

1982

Research Triangle Institute

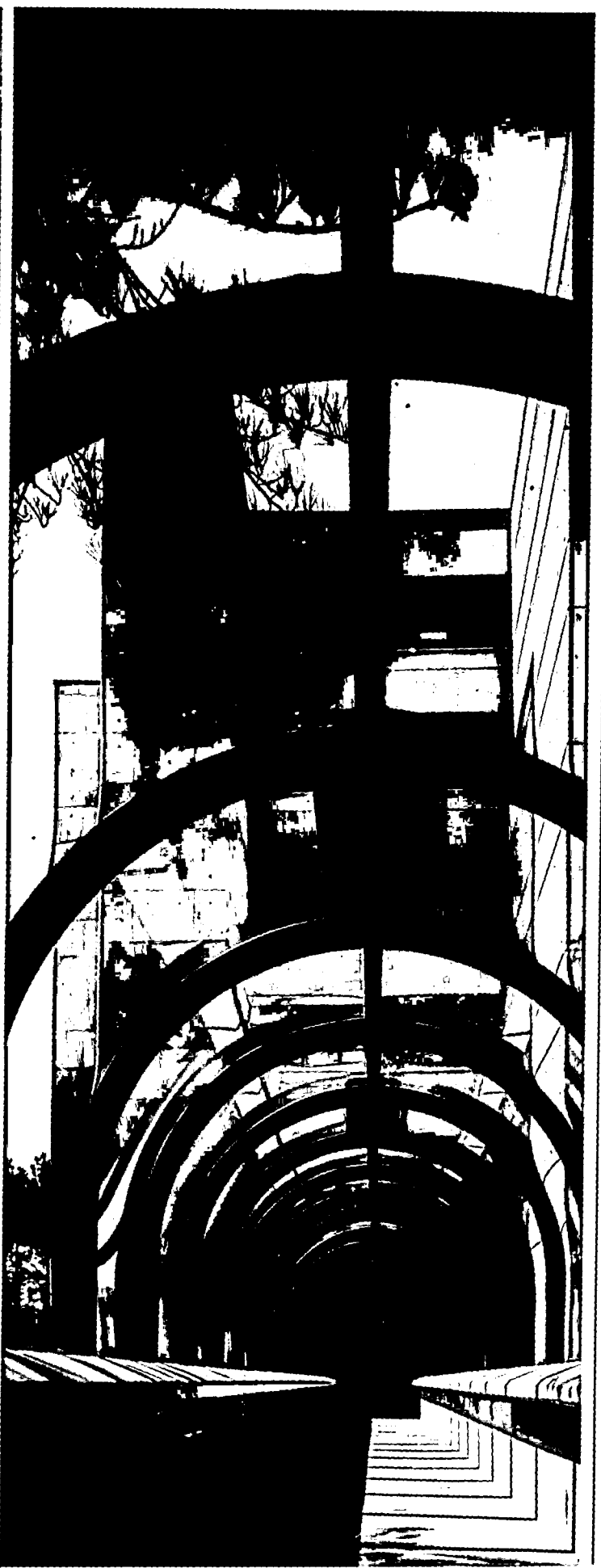
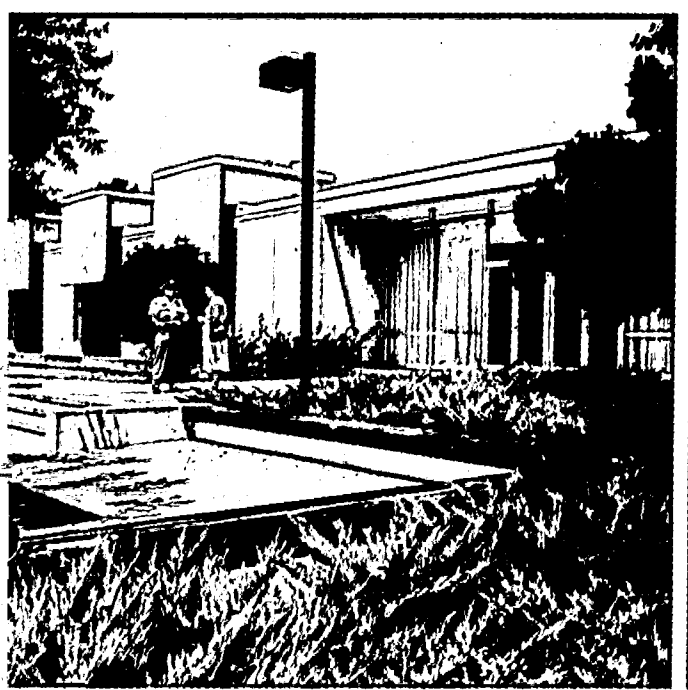
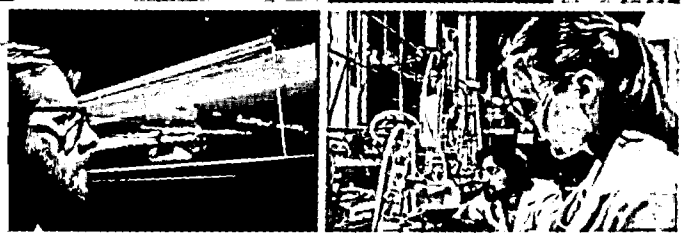
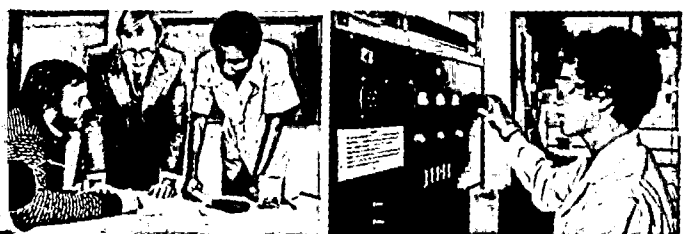
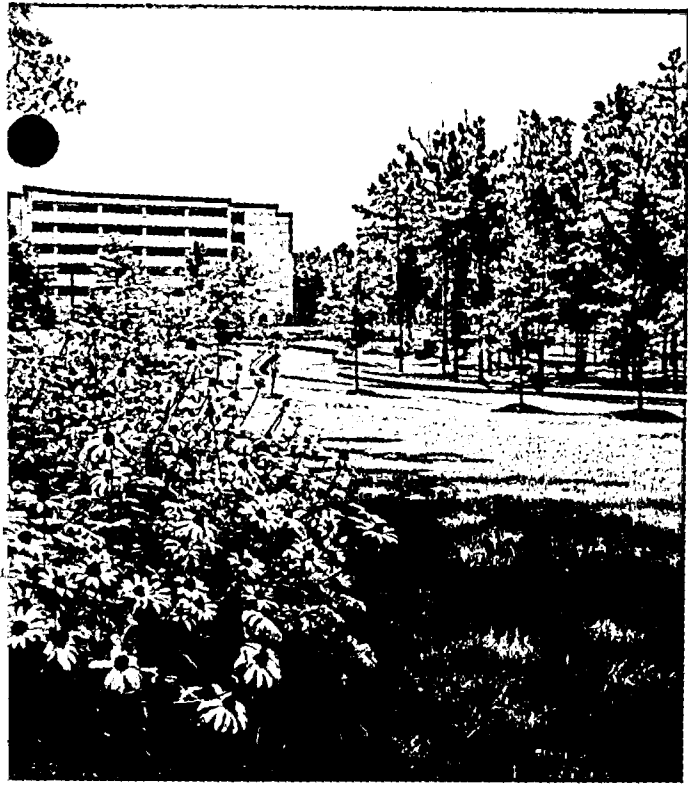
RTI is

- A separately-operated corporate entity created at the end of 1958 by joint action of North Carolina State University, Duke University and the University of North Carolina at Chapel Hill.
- A not-for-profit organization that performs research under contract to clients in business, industry, public service agencies and government.
- Located on a 180-acre campus in the Research Triangle Park centered near the university cities of Raleigh, Durham, and Chapel Hill. The Research Triangle Foundation, a nonprofit trusteeship, develops the resources of the 5,500-acre Research Triangle Park which has grown around RTI to become one of the world's foremost science centers.
- Entirely self-supporting on the contract revenues generated by project charges to research clients. The Research Triangle Foundation provided a start-up grant of \$500,000 and donated RTI's campus. The State of North Carolina participated in RTI's early growth through scientific equipment grants of \$1 million. Other substantial contributions have been received from individuals, foundations, and business firms.

