able plants will be a distinct addition to the small list of strictly alpine plants now in use, but the real significance of the accomplishment was that the successful transfer of these difficult plants from altitudes of 7,000 feet or more down to sea level without loss of time was an encouraging indication that in this far western arboretum the development of plant life can be carried to points hitherto unknown.

The Washington Arboretum is situated on the shore of a large inland salt water basin within an area governed by natural phenomena probably without parallel. This enormous inland sea is almost completely enclosed in high, storm-excluding mountain ranges and filled with warm water that flows in from the equatorial streams of the Pacific Ocean. Hygrothermograph charts show a relationship between air and soil temperatures and humidity that is particularly favorable to plant life. The variation in summer and winter atmospheric temperatures is enough to insure plant vigor and hardiness, but is neither extreme enough, nor abrupt enough to retard plant growth.

The presence of conditions unusually favorable to plant life as shown by the natural vegetation has been recognized by scientific men, such as the late Henri Correvon, Reginald Farrar and Dr. E. H. Wilson.

The accomplishments of Washington Arboretum have substantiated their belief that the further development of plants already domesticated and established should be attempted under these conditions.

With a plan of organization similar to the one used at the Arnold Arboretum and the avowed purpose of collecting all reliable information on plant life of educational or scientific value; located on a site of ample size (260 acres) within an area particularly favorable to that purpose; under the scientific supervision of Dean Hugo Winkenwerder, of the School of Forestry of the University of Washington; supported by the Washington Arboretum Foundation, Dr. E. Weldon Young, president; with the cooperation of the Board of Park Commissioners of Seattle and the United States Federal Government, this latest addition to the facilities for scientific research should become one of the leading institutions of its kind in the world.

J. B. F.

DEVELOPMENTS IN ENGINEERING AT CORNELL UNIVERSITY

RAYMOND F. HOWES, assistant to the dean of the College of Engineering of Cornell University, writes that the appointment of Dr. William Abbett Lewis, Jr., of the Westinghouse Electric and Manufacturing Company, as director of the School of Electrical Engineering at Cornell University, which took effect on February 1, completes the reorganization of the administrative staff of the College of Engineering, begun in November, 1937, with the appointment of Professor S. C. Hollister as dean. To succeed Dean Hollister as director of the School of Civil Engineering, Dr. W. Lindsay Malcolm, formerly lieutenant-colonel of Canadian Engineers, was secured from Queens University. Professor William N. Barnard, long head of the Department of Heat-Power Engineering at Cornell, was made director of the Sibley School of Mechanical Engineering; and with the establishment of the School of Chemical Engineering on July 1, 1938, Dr. F. H. Rhodes, professor of industrial chemistry in charge of the former chemical engineering curriculum, became director.

Since the new school has been added to the college and new administrative officers selected for the other three schools, the curve of enrolment has started upward once more, numerous improvements have been made in facilities for instruction and research, and plans have been announced by President Edmund E. Day and the Board of Trustees for a $6,000,000 program to strengthen the college's resources by increasing endowment for instruction and research and constructing the first two units of a proposed new physical plant. A trustee committee, of which Bancroft Gherardi, retired vice-president and chief engineer of the American Telephone and Telegraph Company, is chairman, and the new provost, H. Wallace Peters, is executive secretary, is raising funds for the project.

While waiting for tangible results from this long-range program, the college is constantly improving existing facilities. During the last few months two floors of Sibley Dome have been entirely remodeled. With the Mechanical Engineering Library moved to the second floor, the first has been used to concentrate administrative offices, making available additional classroom space in East Sibley. Faculty offices have also been remodeled in the Mechanical Laboratory buildings, and changes and additions made in equipment. The material testing laboratory has a new 200,000 lb. tension-compression machine, and is installing two smaller machines. Regrouped on a new concrete floor are other machines for tension-compression, torsion, transverse bending, impact and various other standard tests.

New apparatus has also been added to the photo-elastic laboratory, and a constant-temperature room for heat-transfer tests, humidity control and various other types of research in air-conditioning and related fields is under construction. A micromotion laboratory, with moving-picture cameras and projectors and other apparatus for time and motion studies of industrial operations, has recently been completed.

In the School of Civil Engineering, the sanitary and photo-elastic laboratories have made important additions to equipment, as has the material testing laboratory. A graduate students' shop for the construction of special apparatus needed for research

and a new computing room have been completed. The School of Electrical Engineering has also added modern equipment for demonstration and research, especially in the field of high-voltage transmission.

