Lewis News

LEWIS RESEARCH CENTER
CLEVELAND OHIO

NASA 1958-1973

Vol. 10 No. 21

October 5, 1973

Members of the 1973 ALERT Committee are (seated, left to right) Robert J. Manley, Sanford Felder, Richard W. Wilson, and Lynne Konkoli. Standing left to right are Donald Chubb, Karl Faymon, Dr. John V. Dugan, Jr., chairman, Bernard Sater and Michael J. MacKinnon. (Martin Brown photo)

MEMO TO STAFF

I want to express my appreciation and commendation for the contributions that all of you, directly or indirectly, made to our highly successful program "Technology in the Service of Man". Every visitor I met last week and every letter I have since received were outspoken in their praise of our total program. The material that was presented was impressive, the presentations were excellently conducted, the displays and art work of highest quality and all administrative and logistic matters expertly handled. Without exception, all of our visitors found their day with us to be both enjoyable and interesting.

More importantly, everyone who visited us was both impressed and pleased to find so much of worth going on here at Lewis. We succeeded in informing a cross section of leaders and opinion-makers in our country about our activities and their meaning and value to all our people. We now have over a thousand influential people who know more about us and who will, undoubtedly, spread the word among their associates. I know it was a lot of work and extra effort for many of you. I can assure you it was all very worthwhile.

Bruce T. Lundin
Director

ALERT Committee offers six programs

The AWARENESS Committee, with a new chairman and members, also has a new name — ALERT (Alert Lewis Employees to Relevant Topics).

Chaired by Dr. John V. Dugan, the ALERT Committee will present six programs — one each in October and November, and four from January through April.

Although firm dates have not been set, the committee tentatively plans to kick off the season in late October with Dixy Lee Ray, head of the Atomic Energy Commission. Dr. Ray is slated to head the proposed new Energy Research & Development Agency (ERDA). She was recently nominated by the White House to recommend new energy research programs.

Dr. Seymour C. Himmel returning from Headquarters October 15 to become Director for Aeronautics, will give employees a look at "The Headquarters Scene," as the committee's second speaker.

Following Dr. Himmel will be a panel of community leaders projecting "The Future of Cleveland." Next, ALERT has a committment from G. Mervin Ault to give an overview of "Lewis Energy Capability." Ault is Director for Space Technology and Materials.

A national figure to be named later will follow Ault. The final program of the series will feature an expert on "Ground Transportation Systems," or another broad technology area, according to Dr. Dugan.

"We have attempted to select exciting programs with wide appeal," he stated.

Exact dates and time of the programs will be presented in upcoming issues of the *Lewis News* and through committee flyers to employees.

NASA invention alarms burglars

Burglars may be in for a rough time stealing for a living because of heart research conducted at Ames.

NASA has granted a five-year patent license to a new company to manufacture and sell an intrusion detection system based on an Ames-developed invention that permits physicians to measure blood pressure within the heart. The biomedical invention utilizes a very small capacitance-type pressure transducer, originally conceived by research scientist Grant Coon to measure pressures on wind tunnel models.

In its biomedical application, the ultra-sensitive capacitor actually changes dimensions slightly in response to blood pressure changes. Changes in capacitance produced by the altered dimensions are interpreted as changes in blood pressure readings.

In an application such as an aircraft intrusion detection system, the physical mass of an approaching person changes the environment in the vicinity of the airplane. This change is sensed by the transducer device as a change in capacitance — used to activate an alarm signal.

To make a blood pressure sensor which could be introduced into the chambers of the heart via an artery or vein, Ames scientists conceived a special circuit minimizing the number of lead-in wires to the transducer. As a result of the novel design, a catheter sensor with a single coaxial cable and a maximum diameter of one-twenty-fifth of an inch was ultimately developed.

Dr. William J. Kerwin, formerly of the Ames Research Center and a co-inventor of the original catheter transducer circuit believes the circuit can be adapted into an excellent intrusion detection system. Kerwin, an inventor with many patents, is now a professor of electrical engineering at the University of Arizona, and is also the President of K-H Enterprises.

K-H Enterprises is working on the design of intrusion detection systems based on the Ames biomedical invention. The first system placed on the market will be designed to foil thieves who steal valuable electronic equipment from parked aircraft.

The aircraft system will telemeter an alarm to airport security guards as soon as a thief approaches the aircraft. Later systems will be geared for use in moored boats and buildings.