RTI has

- Close working ties with its founding universities. Relationships extend from board governance to professional consulting agreements with several hundred faculty and medical center scientists, teaching appointments for RTI staff, library services, and the extensive resources of the Triangle Universities Computation Center. Institute affiliations with the Triangle universities are nowhere more apparent or valuable than in collaborative research calling for a portion of the work to be done within RTI and a portion at one or more of the schools.
- A Board of Governors that consists of 13 representatives from the parent universities, 13 members elected from the business and professional communities, and RTI's president.
- 350,000 square feet of laboratory and office space in 15 buildings to house a regular staff of more than 900.
- Multidisciplinary research programs organized into major groups covering chemistry and life sciences, energy, engineering and environmental sciences, and the social and statistical sciences.





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**A sampler of the
diverse scientific
enterprise and
capability at RTI . . .**

Statistics, sample surveys

Toxic exposures

Toxicology

Health

Hazardous wastes

Drugs, alcohol, crime

The generations

Microelectronics

Air navigation

Materials

Energy

Environmental quality

Industry, business

Management services

Learning, occupational
training

National security

Social systems

States and communities

International programs

Technology innovation

Engineering handbooks

Statistics, sample surveys

RTI statistical science and survey research capabilities are among the most comprehensive in the United States, providing resources for studies over a great range of health, business, economic, social and behavioral issues.

From state-of-the-art studies of sampling theory and statistical methodology to experiments with various modes of data collection, RTI addresses many problems of concern to commerce, industry and government. Complete and innovative survey research operations include:

- sample design and selection,
- survey design and management,
- questionnaire design,
- data collection and reduction,
- theory and methods of analysis, and
- tabulation, analysis and reporting.

Basic research programs in survey statistics encompass: inferences from complex survey designs; complex sampling strategies; total survey error/design; optimal allocation of resources; methods and procedures evaluation; and the design of survey data analysis software.

RTI combines its basic research with applied survey services and a fully staffed national general purpose sample to support the preparation and execution of dozens of survey projects, some involving samples of up to 75,000 individuals. Many of these are referred to on following pages. Other examples:

- RTI's national medical care expenditure studies are the largest ever undertaken to gather information for health planners and policymakers about the extent to which Americans use health care services, the nature of treatment, how much it costs, and who pays the bills.

- National Assessment of Educational Progress survey design, sample selection and data collection have been performed by RTI since the assessments began in 1969.

- Survey specialists and chemists join forces in RTI research to monitor and measure human exposures to potentially hazardous substances such as industrial chemicals, manufacturing and mobile source effluents, building materials, pesticides, cleaning materials and other products.

- Data collected from more than 2,700 households are the basis of RTI research to evaluate the impact of dental insurance. Goals of the study are to estimate the effects that insurance coverage has on the use of dental care services, on their total cost, and on the nation's oral health.

Toxic exposures

Military systems and industrial operations may expose individuals and communities to complex mixtures of potentially hazardous agents which lead to acute or chronic health problems.

Chemists, toxicologists, epidemiologists, industrial hygienists and statisticians at RTI carry out studies comparing the health of exposed populations and appropriate reference groups. Data are acquired from primary sources such as interviews and environmental and human physiological samples, and from secondary sources such as medical and vital records.

New laboratory methods, advanced chromatography/spectrometry, X-ray crystallography and other analytical techniques enable RTI scientists to characterize a broad spectrum of organics, metals and particulates in air, water, soil, commercial products, human fluids and other media. Research on toxic substances in the environment and humans draws heavily on RTI capabilities in sample design, survey operations and statistical analysis.

Representative areas of RTI toxic materials research are:

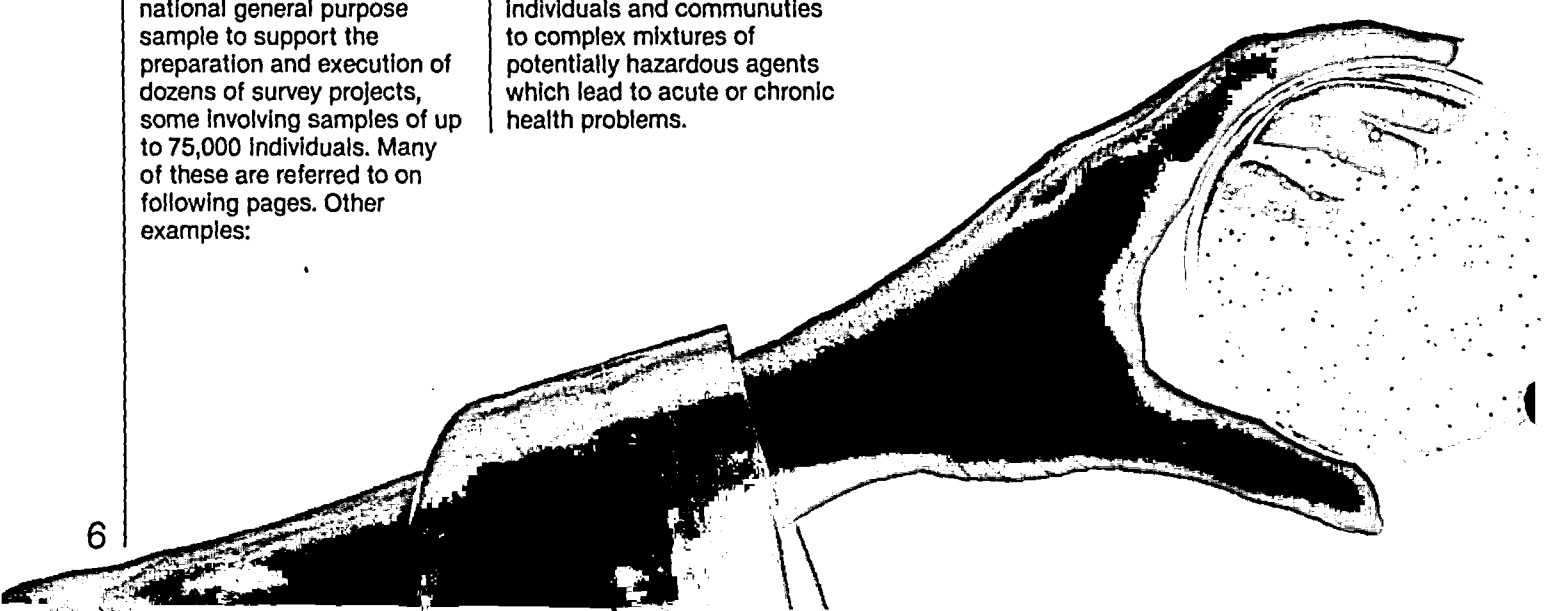
- halocarbon monitoring,
- coal gasification by-products,
- hazardous substance disposal,
- industry source performance standards,
- assays of drinking, raw source and groundwaters, and
- asbestos sampling and analysis.

Toxicology

Institute research on toxic substances extends from studies in bacteria to mammals, and is performed in well-equipped laboratories and a specially designed animal research facility.

Research in reproductive toxicology and teratology focuses on impairment of fertility and reproduction, on alterations in endocrine function, and on abnormal structural and behavioral development in offspring.

The genotoxicity of chemicals and complex environmental mixtures is evaluated in bacteria, mammalian cell cultures and laboratory animals. Modern techniques have been developed to detect mutation at specific genetic loci. New capabilities in inhalation toxicology are expanding to complement RTI's established expertise in general toxicology.

