We're Tomorrow-Minded People

National Aeronautics and Space Administration

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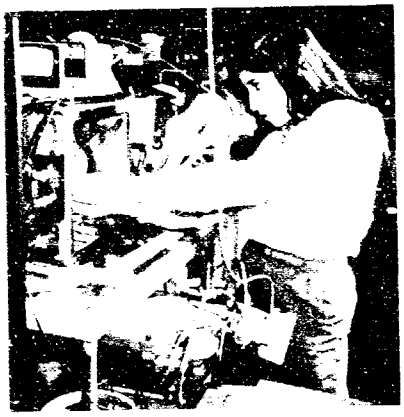








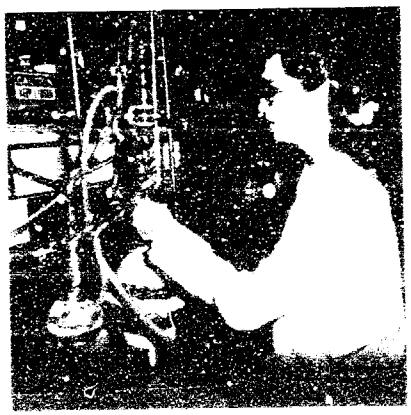
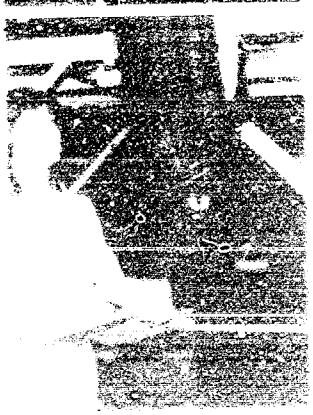


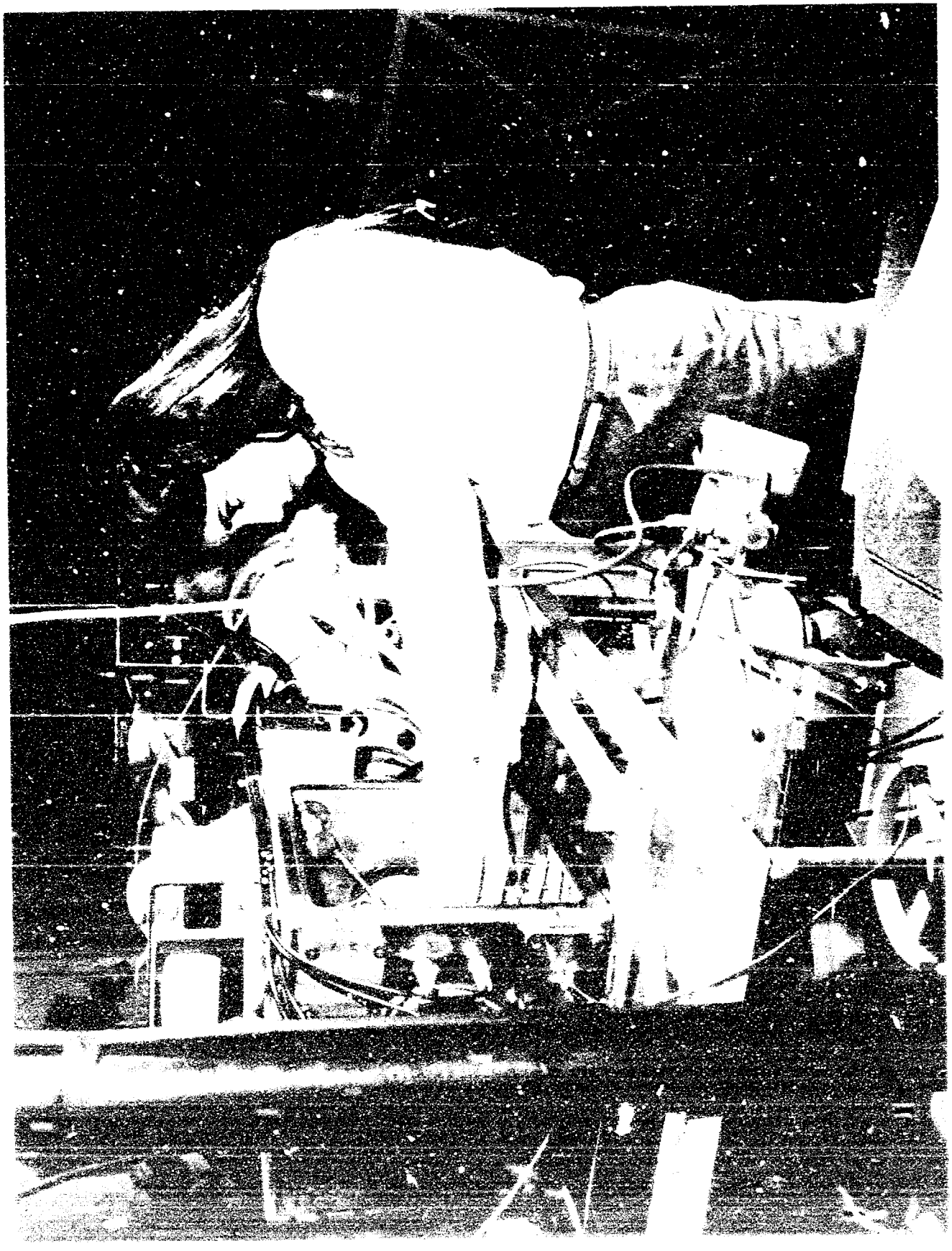

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My childhood dream was to become an astronaut for NASA.

"T minus 5 seconds and counting . . . 4 . . 3 . . 2 . . 1 . . . . We have lift off!" These words were my inspiration when I was a child. I used to watch all the Mercury, Gemini, and Apollo launches and was determined that one day I would be an astronaut conducting experiments in space for NASA.

In school, science was always my favorite subject. Even in the first grade, I knew that science would be an important part of my life because I enjoyed learning about the way things worked.

In high school I was an avid science fiction reader. I also read books about Einstein, who was my idol. I was fascinated that one person could understand and explain so many natural phenomena using the laws of physics. Actually, I studied physics in high school because of my fascination with Einstein.

When I attended college, I registered for physics and math courses and, after one semester, I decided that physics was definitely for me. After four years of hard work, I graduated with a bachelor of science degree in physics.

As a physicist for NASA, I'm studying the space radiation durability of different types of plastic materials – polymers – that may be used to construct solar energy collecting platforms which would then be placed in geosynchronous orbit. This means that the platforms would orbit the Earth at an altitude of about 22,240 miles or 35,780 kilometers. At this altitude the platforms would rotate at the same rate as the Earth and, therefore, would appear to be stationary when viewed from Earth. These platforms would be used to collect solar energy that can be beamed down to Earth as microwaves and then converted at receiving stations into electricity.

These space platforms must be constructed of materials that can resist damage from radiation, be lightweight, stiff, and resist expansion and contraction. These qualities are important because we want the platforms to retain their design properties for many years without deteriorating.

Someday the Shuttle will routinely transport people into space. Some of these people will maintain and repair these platforms. Others will conduct experiments in the zero gravity environment and perhaps develop techniques for producing new alloys for use on Earth. I enjoy the work I do today at NASA because I'm contributing to the advancement of technology for the future.

Beatrice Santos
Physicist

My best advice to you is to pursue excellence.

As a high school student, I had no idea which career I wanted to pursue. My best grades were earned in mathematics and because of my love for that field, I took every mathematics course that was offered.

My guidance counselor was helpful in my career decision-making process. She asked me to think about careers that would use the mathematics that I was learning. Since I was unsure about these careers, she suggested that I consider studying physics. She explained that physics was a subject that required a knowledge of mathematics. After studying physics during my senior year and winning first prize in the physics section of the state science fair, I attended college and majored in physics and minored in mathematics. After graduating from college, I continued my education by earning two advanced degrees in physics.

