CAMILLE DREYFUS LABORATORY
Anton Peterlin, Director

RTI's Camille Dreyfus Laboratory is an international center for basic studies in the physics and chemistry of polymers. It is dedicated to long-range fundamental research in polymer science, and to the discovery of new materials and the modification of known polymers which may provide the foundation blocks for products and industries of the future.

The Laboratory was created by a $2.5 million grant from the Camille and Henry Dreyfus Foundation as a research memorial to one of the great pioneers of man-made fibers, chemicals and plastics. Sustaining support is also received from corporate and government sponsors.

The Laboratory's general program is about equally divided between research relating to the synthesis and modification of polymer structures, and research relating to pure property investigations. All projects undertaken in the Laboratory serve to advance these objectives. Research findings are published in scientific journals and other publications.

Selected areas of study within the general program include:
- the dynamics and thermodynamics of polymer solids; polymer morphology; electrical, optical and solution properties of polymers; crystallization, deformation, permeation and diffusion in polymers; radiation chemistry (degradation, grafting, cross-linking, polymerization); stereochemistry; polymerization kinetics;

The work of the Laboratory's permanent staff is enhanced by the knowledge and experience of Resident Visiting Scientists, from this country and abroad, who hold six-month to two-year appointments at RTI.

* Member, Executive Committee
RESEARCH TRIANGLE INSTITUTE is a contract research organization formed at the initiative of business leaders and state and university officials in North Carolina. Initial funding was provided by the Research Triangle Foundation through contributions received from individuals and corporations. The purpose of RTI's founders was to establish a research center supplementing the activities of its neighboring universities—the University of North Carolina at Chapel Hill, Duke University in Durham, North Carolina State University at Raleigh—in the discovery and application of new knowledge. Created by the Triangle universities to provide professional research services to industry and government, RTI is a scientific resource which contributes directly to the economic well-being and security of the people of North Carolina, its region and the nation.

RTI is a separate corporate entity. Under an independent Board of Governors, Institute management is solely responsible for operating policies and for developing the programs of its research laboratories and divisions. Non-profit status affirms RTI's independence. Like any business, however, it must rely on its own earnings for continued staff growth and expansion of facilities. RTI's operating surplus is used to provide new laboratory equipment, to underwrite new areas of research, and to fulfill the public service obligations of its charter.

Research operations were under way early in 1959. By 1966 the Institute's staff had grown to nearly 300 professional and support personnel, and contract billings reached the rate of $4 million annually.

The Camille Dreyfus Laboratory for fundamental research in polymer science was created under a $2.5 million, ten-year grant from the Camille and Henry Dreyfus Foundation. Research findings from this international center are distributed on an unrestricted basis.

FACILITIES

RTI's 200-acre campus is centrally located within the Research Triangle whose geographic points are the University of North Carolina at Chapel Hill, Duke University in Durham, and North Carolina State University at Raleigh. The proximity of the four institutions creates an environment of unique stimulus and challenge for the research scientist.

Activities of the Institute's eight research laboratories and divisions are housed in five modern buildings containing 95,000 square feet devoted to laboratory space, offices, meeting rooms, an auditorium, and library, shop and service areas. As contractual obligations require, RTI project offices are established in foreign countries and throughout the United States.

Laboratory equipment and specialized instrumentation to support the Institute's wide-ranging research interests represent an investment of over $1.2 million by RTI, including appropriations from the State of North Carolina and gifts. Major items include a general purpose scientific computer center, a Cobalt-60 radiation facility, nuclear magnetic resonance equipment, x-ray diffraction units, infra-red and ultra-violet spectrophotometers, gas chromatographs, electron microscope, facilities for fabricating solid state and thin film devices, seismic installations for field and laboratory studies, atmospheric chemistry sampling stations, and Craig counter-current equipment. RTI also maintains an animal colony for the evaluation of biologically active substances.

The Camille Dreyfus Laboratory is a contract research laboratory that conducts research in the field of polymer science. The laboratory is located within the Research Triangle and is operated by RTI. It was established under a grant from the Camille and Henry Dreyfus Foundation and is recognized for its contributions to the field of polymer science.

