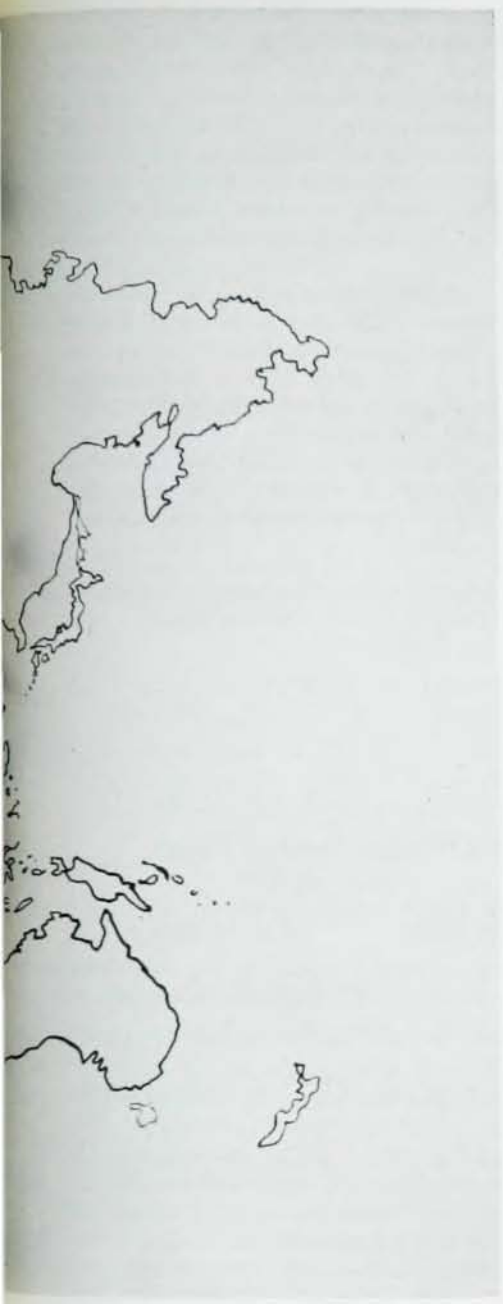

The significant features of most of the high altitude observatories indicated on this map have been summarized in the table which appears on pages 28 and 29. The present list includes most of the formally organized high altitude laboratories of the western world which are established at altitudes higher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

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

States or similar institutions abroad approved by the Foundation. Before he may begin upon his fellowship the fellow must show that he will be accepted by the institution in which he plans to study.

Stipends for NSF fellowships will vary with the academic status of the fellows. First year fellows will receive a basic stipend of $1,400; second year, $1,600; advanced predoctoral and postdoctoral fellows will receive additional allowances for wives and children. Normal tuition and laboratory fees will be paid by the Foundation, and limited allowances to aid in defraying costs of travel will be provided.

It is expected that the announcement concerning National Science Foundation Graduate Fellowships for 1953–54 will be made about October 1, 1952. Application forms will not be available until that time.

Low Power Reactors

Additional Data To Be Released

The U. S. Atomic Energy Commission announced on April 7th that the governments of the United States, the United Kingdom, and Canada have revised the "Declassification Guide" used by the three nations to determine what atomic energy information held jointly may be published and what information should remain secret. The revisions are based on the recommendations made by the Fifth International Declassification Conference held September 14–16, 1951 in Washington, D. C., as a continuation of the wartime collaboration of the three nations. The principal revisions to the Declassification Guide will permit the release of additional data on the nuclear properties of uranium, data necessary in the development and understanding of low power nuclear reactors for atomic research. To speed the development of unclassified reactor technology in the three nations, design and operating data on such reactors was previously declassified (see the September 1951 issue of *Physics Today*, p. 22). The current action will make available to universities and laboratories engaged in unclassified research with nuclear reactors further data that will advance their studies. The three governments have determined that the release of this technical information will assist the expanding manpower training program involved in the atomic energy efforts of the three nations, and will not aid rival nations in the development of military application of atomic energy. Low power natural uranium research reactors cannot be used for production of atomic weapons or power.

The revised Declassification Guide also permits publication of the thermal neutron cross sections for plutonium-239. Its properties with respect to capture and fission by thermal neutrons are similar to the properties of uranium-235. However, when plutonium-239 fissions from the action of thermal neutrons, it is now revealed that three neutrons are released per fission rather than the 2.5 neutrons released by uranium-235 under similar conditions.

In addition to releasing further information on the low power research reactors, the revised Declassification Guide permits the publication of the thermal neutron cross section of xenon-135. This radioactive nucleus, one of the fission products resulting from the fissioning of uranium, is a remarkably effective absorber of thermal neutrons. The release of specific technical information on this property of xenon-135 will be of basic scientific interest in studies of nuclear structure and will aid in fundamental studies of reactor control.

All information declassifiable under the newly revised Declassification Guide must be reviewed prior to publication in accordance with declassification procedures in effect by the three nations. Technical reports will be published in scientific journals concerning the information released.

The following information is declassified concerning the nuclear properties of uranium, plutonium, and xenon which are of importance in connection with general reactor studies.

1. Thermal Neutron Cross Sections for Uranium. (These are currently accepted values in barns for 2200 meters per second neutrons.)

Thermal neutron cross section for	U^{235}	U^{238}	Natural U
Fission	549	0	3.92
Capture	101	2.80	3.5
Scattering	8.2	8.2	8.2

2. Neutrons per Thermal Neutron Fission

$$\nu = 2.5 \pm 0.1 \text{ for } U^{235}$$

3. Fast Fission Effect

The following are typical values of the fast fission contribution to the reactivity of research reactors:

(a) In a reactor of the "CP-2" or "GLEEP" type: 2.9%

(b) In a reactor of the "CP-3" or "ZEEP" type: 3.1%

The following are values of nuclear constants for natural uranium bombarded by *neutrons above the U^{238} fission threshold* in a heterogeneous uranium reactor, which may be used for illustrative purposes: (a) average fission cross section = 0.29 barn; (b) average radiative capture cross section = 0.04 barn; (c) average number of neutrons emitted per fission = 2.55; (d) average total cross section = 4.3 barns; (e) average inelastic scattering cross section = 2.47 barns; (f) average elastic scattering cross section = 1.5 barns.

4. Resonance Absorption Integral

An approximate empirical formula for the effective value of the resonance absorption integral in a uranium lump at room temperature is given by:

$$\int \sigma_e(E)\, dE/E = A\,[1 + \mu\,(S/M)]$$

where the integral is taken over the resonance energy band given below, S is the lump surface area in cm^2