

THE WORLD'S

HIGH

By Serge A. Korff

A RECENT survey article on high altitude laboratories has elicited so much correspondence that it was thought worth-while to present today's roster of such stations in tabular form. In the table below and on the map on p 30 several stations now in operation are listed in order of ascending geomagnetic latitude. In addition four stations at present under study are mentioned, one or more of which may be in operation in the near future. Omitted from this list are such well-known observatories as Mt. Wilson, Mt. Palomar and others, since their elevation is not particularly high. Also omitted are such cities which may happen to lie at high elevations, as for example La Paz, Bolivia, at which no formally organized high altitude laboratories are known to this writer. Finally, we do not list any observatories in countries behind the Iron Curtain, but

only those which will welcome scientists of all nations. The majority of the stations have electric power available usually via transmission lines from generating stations located elsewhere. All these are marked, under the heading of "Power Available", as 25*. The asterisk indicates that while existing lines often carry 25 KW, if the observer should have requirements for larger amounts of power, such as for a large magnet, arrangements should be made for the installation of larger transformers if needed. The listing under access will at once convey to the prospective user of such a station the reasonable limits of weight of equipment which can be transported. Thus, for example, to carry a six-ton instrument to Morococha would present no insuperable difficulties, but if it were desired to take it to Pic du Midi, it would have to be disassembled. Under the

Name & Location	Altitude		Geomagnetic latitude	Geographic		Useful Season	Power KW	Housing Persons	Access
	feet	meters		lat.	long.				
1. Cerro Colorado, Chile	11,000	3350	21°S	33°20'S	70°W	all year	25*	8	auto
2. Chacaltaya, Bolivia	18,000	5500	4°S	16°19'S	68°10'W	all year	5	4	auto
3. Huancayo, Peru	11,000	3350	0	12°S	75°30'W	all year	25*	8	auto & cable
4. Morococha, Peru	14,900	4550	0	11°30'S	76°W	all year	25*	9	auto & cable
5. Teoloyucan, Mexico	7,500	2300	31°N	19°N	99°W	all year	25*	8	auto
6. Aiguille du Midi, France	11,300	3450	47°N	45°N	7°E	July-September	25*	6	cable-car
7. Testa Grigia, Italy	11,300	3450	47°N	45°N	7°30'E	June-September	25*	6	cable-car
8. Pic du Midi, France	9,300	2860	48°N	43°N	0	all year	25*	8	cable-car
9. Jungfrauoch, Switzerland	11,300	3450	49°N	47°N	8°E	all year	25*	12	train
10. White Mountain, California (a) (b)	10,600 12,500	3230 3810	50°N 50°N	38°N 38°N	118°W 118°W	June-September June-September	5 5	6 8	auto
11. Climax, Colorado	11,000	3350	51°N	39°21'N	106°10'W	all year	25*	12	auto & cable
12. Echo Lake, Colorado	10,700	3260	51°N	39°39'N	105°35'W	all year	25*	8	auto
13. Mt. Evans, Colorado	14,150	4300	51°N	39°35'N	105°38'W	June-September	5	4	auto
14. Sacramento Park, New Mexico	9,300	2800	45°N	33°N	106°W	all year	25*	6	
15. Mt. Sanford, Alaska	approx. 11,000 ft.		65°N	63°N	143°W	June-September			
16. Gulmarg, India	9,000	2750	24°N	23°32'N	75°E	March-October	25*		auto
17. India	Station at 16-17,000 foot level being studied								auto
18. Ixtaccihuatl, Mexico	Station at 14,000 foot level being studied; location near Mexico City								
19. Pakistan	Station at 14-15,000 foot level being studied; approximate geomagnetic latitude 22°N								