THE ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN

THE twenty-eighth annual report of the Brooklyn Botanic Garden for the year 1938, just published, calls attention to the fact that during the past year citizens of Brooklyn contributed to the garden for current expenses and permanent improvements more than $54,000. This amount is 57 per cent. of the tax budget appropriation of the city for the support of the garden, and is in addition to private funds, income from endowment and other funds. The private funds budget of the garden was more than 56 per cent. of the total operating budget, the tax budget appropriation being approximately 44 per cent. The City of New York, therefore, derived more than two dollars' worth of return for every dollar appropriated to the Botanic Garden. The attendance at the garden was more than 1,628,000. The record attendance on May 1 of 56,145 was equivalent to 155 visitors every two minutes.

The report records 265 gifts of funds, plants, publications and other objects. The need of additional endowment is stressed by the director. This has become especially urgent since the income from permanent funds and contributions of private funds have fallen off so greatly since 1930, necessitating drastic reduction in the services which the garden renders to the public and to the advancement of science and education. Eighteen pages of the report are devoted to recording the results of scientific research on plant life done at the garden during 1938. These include studies in disease resistance in plants, on the iris and its diseases, on the classification of various groups of flowering plants, on variation in the ferns and studies of economic plants.

The extent to which the garden cooperates with the schools of New York City may be realized in part from the statement that during 1938 more than 150,000 pupils were assisted in their studies through material supplied by the garden, more than 925,000 packets of seed were supplied to school children and more than 24,000 pupils enjoyed plants raised in the garden and placed in schoolrooms.

Under the heading "Free Education," attention is called to the failure of the public to realize that all the so-called "free" educational and recreational privileges which they enjoy through the "free" museums, botanic gardens and other semi-public institutions of the city must be paid for by some one, and there is really no such thing as "free" education. Part of the cost is met by the taxpayers through the tax budget, and a substantial portion of it is met by private citizens who "in addition to their taxes make generous contributions for the support of our public educational institutions." It is pointed out that "it would be salutary if some way could be devised to make every one conscious of this fact who visits our museums, zoological parks and botanic gardens that are open 'free' every day in the year, and who attends their lectures and classes without payment of any fee. Such an opportunity costs money."

SYMPOSIUM ON THE CELL AND PROTOPLASM

DIRECTLY following the meeting of the Pacific Division of the American Association for the Advancement of Science at Stanford University, a symposium will be held in commemoration of the centenary of the cell and protoplasm, opening on June 30 and continuing through July 5.

Papers to be presented, one each forenoon, afternoon and evening, will recognize the comparable development of particulate concepts in both the biological and physical sciences since the beginning of the nineteenth century and will discuss, in view of this development and of its converging trends, some recent investigations in the fields represented. Accordingly both biologists and physicists have been invited to participate.

It is intended that the three papers scheduled for Wednesday, July 5, will link this symposium with the National Colloid Symposium, which convenes also at Stanford University on July 6.

The program of papers on the cell and protoplasm follows:

Friday evening, June 30. "Cell and Protoplasm Concepts: Historical Account," E. G. Conklin, Princeton University.

Saturday, July 1. "The Microdissection of Living Cells" (illustrated), Robert Chambers, New York University. "The Cell Wall and Protoplasm," L. H. Bailey, Harvard University. "Chromosomes and Cytoplasm in Protozoa," H. S. Jennings, the Johns Hopkins University.

Sunday, July 2. "Genes and Chromosomes," Richard Goldschmidt, University of California. "Cellular Differentiation and External Environment," C. M. Child, University of Chicago and Stanford University. "Cellular Differentiation and Internal Environment," R. G. Harrison, Yale University.

Monday, July 3. "Cell and Organism," C. A. Kofoid, University of California. "Chemical Aspects of Microorganisms," C. B. van Niel, Hopkins Marine Station. "Viruses," W. M. Stanley, Rockefeller Institute.

Tuesday, July 4. "Enzymes," H. Theorell, University of Stockholm. "Plant Hormones," F. W. Went, California Institute of Technology. "Vitamines," A. Szent-Györgyi, University of Szeged.

Wednesday, July 5. "Molecular Structure of Protoplasm," O. L. Sponsler, University of California at Los