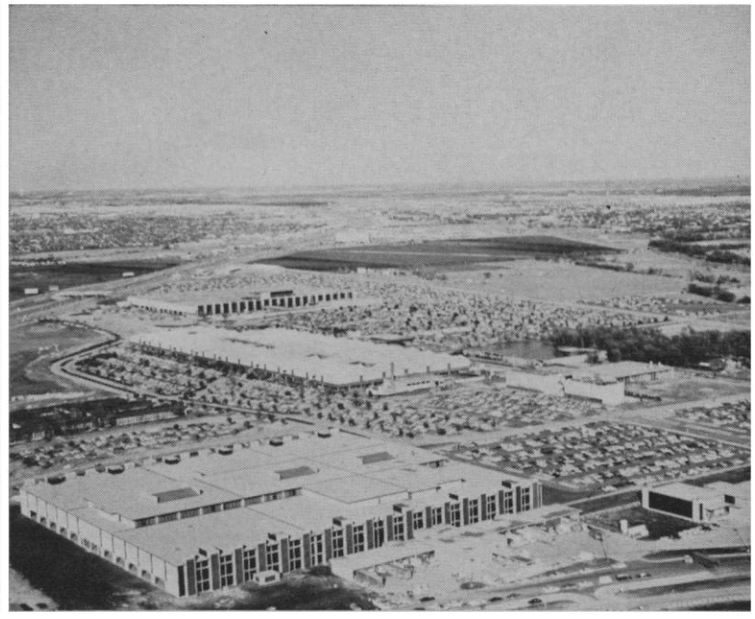
Tours

Dallas, Texas



The Southwest Center for Advanced Studies was founded in 1961 in answer to a growing need for intellectual resources because of the shift of the economy of the region to science-based industry.

An educational nonprofit institution, itself awarding no degrees, the Center dedicated first efforts to gathering a "community of scholars," scientists outstanding in their fields, to explore and expand research in space, earth, biological, material, and mathematical sciences.

As faculty and research programs became well established, the Center has given increasing attention to expanding the educational opportunities; a post-doctoral "residency" for graduates, pre-doctoral research toward dissertations leading to degrees to be granted by the students' cooperating home universities, summer programs for selected undergraduates and seminars for college teachers; teaching over the TAGER (The Association for Graduate Education and Research) television network into north Texas industries and universities, with multiple classrooms enjoying simultaneously the instruction of SCAS' faculty.

From a cotton patch of 1200 acres, rises the Founders Building of the Southwest Center for Advanced Studies. Much of the Center's seven years of progress can be read on the laboratory doors: Cosmic Ray Research, Reaction Kinetics Laboratory, Electron Miscroscope, Electron Microprobe, Experimental Petrology, Organic Geochemistry, Paleomagnetism, Oceanography, Environmental Testing, Ionospheric Plasma Laboratory, Magnetic Variation, Atomic Absorption Spectrophometry, Mass Spectrometry, Lead Isotope Studies, Morphology of DNA, Biosynthesis of B Vitamins, Photoenzymic Radiation Repair, Ultraviolet Damage in Bacteria . . . among the many.

The tour will include an overall view of the campus, with a specific look at the laboratories of the Center's major divisions, where a faculty host will describe the work in progress.

Texas Instruments Incorporated (TI) was founded in Dallas in 1930 as Geophysical Service Inc. to contract its exploration services to the major and leading independent petroleum companies. It pioneered the use of the reflection seismograph to search for sub-surface structures favorable to the accumulation of oil and gas. Because of the newness of the technology, TI designed and manufactured much of the equipment used by its prospecting crews. Exploration operations have been international in scope since the second year of TI's corporate existence. Crews operate on land and at sea in both hemispheres and TI exploration efforts have preceded the development of most of the free world's major oil provinces. The experience and know-how acquired in almost four decades now also is applied to problems of space and oceanography.

In addition to exploration, manufacturing is a major activity of TI. Two major breakthroughs highlighted the early 1950's of TI's history—the manufacture of the first silicon transistors to become commercially available and mass production of the first low-priced, high-frequency germanium transistors, which made possible the pocket radio. Other electronic systems innovations of TI include: a solid state radar system that employs no moving parts; terrain-following radar and forward-looking radar infrared systems for tactical aircraft; large-scale laser pictorial displays that provide direct readouts from computers; factory data collection systems that are computer compatible; electronic message switching centers; and several types of special-purpose computers that perform such tasks as testing integrated circuits, determining position of a ship at sea through satellite data, and filtering out noise from digital seismic data recordings.

Texas Instruments is also international in its manufacturing activities; it has plants throughout the world—in the Netherlands, Australia, Argentina, Mexico, France, and the United Kingdom.