I became a scientist primarily because I wanted to understand the physical laws of nature. As a scientist, I have worked on many important problems and have had the opportunity to talk with and visit other scientists all over the world.

My work in the laboratory has required that I apply my knowledge of subjects such as engineering, chemistry, mathematics, and English. English is important to a scientist because he or she has the constant need to communicate both orally and in writing in clear, concise language. Remember, while an idea may be good, it may never be appreciated unless it's effectively communicated.

As a manager, my job is to direct the NASA program of Photovoltaic Energy Conversion and Advanced Energetics. The scientists and engineers who work in my program conduct research on solar cells and other devices which convert sunlight into electrical energy for use in space and on lasers which may be used in the future to transmit power or propel rockets in space. The development of such devices may make it possible for us to live and work in space stations supplied with electrical power from solar cells. Excess power could be transmitted by means of laser beams to other stations or satellites.

The best advice I can give you about planning for an aerospace career, or any career, is to pursue excellence. Seek excellence in your mathematics and science courses as well as in English, history, and foreign languages. Preparation for aerospace careers should include completion of all the science and mathematics courses offered in your high school. Also develop interests outside of school work. Hobbies may add to your knowledge and enthusiasm for aerospace.

Lynwood P. Randolph, Ph.D.
Manager
Space Power and Propulsion

I have never tired of gazing up at the stars and wondering, "What's out there?"

Can you imagine how far light travels in one year at a speed of 186,000 miles per second? Did you know that the nearest star is 4.4 of these light years away, and the nearest galaxy is over 150,000 light years from us? I'm an astronomer, and these are concepts that have boggled my imagination since I was a child.

My great love for the oldest of all sciences – astronomy – began when I was only four or five years old. Just why I was so fascinated with astronomy at such an early age is difficult to put into words. I know that I was endlessly fascinated by the night sky, and I never seemed to tire of gazing up at the stars and planets and wondering, "What's out there?" As the years passed, my career goals never wavered and working for NASA is now a dream come true.

In high school my hobbies included astrophotography, and I owned a six-inch reflecting telescope. It's probably not surprising to you that mathematics and physics were my favorite subjects. In fact, my highest academic honor was being selected as one of six students out of 350 to take calculus. This was probably a big help for my career.

If you're contemplating a career in astronomy, your first step after high school preparation should be the selection of a college with a strong physics department. Physics is so important because it's the foundation upon which modern astronomy and astrophysics are built. If astronomy is your goal, you cannot be too knowledgeable in physics. At this point, do not worry about astronomy since you'll specialize in it later in a doctoral program. A strong foundation in mathematics – differential and integral calculus and linear algebra – is important.

During your planning, don't be afraid to write to eminent astronomers for their advice concerning college choices and careers in general. I received a helpful and flattering reply from none other than Dr. Wernher von Braun.

I must say that the field of astronomy is extremely competitive, and it is wise for you to keep in mind that good jobs may be difficult to find. However, if you're well trained in physics and mathematics and the job opportunities in astronomy are limited, then you may be qualified for interesting jobs in related fields.

The thrust of my research during the last few years has been the physical study of comets, with specific concentration on the analysis of large-scale photographs showing the "plasma tail." This tail is produced by a comet's interaction with the solar wind. Once we derive the cause-and-effect relationship between solar wind structures and plasma tail disturbances, then we can infer solar wind conditions in regions where spacecraft cannot now travel.

Probably the greatest astronomical event of my lifetime will be the appearance in 1985/86 of the most famous of all comets – Halley's Comet. Its appearance should be a landmark event in the history of the study of comets and, undoubtedly, will be one of the greatest adventures of my career.

My work is challenging and just plain fun! It satisfies my personal needs and contributes to the entire scientific community.

Malcolm B. Niedner, Ph. D.
Astrophysicist

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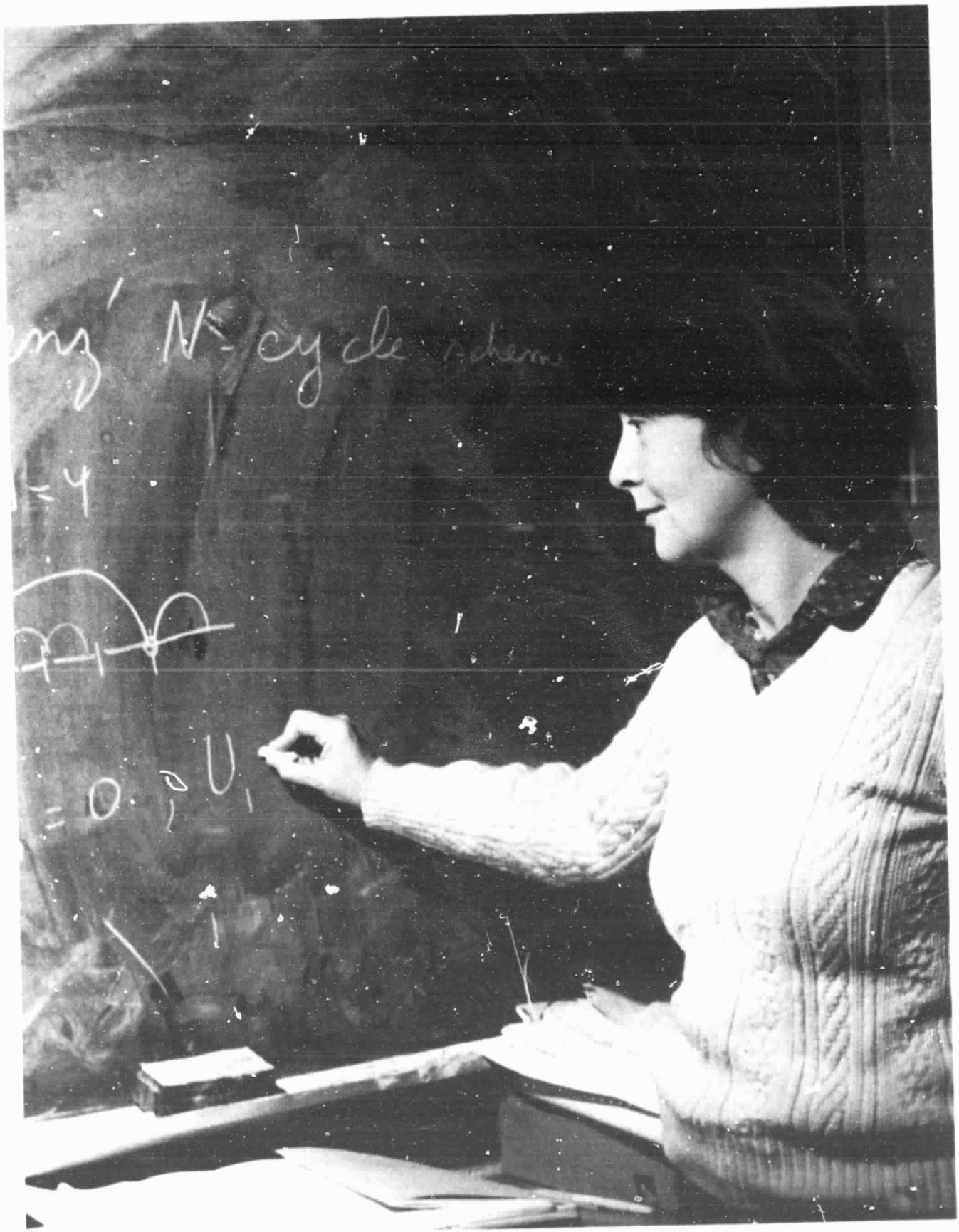


My work contributes to the welfare of people all over the globe.

When I was in high school, I thought I would study medicine because I was always interested in science, especially mathematics and biology. I particularly enjoyed collecting pollen specimens from different plants. I was fascinated by their different shapes, sizes, and colors. I dreamed that some day I would be able to classify plants just from examining their pollen particles.