Lab cites fourteen Tech Brief winners

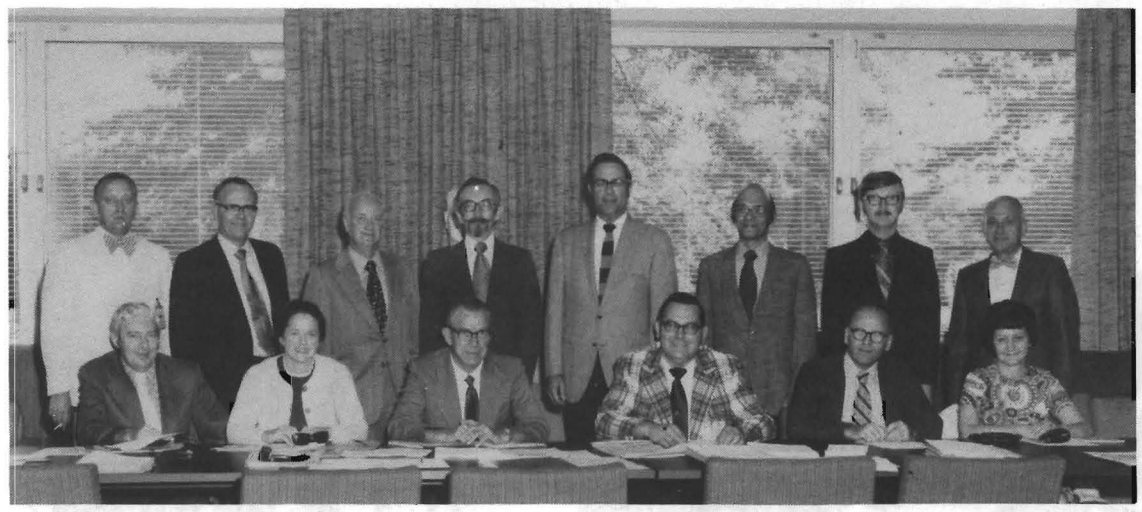
Paul E. Foster, Chief of the Technology Utilization Office, recently presented Tech Brief awards checks and certificates of recognition to 14 scientists and engineers whose research in various fields are published to encourage commercial applications.

This is the first time that NASA has presented certificates along with the monetary awards.

In presenting the awards Foster told the recipients, "NASA appreciates your efforts in bringing these innovations to the Technology Utilization program and thereby to the attention of people throughout the country."

Persons receiving awards and titles of their Tech Briefs are Dennis P. Townsend, "Lubricant Selection for Gear Designers;" David C. Byers, "Improved High Voltage Insulator Use in Vacuum;" John P. Barranger, "High Temperature Permeameter for Measuring Magnetic Properties;" Warren H. Philipp and Stanley J. Marsik, "Radiation-Induced Nickel Deposits;" Ralph D. Thomas and George A. Mazaris, Jr., "Thermocouple Tape;" Roland Breitwieser, "Tungsten-Reinforced Tantalum;" and Henry G. Kosmahl, "Technique for Refocusing, Decompressing, and Conditioning Spent Electron Beams."

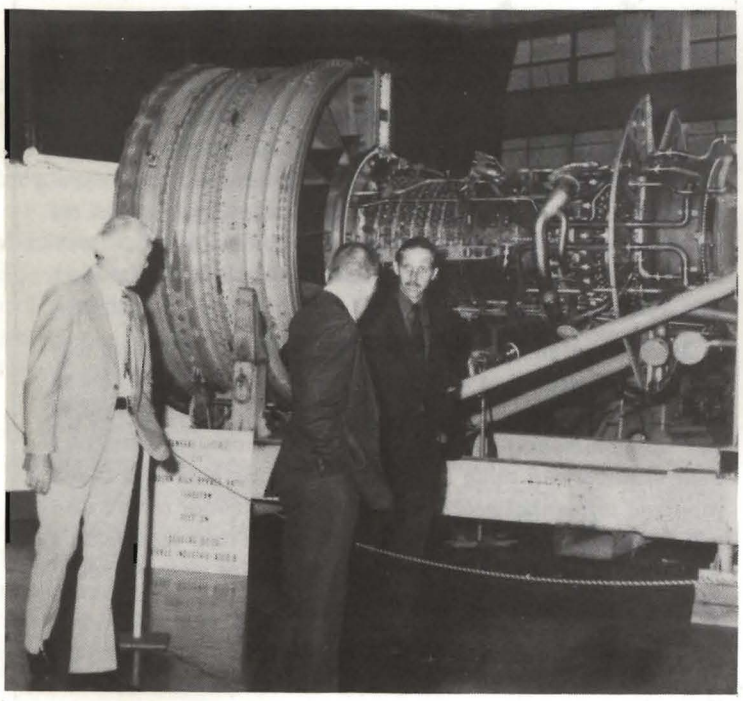
Robert L. Bowman and Ernest W. Spisz, "Improved Transmittance Measurements with a Magnesium Oxide Coated Integrating Sphere;" Edward A. Maslowski, "Automatic Method of Measuring Silicon-Controlled-Rectifier Holding Current;" and James E. Dudenhoefer and Mario N. Miraldi, "Water Tight Low-Cost Electrical Connector."