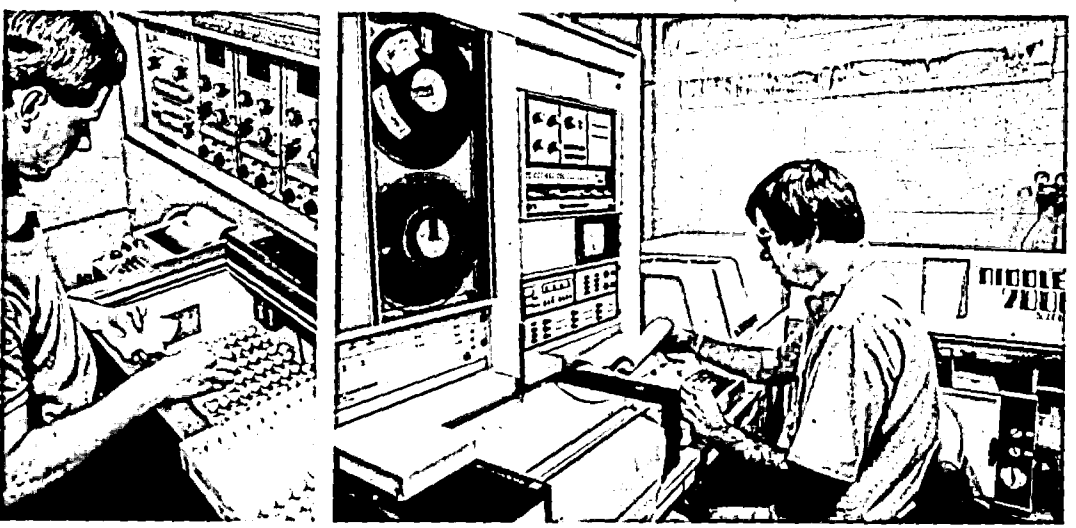




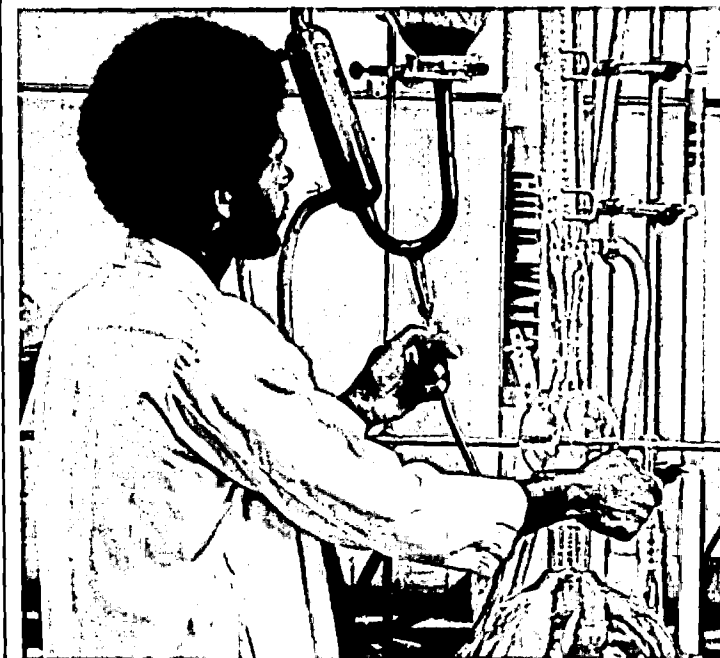
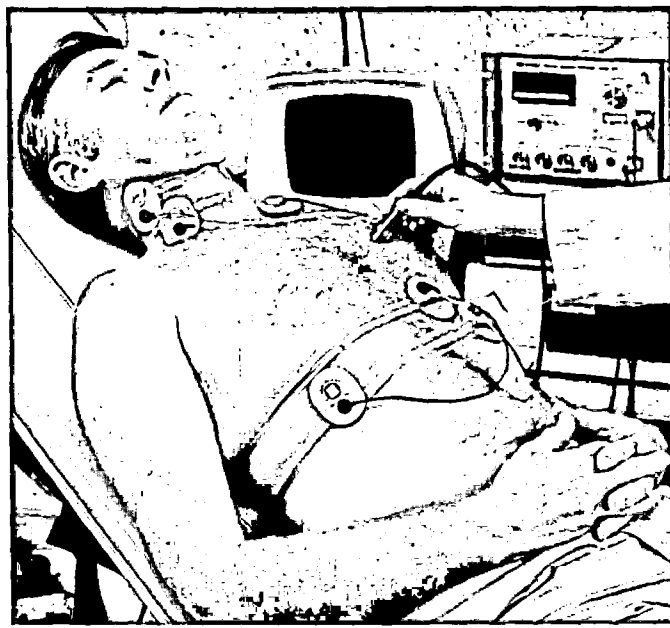
bove: Special staining of tal rat skeletons helps entify chemicals that will use physical birth defects.



RTI chemistry and life sciences research is supported by extensive analytical instrumentation.



ft: *In vitro* tests with cteria and cell cultures ide a rapid and xpensive means for sessing the potential rds associated with strial chemicals, ronmental pollutants, food ditives and drugs. RTI entlists devise new *In vitro* thods to help reduce the ts of toxicology testing.



RTI's health-related research includes, opposite page center, a new, noninvasive method for heart diagnosis.

clockwise from top right: developing drugs to combat cancer; identifying chemicals that might cause genetic damage; computer systems to support toxicology studies; seeking anticancer compounds in natural products; new drugs to treat diseases such as Cooley's anemia; and *in vitro* toxicology research and testing.

Health

Health and medical-related research command major attention in all RTI research groups, as indicated on other pages. A selection from the many allied activities:

— Since 1966 RTI scientists and engineers have operated a NASA biomedical applications program to transfer aerospace advances to help meet medical research and clinical medicine needs through the commercialization of NASA technology. Dozens of transfers have been implemented. Program methodology and activities are to: identify problems through interaction with clinicians and medical researchers; identify and screen applicable NASA technology that meets the medical needs; develop commercialization strategies; transfer potential medical innovations to private industry for final development and marketing.

— Extensively equipped chemistry and life sciences research divisions perform: pharmacology and metabolism studies of drugs and other xenobiotic compounds; immunoassay development; synthesis of organic and isotopically-labeled compounds, including steroids, peptides, barbiturates, amphetamines, antimalarials, anticancer drugs, antiradiation agents, and natural products; acute, subchronic and chronic toxicity studies; clinical chemistry and hematology research.

— Social science and public health analysts give primary attention to quantitative methodology, health systems design, health services planning and delivery, health manpower requirements and health information systems, with particular emphasis on program effectiveness evaluation.

— Statistical scientists act as data coordinators for large clinical trials of treatments to limit heart attack muscle damage, to prevent respiratory distress syndrome among infants, and to quantify atherosclerotic lesions on

large arteries.

— Epidemiologic research includes stroke, epilepsy, mental health, chronic intermittent dialysis, and occupational hazards.

— To help assure safe water supplies and adequate sanitation services in urban and rural areas of developing nations, RTI is a major participant in the Agency for International Development's water and sanitation for health (WASH) project. RTI's research functions in WASH include public health, economics, sample surveys, data management and statistical analysis.

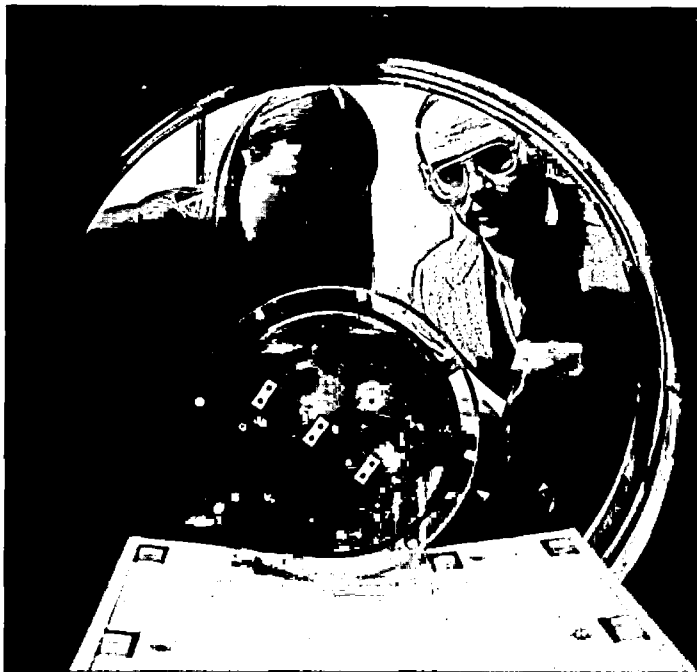
— RTI economists examine family income, consumption and nutrition patterns in several developing countries to aid host governments form policies for identifying and altering household decisions which lead to undernourishment.