In my senior year of high school, I took courses in introductory classical mechanics (physics) and modern algebra. I was deeply impressed by the beauty of the exact sciences because I could prove results through a process of logical deduction. I was so impressed, in fact, that I decided to study physics instead of medicine. At my university in Buenos Aires, scholarships were offered to students studying meteorology. Since meteorology is physics of the atmosphere and I needed the money for college, I decided to major in meteorology. I have never regretted this decision. Later, when I came to the United States, I became the first woman to earn a Ph. D. in the department of meteorology at the university where I studied. I also became a member of the faculty.

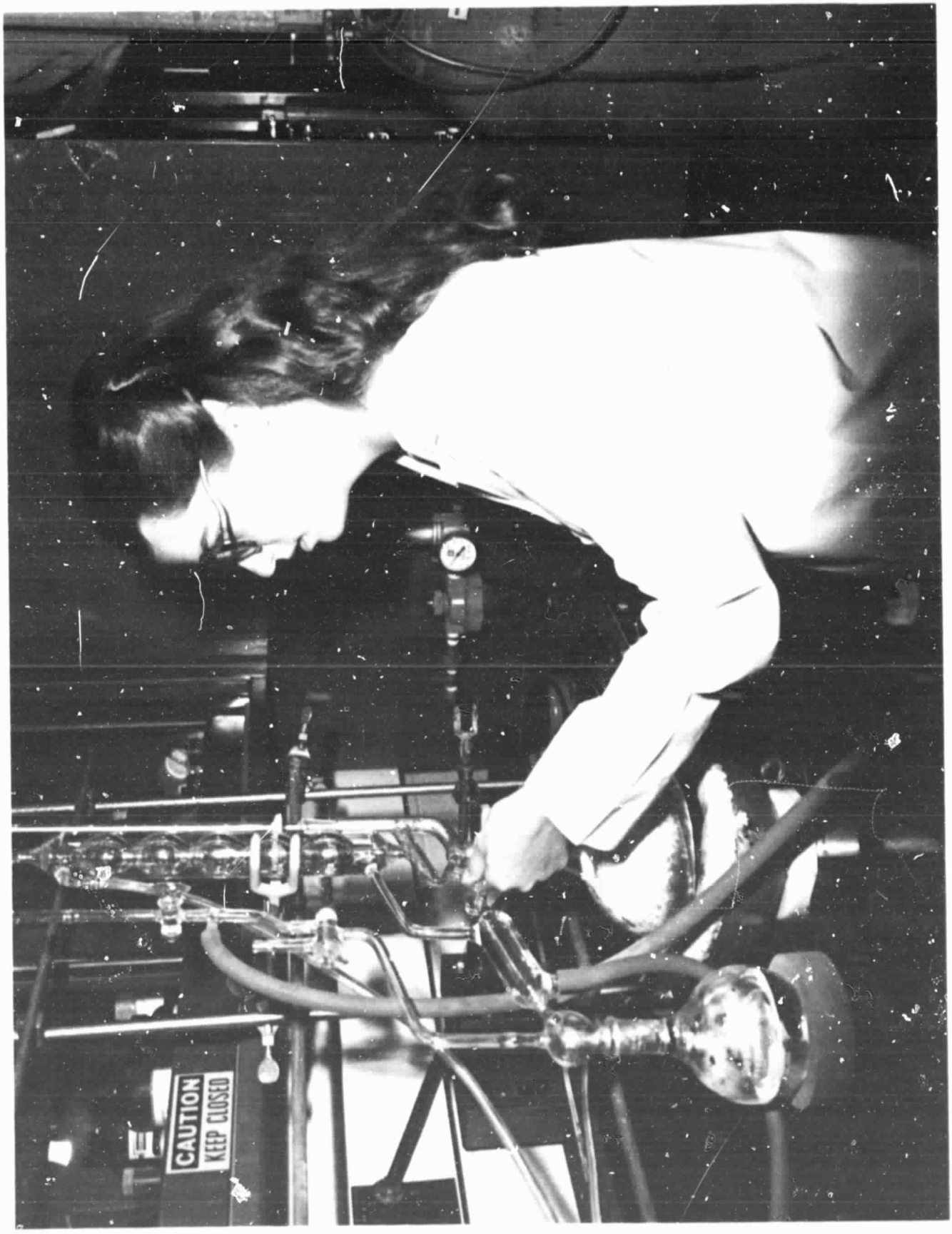
A few years ago, I decided to join NASA because I was particularly interested in improving weather prediction with satellite data. Satellites provide observations even in uninhabited regions where scientists can't make measurements themselves. With the use of improved satellites, we hope someday to provide accurate weather forecasts for two weeks in advance.

At NASA I develop computer models of the atmosphere. These models are programs based on the physical laws of the atmosphere. In order to predict tomorrow's weather, these models need to know where today's storms and fair weather systems are located. The models are fed detailed observations of today's weather (pressure, winds, temperature, clouds) and from these observations they compute weather predictions for tomorrow, the next day, and even next week. We call this "numerical weather prediction."

My job gives me the satisfaction of working in an area of science which I enjoy. I also know that my work will contribute in a peaceful way to the welfare of people all over the world.

If I were in high school and interested in an aerospace career, I would learn as much mathematics, physics, and computer programming as possible because they are essential components of any scientific career. At college I would major in one of the Earth sciences, like meteorology, oceanography, or geology. Many opportunities and rewarding careers exist in these areas for people interested in applying satellite data in their research. I would also apply for summer jobs available to high school and college students at many NASA centers. This would allow me to observe scientists as they work.

Eugenia Kalnay-Rivas, Ph. D.
Senior Research Meteorologist



Today's experts were once interested students like yourself.

As a child, did you ever play with a toy chemistry set? I can remember sneaking into my older brother's room to play with his set when I was too young for one of my own.

My interest in math and science began at an early age. When I was in tenth grade, my geometry teacher discovered my talent in these areas and encouraged me to register for more advanced courses. After taking high school chemistry, I realized this was where I could best use my interests and abilities, and I decided to major in chemistry in college.