ALTITUDE LABORATORIES

heading "Housing, Persons", is given the normal number which can comfortably sleep at the place mentioned. It goes without saying that this number is quite flexible, and it is only desired as an approximate guide to the housing situation. At many places, for example at the Jungfrauoch, Morococha, Echo Lake, Huancayo, and Climax, good hotels are available nearby. Further, if the experiment required 24-hour personnel presence, observers can usually make their own arrangements to sleep near the apparatus on cots they can bring with them. Under the heading "Officer in Charge" are listed the persons who at this writing are well qualified to provide information about the use of each station. The names will change from time to time, and it is the institutional connections which will be more permanent. The author of the present article, who has been fortunate

in visiting almost all of the stations listed, will be glad to provide additional information, should other questions arise. Such correspondence should be addressed to: Prof. Serge A. Korff, New York University, University Heights, New York 53, N. Y.

Bibliography

Many of the observatories have been described only in journals which are not available to most physics libraries. The following admittedly incomplete list of articles describes the observatories whose number correspond in the listing.

2. Chacaltaya, Bolivia, Ismael Escobar, Nimbus; *Bull. Bolivian Meteor. Soc.*, 2: 5, (1950); *Rev. Meteorol. de Uruguay*, #20, (1945); *Bull. Am. Meteorol. Soc.*, (1943).
4. Morococha, Peru, Drs. Carlos Monge and A. Hurtado; *J. Am. Med. Assn.*, 135: 375, (1947).
10. White Mountain, Calif., Charles L. D'Ooge; *Phys. Rev.*, 83: 888, *abstr. C-3*.

General Articles: S. A. Korff; *Physics Today*, Nov. 1950, p. 20; Feb. 1951, p. 11; June 1951, p. 5; Aug. 1951, p. 24.

Officer in Charge	Remarks
Alvial, Facultad de Filosofia, Universidad de Chile, Santiago, Chile	Under construction, 1951
Escobar, Universidad de Bolivia, La Paz, Bolivia	Meteorological station; ski camp nearby
Secke, Huancayo Observatory, Huancayo, Peru	Formerly Carnegie Magnetic Observatory; about 11 miles from town of Huancayo
Carlos Monge, San Marcos Universidad, Lima, Peru	Laboratory of Institute of Andean Biology
Observatorio Nacional, Teoloyucan, D.F., Mexico	Mexican National Astronomical Observatory
LePrince-Ringuet, Ecole Polytechnique, 17 Rue Descartes, Paris 5, France	Cable-car from Chamonix; primarily cosmic-ray station
llo Nazionale delle Ricerche, Rome, Italy. (Profs. Amaldi and Bernardini)	Cable-car from Breuil; Breuil reached by auto from valley of Aosta, cosmic-ray station
Observatoire du Pic du Midi, Bagnères de Bigorre, Hautes Pyrenees, France	Cable-car from auto road; car for equipment, observers on foot. Astronomical observatory
Hochalpine Forschungsstation Jungfrauoch, Bulhplatz 5, Berne, Switzerland (Profs. von Muralt and Dr. Stampfli)	Swiss International Station; biology, meteorology, cosmic-ray, etc.
in Charge, Naval Ordnance Test Station, Inyokern, California	Auto road from main road at Bishop, California; cosmic-ray station
Schein, University of Chicago, Chicago 37, Illinois, or Harvard University	Primarily astronomical station
ario Iona, University of Denver, Denver 10, Colorado	Inter-university high altitude laboratory; cosmic-ray station
ario Iona, University of Denver, Denver 10, Colorado	Inter-university high altitude laboratory; cosmic-ray station
Menzel, Assistant Director, Harvard College Observatory, Cambridge 38, Massachusetts	Primarily astronomical station
son, Acting Director, Geophysical Institute, University of Alaska, College, Alaska	Under exploration, 1951. Present route by auto to base, rest on foot
S. Gill, Aligarh University	Astronomical and cosmic-ray station; bus to within four miles of Gulmarg
V. Sohoni, Director General of Observatories Meteorological Department, New Delhi, India	Several possible locations being studied, 1951 by Himalayan Research Institute
Departamento de Fisica, Universidad de Mexico, Mexico D.F., Mexico	Under study, 1951
John H. Martin, Forman College, Lahore, Pakistan	Under study, 1951