UNIVERSITY AFFILIATIONS

RTI's privileges and relationships within the Triangle university family are the Institute's greatest assets. Strong university orientation is a distinctive feature of RTI operations. The universities are its corporate parents, and faculty members and department heads have played key roles in planning and developing major research areas at RTI. Exchange of information and the sharing of research facilities occurs both at formal levels and through many informal and personal associations.

The libraries of the three universities contain by far the largest collections in the south. RTI's staff has access to a combined total of nearly 2.5 million volumes, cross-referenced and readily obtainable.

Other university facilities available to RTI include high-speed computers, research reactors, particle accelerators, wind tunnels, low- and high-temperature laboratories, and extensive general purpose and specialized equipment.

Consulting assistance from faculty members is of great importance to RTI as a means of supplementing the capabilities of its permanent staff.

Numerous projects in support of university programs are performed at RTI in such fields as public health, agriculture, economics, marketing and instrumentation.

A number of RTI senior staff members hold adjunct faculty appointments, many of them involving special teaching assignments. Many RTI employees are enrolled in credit courses for graduate training.

Seminars and symposia are attended by members of the four institutions. A distinguished visiting lecturer series is presented on a regular basis by RTI's Camille Dreyfus Laboratory.
RTI programs emphasize the multidisciplinary approach. Most work benefits from the active participation of professionals within the Institute and at the Triangle universities who are skilled in a variety of disciplines.

Close and continuing association among specialists in many fields extends the resources of RTI's research managers and enhances the quality of scientific enterprise throughout the Institute.

During 1965 RTI's research groups worked under contract on 115 separate projects for foundations, federal and state government agencies, and industrial sponsors ranging from local companies to national corporations.
The growing complexity of decision-making processes in manu-
sampling and statistical theory is conducted in support of and
requires improved methods of identifying, collecting and
industry, government bureaus and other public agencies.
which describe a process, system or piece of equipment.
mathematicians and engineers in various subject fields. Re-
concurrently with extensive programs in reliability and in the
time and control of operational processes. The approach is to
in multidisciplinary teams, mathematicians and engineers in various subjects. Re-
search objectives in the analysis of functional relationships are, in
to:
• Develop meaningful probabilistic or stochastic models
which describe a process, system or piece of equipment.
• Identify those points where controllable variation enters
the system.
• Design experiments so that the effect of variation at control
points can be measured.
• Optimize the system with respect to some meaningful
criteria for the output.

Emphasis is given to the following program areas:
- Design and Analysis of Experiments
- Sampling and Data Collection
- Statistical Theory
- Reliability
- Analysis and Control of Industrial Processes

GEOPHYSICS LABORATORY
James J. B. Worth, Director

Geophysics research at RTI encompasses the study of physical
phenomena occurring throughout the earth-ocean-atmo-
phere environment. It is concentrated, relating navigational, control and systems
activities to cooperation with the Institute's other laboratories and
disciplines. Major areas include:
- Geophysics, Physics, Chemistry, and Mathematics are applied to problems concerning the composition, structure and energy
balance of the Earth.
- Meteorology—Basic atmospheric processes are examined and the extratropical
environment.
- Environmental influences of ocean boundaries and the chemistry and physics of sea water,
including oceanography, their electromagnetic interactions.
- Aeronomy—Concerns energy exchange processes in the ionosphere and their influence on electromagnetic propagation,
communications, navigation, and the performance of instru-
mentation in satellites and rocket-propelled vehicles.

RADIATION SYSTEMS LABORATORY
F. Gene Smith, Director

Theoretical and applied research is directed toward com-
positions of transmitters, receivers, and the performance of instru-
aments in satellites and rocket-propelled vehicles.

OPERATIONS RESEARCH AND
ECONOMICS DIVISION
Edgar A. Parsons, Director

The objective of operations research is to provide explicit,
quantitative understanding of the essential elements in an
operating system and of the factors controlling them. OR tech-
niques add a new dimension to the finite problems in which
trained research personnel can contribute to increased effec-
tiveness and profitability.