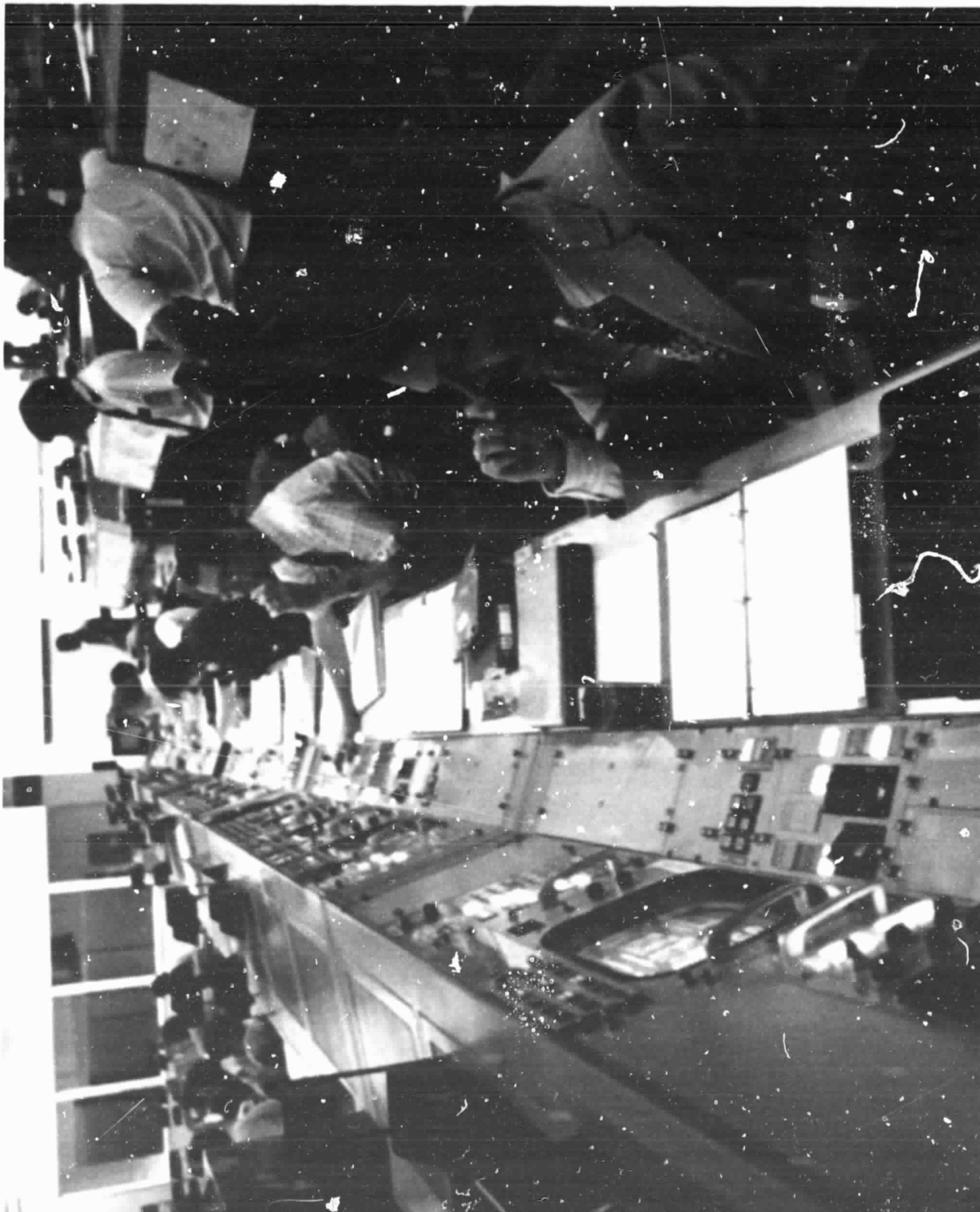
As a chemist for NASA, I'm studying energy-saving materials for commercial aircraft. I develop new or modified plastics for aerospace use. The plastics of interest to NASA differ greatly from household plastics. Depending on how they will be used on an aircraft, the materials may need to withstand high temperatures or impacts from birds or hailstones. These special plastics are combined with carbon fibers to make materials as strong as metals but that weigh substantially less. This weight savings translates into energy savings for the aircraft. I find it rewarding to be involved in research that has such real and immediate applications.

While you're in high school, gather as much information as possible about your future career choices. As a former math and science teacher, I can assure you that your teachers and counselors are really interested in discussing your future plans. So talk to them! Read career information, such as the Dictionary of Occupational Titles, and talk to people who are working in jobs that interest you. Visit work sites so you can better evaluate potential work environments.

If you're interested in a career in chemistry or any other science, a well-rounded high school background is important. English courses are especially important because they train you to communicate with others. Your new ideas may be lost forever if you lack the skills to properly communicate them.

When you're planning for your future, do not sell yourself short. Remember that today's experts were once interested high school students like you.

Diane M. Stoakley
Chemist



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I help keep the astronauts healthy.

I am a flight surgeon and the chief of the Flight Medicine Clinic at a NASA field center. My primary responsibility is the health care of the astronauts and their families. In addition, I follow the training of the astronauts while they're getting ready for flight, monitor the testing and development of special flight equipment, and monitor the health of the astronauts in space flight. A particularly enjoyable part of the job is flying with the astronauts in jet aircraft. The job of flight surgeon to the astronauts is particularly important because the success of manned space flight ultimately depends on the continued excellent health of these individuals.

I enjoy working with flyers and their families, particularly the astronauts. I began this type of work in the Air Force where I took care of fighter pilots. Flyers are very special patients who are highly motivated and extremely professional. They are, therefore, interested in and involved with their medical care. Working with this kind of person is fun and a challenge.

It is difficult to state exactly why I wanted to become a physician. In retrospect, I guess I always leaned in that direction, but the primary reason was probably the example of my father, who was a physician. I liked what he did, and wanted very much to be like him. I think it's interesting, though, that I was not pushed by him.

Actually, going to medical school did not become an established goal until the end of my first college year. In high school I took the usual courses in order to be accepted in college and probably had more sciences than other types of courses. I really had no favorite courses. Biology came easily but mathematics and chemistry required a lot of work. History was another subject that came easily and that I still enjoy today. I did not spend all of my time studying, however, but participated in many extracurricular activities. I ran cross-country in the fall and was on the track team in the spring. I was also involved with several of the school plays. Fishing and camping were favorite pastimes. Water skiing, swimming, and boating occupied a large amount of time in the summer, as did hunting in the fall and winter.

I think the best advice to anyone in high school now is to get a good broad education. Specializing in a narrow area can come at anytime, but a broad education will always be helpful no matter what the field of endeavor.

Michael A. Berry, M.D.
Flight Medicine Clinic

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My search for knowledge about the origins of life represents a quest for mankind's ultimate roots.

How did Earth form? What was it about Earth's development that made possible the origin of life? In what ways did Earth, Mars, and Venus differ in their origins and development that would have affected their respective potential for spawning life? These questions are a few that arise from our hope and expectation that scientific studies of Earth, other planets and moons, comets, meteorites, asteroids, stars, and the dust and molecules in the space between stars will yield a clearer perception of the origin and early history of the solar system, of the bodies within it and, therefore, of life itself.

In NASA, in universities, and in corporate research organizations, the kinds of scientists seeking answers to these questions include astronomers, physicists, chemists, biologists, geologists, and mathematicians, among others. This diverse representation reflects the potential contributions of pertinent knowledge from virtually all fields of science.

When I think back to the years I spent growing up, first in Chinatown, then behind Symphony Hall in Boston, and finally in suburban Philadelphia, I cannot recall ever having thought about comets or meteorites or Mars. The Moon was simply an object in the night sky whose light illuminated dark streets and park paths. Not once did I contemplate how the Sun and its retinue of planets formed, or how and when life began on Earth, or whether or not life existed elsewhere in the universe. Yet today, all of these objects and ideas are encompassed by my interests in scientific research.

During my years of graduate study, chemistry was my field of concentration, particularly the branch known as physical-organic; but my interests also carried me into the arts, humanities, and social studies. In these other fields, I found much to my surprise and delight, that despite differences in subject matter, the same basic skills in communications, problem solving, and human relations were common prerequisites for success in writing papers, delivering lectures, working on a research project, or conducting a research program.

My association with NASA grew out of my curiosity, aroused during a talk advertised as "Chemical Evolution and the Origin of Life," given by a NASA scientist at the university where I was a research associate. Over the fourteen years since then, with the collaboration and help of my colleagues, I have sought clues to the origin of the solar system and of the life within it by studying the chemical composition of rocks – the oldest known Earth rocks from Greenland; rocks and dust from the Moon; and meteorites, rocks from outer space that are as old as the solar system itself.

The search for knowledge about the origins of life and of the world in which we live represents a quest for our ultimate roots. Knowledge of such beginnings will affect how we view ourselves and our place in the universe and will ultimately lead to new discoveries that will benefit mankind materially, intellectually, and spirtually.

