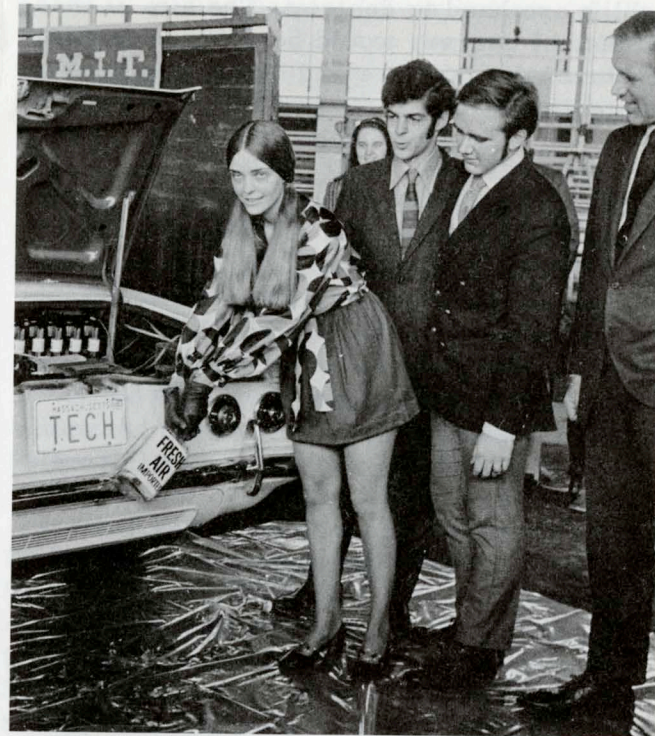
American Institute of Interior Designers. In a display of professional comity, the AID chipped in last fall with the NSID (see below) and bought a New York Times ad. In it, the two groups urged all three mayoral candidates to speak their minds on the following environmental topics: small crafts industries; the role, if any, of interior design specialists on the Planning Commission; preservation of historic landmarks; use and

design of school facilities; equal job opportunity for minorities; art work in public buildings; and safety in the streets through better lighting.

Indicative of the AID's expanding conception of its environmental role, the group this year renamed its award program "AID Environmental Awards--1970," and will henceforth make awards for outstanding achievement in the following areas: urban renewal, city planning, non-residential architecture, transportation design, and education or communication.

National Society of Interior Designers. The NSID is pushing hard for a professional licensing requirement as a means of divorcing the inferior decorators from the trained and talented designers who know how to "solve environmental problems within the spaces people occupy." Other NSID programs: an associate membership arrangement for recently graduated design students requires that they take courses to enlarge their environmental consciousness.... In cooperation with the AID, the group is working on a program to establish minimum standards for curricula and interior design faculties.... Following conversations with HUD for the purpose of encouraging the use of interior designers in government-sponsored housing activities, the NSID is looking for ways to reinforce an argument that still hasn't knocked down barriers.... The group's Interior Environment Research Council acts as a library and research tool; and another key committee, on architecture liaison, does its best to minimize professional friction and to heighten on-the-job cooperation.

WHOLE HOG FOR THE WHOLE EARTH CATALOG: Just because they said something fairly nice about us in their latest issue isn't why we think Whole Earth Catalog is the most refreshing publishing venture of the year. The ad man who reads Ad Age on the train, the hardware man who reads Hardware Age on the train, the steel man who reads Iron Age on the train--if they'd all throw their trades' insecurity blankets aside and read the Catalog, they'd be better husbands, better ecologists, and probably better practitioners of their trades. That's Whole Earth Catalog, 558 Santa Cruz, Menlo Park, California.



THE CLEAN AIR CAR RACE ISN'T AS SILLY AS THIS PICTURE MAKES IT SEEM: Having learned that the first entry in next August's Clean Air Car Race was ready for public viewing at M. I. T., we asked the P. R. people if the car was funny-looking. They didn't know, they said, but promised to send along a picture of it. Described as a "hybrid" vehicle, the above electric powered car was designed by M. I. T. students David A. Saar and William W. Carson, who are shown in a funny-looking picture with Gov. Francis Sargent of Massachusetts and a bottle-bopping colleen named Colleen Keough.

ENOUGH OF THAT CONVENTIONAL MEDICAL WISDOM: "There is remarkably little sentiment anywhere in the Harvard Medical School for continuing to do the old things in the old ways," said Dean of the Faculty Robert H. Ebert recently. "The boldness with which students state their demands and their defiance of authority is disturbing to many of the elders," Dr. Ebert conceded, "but steadily perspectives are enlarging, and productive work is being done."

One of the largest imaginable medical perspectives has been articulated lately by Dr. Warren Winkelstein, Jr., of the School of Public Health at the University of Califor-

nia, who thinks the notion of basing health care on the treatment of separate diseases is outmoded. What isn't? The total environment--and Dr. Winkelstein offers a persuasive case. During ten years of research in Buffalo, N. Y., he determined to his satisfaction that people living in highly polluted industrial areas had a death rate twice as high as that in wealthier, comparatively pollution-free neighborhoods. Says Dr. Winkelstein, "There is an assumption that the health status of any community is largely a function of the quality and quantity of the medical services available to it." Not so, as long as the environment remains polluted.

THE WHOOPING CRANES STILL AREN'T OUT OF THE WOODS: Possibly the most famous of the endangered species, their number has risen to 55. But the National Audubon Society has felt obliged to sue the Texas Parks and Wildlife Commission, of all people, to halt dredging in the San Antonio Bay area. Five shell-dredging firms are also defendants in the suit. If the dredging continues much longer, the Audubon people feel sure that the only remaining winter feeding grounds of the whoopers will be destroyed--and there will go the rare and beautiful birds.

ENVIRONMENTALLY HARD CHOICES: Scarcely any ecological impasse can compare with a head-on conflict between conservationists and recreationists. Neither group is nor deserves to be considered environmental villains. Yet a case in Texas focuses on the dilemma. In protracted legal proceedings, plaintiffs of a conservation stripe have succeeded in stopping the construction of a golf course at Meridian State Park which would destroy a part of the habitat of the golden-cheeked warbler. In another such collision at Great Lakes Estates, Long Island, the issue involves a salt marsh that skirts a high-priced residential area. For the first time in village history, incumbent trustees in this month's election are being challenged--by candidates running on a "Save-the-Marsh" platform. One disconsolate citizen synthesized the whole business when he said, "Beauty is in

the eye of the beholder." Scanning the marsh, he added, "In my eyes a landscaped golf course would be as pretty. And it would add tremendously to our property values." Or, who needs muskrats, raccoons, kingfishers and great blue herons?

THE SEASON'S INDISPENSIBLE WORD: Consortium.

SUPER ECOLOGY: Ecology Action, a Boston group, plans to open an "ecology food store." The ulterior motive is to boycott and "eventually transform" existing supermarkets. Some of the stuff the group is tired of putting up with are non-returnable bottles and cans, foods containing pesticides or chemical additives, and cleaning agents that are not "bio-degradable."

Ecology Food Store will be a non-profit venture, set up to sell organically grown foods packaged in re-cycleable containers. Other goodies for the shelves: books such as Whole Earth Catalog and Household Ecology Handbook, which has "pointers on how to run a household in a way least destructive to the environment."

The store's help will receive subsistence-level wages and will grow some of the food themselves on land set aside for them by farmers in the area.

We get a little weary just thinking about such ecological whirlwinds.

GENTLE REMINDER TO TEACH-INNERS--THE ENVIRONMENT AND VIETNAM AREN'T THE SAME THING: Just before going to press, we got a reading by phone on the way things were going at the University of Michigan, where the Big Idea was born and where a barometric kind of advance teach-in will take place on March 11-14. Our Ann Arbor correspondent said everything was beautiful. All kinds of big guns are coming. The Commoners, Muskies, Nelsons, Reuthers, Coles, Duboses, Browers. And, yes, the president of Dow Chemical, Arthur Godfrey and Eddie Albert. Something like 14,000 copies of a paperback titled The Environmental Handbook have been ordered, the grade school kids

are making exhibits, the high school crowd is buttonholing grownups, and the grownups are acting almost grown up.

We asked our correspondent, "Swell, but isn't anybody clobbering anybody or jockeying for a top power position?"

He replied in plain Midwestern, "No, everybody just seems to be moving along together."

We hope the Ann Arbor way is the universal way, come April 22. But the activist rumblings are building in some parts of the country. Why, we aren't sure, unless the pathology of this particular epoch requires a compulsively strident response to any public issue.

Take ecology. Ecology is order, not chaos. So how is it that raspy splinters of an ever-splintering student generation are shouting, "Be good to the ecology or I'll kill you?" That's Orwellian. Some ecology lovers are not only more pure than other ecology lovers but also claim a special dispensation to behave in an ecologically illogical way toward their webmates.

Or take pollution. We hate it, and we are not very crazy about the fellow who does the polluting. We don't like spitting on the street, smoking on an elevator, air-mailing garbage out the window, spraying sheep to death, flaring radioactive gases, dumping raw sewage into drinking water. And we most especially don't like individuals, corporations and governments who do these things, who should know better, and who thumb their noses at those who are offended by their obtuseness.

But who, we ask, would you punch in the mouth? Your father? Why not, if he works for one of the Big Three whose products cause pollution in their making, in their operation on our highways, and in their

Subscription rates:

One year: \$35 for individual

Two years: \$50 for individual

Five or more subscriptions from same company, agency, association:

\$25 each for one year

\$40 each for two years

The Environment Monthly

420 Lexington Avenue

New York, N. Y. 10017

death in a junkyard? Or why not picket a cousin who climbs telephone poles to fix wires that ought to be underground? Or tongue-lash your grandmother who owns a few shares of U. S. Steel?

The Teach-In of April 22 wasn't thought up as a Love-In (they belonged to the dim, dumb 60's). But neither has it been designed as a keen way for post-adolescents who care less for a viable environment than political posturing to "topple the existing social structure." Nor is the Teach-In a taffy pull. The environmental rot is deep-seated, and fine speeches and piddling appropriations will not budge it.