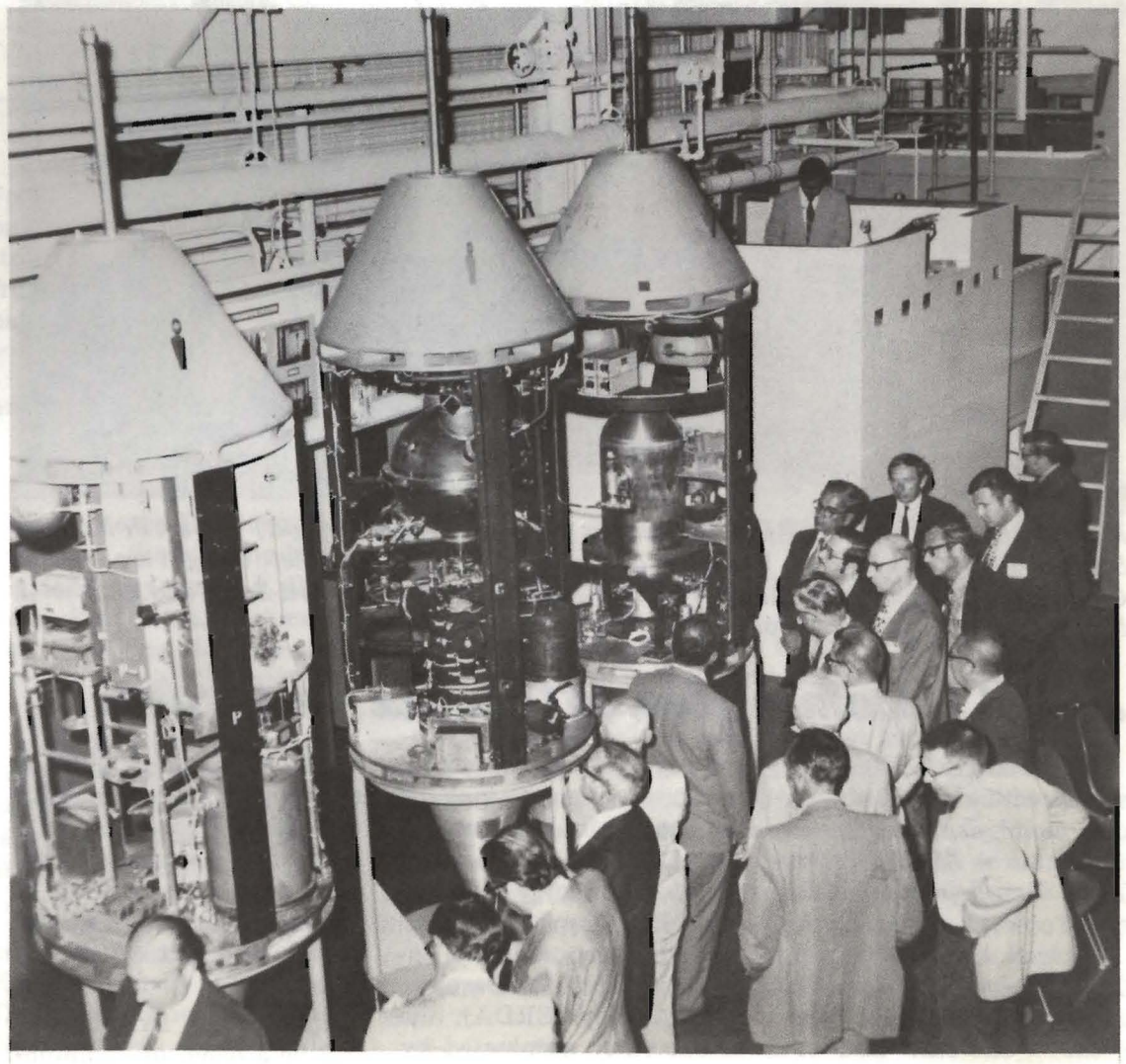


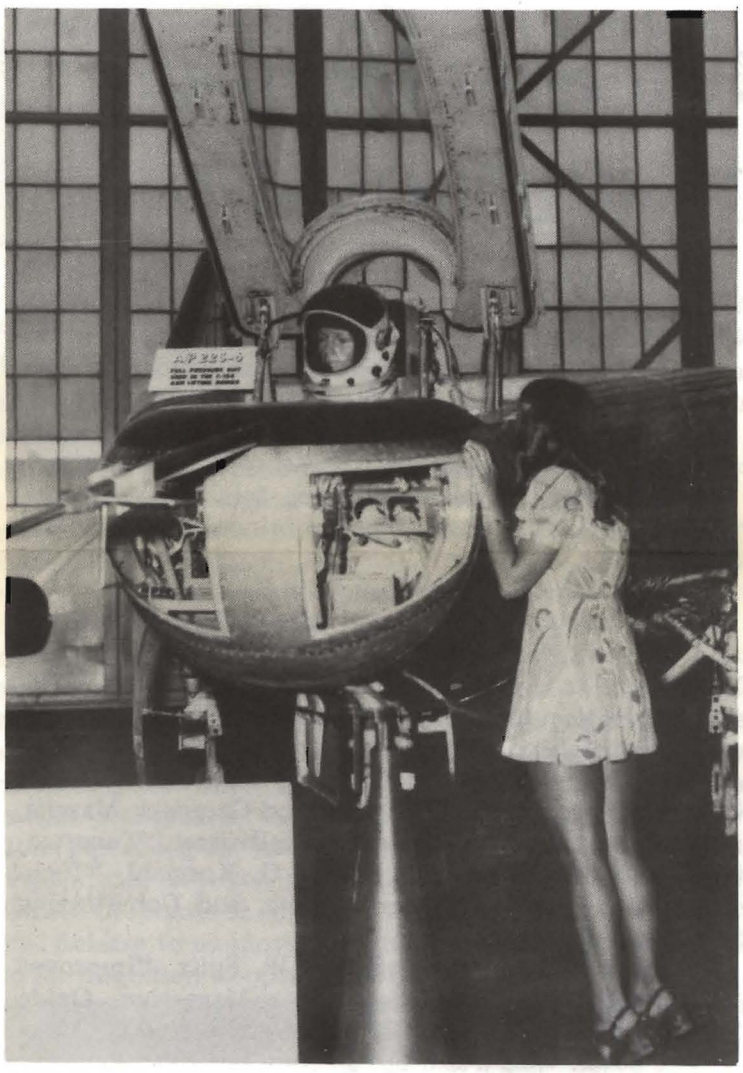
CFC committee

These are the guiding forces behind the Combined Federal Campaign being conducted here from October 1-12. They are (seated left to right) Jack L. Herman, Sandra J. Hines, Lloyd W. Crotser, Ronald F. Kiessling, Richard A. Siggelkow, and Ruth E. Arnholt. Standing left to right: Dale A. Efflandt, William E. McKissock, Clarence E. Forbes, Gilbert J. Widra, Calvin W. Weiss (campaign manager), Robert Siegel, Joseph L. Ferguson and Robert W. Schmidt. Center Director Bruce T. Lundin is overall chairman of the Lewis CFC campaign. Not shown are Chip Kelsey (associate campaign manager), Richard O. Raabe, and James W. Bagwell. (Don Huebler photo)

National, state,local leaders came...