Sherwood Chang, Ph. D.
Research Chemist
Extraterrestrial Research

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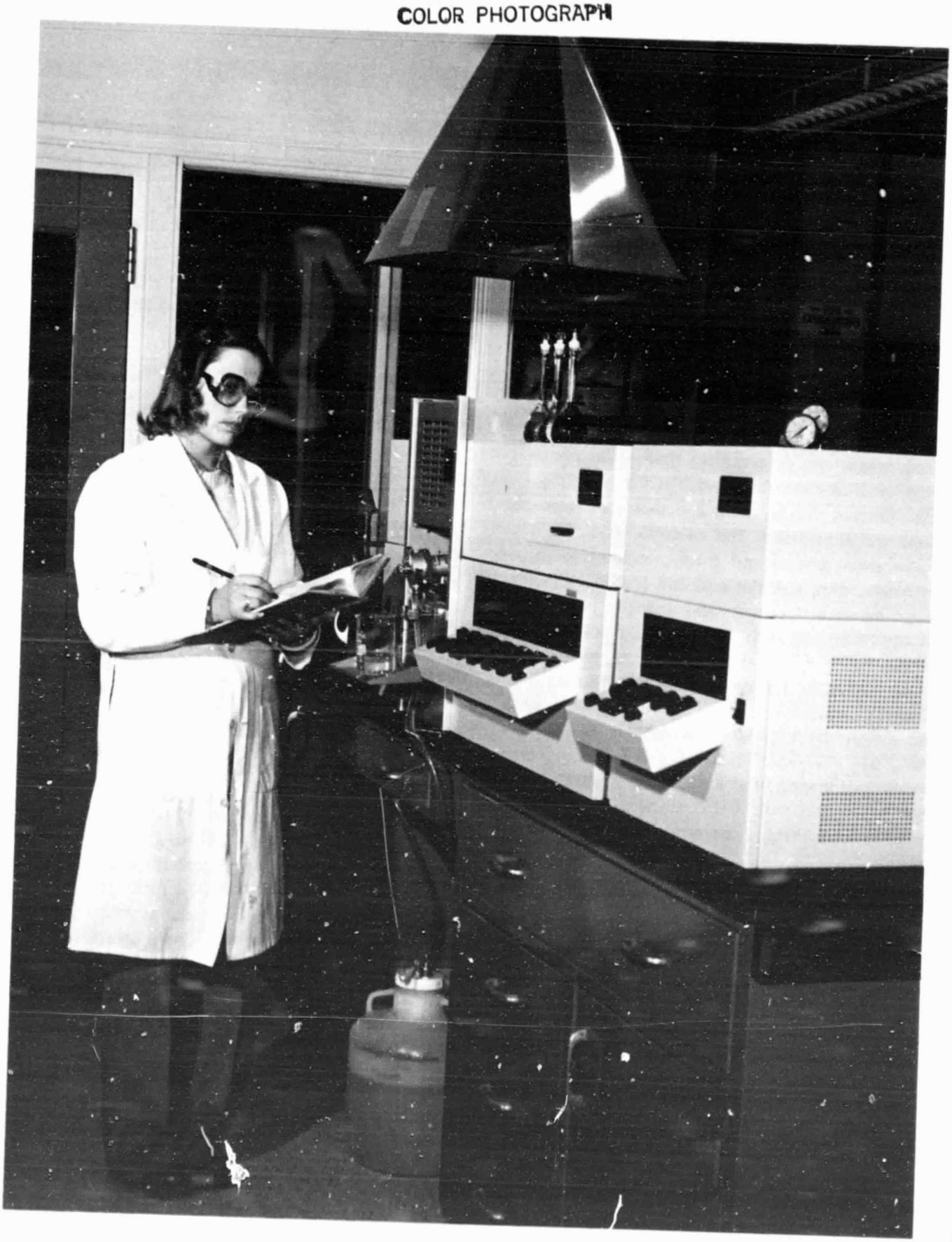

I've always been intrigued by the many different fields in science.

I'm an analytical chemist like my husband, Gary Seng, who is also featured in this publication. As you'll discover, even though our degrees are in the same field, our job assignments and responsibilities are quite different. Like us, once you've earned a degree in chemistry or almost any other field, you'll be qualified to pursue many varied job assignments.

The many different fields in science have always intrigued me. Actually, I can't remember a time when I ever doubted that my future career would be in any area other than science. While attending high school, I was enrolled in a college preparatory curriculum. I received a bachelor of science degree in chemistry, after four years of college, and I immediately entered graduate school. I was so proud when I received my master's degree in analytical chemistry.

I've been working at NASA for two years. The section I work in provides analytical support services for the Materials Division at my Field Center. This division has 12 sections which conduct research on the properties and potential applications of different alloys, ceramics, polymers, and metals, and studies processes for protecting the surfaces of materials when they are used in corrosive or high-temperature environments.

The materials engineers in this division require chemical characterization of materials. I provide this information to them. This is a good example of the team approach which exists among scientists, engineers, and technicians as they conduct research assignments. We use several different types of instruments in order to determine which chemical elements and how much of each element are present in samples of materials. We work with instruments that can measure the amount of an element in the whole sample or in only a very thin layer on the surface of the sample (as thin as 10^{-7} inches).

More specifically, my work involves methods development research using analytical instrumentation. I have recently been trying to more accurately measure the concentration of trace metallic elements in jet fuels and liquid fuels made from coal. This is important because some metals, even when present at very low levels, have been shown to cause adverse effects on fuels and engines. For example, certain metals are known to aid the corrosion of jet engine turbine blades. I'm also involved in an effort to automate our laboratory. This will help our analysts use computers to relieve much of the tedious data acquisition, calculations, and report writing.

I've learned that if you're interested in a career in science, it's important to carefully evaluate the college you select to attend. Give consideration to schools which have accredited programs and are respected by professionals working in the field.

Leslie A. Greenbauer-Seng
Analytical Chemist

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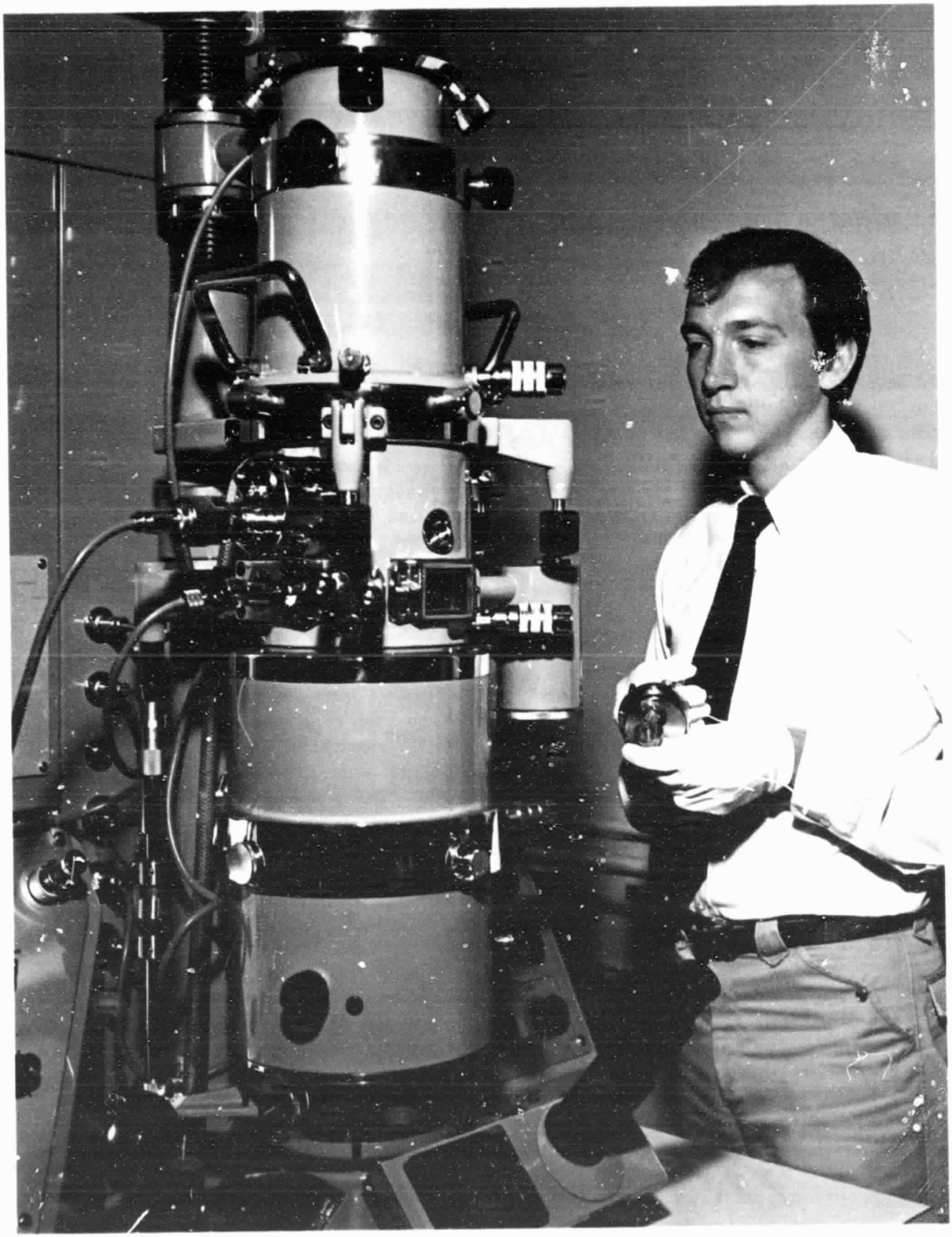

I apply the principles of science and mathematics to solve "real-world" problems.