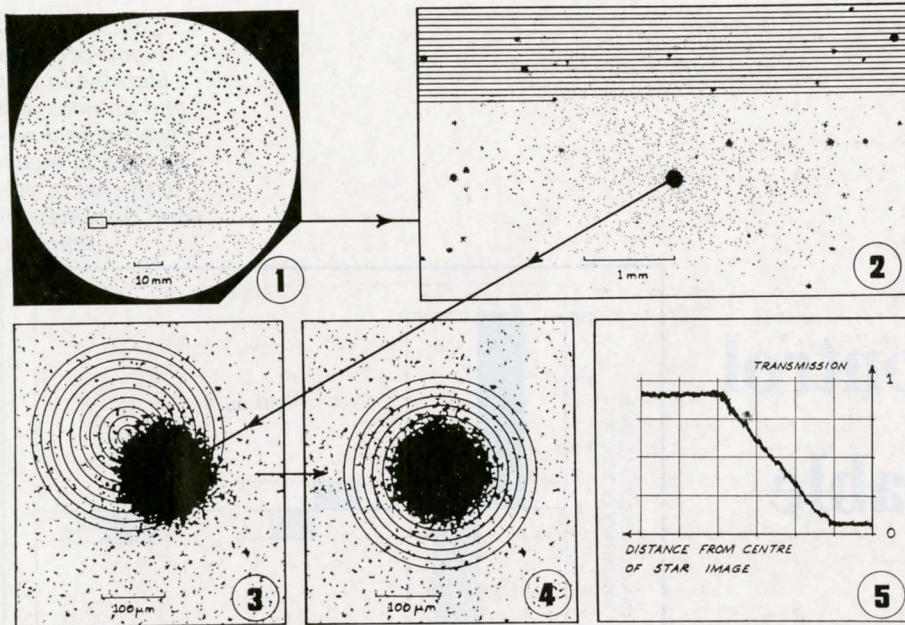
The Teach-In is for learning, not dismantling. For determining the degree of degradation, for fixing responsibility, for assigning accountability, and for redressing environmental injury.

The environment has been warred upon long enough. The Teach-In isn't Vietnam. What Anne Morrow Lindberg said the other day goes for us: "We have not time or strength to lose on gestures of remorse or recrimination."

COMING NEXT MONTH:

First Annual Environment Awards Program for American Corporations. And just ahead of the National Teach-In, too, so we can spike the guns of anybody who says there aren't any good guys in profit-seeking circles.

Plus a roundup of where the big Teach-In action is likely to be.



The Galaxy measuring machine searches a portion of a Schmidt plate (1 and 2) then by concentric circle scanning centers and measures the star image (3 and 4) and displays the profile of the star on an oscilloscope for a computer.

Automated optical astronomy

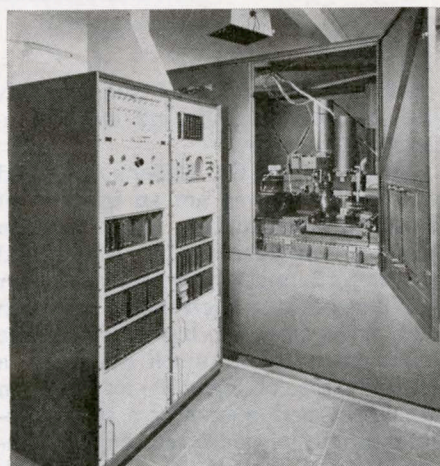
Help in cataloguing stars comes from a computer and an automatic plate-scanner

by F. C. Livingstone

Poets have made the stars in the sky a cliché for infinity or uncountability, but astronomers find the thought more disturbing than artistic. A single plate from a Schmidt camera, the astronomer's special photographing telescope, can contain the images of tens of thousands of stars in an area a few times the size of the image of the moon.

Each of these images is of potential interest to astronomers, either because it may represent a previously unknown class of object or because it may add something to the statistics of known classes. But no one can look at them all. Astronomers usually concentrate on a few objects they happen to be studying, and then put the plate away in a file until someone else comes looking for a specific thing.

The world's collection of Schmidt camera plates contains a wealth of



Four tons to catalogue the heavens.

information waiting to be extracted and catalogued. Such a compendium would bear especially on the statistics concerning different classes of stars, and this is of particular importance in testing theories of the structure and history of the galaxy and of the life cycles of stars. But there has been neither the manpower nor the storage capacity available for the job.

Automation is beginning to help. If it is as successful as its proponents hope, and if it spreads to enough centers, it may provide new methods for cataloguing stars, compiling astronomical statistics and notifying astronomers of the existence of unusual objects.

Applying automation requires an automatic plate-scanning machine linked to a computer. One such machine, called Galaxy, is now working at the Royal Observatory in Edinburgh. Another is on order for the Royal

Greenwich Observatory at Herstmonceux in England.

The design of Galaxy started in 1965 under the direction of Dr. V. C. Reddish of the Edinburgh observatory. The basic concept of the machine was the work of Dr. P. B. Fellgett, who is now professor of cybernetics and instrument physics at Reading University.

The specifications include a cathode-ray tube that could focus a beam of light onto a spot as small as one micron across, a mechanical carriage to hold and position the photographic plate to an accuracy of one micron, a system for measuring the carriage position to the same accuracy and an automated system to control the motions.

A contract was let in June 1966 to Paul Coradi Scotland Ltd. The machine was delivered in March 1969. Though the plates are small, the machine is large: 6 by 6 by 7 feet with a weight of 3.6 tons.

In more than 2,000 hours of running time so far, Galaxy has located over a quarter million stars and determined the brightness and color of 40,000.

The plates used are photographic negatives. A star image is a dark spot that can be from tens to hundreds of microns across. When the spots come under the light beam, less light gets through them than gets through the adjacent transparent portions of the plate, and the drop-off is sensed by a photoelectric sensor underneath.

Typically Galaxy will make a first pass with a beam about 16 microns wide and record the locations of the star images on the plate. In this way it can find and record 10,000 stars an hour.

When the image positions are known, the images can be brought under the beam one at a time and scanned with a one micron beam. This determines the structure of the image, which reflects the brightness and color of the star. Analyses of this kind can be done at the rate of 1,000 an hour.

So far the greatest problem has been programming the observatory's computer to handle the wealth of information generated by Galaxy.

One example of what Galaxy can do is a search for newly formed stars that the Scottish astronomers are making. These are found in interstellar gas clouds. There are many such stars per cloud and many such clouds scattered around the sky. By the old methods of examining Schmidt plates by hand and eye, systematic searches for newly formed stars could be made in only a few locations. Now they can be searched for and catalogued throughout the sky, and their statistics, which are important for theories of stellar evolutions, can be well determined. □

Comparison of blood-pressure learning in rats and humans and experimental set-up used in measurements of visceral responses of animals.

VISCERAL LEARNING

Learning to control the uncontrollable

Experiments in controlling involuntary visceral responses are building a bridge between operant and classical conditioning

by Lawrence Massett

About 10 years ago, researchers under the direction of Dr. Neal Miller, a psychologist at Rockefeller University, performed an apparently simple experiment on two groups of dogs. One group of animals was rewarded with water for increasing its salivation. The other group was similarly rewarded for decreasing its salivation. At the end of 40 days, the dogs had learned to change their normal patterns of salivation in the reward-producing direction.

The experiment sounds unspectacular. Yet its implications have overthrown some of the fundamental theories psychologists have held about the way behavior is learned. More recent work by Dr. Miller and others has built upon the original experiment and suggests as a result the possibility of controlling the autonomic nervous system as an approach to a great range of disorders, including human cardiac arrhythmias, ulcers, asthma, epileptic seizures and abnormal blood pressure. "Right now," says Dr. Jim Matthews, a psychologist at Brown University, "Neal Miller is perhaps the best-known experimental psychologist in the country."

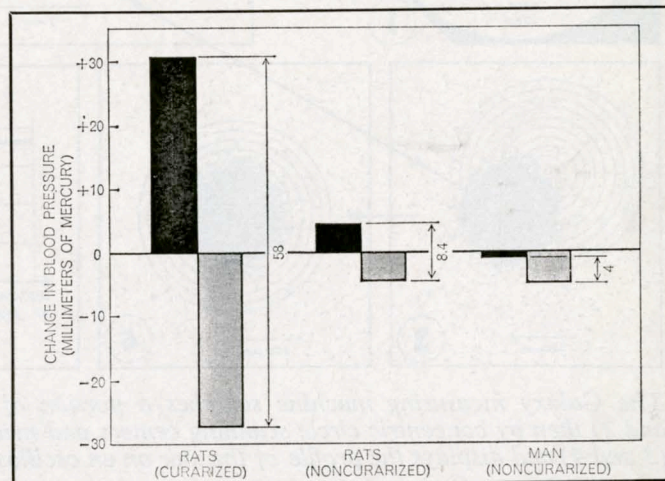
The importance of the experiment with dogs was that it seemed to be an example of operant learning mediated by the autonomic nervous system rather than by the cerebrospinal nervous system. According to traditional doctrine, operant learning could involve only voluntary skeletal responses via the cerebrospinal system. The autonomic nervous system, which mediates involuntary visceral and glandular re-

sponses, was considered suitable only for classical conditioning as demonstrated by Pavlov.

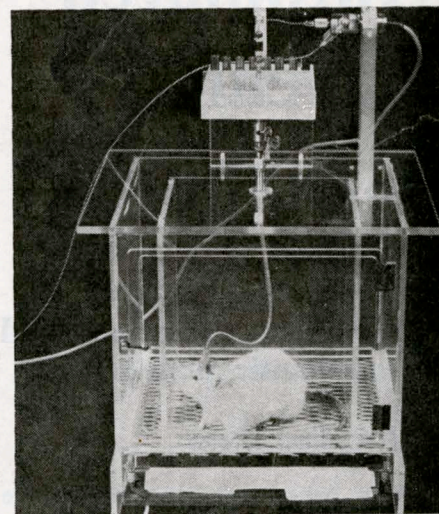
Clearly, what Dr. Miller's dogs had learned to do was not an instance of classical conditioning: Had it been classical conditioning, the water used for reward might have induced either an increase or a decrease in salivation as a reflex response, but not both. The experiment looked much more like a typical case of operant learning, in which the presentation of a reward reinforces any response that happens immediately to precede the reward. Operant conditioning has been considered superior to classical, since it can be used to shape a greater variety of responses.

It was not easy for Dr. Miller to convince others of the significance of his findings, however. He had a hard time even finding someone to help with the experiments. "For years," Dr. Miller recalls, "students and research assistants who were supposed to be working on the problem kept finding excuses to do something else instead. The prejudice against visceral learning was just too strong." He attributes the prejudice partly to the textbook dogma that automatically regulated behavior can be modified only by classical conditioning, and partly to cultural factors. "The autonomic nervous system was just not held in high esteem, at least in this country," he declares. "It's a cultural matter. Someone has said, for instance, that North Americans think with their skeletal muscles, while people in South America think with their glands."

