1964

Biological Station Summer Session, 1964

Montana State University (Missoula, Mont.)

Flathead Lake Biological Station

1964
SUMMER SESSION
Montana State University
Missoula, Montana

Biological Station

FLATHEAD LAKE, MONTANA
JUNE 22 - AUGUST 14

Ernst Peterson

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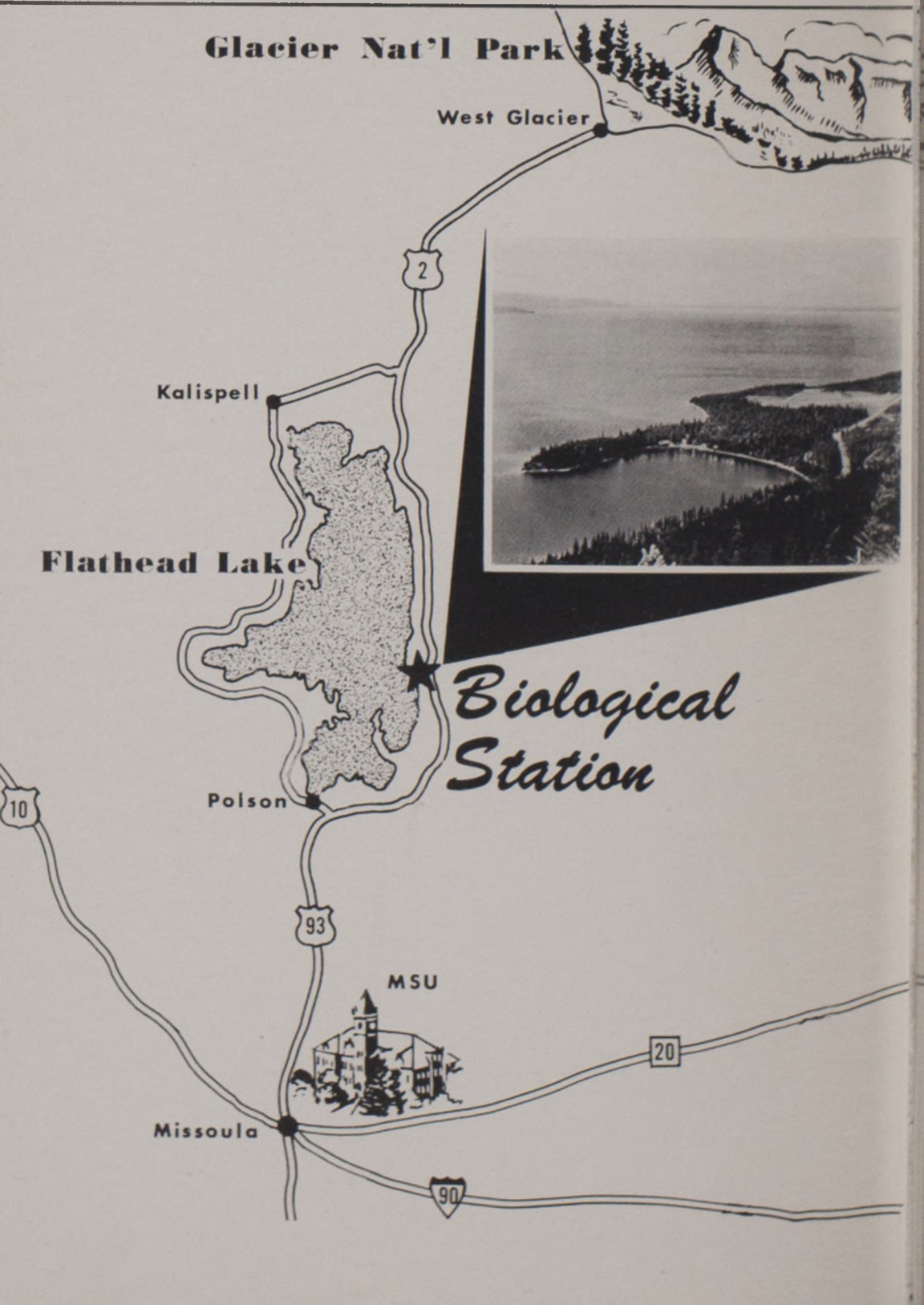

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1964 Summer Session

Montana State University

Biological Station

June 22 to August 14

The Biological Station is a unit of the Summer Session of Montana State University. All courses offered at the Station give graduate credit and are designed for those working at the upper division and graduate level. Students who have reached the junior level in college and who have satisfactorily completed necessary course prerequisites are eligible for admission. Other students may petition the Director for entrance. Biology teachers are invited to take advantage of those courses designed particularly to fit their teaching needs. Investigators in all fields of natural history and biological research are encouraged to utilize the facilities of the Station.