As a student in junior high school, I became interested in the design and operation of mechanical equipment. This interest led me to pursue a career in science and engineering which has proven to be exciting and challenging. As a scientist or engineer, you'll use the principles of science and mathematics to solve "real-world" problems.

Today I am employed by NASA as a research metallurgist. I'm studying the behavior of metallic materials, searching for new metals and/or producing methods which improve the properties of metals. Sometimes my work might involve the use of extremely high temperatures generated by lasers to harden the surface of metals. Sometimes it might involve the melting and freezing of special metals to simulate the weightless environment of space now accessible with the Space Shuttle.

At the present time, I'm studying the behavior of materials known as nickel-based superalloys which are used in the construction of jet engines. These metals must remain strong and resist oxidation (a process similar to the rusting of steel on car fenders) at temperatures up to 2,000 degrees F. As the strength and oxidation resistance of these alloys are improved, the overall efficiency of the jet engine is increased and fuel consumption is lowered.

Although employment opportunities can be found in industry for those with undergraduate degrees in metallurgy, research positions often require further training. For this reason, I entered graduate school in pursuit of a doctorate in metallurgy immediately following my undergraduate studies. Based on my experience, you should expect to spend a total of seven to eight years in a combined undergraduate/doctoral program.

In order to be adequately prepared for college, I'd encourage you to pursue a standard academic program which emphasizes the physical sciences and mathematics. Additional courses in drafting and computer programming will also be quite helpful.

The continuous need for improvement in the properties and manufacture of metals and alloys for aerospace use assures that employment opportunities will exist in the various areas of metallurgy.

John Gayda, Ph. D.
Metallurgist

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My work as a cell biologist will lead to better treatments of diseases like cancer.

When you're ill with a virus, the cells of your body have undergone a change. I know because I'm a specialist in an area of cell biology known as cell separations. My investigations of the biological processes of cells will help provide an understanding of what happens to our cells when they are changed due to some disease, such as when they are infected by viruses. The result of my research will lead to better treatment of diseases and, perhaps eventually, to their elimination.

We know that cells which are infected by viruses have different electrophoretic mobility than healthy cells. Electrophoretic mobility refers to the separation or migration of populations of cells through electrical fields.

In my laboratory, I'm studying the characteristics of equipment now used on Earth to study electrophoretic mobility and to separate cells. I examine chambers with electrodes at either end. The chambers are filled with buffers, solutions which keep cells alive and conduct electrical current. Live cells are placed inside these chambers where their movement can be studied and where they can be separated from other cell types. Because some cells have a more net negative charge than others, they move faster toward the positive electrode. This difference in speed allows one type of cell to be separated from other contaminated cells. These pure cells can then be grown to produce useful products like growth hormone or insuline or perhaps used for transplants.

My goal is to improve various separation chambers so they can be used in experiments conducted aboard the Space Shuttle. The conditions of zero gravity will eliminate the convective disturbances which affect separation chambers on Earth and, therefore, will produce better cell separations.

I've learned that the image of the lone scientist laboring for years in total isolation and surfacing only to reveal a monumental discovery is absolute fiction. Research requires team work. My investigations have brought me into contact with scientists from countries like Great Britain, Italy, and Nigeria. For me to be successful, I must express myself clearly and accurately and be willing to cooperate with others.

I love my job as a cell biologist because I know that one day my work will help prevent human suffering.

Teresa Y. Miller
Biologist

Little did I know that my chemistry major would land me in the payload bay of the Shuttle.

I grew up in a small town where many of the girls got married soon after high school and usually remained in the area with their husbands and children. I was one of the few who decided to attend college. That was one of the best decisions of my life. Without studying a technical curriculum, I would not be fortunate enough to say that my work setting includes the cockpit and payload bay area of the world's first Space Shuttle Orbiter.

Although I majored in chemistry in college, my work is different from that of the other chemists in this publication. I don't mix chemical solutions or perform typical experiments in a chemistry laboratory. Some of you will also find that your work experiences may, in fact, be different from your college majors. My work is more closely related to that of engineers. I make sure that mechanisms on the Orbiter are functioning according to design specifications. For example, I test the latching and movement mechanisms on the doors of the Orbiter. These doors lead to the payload bay, the landing gear, and the area known as the external tank umbilical, the area where the external fuel tank is attached to the Orbiter. Fuel passes from the tanks through the umbilical, to the Orbiter. Once the tank is released, doors covered with heat-protecting tiles snap shut and latch securely to protect the Orbiter and its crew upon reentry. It's my job to make sure that the doors operate properly so that they'll close at the specified time.

Checking these mechanisms requires team work. Two of us sit at a computer console in what is called the Firing Room, a room designed for appropriate personnel to launch the Shuttle and monitor its subsystems during a mission. Two observers report to the Orbiter at the launch pad, where they observe the doors as they operate. Personnel inside the cockpit activate the switches which control the doors. We communicate with one another through radio headsets.

Prior to lift off, we monitor the doors carefully before we give a "go" for launch. We also monitor the system during the mission to verify proper operation.

When I was in high school, I avoided courses in English and social studies because they seemed to require so much reading and composition work. When I attended college, I really wished I'd taken more of these courses because I would have been better prepared for the reading assignments and exams required in college. I also think that it's important to learn about career choices during high school. If the guidance department at your school offers career counseling sessions, you'll benefit from participating in them.