The problem of finding assistants



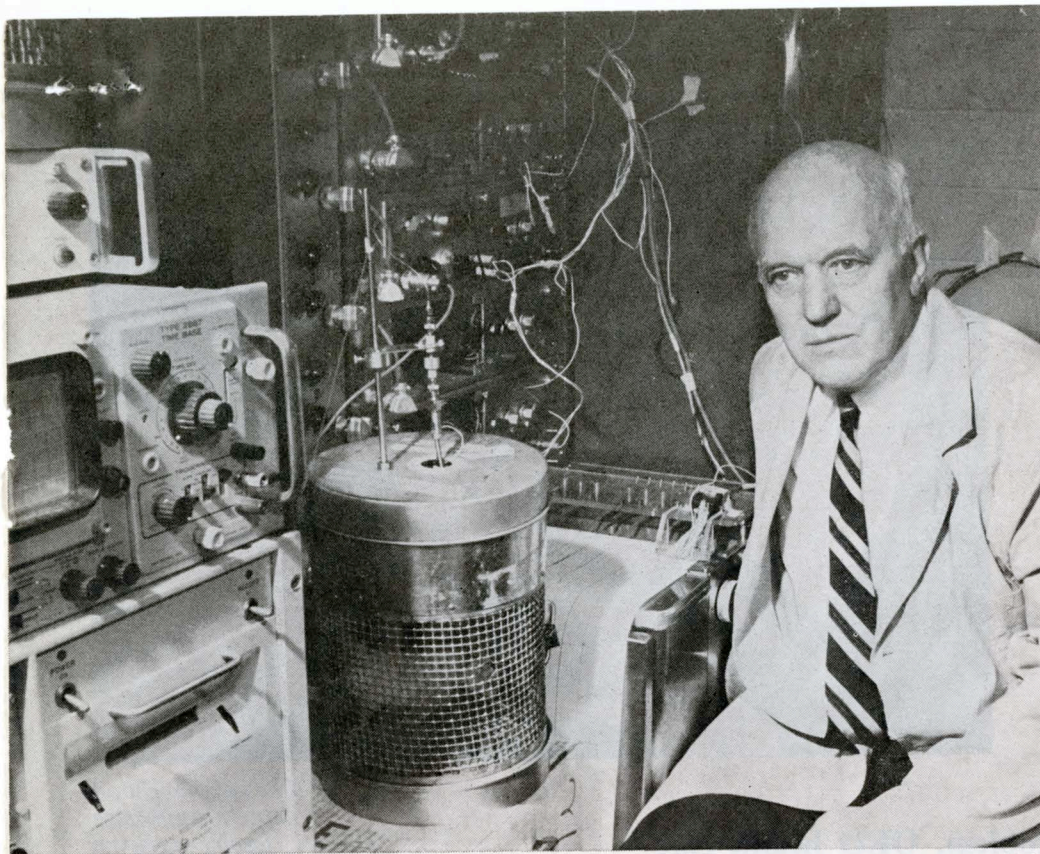
Scientific American



Rockefeller Univ.

was gradually overcome as Dr. Miller and his few colleagues devised experimental techniques that showed more and more clearly that operant conditioning could indeed be applied to visceral responses. The dog experiment was not sufficient proof because, though salivation normally is called a visceral response, the possibility remained that the dogs had somehow learned to regulate their salivation by means of their skeletal nervous system. "A person experienced in yoga," Dr. Miller points out, "is supposed to be able to slow down his heart. That sounds like visceral learning, but it is said that yogi accomplish the feat by using their skeletal muscles to alter the pressure inside their chest."

To eliminate any possible influence



Rockefeller Univ.

Miller and apparatus to record and reward changes in a rat's blood pressure.

from the cerebrospinal nervous system in his laboratory animals, Dr. Miller began working with rats paralyzed by curare. A drug used as a poison by South American Indians, curare blocks the transmission of cerebrospinal nerve impulses but does not inhibit the autonomic nervous system.

Rats under the influence of curare cannot be rewarded for their responses with the usual reinforcements of food and water. Dr. Miller's rats were rewarded instead by direct electrical stimulation of a pleasure center in the hypothalamus. To make sure that brain stimulation was not, for some peculiar reason, the only kind of reward that would reinforce visceral learning, Dr. Miller also rewarded some of the rats by allowing them to escape from a mild electric shock whenever they produced the desired response.

Under these circumstances Dr. Miller has demonstrated a variety of visceral learning in animals. The rats have learned to raise or lower their heart-beat rates, to regulate their intestinal contractions, to alter the rate of urine formation in their kidneys, to increase or decrease the amount of blood flowing through their stomach walls and to change their systolic blood pressure.

Much of Dr. Miller's recent work has been devoted to showing that the responses the rats learn are not merely a reflection of an over-all increase or decrease in the activity of their autonomic nervous system. According to standard physiological theory, the sympathetic branch of the autonomic nervous system is capable only of general activity

and always fires nonspecifically, as a unit. But the rats have been able to alter one visceral function without affecting the others. Some of the responses the animals learned were, in fact, startlingly specific; they learned, for example, to dilate the blood vessels in one ear only.

From a theoretical point of view, it is more difficult to demonstrate the existence of visceral learning in human beings than in animals, largely because curare cannot be administered to human subjects. Even in animals, visceral learning is harder to produce without curare; by paralyzing the skeletal nervous system, Dr. Miller speculates, the curare reduces external distractions and enables the animal to concentrate on modifying its visceral responses more efficiently.

From a practical point of view, the theoretical difficulties are inconsequential so long as people can actually learn, one way or another, to control their autonomic responses. Researchers at a number of institutions, including Harvard University Medical School, Cornell University Medical College and the Gerontology Research Center in Baltimore, have already reported some success in training human subjects to control such functions as heart beat rate and blood pressure. Last month Dr. Miller and his colleagues began a large-scale project at New York City's Bellevue Hospital, designed to teach people to control their blood pressure.

The apparatus needed to train humans is, fortunately, much simpler than the equipment used in animal ex-

periments. The only unusual equipment necessary is an instrument capable of measuring minute changes in whatever visceral function is to be regulated. If, for instance, a person is being taught to lower his blood pressure, then his blood pressure is carefully monitored; each time it fluctuates even slightly in the desired direction the subject receives a signal such as a tone or a light. His only instructions are to maintain the signal for as long as possible, as often as he can; how he does so is up to him.

Some researchers believe that, for humans, hypnosis may serve as a substitute for curare in blocking out distractions. Recently Dr. Philip G. Zimbardo of Stanford University trained several subjects under hypnosis to vary the temperature of their hands. Dr. Zimbardo merely told his subjects to relax and to make one hand hotter than normal and the other colder. Although other experimenters have thought it important to supply their subjects with feedback on their performance, Dr. Zimbardo found that informing his hypnotized subjects about their progress merely distracted them.

The therapeutic possibilities of visceral learning have only begun to be explored. Further research, Dr. Zimbardo says, "will enable us to understand and hopefully to modify the behavior of human beings who somehow 'naturally' induce such disorders as rapid heart action, ulcers, asthma, excessive sweating and similar problems." Dr. Miller agrees that visceral learning may offer an explanation of the ways in which psychosomatic disorders are developed, and has planned a further series of animal experiments to explore the ways in which such disorders might be produced.

"If a child is afraid of going to school," Dr. Miller explains, "he might display a variety of autonomic symptoms. If one of the symptoms, say an upset stomach or a change in heart rate or blood pressure, is particularly disturbing to the child's mother," he says, "she might reinforce the symptom by demonstrating her concern or by keeping the child at home." Eventually, the child might develop a habit of responding to stressful situations with a visceral symptom.

Presently Dr. Miller and his colleagues are experimenting to see whether non-curarized animals can learn harmful visceral responses. They are also trying to determine whether there is a critical period during the animal's infancy when visceral learning is particularly intense and long-lasting.

"It's too early to promise any cures," says Dr. Miller, "but there's no doubt that we have developed a powerful new learning technique." □

Health care goes into the streets

By going directly to the problem, OEO health care centers hope to deliver better care to more people

by Jeanne Bockel

The existence of a health gap in the United States is widely accepted. Despite the expression of concern by several Presidents, it is still growing. Criteria such as infant and maternal mortality, used to gauge a nation's delivery of health care, show that the United States' ratings are shockingly poor. In addition, skyrocketing prices have made health care inaccessible to the poor and crippling for the middle class.

New ways to deliver health care are sorely needed. One attempt has been launched by the Office of Economic Opportunity in its design of neighborhood health center care for the poor.

According to Dr. Thomas Bryant, associate director for health affairs of OEO, the centers are bringing superior care to the poor; moreover, they may point the way to a radical revision of the nation's health delivery system itself.

OEO statistics show that more than 23 million poor people and an additional 13 million medically needy reside in the United States. Health care normally provided to them, inadequate as it is, has been permeated as well with a stigma of charity. To replace it, OEO designed the neighborhood centers primarily as a research undertaking. But to the slum dweller, the centers have made possible a level of care that just was not available before.

So far, 49 health centers, 13 of which are in rural areas, are being funded in 23 states. But OEO asserts

that more centers are needed because, if they were fully functional, they would be sufficient to provide care for a million persons, and OEO is seeking the funds for more.

The Neighborhood Health Centers emphasize family medicine and serve everyone in the target area who is living at the poverty level. They are tailor-made to the needs of the community. As Dr. Bryant says, "It would be of no service to have an English-speaking doctor in a Spanish-American community." In a city, he says, the center may deliver its services to a community; in rural areas, a group of counties may be served. But in either case, a well-organized center can provide services for a population ranging from 10,000 to 30,000.

The largest center, the Watts center in the Los Angeles ghetto, serves about 30,000 people, and employs about 40 to 50 physicians of all specialties. The physicians are divided into teams that include about 4 or 5 doctors, 8 to 10 nurses, social workers, family health workers and other paramedical personnel. Each team serves many families and is able to accomplish what one physician never could. On the other hand, in smaller centers, only three or four physicians, who practice basic medicine, may be employed.

Services are provided on an outpatient basis and the patient receives comprehensive services as preventive health, diagnostic services, at-home care for chronic illness, rehabilitation,

dental care, mental health services, drugs and appliances, and ambulance service.

If the patient needs hospital care, that too is arranged by the center. His personal physician continues his medical responsibility for the patient during hospitalization.

The emphasis, however, is on family medicine and the patient is seen not only as an individual but as a member of the family. Many health problems are related to family problems, and such issues as drinking problems, overcrowded conditions and whether both parents are working are explored by the health team.

The health center provides the members of its staff the opportunity to deliver health services in a new social climate. Each center has a direct link to a hospital in the community, usually a teaching hospital, and all physicians have staff appointments at the hospital.

The OEO centers are supported for a year or so by OEO grants, but are also designed to use all sources of health funds, encompassing Federal, state and local programs. Medical insurance payments are channeled through the center, as are payments for services to persons enrolled in Medicare. It is hoped that eventually Medicaid alone will be sufficient to support the centers. But many states will not use Medicaid funds for ambulatory care. This increases the cost of Medicaid because it encourages even the best-intentioned



The neighborhood centers emphasize family medicine and are tailor-made to fit the needs of the community.

chemistry

EXPLOSIVES

Making dynamite

Asahi Chemical Industries Co., Ltd., of Osaka has developed a streamlined, continuous process for producing dynamite in one operation as opposed to processing in batches.