GEOGRAPHIC LOCATION

The Station is located on Yellow Bay on the east shore of Flathead Lake at the base of the northern end of the Mission Mountains. The Station also has land on Bull Island and on Polson Bay and owns the two small Bird Islands. Flathead Lake lies in the Flathead Valley at the southern end of the Flathead and Purcell Trenches of the Rocky Mountains. The valley, bordered by mountain ranges showing marked differences in geological structure, lies about 40 airline miles west of the Continental Divide and 100 airline miles south of the Canadian Border. This valley and the adjacent valleys and mountains form one of the upper reaches of the Columbia River Drainage. The headwaters of the Mississippi and Hudsonian Drainages are easily accessible in Glacier National Park.

OPPORTUNITIES FOR STUDY AND RESEARCH

Although the more formal part of the course work is given in the seven well-equipped laboratories, all courses emphasize field work.

The many mountain ranges and valleys, with altitudes from 3,000 to 10,000 feet, which are accessible from the Station offer a wide variety of habitats. Plant associations include palouse prairie; sage brush; montane, coast and sub-alpine fir forests; sub-alpine to alpine meadows; and tundra. Aquatic environments include eutrophic and oligotrophic lakes, glacial potholes, ponds, swamps, bogs, streams, and rivers. Opportunities for field trips and for problem work are therefore many and varied.

COOPERATING AGENCIES

The facilities and active cooperation of many state and federal agencies are available to the staff and research workers of the Biological Station. Research projects are conducted independently and in cooperation with biologists and naturalists in Glacier National Park, at the Rocky Mountain Laboratory in Hamilton, at the National Bison Range at Moiese, with the Cooperative Wildlife Research Unit at the Missoula campus, and with the State Fish and Game Department in various sectors of the state. Both long-range and short-term research projects are feasible under these arrangements.

Description of Courses

Credits earned at the Biological Station are transferable to other colleges and universities the same as are credits earned in the Departments of Botany and Zoology on the University Campus. Undergraduates may take only those courses numbered below 500.

Credit is given in quarter hours. The recommended load for students is nine hours for the eight week session. Maximum load for any student is twelve and the minimum load is six hours. Graduate Assistants may carry a maximum of six hours. Only exceptional students will be granted permission to carry courses in excess of nine credit hours. A six-hour course normally meets two days a week and a three-hour course meets one day a week; however, both are scheduled for an extra day each week to make two-day field trips possible.

A student electing Problems Courses in either Botany or Zoology must secure the consent of the instructor in charge before action can be taken on his application.

CONSERVATION EDUCATION WORKSHOP

A Conservation Workshop of five weeks' duration is offered from July 20 to August 21. The Workshop stresses those problems and principles of conservation which are particularly characteristic of the Northwest. Proper management of natural resources is the keynote of the workshop, and field trips are designed primarily to emphasize management practices. Credit is variable from 3 to 9 hours. The workshop is under the direction of Dr. W. L. Pengelly. Anyone interested in this program should write to the Director, Biological Station, for more detailed information.

Courses Offered

BOTANY

349. **Problems in Morphology.** 2-6 cr. May be repeated during succeeding quarters not to exceed a total of 6 credits. Prerequisites: Botany 341 or 343 (Morphology of Thallophytes, Bryophytes and Pteridophytes) and consent of instructor. Individual or group work (consisting of research problems, special readings, discussions, etc.) dealing with aspects of plant morphology not taken up in regular courses. Staff.

361. **Fresh Water Algae.** 3 cr. Prerequisite: Botany 121, 122, 123, or equivalent (a year's laboratory course in botany). Identification, classification, distribution, life histories and limnological relationships of the algae of the Northern Rocky Mountains. Botany Laboratory. Friday, Saturday.* Vinyard.