AAAS Annual Meeting

26–31 December 1968

After touring the **Amon Carter Museum of Western Art** in Fort Worth, Texas, and hearing of its accomplishments, one recent visitor shook his head in wonder. "You call this a museum?" he asked. "It seems more like a modern research center to me." Perhaps in a sense the visitor was right, for the Amon Carter Museum, now in its seventh year, is among the few in the nation busy changing the traditional image of a museum as a quiet place full of dusty antiques. "As far as I know, the Amon Carter Museum is the only museum in the nation combining art and historical research to such an extent," a West Coast historian and author of history textbooks recently observed.

Originally established to house and exhibit the collection of its founder, the late Amon G. Carter, Forth Worth publisher, the museum is now beginning to reach full stride in a second—and perhaps even more important—stipulation of Carter's will, calling for "the study and documentation of western America." Under Director Mitchell Wilder, the museum staff currently is working on more than 30 projects for exhibitions running into the 1970's, with most of the nationwide research destined for publication in book form. The goal, Wilder explains, is "the pictorial documentation of the West, contemporary as well as the historic." Subjects of the projects range far afield, from the Royal Canadian Mounted Police and Hudson's Bay Company to American Indian Religion, Western Mythology, and the Snake River. Some, such as a definitive volume on American Forts, or an eight-volume set on Western Commerce and Technology, when successfully completed, undoubtedly will become landmark reference works, in time making the Amon Carter Museum of Western Art synonymous with original, imaginative western research.

Typical of the museum's combined exhibition-publications program are the titles, "Painting in Texas: The 19th Century"; "Texas Homes of the 19th Century"; "A Gallery of Dudes."

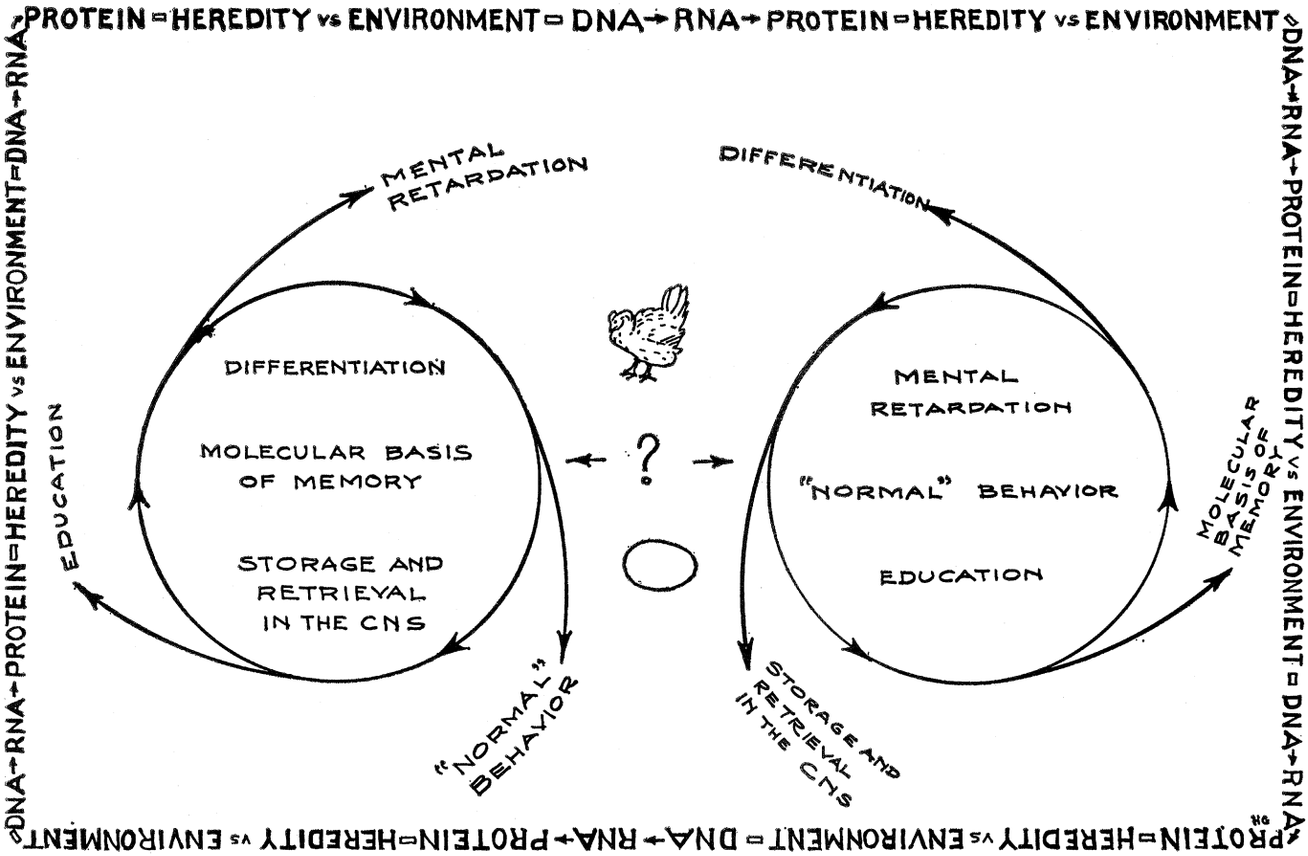
The Callier Hearing and Speech Center. One of the world's most comprehensive, modern facilities for dealing with communications problems is located on a 5-acre tract adjacent to the University of Texas Southwestern Medical School in Dallas' major medical complex. Organized in 1964 under the leadership of the Dallas community and the widely known and acclaimed otologist, Aram Glorig, the Callier Hearing and Speech Center brings together in one place under one administration a total approach to dealing with communications handicaps and achieving advances in techniques and methods to alleviate such handicaps.