In the Japanese process wet nitrocellulose, fed from a rotating drum onto a conveyor belt, is shredded by a spiked wheel. It then falls into a stream of nitroglycerin oil, or nitroglycerin and nitroglycol, and flows down an inclined chute.

Immediately a slurry forms that slides down onto a second belt carrying powdered oxidizing agents, sodium and ammonium nitrate, which gel it into a pasty mixture. Then rotary knives slice it into pieces that are pushed into a hopper where a reciprocating plunger squeezes the mixture into a polymer tube. Rollers knead the tube and push its contents along until a dense dough-like mixture falls out and is extruded into waiting cartridge cases.

ANALYTICAL CHEMISTRY

Laser check

Since impurities in the parts-per-million and -billion range can affect the performance of a ruby laser crystal, scientists at the National Bureau of Standards have applied neutron activation analysis to detecting elements at these levels.

By bombarding ruby crystals with slow neutrons, Dr. Barbara A. Thompson and Eric C. Miller have determined the presence of barium, strontium, copper, cobalt, tungsten, gold, lanthanum, manganese, gallium and iridium at the parts-per-million level and below. Their presence was indicated by the emission of characteristic gamma rays resulting from their being made radioactive through neutron absorption.

AUTOMOBILES

Plastic as a lubricant

Plastics are being tested as a water lubricant to make ships go faster (SN: 3/29/69, p. 308), and now are being suggested for use in multigrade motor oils to improve their lubrication properties.

Ulrich Schodel of Rohm and Haas Co., reports that wear tests on a number of European gasoline and diesel engines show that polymethacrylate in multigrade motor oils reduce wear of rod and main bearings, cylinders, compression rings and lifters.

Schodel found that piston deposits from polymers in the oil were no problem at all. In fact, he reports, polymethacrylate with chemical additives (amine, amide and hydroxyl groups) improved piston cleanliness.

EXTINGUISHERS

Fire-fighting foam

A new fire-fighting foam has been patented by the United Kingdom Atomic Energy Authority. It relies on perlite, an aluminum silicate rock of volcanic origin, that is ground into a powder. Upon heating to 900 de-

grees C., the perlite softens and is expanded by its own steam (it contains 5 percent water) to form a foamy product of 4 to 20 times increased volume.

When applied to a fire, it coalesces as a stable, viscous foam—two advantages over similar foams—that smothers the fire.

POLYMERS

Glass beads in plastic

Solid glass spheres are being used to enhance the properties of plastics. Averaging about 30 microns in diameter, the glass beads are finding increased use in a range of polymers, including nylon, polyethylene, silicones, epoxy resins and polyesters. The beads improve properties such as compression strength, abrasion resistance, hardness and stiffness.

They are introduced into the plastic when it is in the resin stage and are encapsulated by it. The product has the additional advantage, says James Ritter, director of research at Potters Bros., Inc., in Carlstadt, N.J., that as a combined filler and reinforcement they make for more economical plastics.

SOLID WASTE

Ashes to tires

Fly ash, the waste product from coal-fired electric generators, totals 20 million tons a year. It is being proposed by the U.S. Bureau of Mines as a way to make winter driving safer. Scientists at the bureau's Coal Research Center at Morgantown, W. Va., have found that rubber samples formulated like tire treads showed improved traction and skid resistance when they contained fly ash. Preliminary tests indicate that a tire could take up to two pounds of fly ash without noticeable effect on its wear properties.

The bureau's next step is to get a manufacturer to produce such tires for comparison with conventional winter tires.

ELECTROCHEMISTRY

Experimental batteries

Scientists at Argonne National Laboratory are eyeing a unique family of batteries that will store more electricity than conventional batteries and can also be recharged more quickly and easily. Heart of the experimental units is a cell with a lithium anode and a cathode of lithium-alloyed sulfur, selenium or tellurium. The electrolyte, the material that carries the current from anode to cathode, is a paste of fused lithium compounds with halogens such as chlorine and iodine.

The main reason for the cells' greater capacity and improved recharging is that they operate at high temperatures (500 to 800 degrees F.), which reduce electrical resistance. At these temperatures the anodes and cathodes are molten. As batteries they would be insulated to prevent heat escape.

The cells are being groomed for such jobs as powering an electric car and an artificial heart, reports Dr. Elton J. Cairns of Argonne's chemical engineering division.

medical sciences

Gathered from last week's annual meeting
of the American Radium Society in San Diego

BRAIN TUMORS

Premature radiation therapy

When a patient with a cancer outside the central nervous system develops symptoms in the CNS, it is often assumed that the cancer has spread to the brain. The patient may be given radiotherapy, even if a brain tumor has not been demonstrated with X-rays and without surgery or tissue diagnosis.

But Dr. Robert Raskind of the Kaiser Foundation Hospital in Oakland, Calif., claims that radiation, though it may prove a helpful adjunct to surgery, should only be used with extreme caution.

Dr. Raskind reports that of 51 patients in whom a single metastatic lesion of the brain was removed surgically, the lesion was either unrelated to the primary cancer or noncancerous in 12. Forty-four of the 51 survived the operation, and 40 showed good to excellent sensorimotor function and mental and intellectual integrity. One year following brain surgery, 15 have survived.

METASTATIC NODES

Successful therapies

Few studies have been conducted on metastatic cervical nodes from an occult primary lesion—cancer spreading to the neck from an unknown primary source. Moreover, treating patients with lymph node cancer of the neck when the disease has spread and when the site of the disease is unknown is complicated and difficult.

Reporting on studies with 80 such patients, a Puerto Rican physician declares the situation is not hopeless. Dr. José Pico of the University of Puerto Rico School of Medicine in San Juan says most such patients are over age 50, and the male/female ratio is 2:1. In 63 of the 80 cases studied, the disease manifested itself as a large tumor. For this reason, either a needle biopsy or incision of the node was used to diagnose the cases.

Radiotherapy proved the best treatment in 52 percent of the cases, and most undergoing it as primary treatment had advanced metastatic disease or were not candidates for radical surgery. In 29 percent (23 cases) surgery was the main treatment but in 16 of those additional post-operative radiotherapy was given. Fourteen received no treatment.

Dr. Pico says that eight of 38 patients survived for five years. The metastatic nodes of these patients were in the upper and mid parts of the neck where treatment is generally more successful than that given in the lower neck or chest-wall areas.

RADIOTHERAPY

Radiation from two sources

Radium deposits have produced highly successful results in treating cervical cancer, reports Dr. Gilbert H. Fletcher of M. D. Anderson Hospital at the University of Texas in Houston. Statistics for Dr. Fletcher's work are based on studies with 1,350 patients over a 12-year period from September 1954 through June 1966. Ninety

percent showed no evidence of the disease two years after being treated with the deposits in the early stages of the condition.

But Dr. Fletcher claims that a combination of intracavitary radium (inserting radium in the uterus or vagina for example) and external irradiation is generally more successful.

Of 123 patients treated with radium deposits in the uterus and vagina, 117 were free of cancer two years later, and of 283 patients given radium deposits and external radiation, 262 had no recurrence after a two-year period.

Dr. Fletcher says that in the more advanced stages of carcinoma of the cervix, the 16 of 19 treated with radium only were free of disease after two years, and 115 of 137 treated with radium and external radiation showed no evidence of disease.

THERAPY

Primary lymphoma of the orbit

Orthovoltage therapy—X-ray therapy with less than 200,000 volts—has produced good local control of lymphoma of the orbit, the bony cavity that contains the eyeball, with few resulting complications. Furthermore, says Dr. S. C. Foster of Columbia-Presbyterian Medical Center in New York, in a significant percentage of patients the disease does not spread.

Dr. Foster, in collaboration with C. S. Wilson, also of Columbia-Presbyterian Medical Center, reviewed 36 patients with primary lymphoma of the orbit treated at the Presbyterian Hospital during the past 30 years. The predominant pathological diagnosis was lymphosarcoma.

Orthovoltage therapy achieved local control in all patients. Local recurrences were successfully retreated and, the physicians note, recurrences were in the front of the orbit, primarily in a low-dose area, suggesting there is a minimum dose that should be used to treat the whole orbit.

LYMPH NODE CANCER

Combined treatment stressed

Early detection, frequent checkups and combined surgery and radiation to control lymph node cancer are stressed by a Texas radiologist. Dr. Gilbert H. Fletcher of the M. D. Anderson Hospital says that irradiation after surgery effectively prevents spread or recurrence of the disease.

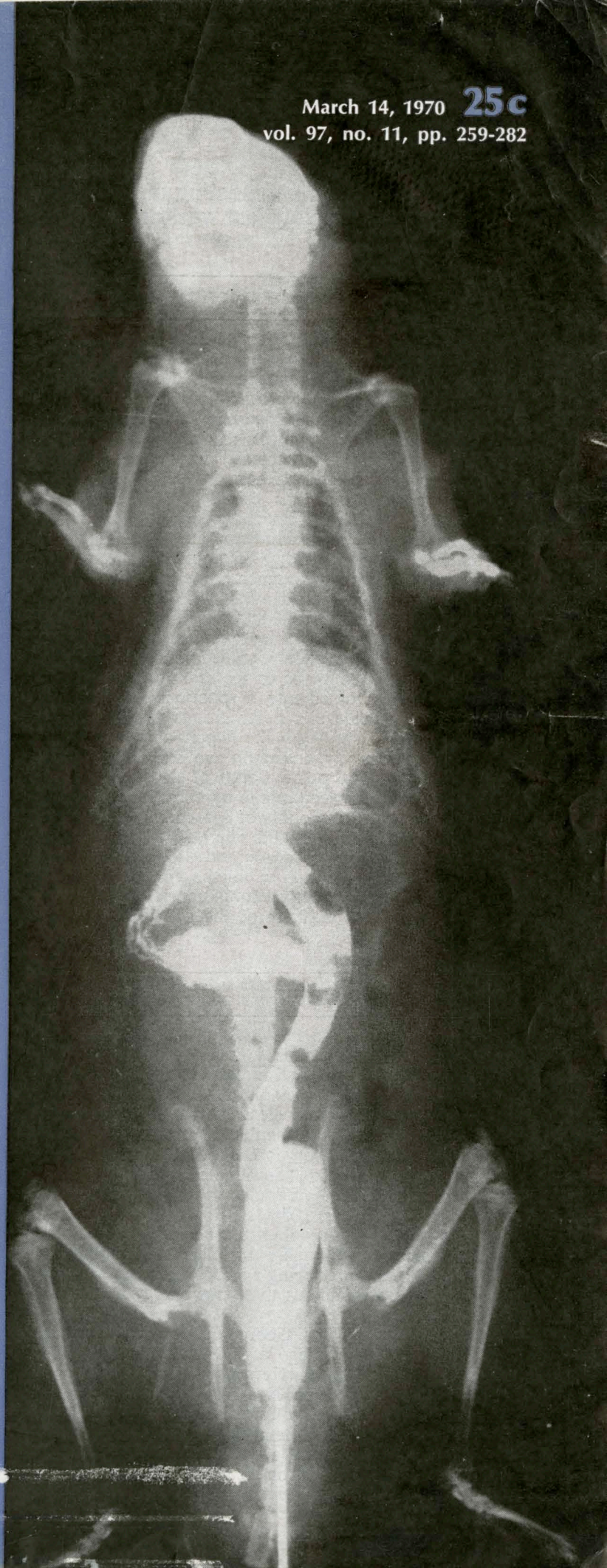
Reporting on a study of 469 patients, the physician claims that irradiation of initially uninvolved areas of the neck for squamous, or scaly, cell carcinomas of the base of tongue and tonsillar area prevented new nodal disease from occurring.