THE WORLD'S HIGH ALTITUDE LABORATORIES

N. North Geomagnetic Pole 1. Cerro Colorado, Chile 2. Chacaltaya, Bolivia 3. Huancayo, Peru 4. Morococha, Peru 5. Teoloyucan, Mexico 6. Aiguille du Midi, France 7. Testa Grigia, Italy 8. Pic du Midi, France 9. Jungfrauoch, Switzerland 10. White Mountain, California 11. Climax, Colorado 12. Echo Lake, Colorado 13. Mt. Evans, Colorado 14. Sacramento Park, New Mexico 15. Mt. Sanford, Alaska 16. Gulmarg, India 17. India (under study) 18. Ixtacihuatl, Mexico (under study) 19. Pakistan (under study)

News and views

National Science Foundation

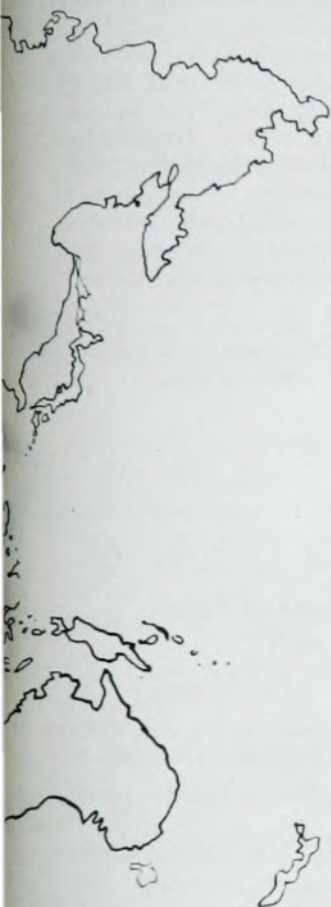
624 Graduate Fellowships Awarded

Approximately three thousand applications for graduate fellowships in the natural sciences for the academic year 1952-53 were submitted to the National Science Foundation, and of these 624 applicants have been selected to receive fellowship awards. The list of awards includes 569 predoctoral fellows and 55 postdoctoral fellows. As required by the National Science Foundation Act of 1950, all fellows were selected by the Foundation on the basis of ability, with awards made in cases of substantially equal ability so as to result in a wide geographical distribution. Predoctoral applicants were required to take fellowship examinations administered by the Educational Testing Service, Princeton, New Jersey, for scientific aptitude and achievement. The test scores, academic record, and recommendations regarding each candidate's abilities were then considered by panels of outstanding scientists in the respective fields of the candidates. This part of the selection procedure was administered by the National Research Council under contract with the Foundation. Postdoctoral applicants were not required to take examinations but their records and recommendations were also screened by panels of eminent scientists in each field in an evaluation procedure administered by the NRC.

The largest group of fellowships, 158, were awarded in the biological sciences. In other fields the number of awards were: chemistry, 140; physics, 137; engineering, 75; mathematics, 62; earth sciences, 36; agriculture, 7; astronomy, 6; and anthropology, 3.

A total of 169 (twenty seven percent) of the awards were made to first year graduate students. This is a sharp departure from previous Federal fellowship programs in which the major emphasis has been upon awards to advanced students. The Foundation hopes through this policy to encourage college graduates having scientific aptitude to continue with advanced studies in preparation for careers in scientific research and teaching. A total of 170 of the awards were made to second year graduate students, 230 to advanced predoctoral students, and 55 to postdoctoral fellows.

All regions of the United States were represented among the fellowship awards: the applications and awards were roughly proportional to the total population and the population attending college of the various regions. Fellows may pursue their training at accredited non-profit institutions of higher education in the United



The significant features of most of the high altitude observatories indicated on this map have been summarized in the table which appears on pages 28 and 29. The present list includes most of the formally organized high altitude laboratories of the western world which are established at altitudes higher than nine thousand feet.