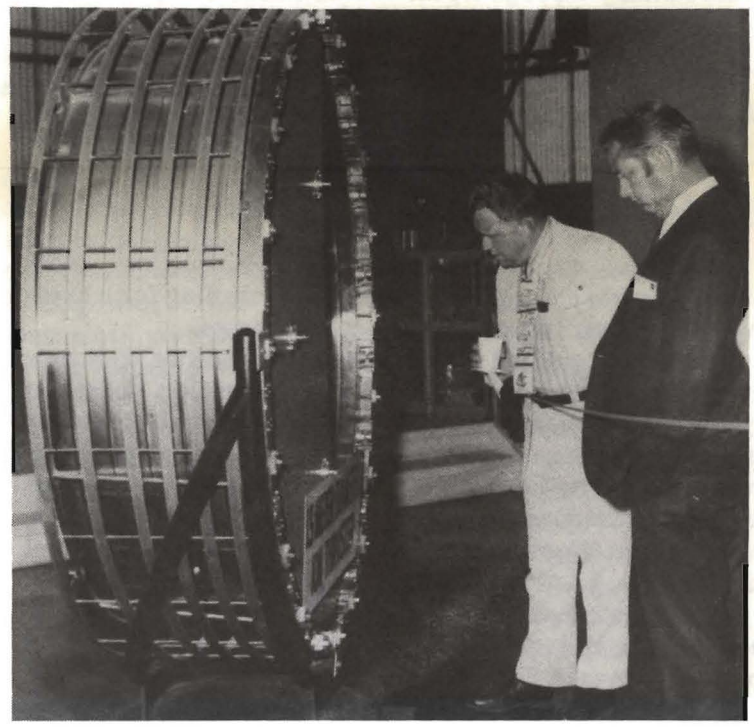


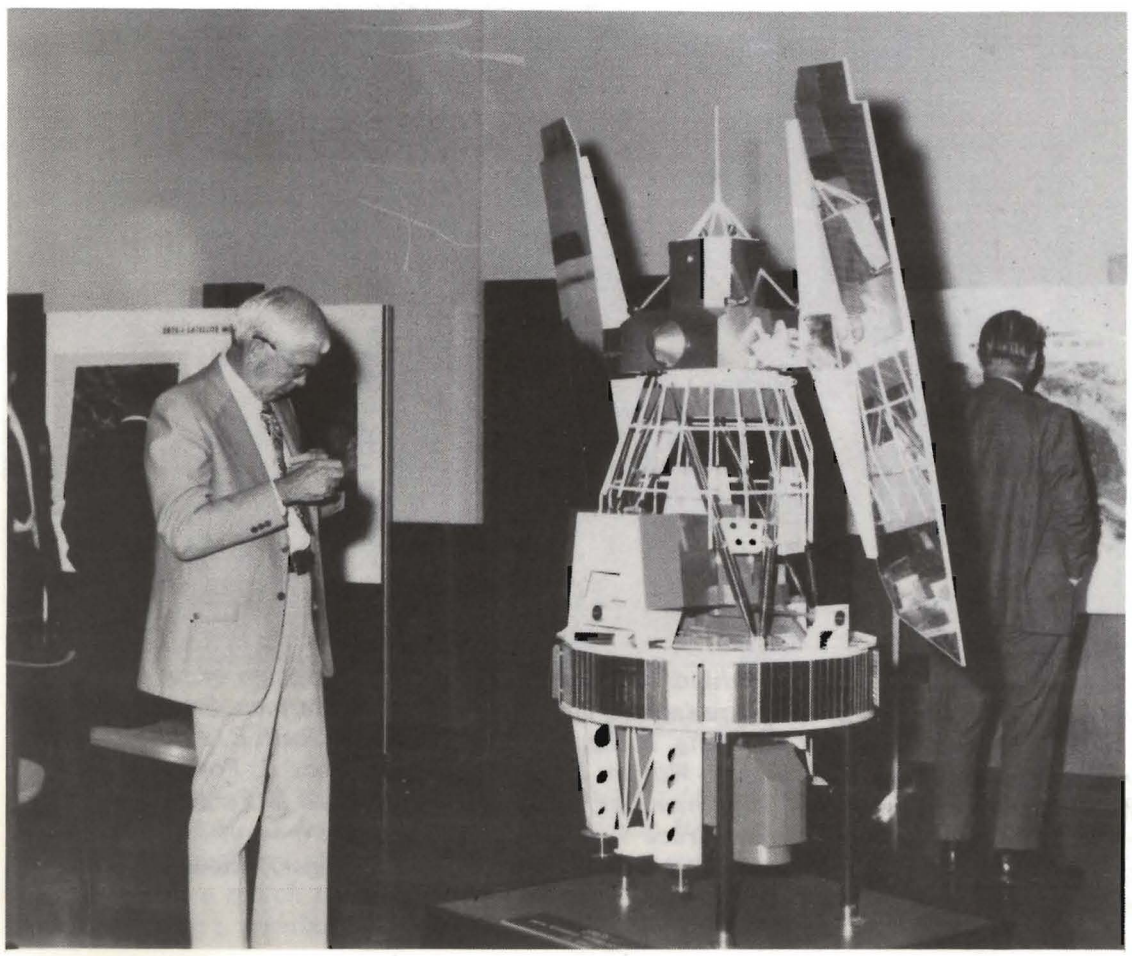




Photos by

Don Huebler





THE LEWIS NEWS presents the Lewis Research Center story in terms of its people, its purpose and its progress. Published on alternate Fridays, the News is produced by the Public Information Office, Lewis Research Center, National Aeronautics and Space Administration, 21000 Brookpark Road, Cleveland, Ohio 44135.

News items should be phoned into PAX 2140, or sent to Room 118, Ad Bldg., Mail Stop 3-11. Deadline is ten days prior to publication.

Editor . . . . . Charles Mitchell

...and went away impressed!

The diversity of the Lewis program and the benefits to mankind came out loud and clear in the presentations. Without exception, the comments from the members of my group were very complimentary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

NASA is involved in some wonderful programs for the betterment of life for all mankind through the application of techniques and knowledge derived from space projects and other scientific endeavors. NASA has a record to be proud of, a fine story to tell and told it very well through this program.

ORTON COMPANY
CLEVELAND, OHIO 44115

Dear Bruce:

The Lewis "inspection" -- "Technology in the Service of Man" -- was absolutely outstanding!

I have nothing but praise for every facet of it; the subject matter, the way it was presented, the displays and demonstrations, the speakers, and the logistics were all great. I heard many comments, from both NASA people and from our outside guests, and all of them were favorable, expressed in superlatives.

If I have to single out one element of the tour, above all others, it would have to be the speakers -- the young men who demonstrated so well that NASA is still the best high technology agency in the world.

Please pass on my congratulations and sincere appreciation to all who were responsible for this outstanding event.

With best regards,

Sincerely yours,

George

George M. Low
Deputy Administrator

I found your program yesterday resulting in one of the more informative and interesting days I've spent in quite a while. I'm sure few of us realized the breadth of activity being carried on by NASA.

We had no previous idea as to the depth of creative science that is done at your Center. Obviously, there is no other way that such large scale research can be accomplished except under the auspices of our Federal Government and we hope that your programs continue to be supported.

It was a very pleasant as well as an educational day and the apparent "esprit de corps" that has been developed in your people was a delight to see. Congratulations on a well organized event and best

Dear Mr. Lundin:

I do want to thank you for a very enjoyable day spent on Wednesday, September 19, 1973 at Lewis Research Center. The presentations were very interesting and extremely informative and the men who made them were exceptionally good. I do appreciate the opportunity to visit Lewis Research Center and want to thank you for inviting me.

GENERAL ELECTRIC COMPANY
WILMINGTON, MASSACHUSETTS 01887

I want to thank you for the opportunity of attending the NASA presentation on "Technology in the Service of Man." The presentation was very informative, extremely well done and helpful in understanding the role of NASA in today's technology. The whole affair was very professionally handled and made good use of my time.

LEO A DALY

PRECISION SCIENTIFIC — SUBSIDIARY OF GCA CORPORATION

I write in behalf of our Rotary Club President Louis Hehman as well as myself in our effort to tell you how much we appreciated, learned and enjoyed on last Wednesday, September 19, when we had the privilege of visiting your Lewis Research Center. We certainly want to thank you again for including us. It was a stimulating, informative, challenging and fascinating experience. You certainly are doing a great job and we appreciate it.

'Sky is falling' is next PAT play

"Dear Me, the Sky is Falling," a comedy based on a story by Gertrude Berg and James Yaffe, will be presented on the DEB Auditorium stage October 19, 20, 26 and 27 by the Lewis Performing Arts Theatre (PAT). Curtain time for all performances is 8:15 p.m.

PAT's production is directed by Ralph Slavik, and stars Marilyn Savino, Jeannette Holley, Thomas J, Kirkland, Zoe Harper, Michele Tomazic, Charles E. (Chip) Kelsey, and Richard G. Goldman. Also in the cast are Sally Ferencik, Ellen Nachman, Theresa Albers, Robert Novotny and Mary Ann Gauntner.

The comedy is about a matriarch who fearlessly takes on all the problems of the neighborhood including those of her husband and her unmarried daughter.

After many years, both the husband and the daughter stiffen and decide to have things their own way for once. The husband voices his own ideas about selling the house and moving to Florida, and the daughter decides that maybe she won't marry her prim fiance, but an unemployed old love instead.

You won't want to miss Mama's scene with the psychiatrist and the series of events that follow! Wit and wisdom abound.

Tickets are available from PAT members and LeSAC ticket sellers at $1.75 per adult; $1 per child.

Answer Line

Questions submitted to this column need not be signed and can pertain to any area of concern or interest to you. Send questions to the Lewis News, Mail Stop 3-11.

QUESTION: By what authority do divisions maintain personnel files, some of which are inaccessible to employees?