— RTI is studying the effects that food supplements received under the WIC program have on the well-being of infants, young children, pregnant women and nursing mothers.

Hazardous Waste

Safe, cost-effective hazardous waste disposal is a research priority at RTI. Institute chemists, chemical engineers and environmental scientists assist the EPA with R&D programs on waste incineration, the evaluation of treatment and disposal technologies, and the characterization and management of industrial hazardous wastes. Studies cover chemical, physical, thermal and biological treatment and disposal methods and their applications in industry.

RTI operations analysts work with scientists at the Duke University Medical Center to improve radiology techniques such as computed tomography and radiation therapy.



Drugs, alcohol, crime

Pharmacology, behavioral science, bioorganic and synthetic chemistry and survey research are major contributors to RTI programs that deal with substance abuse.

Extensive instrumentation resources and experience in chromatography/mass spectrometry, radioimmunoassay and other analytical techniques give RTI scientists distinctive capabilities for studies into the biological disposition of many compounds, including illicit drugs. For research on the metabolism of drugs of abuse, RTI has developed new methods for their analysis in blood and urine samples. Institute chemists synthesize and supply isotopically-labeled drugs and their metabolites for use in a wide variety of drug abuse research programs.

To assess and compare the effectiveness of various drug abuse treatment and rehabilitation services, RTI psychologists and survey teams obtain detailed personal data from thousands of people who enter treatment programs and later return to their communities. This study of program impacts on the subsequent lives and behavior of drug abusers is in its sixth year and is producing new insights for improved treatment methods.

In 1982 RTI began a worldwide survey of nonprescription drug and alcohol use among U.S. military personnel. The research is similar to another study RTI conducted ten years earlier.

RTI's nationwide surveys of American teenagers' drinking and drug habits were the first of their kind and provide exhaustive data sources for analyses at RTI and elsewhere concerning causes, deterrents and cures.

Institute criminologists and social psychologists make significant contributions to research in such fields of concern as narcotics law enforcement, alcohol and crime, drugs and crime, and the physical and social attributes that characterize safe neighborhoods.

Continuing crime-related research at RTI also deals with the roles of police informants, the economic costs of drug abuse, probation strategies, and adolescent delinquency.

Population

Reproduction and fertility.

State-of-the-art instrumentation supports RTI research leading to the design and synthesis of novel drugs which have potential contraceptive properties in males and females. Biological studies include endocrinology, hormone receptor analysis, hormone radioimmunoassay, and fertility and antifertility assays.

Drug delivery. RTI scientists design polymer devices with predictable drug delivery rates and lifetimes. A polyester implant which releases a continuous flow of a progestogen contraceptive within a woman's body at predetermined rates for as long as one year, and which then biodegrades, has undergone initial clinical trial at the Duke University Medical Center. Controlled release maintains drug dosages at an even level that avoids the fluctuations, side effects and uncertainties of other methods of administration.

Population dynamics.

From North Carolina, from an office in the capital city of the Republic of Togo, and from field sites in many nations of Africa and Asia, RTI works with host country research and planning officials to assess the relationships between economic development and changing

population growth and distribution patterns. The RTI Integrated Population-Development Planning program goes beyond family planning and birth control measures to stress other population-related issues such as labor force composition and participation, land use, production and consumption trends, migration, productivity, and public education and health.

