

of nerve impulses and the analysis carried on within the brain. A gigantic study of trachoma has been supported in Egypt.

We now have more precise knowledge of visual pigments which are light sensitive. Disorders of these chemicals relate to various types of severe blindness. Electrophysiological techniques have been developed whereby disease in these pigments can be recognized in the early stages. We now know that this is not a single disease but several which can be distinguished by these techniques. While not a cure, it is a significant step forward.

The NINDB points with pride to a current grantee and a former grantee who this year were awarded the Nobel Prize in Physiology of Medicine for their accomplishments in eye research, Dr. Halden K. Hartline of Rockefeller University, and Dr. George Wald of Harvard. Dr. Hartline demonstrated the reaction pattern of individual visual cells in relation to quantity and quality of light. He also made primary contributions to the study of the generating of impulses in visual cells. Dr. Wald made a number of basic discoveries about photo-chemical reaction of sensory cells in the retina and discovered the molecular buildup of substances sensitive to light of the sensory cells common to animals.

The Institute has had a very active training program in the vision field for the past decade. The growth in ophthalmological manpower, spurred by NINDB training support, has been twice that of medicine, in general. The total number of ophthalmologists has increased from 7,279 to 9,131, an increase of 25 percent, while those engaged in full-time research and teaching has increased from 105 to 224, an increase of 114 percent. During the same period, the number of all physicians engaged in full-time teaching and research activities has increased by only 42 percent.

The Institute's vision program has been directed toward the development of (1) trained personnel in the field to conduct research, and (2) expansion of the general academic field. This program is providing highly trained men to lead the national research effort.

Mr. ROGERS. How long have these 11 clinical eye research centers been established, where are they, and the out-patient clinical research units. If you could supply that for the record, it would be helpful.
(The information requested follows:)

NINDB VISION RESEARCH CENTERS

Investigator and institution	1967 costs	Title of project	Primary goals
B. Becker, M.D., Washington University School of Medicine, St. Louis, Mo.	\$249,946	Clinical glaucoma research....	The natural history of the glaucomas. Training personnel in glaucoma research and management.
M. W. Van Allen, M.D., University of Iowa, Iowa City, Iowa.	212,672	Neurological clinical research center.	Supports laboratories of neuropsychology, electroretinography, and retinal physiology, pupillography, electromyography, histology, electron microscopy, and biochemistry.
M. B. Bender, M.D., the Mount Sinai Hospital, New York City.	85,257	The oculometer system and body postural mechanisms.	Oculomotor function. Pathways in the brain-stem cerebellum and cerebrum mediating eye movements.
Frank W. Newell, M.D., Sensory Diseases Clinical Research Center, University of Chicago, Chicago, Ill.	179,096 90,184	Sensory disease clinical research center.	(1) Immune mechanism in ocular disease. (2) Retinal profiles of children with unexplained decreased visual acuity and inpatients with progressive retinal disease and intermediate sex-linked carriers of retinal disease. (3) Etiology of presenile cataracts. (4) Ocular tumors—management and diagnosis. (5) Diabetic retinopathy. (6) Otolary studies.
Richard J. Johns, Jr., M.D., Johns Hopkins University, Baltimore, Md.	549,437	Interdisciplinary research in ophthalmology.	Improved instrumentation for ophthalmology.
C. L. Schepens, M.D., Retina Foundation, Boston, Mass.	212,979 52,766	Connective tissue diseases of the eye.	(1) Optimize methods of using light and other radiations in ocular diagnosis and therapy. (2) Direct clinical research in diagnosing, managing, and preventing retinal detachment and allied conditions. (3) Experimental pathology of retina with emphasis on wound healing.
A. G. DeVoe, M.D., College of Physicians and Surgeons of Columbia University, New York City.	287,713	A corneal center.....	Basic studies on the cornea as well as on specific clinical problems. Immunology (corneal transplants), biochemistry, electron microscopy, physiology, pathology, pharmacology, and histology of the cornea.