Linda H. Fernández
Chemist

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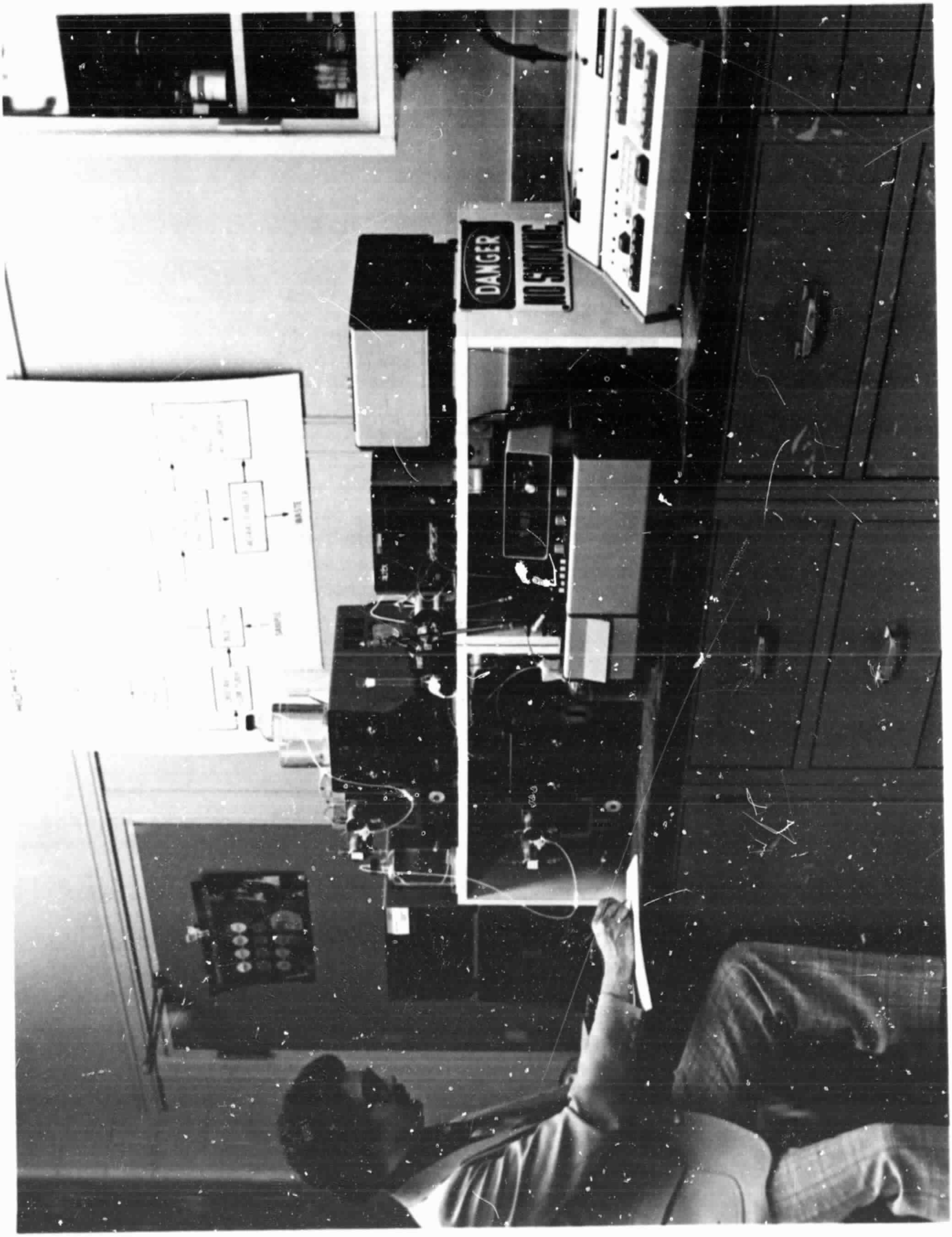

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It's satisfying to apply knowledge from my college courses to real life problems like the energy crisis.

For as long as I can remember, I've been fascinated by the practice of mixing anything and everything, just to see the results. This preoccupation with combining different substances led me to some early chemical experimentation which occasionally produced some rather interesting, if not bizarre, results. Once I was performing experiments in rocket propellants in my back yard. I enclosed the propellants in an engine case for testing. I carefully lit the fuse to the engine and stood back to monitor the experiment. To my surprise, the case exploded like a firecracker and with such force that I found myself knocked to the ground! In spite of such mishaps, I continued to study model rocketry and the chemistry of solid propellants for several years during high school. I'm certain that this influenced my choice to practice my profession at NASA.

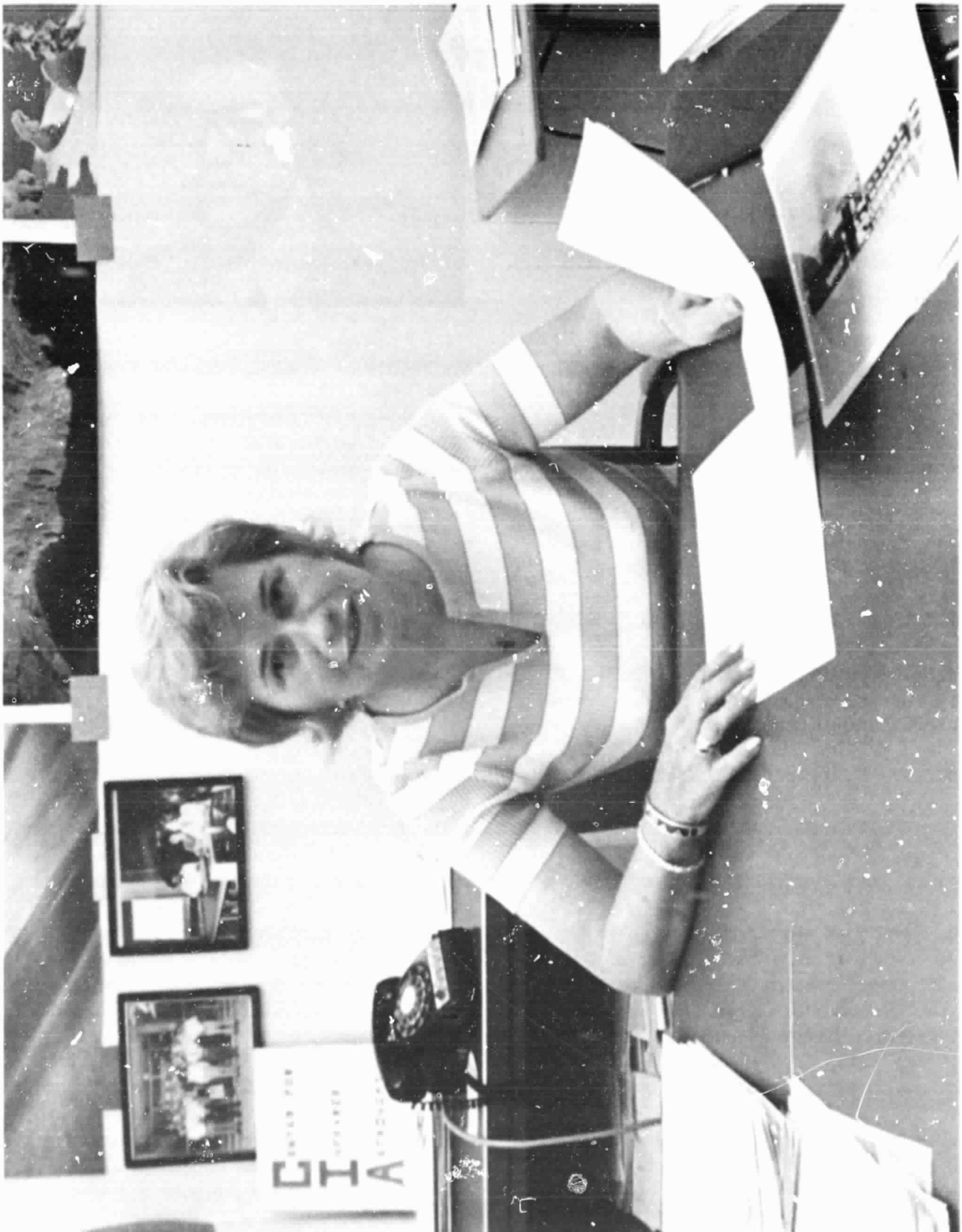
High school reinforced my growing appreciation of chemistry, and I found that I enjoyed all the sciences, as well as English literature. My hobbies and classes eventually directed me into a study of chemistry in college. In my junior year, I began to develop a strong interest in analytical chemistry. A major portion of analytical chemistry is concerned with the use of a variety of chemical and instrumental methods to perform qualitative and quantitative analyses. Qualitative analysis is the determination of which substances are present in an unknown material, and quantitative analysis is the determination of how much of a substance is present. Analytical chemists can be involved in the analysis of anything from lake water to moon dust.

Following graduation from college with a bachelor of science degree in chemistry, I decided to continue my education by attending graduate school and specializing in analytical chemistry. Graduate studies introduced me to the world of instrument development and automation. I studied an instrument which employed a spark similar to that found in automobiles to determine the types and quantities of metals dissolved in water to levels as low as one part-per-billion (ppb). Detecting one ppb of a metal is equivalent to seeing one tiny drop of water in about 15,000 gallons – enough to provide the average person with drinking water for about six years.