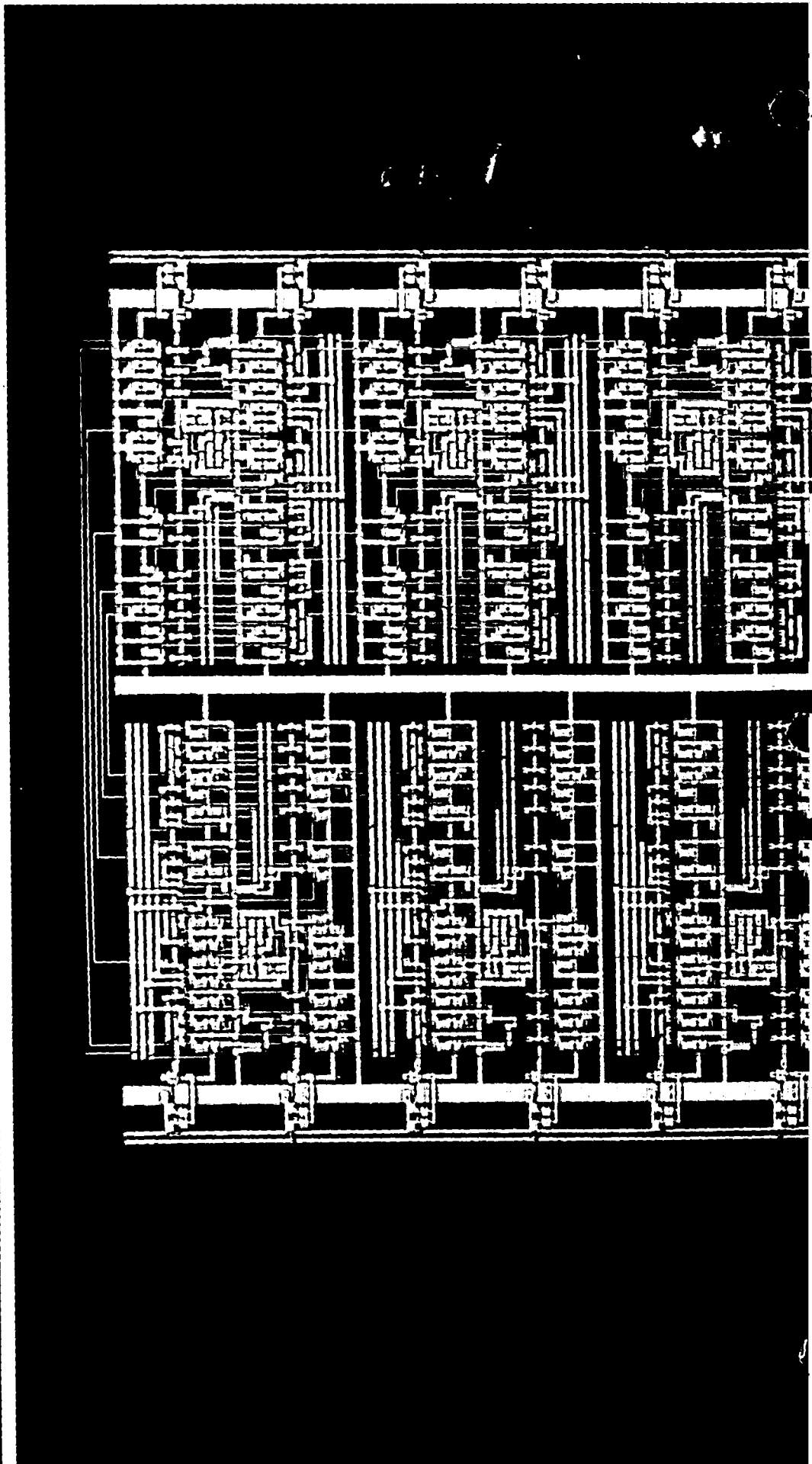
The generations

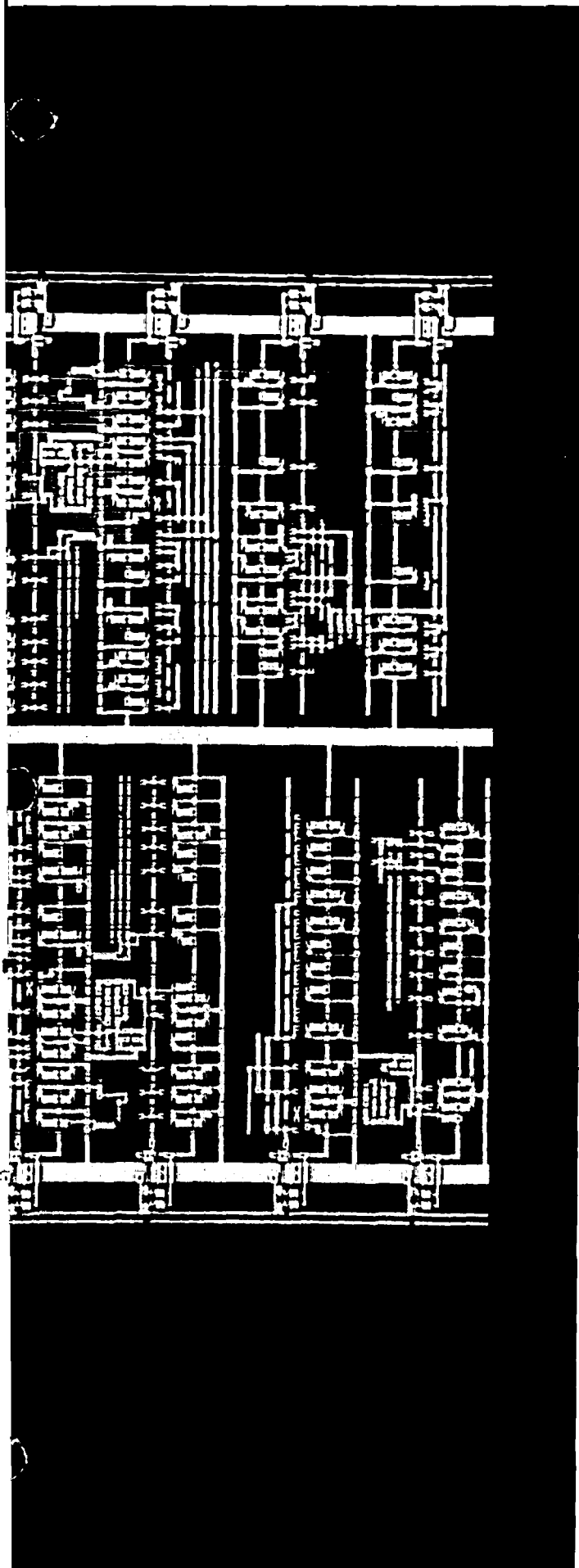
Demographers, sociologists and statistical scientists at RTI undertake a variety of studies that deal with youth, marriage, fertility, family relationships and aging. Topics include marital stability, the frequency and spacing of childbirth, the effects that divorce and remarriage have on fertility, comparisons of the attitudes that childless couples and parents have about families and children, and family relations and well-being in older years.

In a series of longitudinal studies to help sharpen educational goals, RTI amasses and analyzes enormous amounts of data about the post-secondary education, work and family experiences of a cohort of 20,000 young men and women, and about their attitudes towards school, careers and community involvement.



RTI electrical engineers and computer scientists design and develop complex microelectronic circuits for government and industrial sponsors. An important step in this process is to create computer-generated plots, such as that shown here, for verifying the correctness of the design.





Microelectronics

Twenty years after its entry into solid state electronics programs, RTI maintains a prominent national role in digital systems, computer science and semiconductor research.

Fundamental studies in microelectronics systems, materials and devices go hand in hand with extensive applications development for Department of Defense agencies, NASA, and the aerospace and telecommunications industries.

Virtually all aspects of integrated device and computer hardware and software technologies are addressed by RTI's multidisciplinary staff of research scientists and engineers.

RTI's Very Large Scale Integration (VLSI) laboratory contains computers, graphics equipment and computer-aided programs for use in the design and testing of VLSI circuits. Systems are realized by constructing VLSI circuits which provide the capability for verifying theoretical systems designs. This design laboratory supports industrial and government contracts related to fault tolerance, self-testing, and digital systems architecture.

Microelectronics Center of North Carolina.

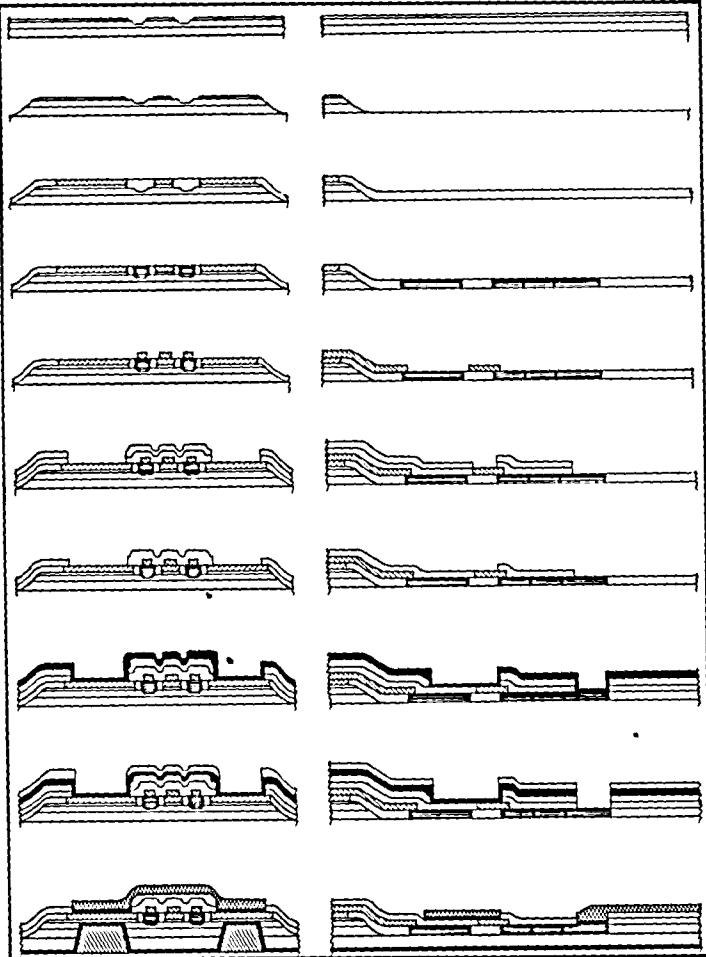
An additional resource available to RTI is the Microelectronics Center of North Carolina, a unique, state-supported enterprise to foster microelectronics education and research. MCNC participating institutions are the three Triangle universities, North Carolina A&T State University, the University of North Carolina at Charlotte, and RTI. The state's General Assembly appropriated \$24 million to provide funds for initial equipment and operations, and for an 80,000-square-foot building now under construction near RTI in the Research Triangle Park. An interim fabrication facility at North Carolina State

University in Raleigh includes an ion implantation system, diffusion furnaces, and photolithographic and plasma processing equipment. A VLSI circuit design computer system located at RTI is tied to color graphics terminals and plotting equipment at each of the five university teaching centers.

Air navigation

Defense, space and commercial air travel demand ever greater precision, reliability, economy and safety. Computer scientists, engineers and mathematicians at RTI have been engaged for twenty years in research on advanced systems for air navigation guidance and control, including:

- fast-time and real-time simulations of terminal area air traffic,
- metering and spacing for inter-sector flight pattern monitoring and coordination,
- color computer graphics for displaying information to pilots and controllers,
- global positioning satellites for navigation and aircraft collision avoidance,
- fuel-efficient air traffic control procedures, and
- automated pilot advisories for general aviation.