A dose of 4,500 to 5,000 rads for five weeks controlled 80 to 90 percent of nonpalpable cancer cells (where nodes are not perceptible to touch), whereas doses ranging from 5,000 rads for five weeks to 7,000 rads for seven weeks controlled a high percentage of palpable nodes.

science news

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**training
the autonomic
nervous system**



Automating a sky search

A medical seedbed

Letter from Brussels

Europe's environmental dilemma

biophysics

Gathered at the annual meeting of the Biophysical Society last week in Baltimore

MEMBRANES

Hypothesis explains semipermeability

Many important biological functions—respiration, nerve transmission and photosynthesis among them—take place on subcellular membranes about 80 to 100 angstroms thick. These protein-lipid membranes are semipermeable. They permit certain ions to pass through but not others. To accomplish this they distinguish between ions which are chemically very similar such as sodium, potassium and rubidium.

A group of compounds called ionophores provide insight into how semipermeability might work. These molecules form very specific complexes with metal ions and enable them to dissolve in nonpolar solvents that are chemically similar to membranes. Nobel laureate Manfred Eigen and Dr. Ruthild Winkler of the Max Planck Institute for Physical Chemistry on Goettingen, Germany, studied a class of ionophores called actins. The first molecule of the class is called monactin and is a circular chain in the shape of the seam of a tennis ball. The molecule is folded into a spherical ball with non-polar groups outside and polar groups inside.

The molecule can open like a pair of jaws to admit into its central cavity a sodium ion and its associated water molecule. The polar groups of the monactin then replace the water molecules one by one, a process which is completed in 20 billionths of a second.

The potassium ion and its shell of water molecules are larger than the sodium ion and its water molecules. The sodium complex fails to fill the cavity. The potassium complex fits perfectly. Rubidium is too large. This then explains the specificity of the system.

PHOTOSYNTHESIS

Missing electron found

Most workers in the field believe that the first event in bacterial photosynthesis is the loss of an electron from a bacterio-chlorophyll molecule. The best evidence for this is from electron spin resonance measurement that detects the unpaired electrons that remain behind. In this technique, a magnetic field is applied and the spin of the unpaired electron is flipped from clockwise to counterclockwise (spin "down" to spin "up") by a microwave field of a particular frequency.

Until now, however, detection of the electron lost from the bacterio-chlorophyll has eluded the most careful experiments. Presumably this electron is captured by another molecule, producing a strong reducing agent that drives a series of reactions that store energy for later use by the bacterium.

Measurements by Drs. George Feher of the University of California at San Diego and David Mauzerall of the Rockefeller University in New York, have finally traced down the elusive electron. Drs. Feher and Mauzerall did an electron spin resonance measurement with modulated light of 1.5 degrees K., a temperature at which helium is superfluid. They detected a weak signal which they attribute to the first electron acceptor. Previous experiments by these and other workers had never gone below

4 degrees K., the temperature of boiling helium liquid. At that level they could not detect the missing electron because of noise problems.

The experiment leaves open the question of the identity of the molecule on which the electron is trapped. From the weakness of the signal Dr. Mauzerall speculates that the electron acceptor is an iron derivative.

SLIME MOLD

New focus of attention

Thirty-three years ago Dr. Max Delbruck began a revolution in molecular kinetics by an intensive study of bacteriophage, a virus that infects bacteria. Dr. Delbruck reasoned that phage had practically no functions other than genetics and would make it possible to study genetics in its simplest form.

Now a Nobel laureate, Dr. Delbruck has a new love, a slime mold called phycomycetes, which he says displays sensory responses in their simplest form. Phycomycetes detects blue and yellow (but not red) light, then grows toward it. It grows away from an object that is touching it. Most remarkably, phycomycetes detects and avoids nearby objects by detecting a disturbance in the circulation of air around itself. These properties, Dr. Delbruck says, are a simple form of sensory transduction that should repay intensive study just as did the genetics of bacterial viruses.

VISION

Effect of light on retina

In most sensory nerve cells, stimulation produces a sudden increase in the permeability of the cell membrane to sodium ions. Sodium ions then rush across the membrane to the cell's interior, creating a change in voltage across the membrane. These changes control the firing of a signal in the same or an adjacent cell.

Until last year, scientists thought that the retina produced its impulse in more or less the same way. Then, Dr. William A. Hagins and his colleagues of the National Institutes of Health in Bethesda, Md., measured the conductance of the external membrane of the outer segment of the rod cells of rat retina. Unlike other sensory cells, he says, stimulation of the retina leads to a decrease, rather than increase, of membrane permeability to sodium ions, and thus a decrease in the flow of sodium ions.

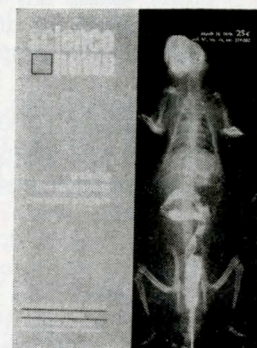
The current circulating in the rat rod outer segments consists of sodium ions flowing spontaneously from a region of higher to one of lower concentration. Experiments with the metabolic poison, ouabain, indicate that metabolic energy is needed to pump the ions from this outer segment into the intercellular space to maintain the concentration gradient.

A small increase in the concentration of calcium ions reduces the current in the dark in a way analogous to the action of light. This suggests that light may cause the rods to release calcium to stop the sodium currents.

science news®

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X-ray of experimental rat with intestinal mobility measuring device which is being used at Rockefeller University in studies having to do with learning to control the autonomic nervous system. See page 274. (Photo: Rockefeller Univ.)

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films OF THE WEEK

THE DEVELOPMENT OF ELECTROCHEMISTRY. 16mm, color, sound, 19 min. This historical survey of the production of an electric current by chemical action covers the work of Alessandro Volta, Sir Humphrey Davy, Hans Christian Oersted, Michael Faraday, van't Hoff and others in Europe and America. Audience: high school, college, general. Purchase \$195 from International Film Bureau, 332 S. Michigan Ave., Chicago, Ill. 60604.

THE MARTIAN INVESTIGATORS. 16mm, color, sound, 28 min. Presents a candid study of the principal investigators at the moment of discovery as the Mariner 6 and 7 spacecraft provide close-up pictures of the surface of Mars. Mariner 6 completed a 156-day journey through space on July 31, 1969, when it passed within 2,000 miles of the Martian surface. Mariner 7 passed by the planet at a similar distance on Aug. 5, 1969. In addition, to detailed photographs of Martian craters and the south polar "ice cap," the twin spacecraft provided new data on the pressure and chemical composition of the atmosphere and on atmospheric and surface temperatures. Audience: general. Purchase from National Audiovisual Center (GS), Washington, D. C. 20904 or free loan from NASA field libraries or National Aeronautics and Space Administration, Code FAD-2, Washington, D. C. 20546.

THE PROBLEM IS LIFE. 16mm, color, sound, 29 min. The population explosion is a major threat to India. Unless the birth rate is reduced, famine will erase all of the economic progress made in the past 20 years. With help from the United Nations, India has started a vast birth control program. This film takes us to an Indian village where a Family Planning worker makes person-to-person contact with the people. We follow a young doctor to the Family Planning Center where free contraceptive information is supplied and see a vasectomy, the method of contraception that has so far proved most successful in India. Audience: general. Purchase \$260 or rental \$11 from Contemporary/McGraw-Hill Films, Dept. DF, 330 W. 42nd St., New York, N. Y. 10036.

SCIENCE LAB SAFETY—PART I. 16mm, color, sound, 19 min. Points out many steps which should be taken in certain high school science laboratory situations to prevent injury. Concentrates on safety in the physical science laboratory, but many aspects are also basic to safety in the biological science laboratory. Film shows that when a young person reaches junior high school he assumes a share of the responsibility for his own safety as well as the safety of others. This is especially true for the science laboratory, where the simplest exercises could be dangerous, and where one individual must depend upon another for his safety. Audience: high school. For purchase information, write Film Production Service, Virginia Department of Education, 523 E. Main St., Richmond, Va. 23219.

Listing is for readers' information of new 16mm and 8mm films on science, engineering, medicine and agriculture for professional, student and general audiences. For further information on purchase, rental or free loan, write to distributor or circle the appropriate number on the Reader's Service Card.

to the editor

Meteor/meteorite

In your article "Go, and catch a falling star" (SN: 1/17, p. 60) you state, "... meteorites flaming through the earth's atmosphere. . . ."

Meteorites do not flame through the earth's atmosphere. Meteors do and become meteorites only after they hit the earth.

Russell M. Harvour
Chatham, N.Y.

(Strictly speaking a meteor doesn't become a meteorite until it strikes the ground. However, scientists commonly speak of a meteorite "passing across the sky" or being "decelerated by the atmosphere." Ed.)

First step

"Sulfur dioxide and guinea pigs" (SN: 1/17, p. 70) should be classed in the half-truth, or "what wasn't said" category of science.

It may be true that sulfur dioxide, like carbolic acid, kills or deactivates bacteria. But what about sulfur dioxide on particles, or mixed with other pollutants. There is certainly evidence that various pollutants have synergistic action on each other, and that the sun and weather also can change them, often for the worse.

Your magazine has an obligation to report the whole story, even in those brief abstracts, because so many people depend on you to interpret current research. I can just see what some uneducated newspapers could do with your inadequate coverage: "Air Pollution is Good for You!"

Paula Ayers
Washington, D. C.