Operations research and economics research at RTI bring
together many skills and disciplines to aid business and govern-
mental decision making. Staff members have professional
training and experience in the economic sciences, the physical
sciences and engineering, agriculture, government, finance,
and mathematics. Economic, economic models, statistical tech-
niques and high speed computers are among the basic tools of
the OR Analytical staff to discover and highlight significant patterns of interaction within industrial,
military, national and international operating systems. Their
purposes are to identify and evaluate alternative choices facing
management in its policy, planning and action decisions, and
to determine the most effective utilization of natural, financial,
and human resources.

Program capabilities at RTI include industrial and regional
economics, resource development, military systems, interdiscipli-

cal economics, investment planning, civil defense, marketing
and distribution, transportation, communications, and infor-
mation and command and control systems.

NATURAL PRODUCTS LABORATORY
Monroe E. Wall, Director

The Natural Products Laboratory uniquely includes chemists
and biologists working together on problems which require
inter-disciplinary approaches. Broad programs are pursued in
screening natural products for potential cellular or biologically
active compounds, with particular emphasis on isolation,
structure proof and synthesis.

Although organic chemistry is a major discipline, there are also excellent faculty and graduate student specialists in
biochemistry, pharmacology and microbiology. Specialties include steroid and alkaloid chemistry, sulfur and phosphorus
chemistry, heterocycles, photochemistry, metallo-organic chem-
istry, proteins and steroids.

Activity within the Laboratory's closely inter-related areas of research interest includes:
Production of new, structurally modified steroids and
testing them for hormonal and anti-tumor properties.
Synthesis of compounds that may reduce the effects of
radiation upon living cells.
Exhaustive effort to identify and characterize cancer
retarding agents in growing plants.
Bio-assay of crude extracts from natural products.

Characterization of unidentified natural resins in fluted
tobacco.

Preparation of a new family of chemicals for possible
agricultural applications.

SOLID STATE LABORATORY
Robert M. Burger, Director

Ranging from basic exploratory research to application and production of functional silicon devices in the Solid State Laboratory,
researchers are focused on understanding, unique measurement problems, and the study of physical processes. Mathematical models are incorporated into systems
studies for determining the behavior, economics, and design
capabilities of industrial processes, such as used in desalting
seawater.

The Chemistry Group specializes in development of analyti-
cal instrumentation by combining chemical and radiotechnical
principles with electronic and mechanical measurement
techniques. A primary contribution has been "radio-release"
analysis, its application to the determination of radioisotope
terms of all the factors which influence it. The analysis is
then taken as a fundamental step in the development of
isotopes and their applications.

Engineer's Analysis emphasizes the development of funda-
mentally sound processes. Applied work includes the develop-
ment and application of new materials, new device and system
techniques, and new device concepts. The primary objective is to develop improved new materials, new device and system
techniques with special emphasis on the long-range objective to provide re-
search assistance in the industrial, military and economic growth of the region. RTI maintains an Office of Industry Services and a
Regional Development Office. Working closely with other
agencies, the Office provides a unique measure of environmental systems and physi-
tracing the trace of an object on a target (e.g., light, heat, or
materials. —

REGIONAL SERVICES

The following areas of specific research interest include:
- Field Programs—In situ, on-going measurements of the physical properties of new materials and devices, and the
study of state-of-the-art components and sub-systems.
- Development of analytical techniques and sub-system

GEOPHYSICS RESEARCH

STATISTICS RESEARCH DIVISION
Alva L. Finkner, Director

The science of statistics is yielding increasingly powerful
tools and techniques for use in all fields of scientific research
and development, and in the technical and business operations
of industry, government bureaus and other public agencies.
The growing complexity of decision-making processes in manu-
sampling and statistical theory is conducted in support of and
requires improved methods of identifying, collecting and

MEASUREMENT AND CONTROLS LABORATORY
John C. Orcutt, Director

Three inter-disciplinary groups, provide theoretical and ap-
plied research capability in process analysis and optimization,
unique measurement problems, and the study of physical
processes.
NOTE:
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missing A.R.