The center is composed of three divisions: Research; Pilot School for the Deaf; and Clinical Services Division. The latter division encompasses complete audiological evaluation and rehabilitation services, and speech pathology services for all types of language and speech problems. The Center is equipped with audiological test suites; complete audiometric test equipment is available for all diagnostic tests including electronystagmography.

Problems evaluated and programed for rehabilitation cover the entire spectrum of oral communications problems, including aphasia, esophageal speech, stuttering, language problems, cleft palate, hard of hearing, articulation, and emotionally disturbed children. Audiologists hold classes in speech reading and auditory training. Special staff personnel provide needed counseling and assistance to adult deaf who depend on non-oral communications.

The Pilot School for the Deaf, the educational service of Callier, has 140 children enrolled, ranging in age from 1 to 15 years. Each classroom is equipped with the latest in audio-visual aids for teaching.

The research division is presently engaged in two investigative programs, one in neurophysiology of hearing and the other in assessment of auditory functioning along auditory pathways through behavioral psychology test techniques.



Molecular Approaches to the Central Nervous System

AAAS Symposium • 29–31 December 1968 • Dallas, Texas

"This patient illustrates another aspect of the syndrome—he had to be kept with the hands securely tied to prevent destructive biting of the fingers. This behavioral characteristic of the syndrome may well be the most striking aspect of the clinical picture. At first thought one might think that this was a manifestation of some type of sensory anesthesia, but this is not the case. These children have a compulsive behavior. —This extreme degree of self-destructive activity about the face was progressive. He looked at first like a patient with a congenital hairlip and cleft palate. However, when he was born, his lip and palate were completely intact. —These children are generally aggressive and self-destructive. —Aggression against the outside world is very direct, expressing itself in blasphemous language with intense swearing, putting parents in embarrassing situations. Two boys developed the disturbing habit of pinching the mother's breasts when she was holding them, and subsequently, pinching the genitalia of the father. They did these things any time, any day, or place. One cannot underestimate the overall aggressiveness of these children. —Older children do not generally bite others. They hit or kick, knock glasses off, and laugh uproariously. The younger ones bite first. Most parents of affected children have been bitten. There are some fairly dramatic examples. Nurses in the clinical research unit must learn to avoid or adjust to this type of behavior. It takes a certain maturity to manage a boy who pinches. —Mental retardation is rather difficult to assess in the presence of choreoathetosis. We are impressed that these children do not seem to miss much that goes on about them. One patient, when asked why he bit his finger replied with a glint in his eye, 'My uric acid's too high.' —It has been most impressive in view of their appearance, limitations, and behavior to find them unusually engaging children and often particular favorites of the nurses and other members of the hospital staff."

The above statements were taken from a series of seminars on the Lesch-Nyhan Syndrome [*Federation Proceedings* **27**, 4 (July–August 1968)]. It was also pointed out that it was important to identify clinical features of the syndrome since careful assessment of clinical similarities and differences may elucidate much heterogeneity. "Four clinical characteristics appear clearly to be parts of the syndrome, that is, mental retardation, neurological abnormalities (choreoathetosis or athetoid cerebral palsy), obsessive destructive behavior, and hyperuricemia (certain features of clinical gout)." Hyperuricemia itself is not constant, but increased secretion of uric acid is. The most constant manifestation is the aberration of purine synthesiss. In a 4-year period researchers collected information on over 60 patients and studied 15 in detail. Therefore, a relatively common metabolic disease is a distinct

cause of mental deficiency. "*It also appears to be the first condition to be recognized in which characteristic biochemical abnormalities are associated with a reproducible pattern of abnormal behavior.*" The characteristic biochemical abnormality has now been defined [*Science* **155**, 1682 (1967)] as the complete absence of an enzyme, hypoxanthine-guanine phosphoribosyltransferase, HG-PRTase, which catalyzes the following reaction.

$$\text{PRPP} + \text{hypoxanthine or guanine} \rightarrow \text{IMP or GMP} + \text{PP}$$

Previously this enzyme was accepted as a component of the salvage pathway for purine metabolism with no hint of a relationship to the control of de novo purine synthesis. The complete absence of the enzyme is apparently associated with the neurological changes in the Lesch-Nyhan syndrome and other examples of excessive purine synthesis (gout) are also associated with greatly reduced levels of enzyme activity. Apparently, a low level of activity has an ameliorating influence on the neurological aspects of the disease.