(Dr. J. Wesley Clayton, director of Inhalation, Toxicology and Biochemistry Laboratories at Hazelton Laboratories, Inc., says the experiments with sulfur dioxide alone were the first step in a series in which other pollutants,

such as sulfuric acid mist and particulates, will be examined to study any synergistic or antagonistic effects. Studies will also include the effects on primates. Ed.)

Prospector's perspective

A recent article (SN: 1/24, p. 89) on the possibility of dangers to humans because of radioactive contamination of soils, water and air from nuclear power plants has only contributed to the hysteria of the uninformed and made political propaganda for those on the left.

Since 1951, my associate and I have been extensively prospecting and exploring for uranium. Among other things, we use radioactive detection equipment, water sampling, etc. We have worked in dozens of areas, most of which consisted of many square miles where the radioactivity from uranium and its daughter products is as much as 10 times greater than what the AEC considers standard.

Water wells, springs, lakes, etc. tested for uranium in these areas have in a number of instances run several hundred times over what is considered normal.

Ranchers, sheepherders and others lived and raised families in these areas and drank this radioactive water. They also eat livestock, wildlife and fowl that have drunk these waters and grazed on grasses, plants and products that have absorbed much uranium.

Most of the inhabitants of these areas are quite healthy, robust and live to a ripe old age.

Ralph L. Schauss
Casper, Wyo.

Address communications to Editor,
Science News, 1719 N Street, N.W.
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science news OF THE WEEK

The long and short of the oil spills

Scientists discover lingering effects of oil spills as a well in Louisiana tests defenses

Since the wreck of the tanker Torrey Canyon off the coast of England in 1967, and the Santa Barbara oil leak in 1969, scientific, official and public awareness of the seriousness of oil spills has grown. The problem has grown, too, as larger facilities are built both to produce and to transport the increasing volume of petroleum consumed throughout the world.

But effective methods of coping with oil spills are still lacking (SN: 2/29/69, p. 183), as are clear-cut guidelines for assigning liability and jurisdiction for cleanup. A Congressional conference committee worked toward a solution of the legal problems this week; at the same time one of the worst oil spills in history was in the making eight miles off the Louisiana coast, where several wells had been burning at a collection point since Feb. 10.

The fire, in fact, had been all that protected the Gulf Coast from the oil, consuming it as fast as it surfaced. But when the fire atop the Chevron Co. drilling platform in the Gulf of Mexico was blown out with a dynamite blast, at 11:27 A.M. Tuesday, a gusher of oil and gas 100 feet high erupted.

Chevron threw booms, skimmers and other equipment into action immediately, reporting that 20 percent of the oil was getting through the boom that served as the first line of defense. But officials believed they would be able to stop it before it got ashore. The Interior Department estimated the oil was flowing at a rate of 600 to 1,000 barrels a day, making the Louisiana spill bigger than the Santa Barbara leak. But Chevron officials hoped that the time they had had for advance preparation would make the disaster less serious.

Chevron had prepared, along the

Louisiana shore as well as at sea, one of the largest and most expensive assemblages of men and equipment ever gathered for an oil spill. The company says it is using every technique known to try to prevent the oil's spread and to shut off the flow.

But such willingness to accept responsibility is not always the case. There was a serious question of liability after Santa Barbara, and the Senate-House conference committee discussing pollution control legislation this week sought to nail shut several loopholes. It gave tentative approval to a proposal that would assign nearly ironclad liability to a well or ship which is the source of an oil spill. This would amend a 1966 law, which insists on proof of willful negligence before liability can be assigned.

The amendments would also authorize money—\$50 million in the Senate version and \$20 million in the House version—for a revolving fund for the Interior Department's Federal Water Pollution Control Administration to use in dealing with oil spills. Replenishment of funds spent would come from judgments against polluters.

Other provisions would allow the President to clarify jurisdictional problems within the three-mile limit and extend Interior's authority over vessels beyond it.

The Interior Department now has jurisdiction for outer continental shelf drilling beyond the three-mile limit. After the Santa Barbara leak, Interior Secretary Walter Hickel used leasing laws as a basis for regulations which impose total liability, without a requirement for proof of negligence, for spills from these wells (SN: 3/1, p. 208). The Union Oil Co. and others have

spent \$5 million in cleanup since the Santa Barbara spill started.

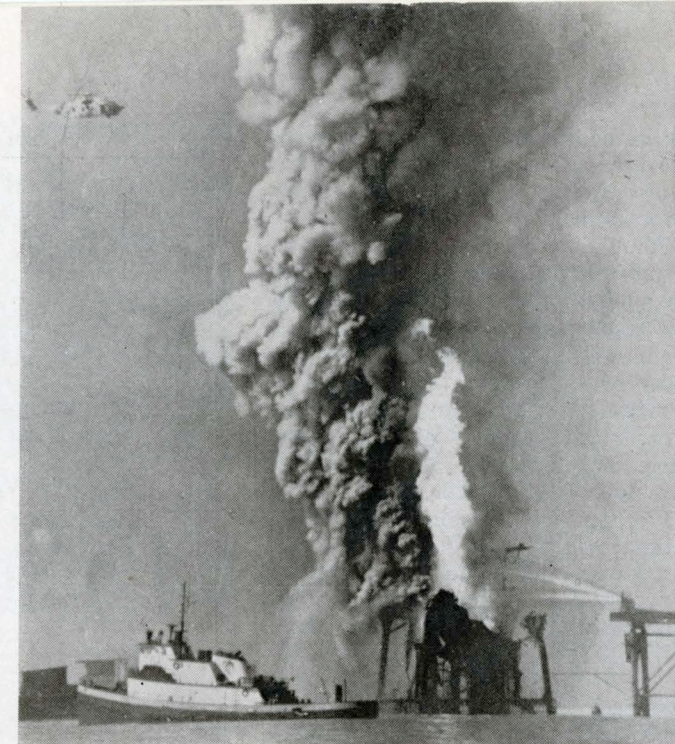
Valuable as FWPCA officials believe these existing regulations to be—they apply in the Louisiana case—and as much as they want enactment of amendments along the lines of those considered by the conference committee, they are convinced that because of the drawbacks of cleanup methods, prevention will be the only ultimate remedy for oil pollution.

The spectacular Louisiana disaster is still at center stage, but research is under way which promises to overshadow any single oil spill in ecological importance.

The research, centered at Woods Hole Oceanographic Institution, shows already that effects of various fractions of petroleum on marine life systems are insidious, deadly and widespread, even months after a disaster is ostensibly over.

Dr. Max Blumer, Woods Hole chemist, reports that levels of certain hydrocarbons from a September spill at West Falmouth, Mass., are as high in sediments and organisms now as they were six months ago. These hydrocarbons are like chlorinated pesticides; they are not biodegradable, and they concentrate in organisms up the food chain.

Dr. Blumer is most concerned about the toxic aromatic hydrocarbons—containing closed rings—in petroleum and its products. Unlike other fractions, the aromatics—such as benzene, toluene and xylene—do not occur naturally in marine organisms, and bacteria which would degrade them have not evolved. Though such relatively volatile fractions might be expected to evaporate, Dr. Blumer has discovered them in the Sargassoc Sea, where tar balls that had



Louisiana: With the fire out, a gusher in the sea.

been in the ocean for long periods were discovered and analyzed. The aromatics are also more water-soluble than other hydrocarbons.

Although he regards the aromatics as the most toxic fractions, Dr. Blumer says all hydrocarbons are suspect and some are unexpectedly nondegradable. Paraffins—straight chain saturated hydrocarbons—degrade scarcely at all in sediments, although they degrade within organisms at rates not yet determined. They are also showing themselves to be unexpectedly toxic.

Hydrocarbons in general tend to concentrate in the fatty tissues of organisms, where they remain virtually unchanged by metabolic processes. By transfer from the fat of one organism to another, they can become more concentrated as they move up the food chain. Mechanisms of toxicity are not wholly understood, but the aromatics have been implicated as carcinogens. The paraffins cause damage through cell narcosis, especially in shrimp larvae and other juvenile organisms.

Olefins—unsaturated—hydrocarbons interfere with ecologic processes which use various chemicals in concentrations as small as one part per million for such functions as attracting predators to their prey.

The olefins are generally absent from crude oil, but they are common in gasoline and other petroleum products, as well as in synthetic crude produced from coal or oil shale. "There is still a great mystery about the role that the olefins play in marine life processes," Dr. Blumer says. "But even if they are nontoxic, they can interfere with these life processes."

Dr. Edward Goldberg of Scripps Institution of Oceanography confirms Dr. Blumer's conclusions. "The chronic buildup of pollutants from petroleum is quite serious," he says. Dr. Goldberg has done research in the transmittal of pesticides in the environment.

Woods Hole scientists plan further sampling, at various points in the open sea, to learn the extent of pollution farther from shore.

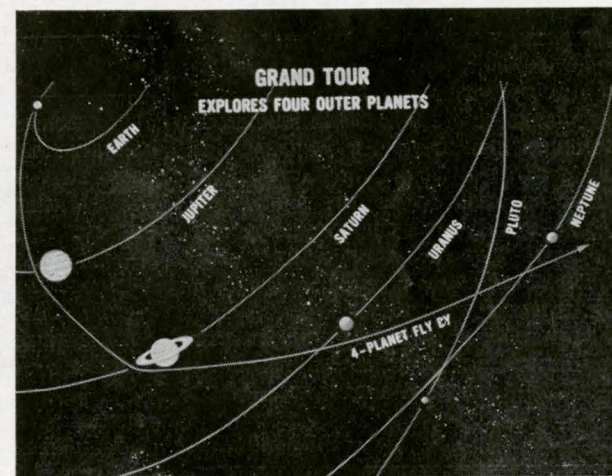
Dr. Blumer's work has concentrated on the more subtle biochemical effects of oil pollution. But the grosser effects have been known for a long time. Petroleum saturates the feathers of aquatic birds, reducing their buoyancy and water resistance and finally killing them.

The Interior Department reported last week that an estimated 10,000 birds had been killed along the shores of Alaska's Kodiak Island as a result of tankers pumping oily ballast out of their tanks into the sea. A sternly worded statement from Hickel indicated that he held this spill to be one that could have been avoided. □

SPACE MESSAGE

Reaching for the planets

To the outer planets: An earlier version planned to visit four.



NASA

With the first round of a continuing budget battle and the dedication of his Administration to environment, education and fiscal responsibility behind him, President Nixon last week turned to space. His promised space message (SN: 9/20, p. 233) was exactly what the scientists had ordered—not one present but a bundle full, largely unmanned.

The President, in deferring to the "many critical problems here on this planet which make high priority demands on our attention and resources," seemed to be trying to allay criticism of space-budget cuts by announcing that "by no means would we allow our space budget to stagnate."