368. **Aquatic Flowering Plants.** 3 cr. Prerequisites: Botany 365. Identification, classification, and ecological distribution of the higher aquatic plants. The Flathead Lake Region is particularly rich in aquatic flowering plants. The small lakes, and ponds among the glacial debris of the valley floor provide local habitats suitable to a wide range of species. Botany Laboratory. Thursda,* Friday. Vinyard.

369. **Problems in Taxonomy.** 2-6 cr. May be repeated in succeeding quarters not to exceed a total of 6 credits. Prerequisites: Botany 365 and consent of instructor. Individual or group work (consisting of research problems, special readings, discussions, etc.) dealing with aspects of plant taxonomy not taken up in regular courses. Staff.

375. **Mycology.** 6 cr. Prerequisites: Botany 123 or consent of instructor. The classification and relationships of the fungi, with training in their collection, preservation, and cultur. Botany Laboratory. Monday,* Tuesday, Wednesday.' Gilbertson.

490. **Seminar in Biology.** 1 cr. Lectures and discussions of special problems in biology. To be arranged. Staff.

519. **Advanced Morphology.** 2-6 cr. Prerequisite: Consent of instructor. Staff.

522. **BSCS Biology.** 6 cr. Basic elements of plant and animal ecology, with particular stress on the utilization of those concepts in teaching secondary students of biology as outlined in the Biological Science Curriculum Study —Green Version. (NSF Institute). Biology Laboratory. Monday,* Tuesday, Wednesday.* Twente.

551. **General Ecology.** 6 cr. Prerequisite: Bachelor's degree and a major in botany, biology or zoology. Community concepts including succession, stratification, periodicity, and energy relationships; introduction to population problems. Limnology Laboratory. Monday,* Tuesday, Wednesday.* Bailey.

569. **Advanced Taxonomy.** 2-6 cr. Consent of instructor. Staff.

600. **Advanced Botanical Problems.** Credit variable. The botany department is prepared to arrange for properly qualified graduate students to carry on research in plant anatomy, cytology, ecology, morphology, mycology, pathology, physiology, and taxonomy leading to a master's degree. Maximum credit allowed 15. Staff.

699. **Thesis.** Credit variable. Maximum credit allowed 15.

ZOOLOGY

308. **Ornithology.** 3 cr. Prerequisite: One laboratory course in vertebrate zoology. Life history, habits, identification and distribution of birds. Weekly field trips are taken to a variety of habitats extending from the marshlands of the Flathead Valley, the islands of Flathead Lake to the alpine region of Glacier National Park. Mammalogy Laboratory. Friday, Saturday.*

*Indicates scheduled class days. Other days listed to be used at the discretion of the instructor.

309. **Mammalogy.** 6 cr. Prerequisites: Comparative vertebrate anatomy. The life history, habits, identification and distribution of mammals, with particular reference to those of the Rocky Mountain region. Overnight field trips are taken into representative habitats. The small mammals of a plot on the Station grounds are censused annually by the live trap method. Mammalogy Laboratory. Monday,* Tuesday, Wednesday.* Eadie.

431. **Problems in Vertebrate Morphology and Taxonomy.** 1-5 cr. Prerequisites: 25 credits in zoology including adequate background courses in the subject and consent of the instructor. Primarily a problems type course, involving semi-independent work. By variation of content, the course may be repeated during succeeding quarters. Staff.

433. **Problems in Vertebrate Ecology.** 1-5 cr. Prerequisite: 25 credits in zoology including adequate background courses in the subject and consent of instructor. Primarily a problems type course, involving semi-independent work. By variation of content, the course may be repeated during succeeding quarters. Staff.

434. **Problems in Invertebrate Morphology and Taxonomy.** 1-5 cr. Prerequisite: 25 credits in zoology including adequate background courses in the subject and consent of the instructor. Primarily a problems type course, involving semi-independent work. By variation of content, the course may be repeated during succeeding quarters. Staff.

436. **Problems in Invertebrate Ecology.** 1-5 cr. Prerequisites: 25 credits in zoology, including adequate background courses in the subject and consent of the instructor. Primarily a problems type course, involving semi-independent work. By variation of content, the course may be repeated during succeeding quarters. Staff.