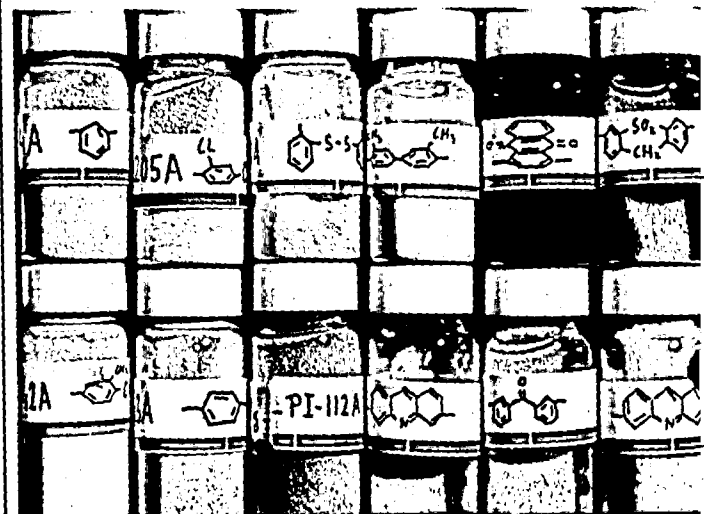
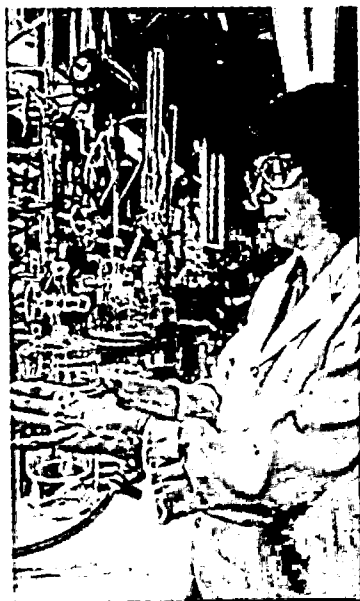


Semiconductor materials research at RTI includes, above, advanced GaAs microelectronic devices; below, new methods for

fabricating microcircuits, and studies of how resistant they are to damage from various forms of radiation.



New polymers developed by RTI chemists and physicists have many applications in medicine, industry, and environmental research. The middle photograph in this column shows crystals of a purified material for making adsorbent polymers (bottom photo) whose properties are useful for sampling toxic compounds in ambient air.



Materials

Semiconductor materials' sensitivity to nuclear and space radiation could compromise defense, communications and aerospace operations which rely on integrated circuits. The Very Large Scale Integration (VLSI) and Very High Speed Integrated Circuit (VHSIC) systems are increasingly vulnerable to damage, even from a single subatomic particle. RTI scientists focus on characterizing the effects that high energy electrons, X-rays and gamma rays have on semiconductor materials used in microprocessor chips, logic elements and memory cells.

RTI scientists have made significant advances in vapor-phase and liquid-phase epitaxial technologies to produce semiconductor materials for microelectronic devices and solar cells. Using a novel epitaxy technique called metallorganic chemical vapor deposition, RTI engineers grow layers of zinc silicon arsenide on substrates of germanium, silicon, and gallium arsenide.

Plasma polymerization experiments are carried out to make chemically reactive coatings containing transition-metal atoms that may have catalytic properties for industrial processes. Plasma polymerization methods also enable RTI chemists to create blood compatible surfaces whose properties diminish the clotting reactions that occur in such environments as kidney dialysis, artificial veins and heart valves, and other body replacement parts.

New polymers with adsorbent properties structured to capture specific chemicals from the atmosphere are being designed at RTI to improve air sampling for toxic compounds.

RTI environmental chemists prepare and perform quality assurance audits to verify the accuracy and reliability of

the standard and certified reference materials that are used for measuring and monitoring pollutants in ambient air and at specific source sites.

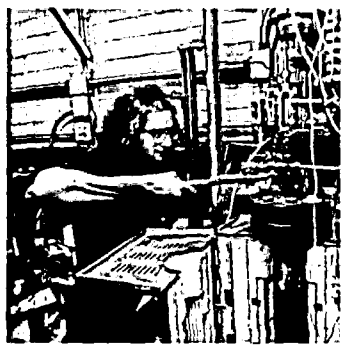
Energy

Laboratory and analytical studies focusing on America's energy future involve RTI scientists from many disciplines, including chemical and electrical engineers, economists and regional planners.

Their research for the U.S. Air Force and other government departments, for power and light companies, utility industry groups and state agencies covers many aspects of energy supply, conversion, conservation and distribution:

- semiconductor materials,
- solar cell and thin film design and fabrication,
- time-of-use electric utility rate structures,
- homeowner response to residential load management,
- thermal energy storage,
- fiber optics,
- spatial analysis of regional gasoline use patterns and urban mass transit,
- fossil energy technology,
- synthetic fuels, and
- alternative energy sources.

RTI has designed and built facilities for synthetic fuels research, including this bench-scale coal gasifier. Institute scientists and engineers conduct experiments to identify optimal operating conditions for synthetic fuel production processes, and to design economically feasible methods for controlling hazardous byproducts.