A symposium entitled "Molecular Approaches to the Central Nervous System" was developed 29–31 December 1968 in Dallas, Texas. The symposium was developed as a sequel to the 1967 symposium which will be forthcoming in book form through Academic Press under last year's symposium title, "Molecular Approaches to Learning and Memory." The previous program emphasized [*Science* **158**, 1081 (1968)] experimental approaches which could lead to an understanding of the nervous system at the molecular level. Some of these same subjects are represented in the 1968 symposium, but the session entitled "Molecular Approaches to Mental Retardation," chaired by Robert E. Cooke, has been selected to emphasize those areas in which human biology (pathology) and molecular understanding go together. The first two speakers, Marcus Jacobson and Merril K. Wolf, represent selective ("editorial") emphasis to the end that development of the nervous system is an important and fertile area, but the remaining presentations represent paired-presentation on a single subject which will cover the full spectrum from the clinical syndrome to the chemical evidence.

The preview of the Lesch-Nyhan Syndrome was given to illustrate a possible paired presentation. It also seems possible that the association of a reproducible pattern of abnormal behavior with aberrant purine metabolism and the identification of an HG-PRTase deficiency with the metabolic defect represent contributions which should be compared to the sequential understanding of the hemoglobinopathies based on the contributions of Linus Pauling, Harvey Itano, and Frederick Sanger which had subsequent far-reaching consequences for molecular biology and genetics. A prediction of the progress which can be anticipated in the next 10 years (including the influence of the Lesch-Nyhan Syndrome) would be difficult to make and undoubtedly would meet with a controversial response, but the chairman and speakers in the symposium represent a sample of those who have committed themselves to an understanding of the central nervous system with the implied assumption that the current concepts of molecular biology (Stent's central dogma) will be applicable. An ultimate understanding may require the development of an avant-garde attracted by "the hope that some 'other laws of physics' may yet turn up through the study of the nervous system" [G. S. Stent, *Science* **160**, 390 (1968)], but in the meantime some progress can be anticipated by efforts which are interdisciplinary to the point where basic versus applied and clinical versus preclinical have no meaning.

A specific historical evaluation at some future date may imply that progress was made as a result of spin off from a discipline-oriented approach. It also seems possible that the interdisciplinary approach would lead to a historical evaluation which would have to include: (i) An age old question . . . which came first . . . ? . . . and (ii) A space-age question . . . who spun off what to whom?

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Molecular Approaches to Central Nervous System (29 Dec).

Chairman: William L. Byrne.

Historical Review of Memory Transfer, Ejnar J. Fjerdingstad.

Memory Transfer—Specificity and Reproducibility, Georges Ungar.

Molecular Approaches to Mental Retardation (30 Dec.)

Chairman: Robert E. Cooke.

Introductory Remarks.

Prewiring of Nervous System, Marcus Jacobson.

Organotypic Culture Analysis of Disease Mechanisms in Neurological Mutant Mice, Merril K. Wolf.

Mental Retardation and Nutrition: Clinical and Biochemical Aspects, P. Dodge and D. Cheek.

Clinical, Behavioral, and Biochemical Aspects of the Lesch-Nyhan Syndrome, William L. Nyhan and J. Edwin Seegmiller.

Inborn Errors of Complex Lipid Metabolism: Clinical and Biochemical Aspects, Roscoe D. Brady and Guy M. McKhann.

Mucopolysaccharidoses: Clinical and Biochemical Manifestations, Andrew E. Lorincz and Elizabeth Neufeld.

Behavioral and Biochemical Aspects of Trisomy, George Smith and R. Rodney Howell.

Molecular Approaches to Learning and Memory (31 Dec.)

Chairman: Henry P. Mahler.

Detection of Unique RNA Species by Hybridization Procedures, John Gaito.

The Effect of Short Term Training on RNA Polysomes, Edward Glassman.

Current Studies of Memory Formation in the Goldfish, Bernard Agranoff.

Hippocampal Function in Memory, Peter Carlton.

Pigeon Brain Mucoids and Training, Learning and Memory, Samuel Bogoch.