461. **Limnology.** 6 cr. Prerequisite: Elementary Zoology and one collegiate course in chemistry. Ecology of lakes, streams and ponds, with emphasis on the physical, chemical and biotic factors which determine their biological productivity. Although most of the work is done on Flathead Lake, a three-day trip is taken to some mountain lake and a complete limnological survey is made of that body of water. The last field trip is one to a glacier in Glacier National Park where students observe the history of the water through a succession of lower lakes to the valley floor. Limnology Laboratory. Monday,* Tuesday, Wednesday.* Gaufin.

490. **Seminar in Biology.** 1 cr. Lectures and discussions of special problems in biology. To be arranged. Staff.

551. **General Ecology.** 6 cr. Prerequisite: Bachelor's degree and major in botany, biology or zoology. Community concepts including succession, stratification, periodicty, and energy relationships; introduction to population problems. Limnology Laboratory. Monday,* Tuesday, Wednesday.* Bailey.

600. **Advanced Zoological Problems.** 1-5 cr. Opportunity is given to graduate students with sufficient preparation and ability to pursue original investigations. Staff.

699. **Thesis.** Credit variable. Maximum credit allowable 15.

*Indicates scheduled class days. Other days listed to be used at the discretion of the instructor.

1

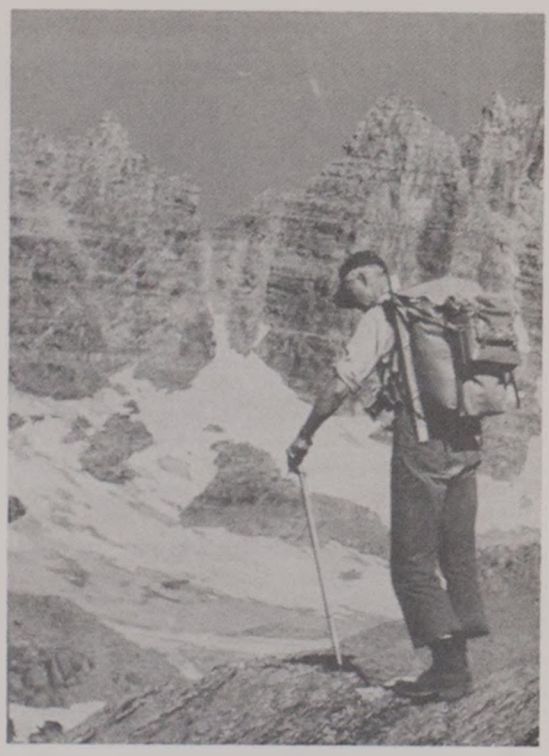
2

1—*Dr. Arden Gaufin, Visiting Professor of Zoology, University of Utah, taking a plankton sample from the limnological research launch.*

2—*The Limnology laboratory-classroom located on the shore of Yellow Bay.*

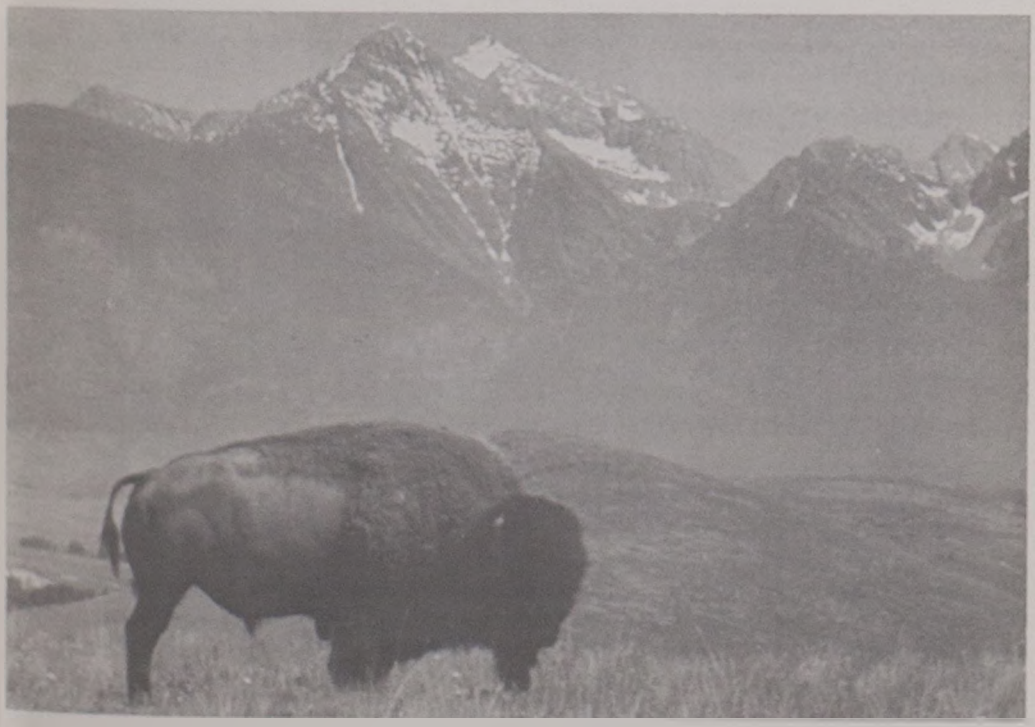
3—*Weekends and field trips afford opportunities for excursions into the heart of the Rocky Mountains.*