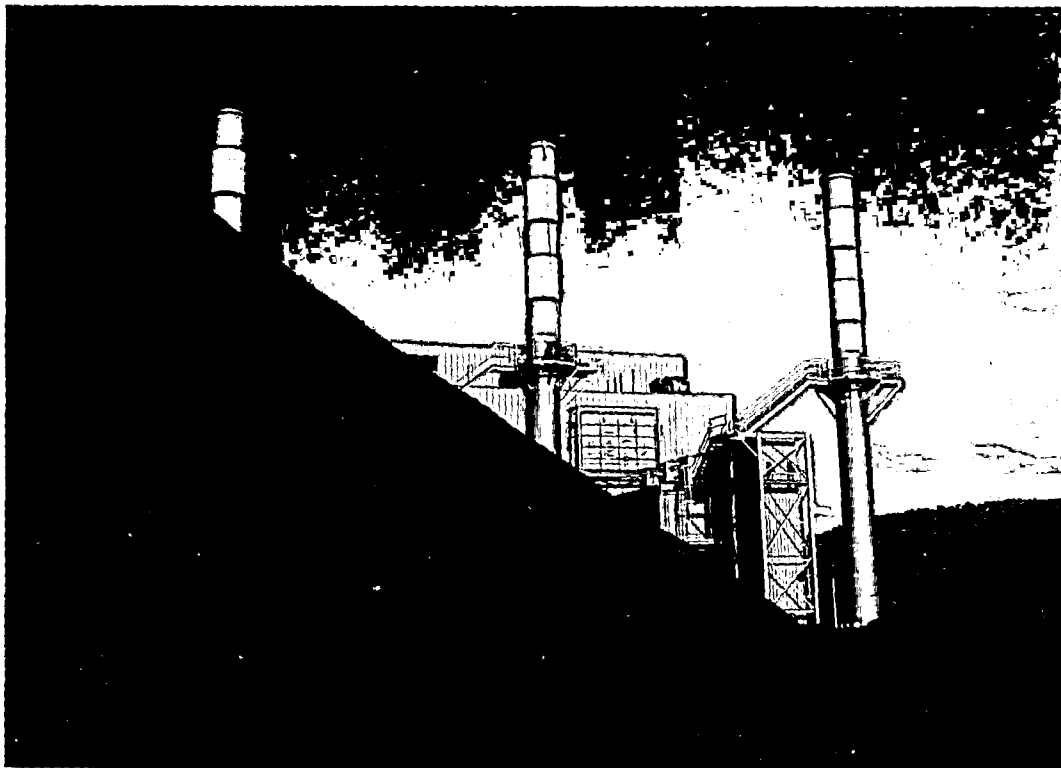
Environmental quality

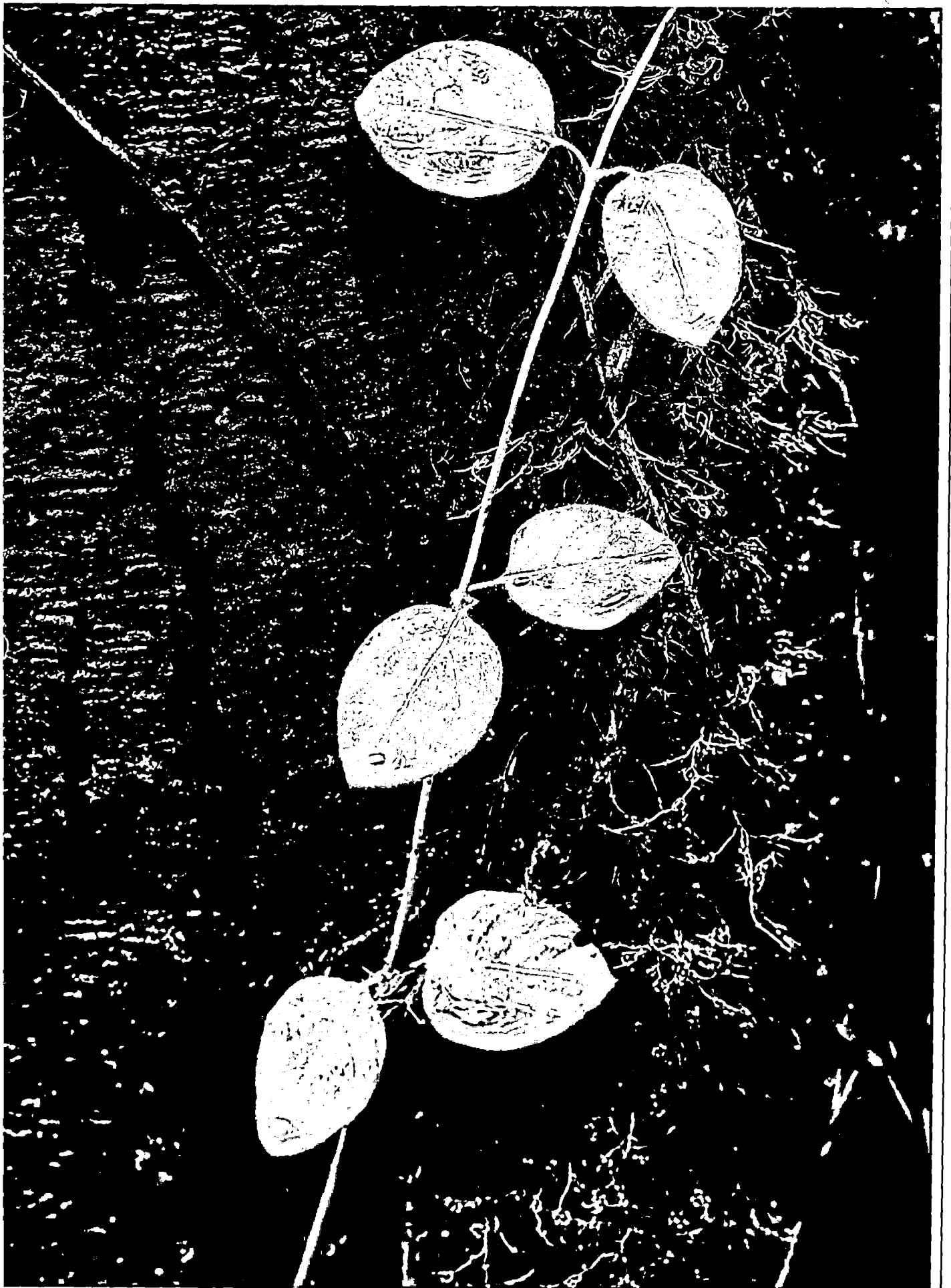
Research in RTI laboratories and at many field sites across the United States encompasses air and water pollutant monitoring, measurement, control technology and health effects. Multidisciplinary programs range from bench-scale coal gasifier reactor modeling to economic studies of control regulations and magnetic filtration technology for industrial process emission controls, and include:

- abatement program evaluation,
- acid depositions,
- air monitoring data collection, reduction and analysis,
- air quality control strategies,
- air sampling network audits,
- cost analyses of alternative pollution control strategies,
- epidemiologic research design,
- hazardous waste analyses,
- health risk assessment
- high gradient magnetic filtration,
- industrial source test methods and waste characterization,
- instrument design, development and testing,
- particulate network operations and devices,
- quality assurance methodology,
- synthetic fuels process emissions,
- system and device reliability,
- wastewater sampling and treatment.

Right: scientists at RTI and Duke University work on new methods to determine how both acid rain and dry acid depositions affect environmental quality.

Below: RTI's particle control research includes work with the Environmental Protection Agency to improve electrostatic precipitation and fabric filtration methods for coal-burning and other industries, and developing new, cost-effective technologies such as high gradient magnetic filtration for the steelmaking industry.





Industry, business

Productivity, health, safety and profitability are the major goals that RTI analysts, economists and engineers emphasize in their research for business and industry.

Microprocessors, microcomputers and related office technologies offer dramatic opportunities for corporate and public agency innovation to improve business systems and increase productivity. Through its skills in organizational analysis and planning, information science, engineering and computer technology, RTI works with corporate and agency managers to:

- identify cost-effective applications;
- determine optimum hardware/software configuration;
- evaluate, select and modify software packages;
- implement microcomputer systems and train personnel.

The Johnson & Johnson LIVE FOR LIFE program is intended to make its employees the healthiest in the world, with potential corporate dividends in the form of lower health care costs, less absenteeism, and increased productivity. To measure the impact LIVE FOR LIFE may have when it is implemented at all Johnson & Johnson companies, RTI survey statisticians are conducting an experiment with nine of them, four where the program is offered and five where it is not. Through a series of individual employee evaluations, RTI research is producing rich stores of data comparing changes in the lifestyles, health and attitudes of workers at the treatment and control companies.

U.S. Air Force concerns for productivity improvements and operating economies among its major suppliers led to the participation of RTI industrial engineers, operations analysts and computer scientists in the Integrated Computer-Assisted Manufacturing research

consortium to determine the optimum material flow characteristics required in aircraft manufacturing.

Computer-assisted telephone interviewing provides a speedy method of data collection from a large sample of Savings & Loan associations that participate in a series of RTI studies to compare and assess the various types and rates of mortgage loans offered to homebuyers.

Corporate costs of compliance with government regulatory requirements covering pollutants, noise, health and safety are major items of business expense and directly affect employment, production, profits and prices. RTI economists analyze the cost-benefit and operating impacts of different regulatory options in many industries.

Nuclear power plant safety is potentially endangered by the remote chance of damage from tornado-borne missiles or heavy metal fragments spun at high velocity from a malfunctioning turbine. RTI scientists apply probabilistic modeling and analysis techniques to research for the electric utility industry that simulates the sequence and extent of such extreme loading conditions.

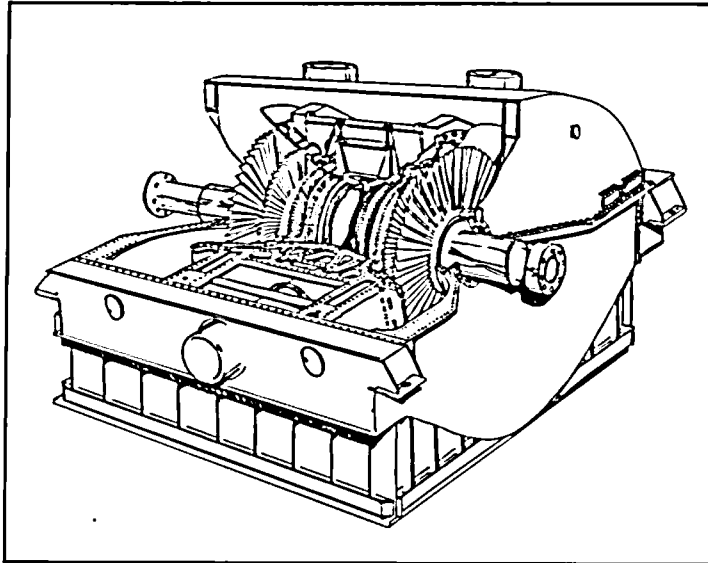
Job skill needs for an increasingly information-based economy pose human resource planning challenges for business, industry, and public sector vocational education. Working with major corporate employers and education officials in Texas, RTI economists and labor market analysts are identifying priority occupations through the year 1987, determining the specific skills they require, and assessing how effectively the training for these skills is being provided and planned for by the state's vocational education system.

RTI Management Services provides business and economics research assistance to small enterprises, large corporations, and public agencies. Through its flexibility in assembling teams of specialists from disciplines such as economics, engineering, chemistry, and the information and social sciences, the RTI Management Services unit offers a cost-effective approach for meeting clients' problem-solving and corporate planning needs. Capabilities include productivity and performance measurement, finance and budgeting, marketing strategies, commercial and industrial development, and resource requirement and economic feasibility analyses.



The selection and use of microcomputers and other advanced office technologies illustrate RTI's multidisciplinary capabilities in consulting projects for business management.