ANSWER: The Federal Personnel Manuel provides for the maintenance of official personnel records for each employee. These are maintained in the Processing and Records Branch of the Personnel Division, and the employee may review his or her records at any time. The Federal Personnel Manuel expressly permits maintenance of service record cards (summary personnel histories) on employees by operating officials. However, operating officials are not prohibited from maintaining other files or records regarding employees for use in carrying out their personnel management responsibilities. These normally include records of annual performance discussions, notes on interim discussions pertaining to work assignments or performance, correspondence between operating officials and employees, records of awards or commendations, position descriptions, etc. Release to employees of these informal records is left to the discretion of operating officials.

Speakers' Bureau

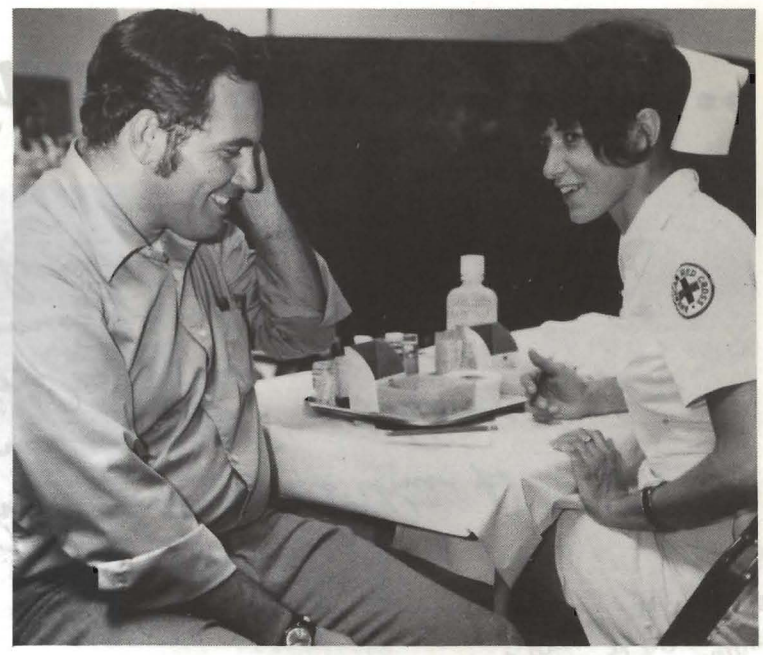
Members of the Lewis Speakers' Bureau, have been on the circuit telling Lewis' story to audiences ranging from ladies groups to technical societies.

Here is the list of speakers and where they are speaking.

Ronald F. Kiessling, St. Bridget Holy Name Society, Parma; **Louis R. Revnyak**, American Society for Metals, Sandusky; **James E. Burnett**, Federation of American Students for Science and Technology, Ashtabula High School, Ashtabula; **Harvey J. Schwartz**, Annual Nation Meeting, Clinical Orthopedic Society, Cleveland; and **Earl T. Bloam**, Hillcrest Shrine Club, East Cleveland.

Robert Friedman, Engineering Seminar, Cleveland State University, Cleveland; **Dominic Giomini**, Holy Name Society, Holy Family Church, Parma; **Marshall W. Dietrich**, Ladies Night, Lakewood Masonic Lodge, Lakewood; **Dr. Robert W. Graham**, Akron Physics Club, University of Akron, Akron; **Ronald J. Schertler**, Wooster Kiwanis Club, Wooster YMCA, Wooster; and **Harrison Allen, Jr.**, Propylaeum Club, Indianapolis, Indiana.

Dr. Graham and Dietrich will follow their October speeches with another one in November. Both will speak before the Cleveland Regional Council of Science Teachers on November 3.



Bloodmobile visits Oct. 16-17

When the Red Cross recently declared a blood emergency in Greater Cleveland, John R. Zeller of the Wind Tunnel and Flight Division, responded by giving blood at the Red Cross Bloodmobile in Cleveland Heights. He is shown having his medical history checked by a Red Cross nurse.

Lewis employees who have not given blood within eight weeks can give at several Greater Cleveland neighborhood bloodmobiles. The blood certificates will be credited to the Lewis Blood Bank for employees and their families.

Contact Helen L. Kechele, PAX 2143 or PBX 459, or the Red Cross, 781-1800, for information about donating in the Greater Cleveland areas near your home.

Mrs. Kechele, chairman of the Lewis Blood Bank, states that the next Bloodmobile visit here will be October 16 and 17.

The two-day blood drive will be held in Room 255 of the Instrument Research Laboratory (IRL), between 10 a.m. and 4 p.m. on both days.

Scouts start 9th year

Director of Center Development Eugene J. Manganiello, recently welcomed high school students from 14 surrounding schools as the Lewis Explorers Posts began their ninth year here.

The students were selected by their schools to participate in the program to gain an understanding of the work and dicipline involved in a scientific or technical career.

During the year, the students will hear lectures by senior Lewis staff members and then put their knowledge into practice by actually completing a technical project.

Involved in the program are two Explorer Posts — the Aerospace, and Electronics and Computers. The Aerospace Post will study rocketry.

The Electronics and Computer Post will concentrate on projects involving computers.

This year, 15 girls have signed up for the program, probably proving that science and technology still commands a strong interest of both sexes. It was just four years ago that the daughter of Lewis employee Jarman (Jerry) Kennard became the first female to join the program.

Both Explorer Posts will have their first technical meeting this Saturday, October 6.