4—*The proximity of the National Bison Range at Moiese affords occasion for interesting wildlife studies. The Mission Range is in the background.*



3 Photo — U.S.F.S.

4



General Information

FEES

A student fee of $79.00 (maximum) is charged both resident and non-resident students. In addition, all students pay a $10.00 Field Trip Fee to partially cover the cost of Field Trip transportation.

Those desiring to carry on independent research, resident or non-resident, are charged an investigator's fee of $50.00. This entitles him to the use of one 4′ x 6′ table and a proportionate amount of shelving. Chemicals and glassware are provided in reasonable amounts. Microscopes will be provided if available. Those with special equipment, supplies or space problems should write the Director.

Inasmuch as the Biological Station is part of Montana State University, governmental educational benefits to Veterans under Public Laws 894 and 550 apply at the Station in the same manner as they do on campus. Veterans should indicate on the application blank the congressional act under which they enroll.

Full subsistence will be paid by the Veterans Administration if one is enrolled for nine or more credit hours.

LODGING

All individuals are housed in 12′ x 14′ or 12′ x 16′ cabins which have three 36″ x 24″ windows. Each cabin is provided with lights and electric (AC) outlets, beds, mattresses, pillows, chair, table, dresser, and minor items of equipment. Cabins are segregated into men's, women's and married couple's areas. The following fees are charged: $2.00 each per week for double occupancy, $1.50 each per week for triple occupancy, and $1.25 each per week for quadruple occupancy. Dependents of students and investigators must pay a cabin fee; however, none is charged for those under three years of age. Staff members are not charged a cabin fee. **Limited facilities make it necessary to restrict the number of students who may bring their families.**

BOARD

All station personnel are required to board at the Commissary; costs, $18.00 per week for adults and $10.80 for those under thirteen. **No refunds are made for absences of less than a week.**

BATHING FACILITIES

The Station has three modern washrooms with hot and cold running water and toilet facilities. The central one, in addition, has showers and washing facilities. It also has a small ironing room with ironing boards. The Station does not provide irons.

HEALTH SERVICES

Each student is covered by a health and accident insurance for sickness and accidents which occur during the insured period and for 48 hours before and afterward. This is paid for by the health service fee. Dependents can be similarly covered on the payment of a fee of $0.75 per week per person. The nearby towns of Polson and Kalispell have excellent doctors and hospital facilities.

ADVANCED DEGREES

Qualified students who are officially enrolled in the Graduate School may take course work and do research at the Station toward a master's degree. Master's degrees are offered in Botany, Zoology, Wildlife Technology and Teaching of Biological Sciences. Students interested in earning a master's degree through successive summers at the Biological Station should write to the chairman of either the Department of Botany or Zoology for additional information.

FIELD TRIPS

Transportation will be provided for all regular class trips. All field trips are under the supervision of an instructor. Many of the field trips will be completed within one day, although at least one overnight trip in each course may be expected. Meals on such trips are supplied by the commissary. The Station cannot as yet offer transportation for independent research workers; however, space on scheduled field trips may be used when available.