The biggest plum was the first Presidential confirmation of a grand planetary tour: two unmanned cruises to the outer planets. One, aimed at Jupiter, Saturn and Pluto, is set for 1977. The second, to Jupiter, Uranus and Neptune, will go two years later. Such missions are the rare opportunity of this decade; it will be 180 years before the planets will be aligned again in such a way as to allow one vehicle to swing by each of them.

Scientists had been rather gloomy about the prospects of the grand tour idea. The date had not been mentioned in the National Aeronautics and Space Administration budget announced Jan. 31 by Administrator Dr. Thomas Paine. At that time Paine also inferred that neither the nuclear-powered vehicle NERVA, nor the Saturn 5 rocket, would be able to carry out the mission; the nuclear vehicle will not be flown until 1978, and production of the Saturn 5 rocket has been suspended. Now scheduled for the task is the Titan III-D Centaur-Burner II, which could carry a payload of about 1,600 pounds; the Saturn could carry 9,800 pounds.

Another theme that scientists have

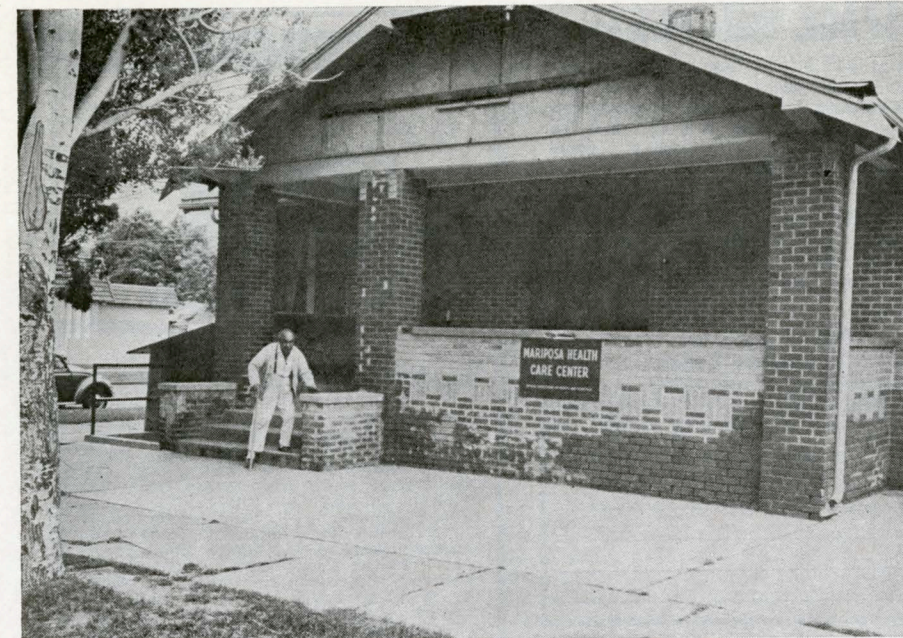
been pushing is greater emphasis on unmanned flights as precursors to manned missions. The President seemed to be going along with this idea, too. In particular, he did not set a firm date for a manned flight to Mars, although he said we will eventually, fly there. Dr. Paine says such a flight could not take place before the late 1980's.

Nevertheless, manned flights are the meat of the space program, and to support his contention that his program is "bold but balanced," the President emphasized the importance of the remaining manned lunar flights, to be completed with Apollo 19, according to NASA plans, by 1974. He also mentioned Skylab—the orbiting workshop of 1972—which will house several three-man crews for periods up to 56 days.

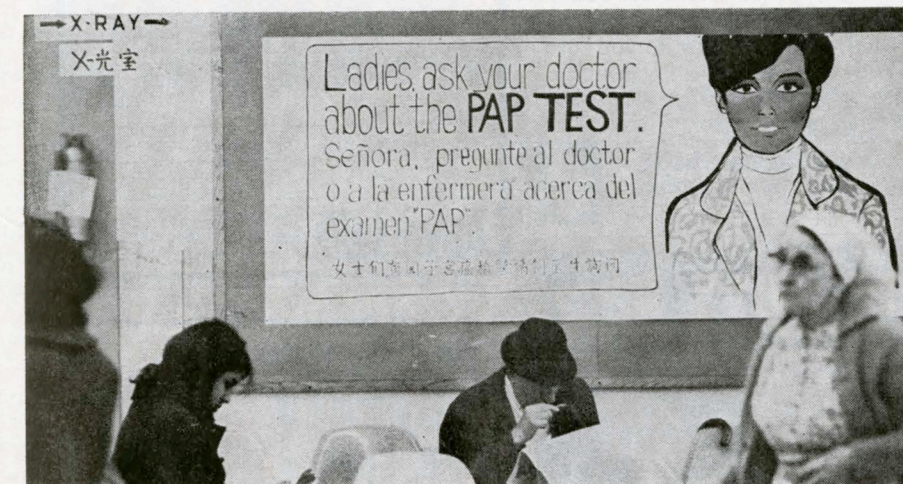
In addition, as his Space Task Group pointed out in its September report, unmanned planetary explorations, such as two planned Mars orbital flights in 1971, the two unmanned spacecraft landings on Mars in 1976, and the Venus-Mercury flyby in 1973, are all precursors of later manned missions.

Another aspect of President Nixon's space program is the much-touted possibility of gains from earth applications. The President went through the catalogue once more: communications, weather forecasting, low-cost space transportation, crop surveys, mineral location and the measuring of water supplies. Much of this work will be done by a variety of earth satellites which Mr. Nixon did not catalogue.

The President also made a traditional gesture to "greater international cooperation in space," a point backed up by Dr. Paine's recent trip to Canada, Japan and Australia to discuss cooperative space projects.



The results in Denver indicate that neighborhood centers may be the answer.



For the needy, the neighborhood health centers make possible a level of care that was not available before.

physician to put the patient in a hospital. Dr. Bryant stresses that Medicaid must begin to support ambulatory care because "hospitalization costs money." This is a realization that is already reflected in Presidential policy; the support of hospital construction rather than ambulatory facilities was an issue in President Nixon's veto of the controversial Health, Education and Welfare appropriations bill (SN: 1/31, p. 121).

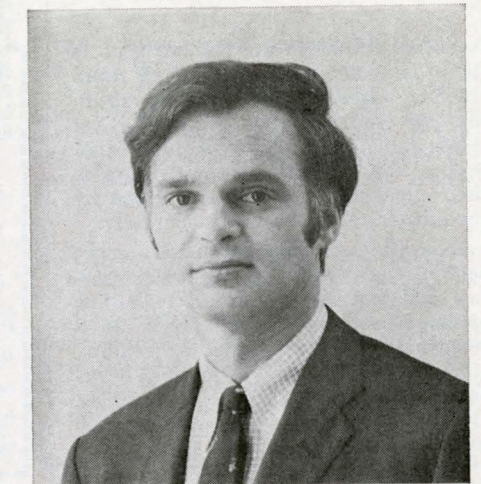
Dr. Bryant anticipates that Neighborhood Health Centers ultimately will operate without OEO subsidy, as they strengthen their resources through integrating other sources of funds and services.

Although it is not universally accepted that the centers have as yet been successful—any effort to extend them beyond the poverty level is sure to be resisted—Dr. Bryant contends

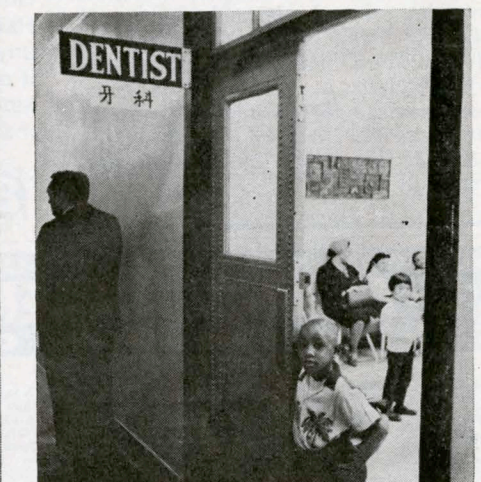
that a few points have been proved. He says that in ghettos, where there is no health care system, centers are the answer. In areas where there are active public health centers with group practice, however, then the answer may be to build on this. "We can't say we've got a model and can spread it around," he says.

A second proven point, he says, is that people and institutions can be brought together to focus on the problem. City governments, the poor, physicians and public health workers have willingly joined in helping to provide health care to poor populations, he says.

The impact of success, claims Dr. Bryant, cannot be measured in two or three years. "It would take 20 years of practicing good preventive medicine before that can be done." But some measure of success is already being



Bryant: Superior care for the poor.



Photos: OAO

seen. In Denver, for instance, he believes the center is responsible for the fact that patients are not missing as many days at work, and lengths of hospitalization have decreased.

If OEO's role is to prepare the system for universal health insurance by bringing about the necessary changes in the health care system, the next step, according to Dr. Bryant, is to move into preventive medicine outside the nation's ghettos.

Episodic health care for preventive medicine must be practiced. OEO can bring about this change by next entering the hospital out-patient departments and then into the hospitals themselves. Last summer, OEO made sizable grants to four municipal hospital out-patient departments serving up to 200,000 persons, and hopes to expand the program to 5 to 10 cities in the next year. □

Are You A Slow Reader?

A noted publisher in Chicago reports there is a simple technique of rapid reading which should enable you to increase your reading speed and yet retain much more. Most people do not realize how much they could increase their pleasure, success and income by reading faster and more accurately.

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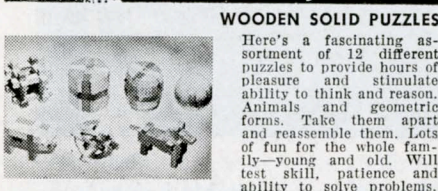
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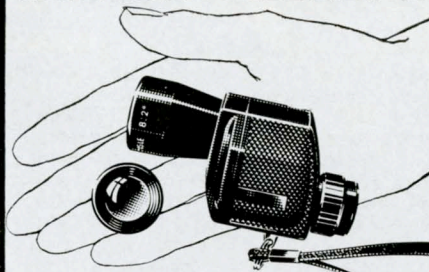
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books OF THE WEEK

ABOVE AND BELOW: A Journey Through Our National Underwater Parks—Helga Sandburg and George Crile, Jr.—McGraw-Hill, 1970, 302 p., \$7.95. Highly readable account, acquaints the reader with the marine environment, and the land and sea animals in and around the Everglades, the Virgin Islands, Anacapa off the coast of California and the coral reefs off Saint Croix.