Thank you

"Thanks for the cards, letters, and expressions of sympathy during my father's extended illness and at the time of his death." **Charles Mitchell**

"My sincere appreciation and thanks to my many friends at Lewis for their kindness and expressions of sympathy at the death of my mother-in-law, Mrs. Albertina Buchholz." **Karl Hagedorn and family**

"I would like to thank my friends and co-workers for the cards, calls and the blood provided by the Lewis Blood Bank at the time of my recent surgery." **Lorene A. Johnston**

TU Publications

The following new publications are available at Lewis' Technology Utilization Office, Room 228, Ad. Bldg., PAX 5233 or 8049.

TECH BRIEFS

Gettering Capsule for Removing Oxygen From Liquid Lithium Systems, L.K. Tower and R. Breitwieser, Lewis Research Center, B73-10002.

Production of Small Diameter High-Temperature-Strength Refractory Metal Wires, D.W. Petrasek and R. A. Signorelli, Lewis Research Center, and Westinghouse Electric Corp. under contract to Lewis, B73-10003.

Squeeze, please!

Richard A. Tashjian of the Test Installations Division demonstrates the concentration that was necessary for him to win first expert in the U.S. High Power Rifle championship held recently at Camp Perry, Ohio. Tashjian won out over some 100 other experts from all over the country in a match where competitors fired 1600 rounds at targets of 200, 300, and 600 yards. He is a member of the Lewis Sportsmen's Club.

Lewis News

LEWIS RESEARCH CENTER
CLEVELAND OHIO

NASA

Vol. 10 No. 18 September 7, 1973

Thousands to see, hear Lewis, agency missions

(Editor's note: this issue carries below highlights of four of nine tour stops that many visitors will view here in less than two weeks. The other five stops were featured in the last issue.)

Leaders from business, industry, labor, education and government will be here September 19-21 to hear talks and see exhibits reflecting the theme "Technology in the Service of Man."

Activities also are planned here for employees, their families and friends on September 23; and for the general public a week later on September 29-30. Tickets for the September 29-30 open house may be picked up from the Public Information Office, PAX 3284 or 2140.

Tours will start from the Hangar where a wide range of research hardware will be displayed.

(PSL 3 & 4) "Cleaner Skies"

Public concern for the effects of air pollution both near the ground and in the stratosphere has led to a number of programs here aimed at ways in which pollution from aircraft engines can be minimized.

The major emissions from gas turbine engines are smoke, carbon monoxide, unburned or partially oxidized hydrocarbons and oxides of nitrogen.

Oxides of nitrogen emissions are very reactive compounds and in the atmosphere can react with other pollutants such as hydrocarbons. They are a major contributor to formation of photochemical smog.

An important first step in understanding the air pollution problem is to determine the make-up of the air.

The Global Air Sampling Program being conducted here is concerned with measuring the constituents of the atmosphere at the 20 to 40 thousand foot altitudes where most present day jet transport cruise. Instrument packages are being installed on 747 aircraft. It is hoped that the data will show how pollutant concentration in the upper atmosphere change due to air traffic density and the change in seasons and local weather.

Another effort here is related to atmospheric constituent measurement as part of the Department of Transportation's "Climatic Impact Assessment Program." Lewis also is conducting a clean combustor program in which both contracted and in-house work is directed at new combustor designs for reduced emission.

(Administration Building)
"Servants in Space"

Among the many uses of spacecraft are communications, weather forecasting, scientific data gathering in space, solar observation, and, perhaps surprisingly, exploration, inventory, and management of terrestrial natural resources and the activities of man on Earth.

On July 23, 1972, the first research-directed, Earth-observing satellite, called Earth Resources Technology Satellite (ERTS-1), was launched in a near circular orbit.

This satellite carries several imaging sensors that covers more than 12,000 square miles at once. The satellite views the same large area every 18 days. This repetitive viewing permits seasonal monitoring of changes in vegetation, extent of snow cover, water supply, and the like.

Inventory of croplands during a growth cycle can be obtained from the repetitive coverage by ERTS.

The experimental space station, Skylab, was launched May 14, 1973. One of its prime objectives is to provide the potential to vastly improve man's understanding of Earth resources in such fields as geology, forestry, oceanography, and agriculture.

Lewis and other Federal agencies are looking into the feasibility of extending the shipping season up to 12 months of the year. The Great Lakes are closed for shipping for four months of the year.

(ERB, West Wing)
"The Impact of Wear"

As man developed labor-saving devices, he encountered lubrication problems. The problems are still with us, and have become a very critical element in today's technology.

Much of Lewis work has been directed toward discovering and defining fundamental principles of performance of mechanical elements, continuing advanced work on the mechanisms of lubrication, pioneering studies of lubricant additives, and research on bearing ma-