REMUNERATIVE WORK

Opportunities for work are not numerous. Three assistantships which pay $400.00 per session are available. One is in mammalogy and ornithology, one in limnology, and one in botany. To be eligible for these the student should have a major in the field concerned as well as having had the course to which the assistantship is assigned. Research assistantships are also available. There are some part time jobs available for janitor work, common labor and driving vehicles. Drivers must have, or procure, a Montana chauffeur's license. Minimum wage is $1.00 per hour. Applications should be sent to the Director.

RECREATION

Opportunities for recreation are many. Mountain climbing, hiking, swimming, boating and fishing offer the best means of relaxation. Some of the best fishing in the western United States is found within a few hours' drive of the Station. Fine catches of rainbow, cutthroat, Mackinaw and Dolly Varden trout and landlocked salmon are made the year round in Flathead Lake. Ideal trout fishing may be had in most of the streams and rivers in the area. There are Forest Service and Indian Service trails in the Mission and Swan Mountains. There are also many fine trails with overnight accommodations at chalets in Glacier National Park.

Since the Station area is a game reserve, dogs and other pets are not allowed. Firearms may not be brought onto the premises without advance written permission from the Director.

EQUIPMENT AND SUPPLIES NEEDED

Course and field trips: The student should, if he has them, bring dissecting kits, hand lens, field glasses, musette bag, and other usual field and laboratory course supplies. Since the Station is located in a mountain valley and many of the classes will work in the mountains during the course of the summer, students are strongly advised to have adequate clothing and footwear. Nights are cool and temperatures can be low. There will be cool, rainy as well as warm to cool dry weather.

Therefore one should have warm, wool clothing, cotton clothing, and rainy weather equipment. Good hiking boots with 6 to 8 inch tops are advised for field trips in the mountains. Tennis shoes or hip boots are the best type of footwear for aquatic work. Remember that mountain streams are cold. Inasmuch as some overnight trips will be taken, back packs, warm sleeping bags (such as the inner arctic type) with liners and ground-cloth are recommended.

Living equipment: The student is responsible for supplying his own blankets, bed linen, towels, toilet articles, and proper clothing. Most students wear slacks or jeans. A flashlight, small mirror and curtains for the three cabin windows (36 x 24) also will be useful. Recreational, musical and photographic equipment are also useful.

STUDENT STORE

The student store carries books and other course supplies, toilet articles, stationery, and confections. Limited scientific equipment such as vials can be borrowed or purchased from the student store. A complete grocery store is within walking distance of the Station.

ENROLLING

Application for admission to courses should be made before May 1, using the blank provided in this catalog. Additional blanks will be provided on request. Applications are reviewed on May 1 and notification of acceptance is mailed soon thereafter. Applications made after May 1 will be considered in the order in which they are received.

Students who have not previously enrolled at the Station must submit a complete official transcript together with recommendations from two instructors. Graduate students must first enroll in the Graduate School of Montana State University. Application blanks for this will be sent to all such students.

A $10.00 deposit must be included with the application for admission to the Biological Station. This will be refunded if the applicant withdraws his application before June 1. At the time of registration, it will be credited to the commissary fee. Official registration will be held at the Station on Saturday, June 20. Classwork begins Monday, June 22 and extends through the full session of 8 weeks.

An institute for secondary school teachers of biology supported by the National Science Foundation will be offered in part at the Biological Station. During the summer, a course in general ecology will be provided for twelve students of this institute. Students in attendance at the Station will also register for an additional three credit course chosen from among the offerings at the Station, and for the seminar offered at the Station. For further information, write Dr. Sherman Preece, Montana State University.

Information concerning a second NSF Institute dealing with BSCS Biology—Green Version, may be gained by writing Dr. R. A. Solberg, Montana State University.

Application for Admission

MONTANA STATE UNIVERSITY
BIOLOGICAL STATION
SUMMER SESSION, 1964

Name _____
Last First Middle

Address _____
No. and Street

_____
City State

Age _____ Sex _____

Check level work desired:

☐ Graduate ☐ Undergraduate

If undergraduate, how many biology credits will you have by June, 1964?