ADVANCES IN ENVIRONMENTAL SCIENCES, Vol. 1—James N. Pitts, Jr. and Robert L. Metcalf, Eds.—Wiley-Interscience, 1969, 356 p., illus., \$15.95. Deals with the application of science and technology to the control and improvement of environmental quality, in specific areas such as oxides of nitrogen, biodegradable detergents, and aeroallergens and public health.

THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC for the Year 1971—Nautical Almanac Office, U.S. Naval Observatory—GPO, 1969, 520 p., diagrams, \$6.25. Source of basic calculations and data, principal ephemerides, configurations of satellites, eclipses, sunset and twilight time, moonset, observatories, and other tabulations.

AMERICAN INDIAN MEDICINE—Virgil J. Vogel—Univ. of Okla. Press, 1970, 583 p., illus., \$12.50. Comprehensive account of the effect of Indian medicinal practices on white civilization, discusses Indian theories of disease and methods of combating disease, and lists Indian drugs that won acceptance in the U.S. Pharmacopeia and the National Formulary.

THE ARCHAEOLOGY OF THE NEW TESTAMENT: The Life of Jesus and the Beginning of the Early Church—Jack Finegan—Princeton Univ. Press, 1970, 273 p., photographs, maps, \$20. Presenting the tangible things, inscriptions, objects, tombs, architectural remains, the book investigates sites connected with John the Baptist, Bethlehem and Nazareth, Caesarea, Jericho, the Mount of Olives, and Jerusalem.

THE ART AND SCIENCE OF TAKING TO THE WOODS—C. B. Colby and Bradford Angier—Stackpole Bks., 1970, 288 p., illus. by Arthur J. Anderson, \$7.95. Covers outdoor living and camping, on foot or on wheels, tells about basic skills, shortcuts and advanced techniques.

BIOLOGICAL ASPECTS OF THERMAL POLLUTION—Peter A. Krenkel and Frank L. Parker, Eds.—Vanderbilt Univ. Press, 1969, 407 p., illus., \$7.95. Symposium papers and discussion of the magnitude of the problem, the effects of heated discharges on marine zooplankton and estuarine benthos, thermal requirement of freshwater fishes and other aquatic life.

BRAIN AND BEHAVIOUR, Vol. 1: Mood, States and Mind. Vol. 2: Perception and Action—K. H. Pribram, Ed.—Penguin Bks., 1969, 496 p., 475 p., plates, illus., paper, \$2.95 each. Readings on basic neuropsychological research, work on sleep, alertness and mood, and on physiological determinants of drive states.

Vol. 2 deals with neural events involved in perception and cognition, and motor function of the nervous system.

CHEMOTHERAPY OF CANCER—Warren H. Cole, M.D., Ed.—Lea & Febiger, 1970, 349 p., photographs, diagrams, \$12.50. Summarizes contemporary improved methods of therapy with anticancer drugs, indications, contraindications, and methods of administration—perfusion, infusion, and in combination with radiotherapy and surgery.

DICTIONARY OF FUEL TECHNOLOGY—Alan Gilpin—Philosophical Lib., 1969, 275 p., diagrams, \$20. Broad treatment, intended to be of value to fuel technologists, chemical engineers, air pollution control engineers and others.

THE DIRECTION OF HUMAN DEVELOPMENT—Ashley Montagu—Hawthorn Bks., 1970, rev. ed., 406 p., \$7.95. Anthropologist explores the nature of human nature, the evolutionary pressures that caused man to develop as a highly interdependent and cooperative creature; shows how innumerable investigations have substantiated the fact that interference with the infant's development as a loved and loving creature will damage his subsequent behavioral development.

THE DIVORCED MOTHER: A Guide to Readjustment—Carol Mindey—McGraw-Hill, 1970, 268 p., \$6.95. Intelligent assessment of the problems confronting the divorced mother—legal, financial, psychological and practical, with sound advice for working out satisfactory human relationships for the children and herself.

THE ENCYCLOPEDIA OF THE BIOLOGICAL SCIENCES—Peter Gray, Ed.—Van Nostrand Reinhold, 1970, 2nd ed., 1027 p., illus., \$24.95. Authoritative, encyclopedic work, incorporates latest research in articles ranging from "abiogenesis" to "zosterophyllophytina." A number of new topics, such as anthozoa, anura, cnidaria, neurophysiology, phytochromes and scyphozoa, have been added.

ENGINEERING ASPECTS OF THERMAL POLLUTION: Proceedings of 1968 National Symposium on Thermal Pollution—Frank L. Parker and Peter A. Krenkel, Eds.—Vanderbilt Univ. Press, 1969, 351 p., illus., \$7.95. Discusses ecological changes induced by heated waters, water quality standards, condenser-water discharge, cooling tower design, and research needs.

GAMES ANALYSTS PLAY—Martin Shepard, M.D., and Marjorie Lee—Putnam, 1970, 189 p., \$5.95. Analyst analyzes analysts' techniques and attitudes, describes sample conversations between therapist and patients, and points out the importance of successful patient-therapist rapport.

GENETIC EPISTEMOLOGY—Jean Piaget, transl. from French by Eleanor Duckworth—Columbia Univ. Press, 1970, 84 p., \$5. Swiss experimental psychologist explains the principles of genetic epistemology and discusses how a child's coordination of actions leads to their becoming mental operations and later logical concepts.

GRAVITATION AND THE UNIVERSE—Robert H. Dicke—Am. Philosophical Soc., 1970, 82 p., illus., \$2.50. In these Jayne Lectures for 1969, the author presents to a general audience the results of his intensive and extremely accurate tests of general relativity.

THE GREAT WEAPONS HERESY—Thomas W. Wilson, Jr.—Houghton, 1970, 275 p., \$5.95. Annotated reexamination and interpretation of J. Robert Oppenheimer's role as creator and critic of U.S. strategy decisions in atomic weapons development, with reflections on the current controversy.

A GUIDE TO SUPERCONDUCTIVITY—David Fishlock, Ed.—Am. Elsevier Pub. Co., 1970, 150 p., illus., \$7. Eight researchers offers their views on the progress and prospects for superconductivity in such fields as large magnets, rotating machines, transmission equipment, computers and electronic engineering.

HOW TO KNOW POLLEN AND SPORES—Ronald O. Kapp—Brown, 1969, 249 p., 500 drawings, paper, spiral-bound, \$3.25. A pictured-key, general guide to the identification of genera and families. Includes bibliography and describes laboratory techniques for preparation of modern pollen samples as well as fossil sediments.

IN QUEST OF QUASARS: An Introduction to Stars and Star-like Objects—Ben Bova—Crowell-Collier, 1970, 198 p., illus., \$5.95. A layman's introduction to what has become known about the quasi-stellar objects that eject extraordinary amounts of radio energy into the universe.

INGREDIENT X: The Production of Effective Drugs—Louis C. Schroeter—Pergamon Press, 1969, 157 p., illus., \$7.75. Tells about some of the challenging aspects of pharmaceutical research and product development.

MARTY MANN Answers Your Questions About Drinking and Alcoholism—Marty Mann—Holt, 1970, 112 p., \$3.95. Dealing with alcoholism as a dread disease that afflicts 6.5 million Americans today, the book answers questions about the alcoholic, his family and his treatment, factually and thoroughly.

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LETTER FROM BRUSSELS



For a cleaner Europe

Nature Conservation Year is spotlighting the need for more international action

by John Lambert

Europeans are waking up to the fact they are creating a world unfit to live in. And prospects for solving intensifying pollution problems are made less bright because of political confusion created by national boundaries that cut across natural features.

Some aspects of the deterioration of the European environment can be met on a national level through legislation and planning; Sweden is far advanced, and the British are making a major effort. But pollution has an unhealthy disrespect for the political frontiers Europe inherited from the past.

The Rhine, for example, gathers impurities from Switzerland, Germany, France and the Netherlands (SN: 7/19, p. 64). Rhine water flowing from Switzerland through Strasbourg to its mouth in the Netherlands shows a 100,000-fold increase in microorganisms. A pollution chart of the Rhine is known to exist, but even Council of Europe experts have been unable to obtain it. The Rhine water authority that assembled it is too afraid of the backlash from industrialists if their responsibility were made public.

But this year is Nature Conservation Year, promoted by the council, and the emphasis is changing. At a conference held in Strasbourg in February to launch the year, the theme was changed, significantly, from "conservation" to "the management of the environment in tomorrow's Europe." A big effort is on to educate European public opinion to the fact there is more to conservation than keeping the beaches clean or saving rare bird species from extinction, and that urbanization, the relentless growth of industry, new methods in agriculture and the expansion of leisure activities all contribute to the steady and irreversible deterioration of the natural environment. These were the four themes chosen for the conference, and the information on them was gathered from all 14 member countries in Europe.

In the fine-sounding words of the council's official declaration. "Conservation is not merely a palliative designed to put a stop to the impact of growing population numbers and technological progress on our physical environment. Far more, it must be a concerted effort to make the right choices in improving the quality of the environment and creating surroundings that satisfy man's present and future needs."

But a conference of this sort makes no decisions, and as the delegates were warned by Prince Philip, Duke of Edin-

burgh, who had been invited to attract press attention, "This . . . conference will mean nothing at all . . . if it does not lead to practical conservation measures in every European country. All its discussions and resolutions will quickly disappear into the polluted atmosphere, if this meeting doesn't produce more closely organized international cooperation between responsible and effective government departments." The Prince put his finger on the major weakness. Experts aren't decision-makers and politicians so far have been unwilling even to look at the problem's realities.

This failure to get down to hard facts indeed was one of the weaknesses of the Strasbourg conference. The ills of pollution were described in detail, but there was too much delicacy about saying who is responsible. It is going to be a hard fight in most European countries to enact legislation penalizing polluting industries heavily enough or imposing high enough quality requirements on them; economic growth is still too widely accepted as an over-riding priority. And even if controls could be achieved, as some optimistic participants at Strasbourg seemed to believe possible, there remain the more complex environmental problems of which Europeans are just now becoming aware: poisoning of the soil and underground water by pesticides and fertilizers and destruction of ecological cycles through, for instance, thermal pollution from power stations. And there is the unstemmed advance of industry, cities and secondary residences into Europe's last remaining free space.

As a bitter footnote, the Council of Europe now finds itself faced with a powerful competitor for Government interest and support and for the limited funds which are likely to be made available. NATO's new Committee on the Challenges of Modern Society is getting down to work in Brussels, and pollution problems are high on its list. European left-wingers, associating NATO more readily with nuclear waste dumped into the Mediterranean, are shocked; the Council of Europe is angry. But NATO coolly claims that it has the best available machinery for the transmission of technological and scientific knowledge—and for simply getting things done.

Whether NATO really has the will and the means to accomplish major environmental aims is unknown. Equally unknown is whether any other international body can mobilize resources to get the job done; the obstacles are formidable.

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