In order to prevent nuclear hazards caused by extreme loading conditions such as turbine failures and tornadoes, analysts use simulation techniques to help improve nuclear power plant design.



A series of rapid, accurate surveys reveals trends in relative home financing and possible impacts on mortgage insurers, lenders, home builders and buyers. Computer-assisted telephone interviewing speeds survey reporting.



Learning, occupational training

Business, manufacturing, military, and government employers alike face severe problems in preparing their personnel to perform complex tasks in changing environments.

RTI social psychologists and human resource analysts have the capability and experience for assisting with the plans and execution of educational and training programs at many levels, including:

- assess training objectives, costs and efficiency; design the content and sequence of instruction; specify a management plan and delivery system; develop and package course materials;
- self-paced, on-the-job and conventional classroom techniques for training in industrial operations, communications, hygiene, safety and basic skills;
- occupational information systems for local, state and federal agencies, and for individual institutions and counselors;
- matchups between labor market demands and vocational training resources;
- comprehensive statewide occupational education analyses, including long-range employment prospects, salary trends, and industrial development objectives;
- institution-building to train officials of developing countries to operate and maintain physical facilities such as water treatment plants, and to manage local agency administration systems.

National security

Some of RTI's scientific and technical capabilities for contributing to our nation's defense strengths are referred to on other pages. Beyond these is an area of policy and planning support in which RTI scientists work with their Department of Defense counterparts to assess and analyze technical strategies for meeting broadly defined national security concerns.

Examples are assistance to Defense Science Board studies of the defense technology base, to the Very High Speed Integrated Circuit (VHSIC), program, and to the review and assessment of the roles of various DoD research laboratories. In addition, RTI makes substantial scientific and programmatic contributions to VHSIC and to models for guiding defense investment strategies and decisionmaking.

Social systems

Court performance assessment, organizational and policy alternatives for fire prevention and suppression, food stamp distribution, neighborhood revitalization, and local government efficiency are some of the social systems analyzed by RTI political scientists, economists, sociologists and regional planners.

National defense functions, municipal services, and state criminal and civil court operations may not be readily susceptible to standard definitions of acceptable performance, so RTI specialists adapt a variety of comparative analysis techniques to measure achievement and productivity at unit and sub-unit levels.

RTI staff members work in many developing nations around the world. Activities range from examining innovative financial

management practices to assessing the impact of proposed agricultural policies on food availability and export markets; from improving public service delivery in urban neighborhoods to organizing rural development programs that combine social service and income production.

States and communities

Evaluation and planning for the delivery of public services and the allocation of public resources are major elements of RTI research and technical assistance for government departments in many states and localities.

Information developed for government policy planners and decision makers covers economic and demographic forecasts, employment trends, occupational education, public service investment impacts, social service needs, and human, natural and financial resource assessments. Research is also directed to statewide health care needs and costs, criminal justice system performance measurement, population projections, taxation sampling and environmental impact analysis.

County and municipal issues addressed in RTI research include water resource planning, fire protection organization, neighborhood preservation and housing studies, cost-revenue implications of annexation proposals, school district management, and labor market analysis.

CHIPS is RTI's Community Health Information Policy Study through which national survey and analysis methods are applied to health care delivery planning in small geographic areas.

RTI assists municipal, county and state governments to improve the cost-effectiveness of their spending for services such as fire protection, law enforcement and criminal justice, water supply planning, transportation, economic development and employment training programs.

Computer support for RTI research includes microcomputer applications, large data processing systems, and a data management staff dedicated to quality control of the complex data sets often involved in RTI projects.





Helping to assure the delivery of adequate water and sanitation services to rural communities is among the many aspects of RTI international programs to assist developing nations.



International programs

RTI provides research and technical assistance in more than thirty countries on issues that range from national policy development to local project management. An Office for International Programs carries out some of these assignments and supports overseas activities undertaken by other RTI units.

In assisting host governments to design and implement programs affecting agriculture, health, nutrition, education, institutional management and urban-rural planning, RTI analysts give special emphasis to reporting and evaluation systems, manpower development and financial management.

RTI proficiencies in computer science, electronic engineering and management analysis are significant resources for introducing microprocessor technology applications to government and business settings overseas in both industrialized and developing nations.

The improvement of health care services and education has become a prominent objective in international development. RTI is active in the design, implementation and evaluation of programs to enhance water supply, sanitation, nutrition, primary health care and health planning.

Technology Innovation

RTI activities present constant opportunities and requirements for developing, adapting and applying innovative systems, devices and concepts in the course of basic and problem-solving research.

Contributions come from a disciplinary spectrum that includes chemical, electrical and process engineering,

chemistry and physics, health and policy analysis, physiology, statistics and the social sciences. Illustrative selections from innumerable possible examples are:

- computer mapping,
- machine vision,
- real-time speech processing,
- health program evaluation,
- complex survey data analysis software,
- noninvasive cardiac monitoring,
- catalytic testing and characterization,
- organizational performance measurement,
- electron microscopy,
- survey error taxonomy,
- fossil fuel conversion,
- particulate sampling network audits,
- microwave radiation effects on brain activity,
- computer programming languages,
- reverse osmosis membranes,
- continuous emission monitors,
- econometric modeling,
- computer-assisted telephone interviewing.

Engineering design handbooks. Scientists throughout the country contribute to an Engineering-Design Handbook series published by the U.S. Army Materiel Development and Readiness Command. The handbooks provide fundamental design information and up-to-date records of advancing technologies. Manuscripts are prepared at industrial and government laboratories, universities and other scientific organizations. RTI is responsible for handbook editing and administration.



The electrocage is a cost-saving, energy efficient air pollution control device developed by RTI, ETS, Inc., and the Environmental Protection Agency. Named by *Pollution Engineering* magazine as one of 1981's top technology innovations, it applies electrostatic fields to improve the efficiency of fabric filters. The electrocage is proving successful in full-scale field tests to reduce the amount of energy needed for filtration system operation.

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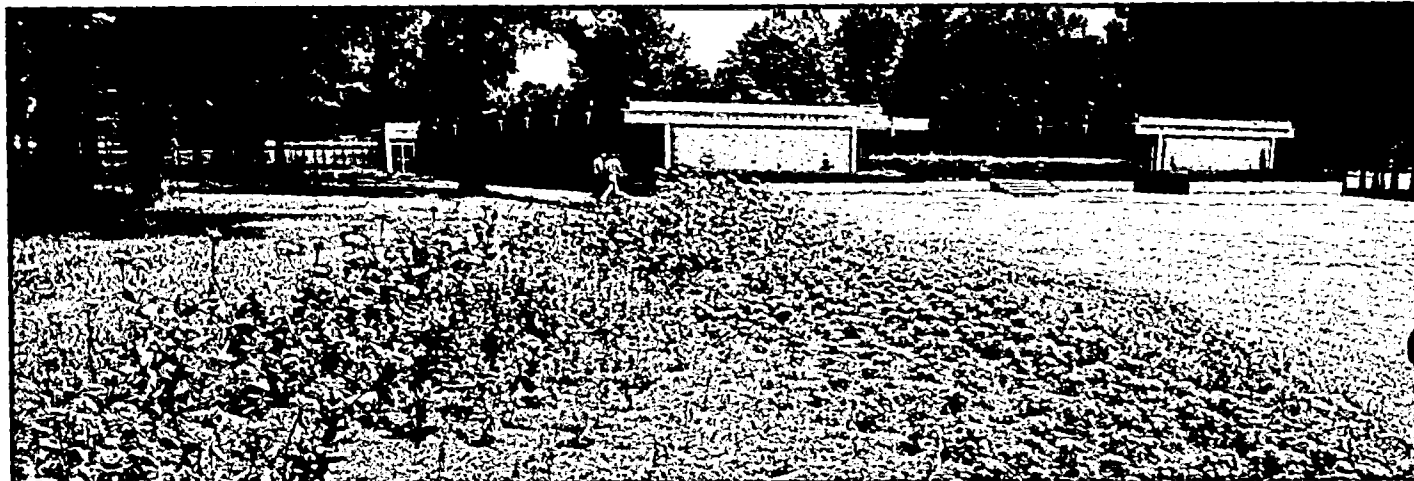
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