After nine years of college, I graduated with a doctorate in analytical chemistry and joined NASA as a research chemist. I now develop ways to determine the composition of petroleum, shale oil, and coal-derived fuels. Many different complex methods are required to unravel the hundreds of substances which comprise a typical fuel sample. Our objective is to understand the composition of the fuels and relate this information to their operating performance in jet turbine engines.

Being a part of the research effort directed at solving the energy crises is definitely exciting. It is particularly satisfying to apply the information from my course work to "real-life" problems. I'm certain that I'll never tire of the challenges presented to me by the programs at NASA.

Gary T. Seng, Ph. D.
Analytical Chemist



I help turn astronomers' dreams into realities.

As an astronomer at NASA Headquarters in Washington, D. C., I'm responsible for the scientific planning of future space missions in the areas of infrared and radio astronomy. I also monitor the research that helps lead to these missions, and I ensure that the scientific goals of missions currently under development are met. All this is a far cry from my thoughts in high school. At that time, NASA didn't exist, and outer space travel was in the realm of science fiction!

In high school my thoughts rarely went further than my daily activities. I was caught up in sports, particularly hockey and swimming, and I spent many hours on wilderness hikes. I did know that I wanted to continue my education after high school, so academic subjects played a reasonable role. Mathematics was by far my favorite subject because there were no tedious term papers or long lab hours. The precision and integrity of mathematics particularly appealed to me. I also realized that English was vital in order to write and speak well. Through college, emphasis on mathematics and English continued and upon graduation, I turned to astronomy as a beautiful application of mathematics. My graduate school study through a doctorate was interrupted while I raised three children. After they entered school, I resumed my studies.

If you're inquisitive about how things work, creative with ideas, and want to understand the physics of certain aspects of astronomical objects, astronomy may be for you. A good foundation in mathematics, physical sciences, and English is important. No matter what your endeavor, it is also necessary to get along with others and be willing to work hard.

I really enjoy being a staff astronomer, working on space missions, for it gives me the opportunity to learn about advances being made in my field on a world-wide basis. A truly rewarding aspect of my job is knowing that I help turn astronomers' dreams of learning more about our universe into realities.

Nancy W. Boggess, Ph. D
Staff Astronomer
Office of Space Science

If you get car sick or sea sick, my research may help you.

I grew up in a small steel mill town and, when I was in high school, the space program was in its infancy. The first unmanned Earth-orbiting satellites had just been launched and preparations were being made for the first manned space flight missions. Because of my interest in engineering and science, I followed these early events with interest, but I never dreamed that I would become a part of them.

I started my college career as an engineering student, but I soon shifted my academic interests to experimental psychology. I became intrigued with human behavior, especially how people use their special senses (for example, eyes and ears) to perceive and interact with the environment. This interest led me to pursue and obtain a Ph. D. degree in sensory psychology. During my years in college, our nation's accomplishments in space occurred at an accelerated pace, and I became increasingly interested in manned space travel. Upon completing graduate school, I was offered a job by NASA, and I jumped at the opportunity!

Today, I'm Head of the Neurophysiology Laboratory at a NASA Field Center. I'm responsible for managing a wide array of research directed toward understanding how people's sensory systems, especially the inner ear balance mechanism, react to weightless space flight. Much of my research is focused on solving the problem of space motion sickness, which is much like sea or air sickness, and which affects about 30 percent of our astronauts. Solutions to the problem of space motion sickness will not only improve the health and well-being of Shuttle astronauts, but will also help people on Earth who suffer from motion sickness and disorders of the inner ear.

My work is exciting, challenging and often personally rewarding. I have conducted special biomedical tests on many astronauts who have flown in space. I'm developing experiments that will fly on the Space Shuttle. As part of my job, I have traveled to many parts of the United States and Europe. I derive satisfaction from my work because I know that I'm making an important contribution to the success of our nation's exploration and use of outer space.

I'm convinced that, compared to when I was in high school, there are a far greater number of opportunities for young people to prepare for careers in aerospace related jobs. If you're considering a career in aerospace, read as many as possible of the dozens of factual books and magazines that have been written about our aerospace program. Above all, develop your skills in reading, writing and effective oral communication. Finally, don't be afraid of making a wrong decision. If you decide to pursue a career in aerospace and it doesn't turn out to be what you expected, your education and experience can be applied to other equally challenging and rewarding jobs.

Jerry L. Homick, Ph. D.
Experimental Psychologist

ORIGINAL PAGE
COLOR PHOTOGRAPH

ORIGINAL PAGE
COLOR PHOTOGRAPH

I'm designing a facility so computers can "talk" with one another more efficiently.

Sometimes I feel like I've taken a giant step into the future. Each day I'm surrounded by the blinking lights and graphic displays of computers as they communicate back and forth. You see, I'm a computer science specialist for NASA, and I'm helping to shape the future of aeronautics.

Part of my job is designing a computer facility where researchers from industries, government agencies, and universities can test their latest ideas in aircraft control. This facility will provide a laboratory environment which will make it easier for engineers to experiment with their ideas. In the future, some of their ideas will make it possible for airplanes to take off, fly, and land under the control of advanced electronic and computer systems.

When I was in high school, I didn't realize that my interest in math would one day lead me into computer science. That's one reason I'd encourage you to keep your options open and take courses in many different areas. Social studies and foreign languages are important, as well as math (including calculus) and science (including physics, chemistry, and computer science). English courses are also needed because no matter what job you choose you'll need to be able to communicate your ideas to others. Remember, you never know what opportunities will come your way or how your interests might change as you're exposed to new experiences.

Be sure to take electives instead of study halls. Electives will increase your learning and may lead to a satisfying hobby, if not a career. I took four years of music while I was in high school which taught me to appreciate music and trained my voice. Now in my spare time I sing barbershop harmony and really enjoy it.

I didn't always want to be a computer science specialist, mostly because I didn't have much exposure to the field. My high school and college courses and my work experiences helped me discover that computer science was just right for someone with my abilities, interests, and personality. Computer science could be just right for you, too.

Linda A. Hunt
Computer Scientist

While you're in high school,

there are many steps you can take to prepare yourself for a career as a scientist in the aerospace industry.

Discuss your career plans with your guidance counselor and teachers. They can tell you about the many different kinds of occupations available in this diverse industry. They can recommend special tests designed to help you determine your interests, abilities, and aptitudes. Be sure to plan your high school courses with their help.

As you plan your high school curriculum, there is a wide range of courses that will be helpful to your future career. Good grades in mathematics and science courses are a must. In addition to these courses, a well-rounded high school curriculum includes courses in English, social studies, and foreign language(s), as well as technical subjects like mechanical drawing. By studying a wide range of subjects, you'll be prepared to respond to unexpected opportunities. Participation in extracurricular activities and hobbies will expand your high school experiences and prepare you for the years ahead.

Be sure to seek the advice of people actually working in jobs of interest to you, and visit their work sites. Your friends, neighbors, and relatives can help as you consider various career choices.

Visit your school and public libraries for additional information about the thousands of different types of careers. Ask the librarians for the names of professional associations which you can contact for more information about specific careers in aerospace.

Part-time and volunteer jobs will expose you to daily work activities and responsibilities.

These suggestions are aimed at helping you prepare for a career as a tomorrow-minded scientist.

At this point if you'd like additional information about careers in aerospace, contact the Educational Programs Officer at the NASA Center serving your state. See below:

NASA Ames Research Center
Moffett Field, California 94035

serving: Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming

NASA Goddard Space Flight Center
Greenbelt, Maryland 20771

serving: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont

NASA Johnson Space Center
Houston, Texas 77058

serving: Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas

NASA Kennedy Space Center
Kennedy Space Center, Florida 32809

serving: Florida, Georgia, Puerto Rico, and Virgin Islands

NASA Langley Research Center
Hampton, Virginia 23665

serving: Kentucky, North Carolina, South Carolina, Virginia, and West Virginia

NASA Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135

serving: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin

NASA Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

serving: Alabama, Arkansas, Iowa, Louisiana, Mississippi, Missouri, and Tennessee