_____ quarter credits _____ semester credits

Institutions previously attended:

Name of Institution Dates Degree

_____

_____

_____

Undergraduate major field _____

Graduate major field _____

Are you a Veteran? _____ Do you plan to use Veterans' Benefits to finance Summer School? _____

If yes, check applicable category:

☐ PL 894 ☐ PL 550

(Continued on next page)

If a member of some instructional staff, give status and address of school.

Schedule of courses desired (First Choice)

(Second Choice)

If research work:

☐ Independent ☐ Under supervision

If under supervision, with whom and in what field?

Cabin requirement:

Roommate preferences:

If married, can you come without your family?

If not, give number, sexes, and ages of children.

INSTRUCTIONS FOR ARRIVAL AND OTHER PERTINENT INFORMATION WILL BE MAILED TO APPLICANTS UPON ACCEPTANCE

A $10.00 Application Fee must accompany this application.
(See "Enrolling")

Recent Publications

Based on work done in part at the Biological Station of Montana State University

BALDWIN, PAUL H., and WILLIAM F. HUNTER. 1962. Nesting and Nest Visitors in the Vaux's Swift of Montana. Auk. Dec. issue.

BRUNSON, R. B., and UNDER OSHER. 1957. Haplotrema from Western Montana. Nautilus. 70:(4), 121-123.

_____ and D. G. BLOCK. 1957. The First Report of the White Sturgeon from Flathead Lake, Montana. Proc. Mont. Acad. Sci. 17: 61-62.

CUMMINS, GEORGE B. 1959. Observations on the life cycles of West American rust fungi. Plant Disease Reporter, 43: 411-412.

_____ and H. C. GREENE. 1958. A Synopsis of the Uredinales Which Parasitize Grasses of the Genera Stipa and Nasella. Mycologia. 50(1): 6-36.

GEIS, MARY BARRACLOUGH. 1956. Productivity of Canada Geese in the Flathead Valley, Montana. Journ. Wildl. Manag. 20(4): 409-419.

HARVEY, L. H. 1954. Additions to the Flora of Glacier National Park, Montana. Proc. Mont. Acad. Sci. 14: 23-24.

HOFFMAN, ROBERT S., RICHARD D. TABER, THOMAS J. NIMLOS and SAMUEL A. BAMBERG. 1961. Alpine ecosystems of northern Rocky Mountains. Bull. Ecol. Soc. Amer. 42: 140.

_____ and RALPH L. HAND. 1962. Additional notes on Montana Birds. In press.

HUNTER, WILLIAM F., and P. H. BALDWIN. 1962. Nesting of the Black Swift in Montana. Wilson Bulletin. Dec. issue.

KEMPNER, THOMAS. 1959. Notes on the Breeding Cycle of the Red Crossbill (Loxia curvarostra) in Montana. Auk 76: 181-189.

MEWALDT, L. R. 1956. Nesting Behavior of the Clark Nutcracker. Condor 54(1): 3-23.

NEWBY, F. E., and P. L. WRIGHT. 1955. Distribution and Status of the Wolverine in Montana. Jour. Mammal. 36: 248-253.

PENGELLY, LESLIE W. 1962. The Art of Social Conservation. Presented at 7th Annual Conference of Plains and Rocky Mountain Sections of the Wildlife Society, Pingree Park, Colorado, Aug. 27, 1962. In press.

POTTER, LOUISE F., and GLADYS E. BAKER. 1956. The Microbiology of Flathead and Rogers Lakes, Montana. I. Preliminary survey of the microbial populations. Ecology 37(2): 351-355.

PRESCOTT, G. W. 1955. The Fresh-Water Algae of Montana. I. New Species of Chaetophoraceae. Hydrobiologia. Vol. VII(1-2): 52-59.

SENGER, CLYDE M. 1955. Observations on cestodes of the genus Hymenolepsis in North American shrews. Jour. Parasit. 41(2): 167-170.

VINYARD, W. C. 1957. Algae of the Glacier National Park Region, Montana. Proc. Mont. Acad. Sci. 17: 49-53.

WEISEL, GEORGE W. 1955. Three New Intergeneric Hybrids of Cyprinid Fishes from Western Montana. Amer. Midl. Nat. 53(2): 396-411.

WRIGHT, P. L., and R. RAUSCH. 1955. Reproduction in the Wolverine (Gulo gulo). Jour. Mammal. 36: 346-355.