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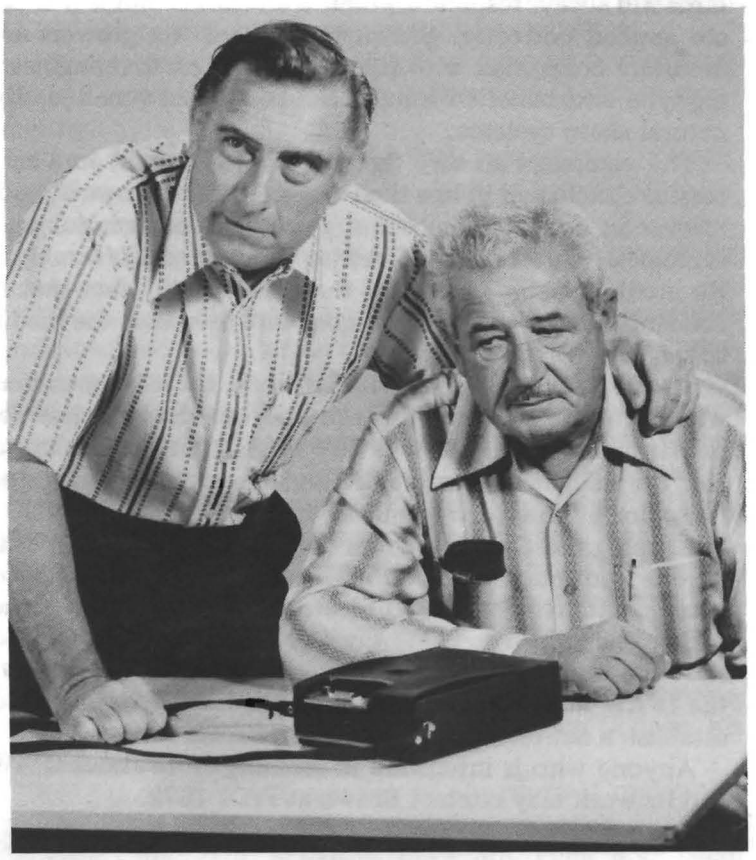

Do you hear what I hear?

What are William F. Brown, Jr. (left) and Gordon W. Boudreau listening to so intently? See page 2 for the story on the unusual recording sound that has the duo's undivided attention.

Director's support

One of Center Director Bruce T. Lundin's "other duties as assigned" is an enjoyable one — driving to Pittsburgh to visit his grandson, Brian Douglas Haskell, and Brian's parents, Lundin's daughter Dianne and husband Bill. Seven week-old Brian has no trouble getting the Director's support!

Welcome, welcome, welcome to familiar and new faces

Recently, you may have seen some new faces and perhaps some old familiar faces at Lewis.

Although we're unable to run pictures of all those who have come aboard during the past weeks, we will print their names and where they are assigned.

Say hello to **Marilyn Zering** who has recently joined Lewis as Public Information Specialist, reporting to Dr. Walter T. Olson, Director of Technology Utilization and Public Affairs. Miss Zering came to us after eight years as International Relations

Miss Zering

Specialist for the NASA European Representative in Paris, France. She tells us

(Continued on page 3)

SNYC students told of decade of social gains

August 28 was a significant day in this country's civil rights struggle as well as for the 70 Schools' Neighborhood Youth Corps (SNYC) students who ended their summer work stint here with an awards ceremony.

It was 10 years ago on that date that the march on Washington occurred and when the late Dr. Martin Luther King made his now legendary "I have a Dream" speech.

It also was graduation day for the SNYC students who had worked here since July 3 under the Federally-funded jobs program for a number of selected students.

Curtis Wilson, Director of Black Studies Program at Cleveland State University, delivered the principal address to the students. He traced the progress that has been made in civil rights since that time.

"You can't rest on your laurels because it is not yet clear that the commitments made over the past decade

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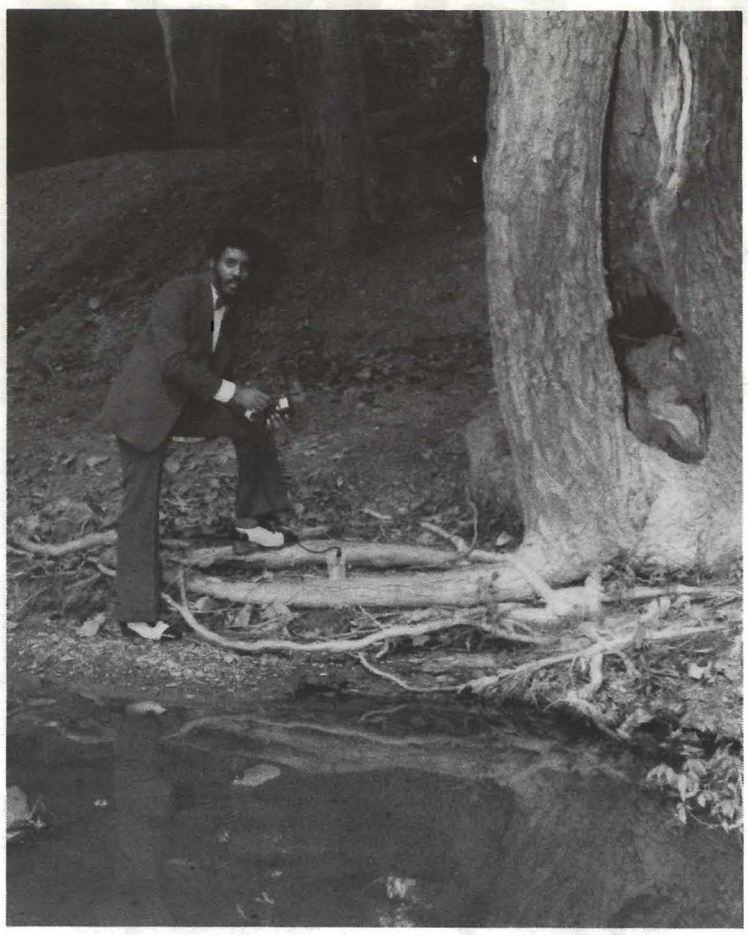


Dr. Julian M. Earls tests acidity of water in a lake located near the Lewis Center. (Don Heubler photo)

Involvement is byword for busy Dr. Earls

It's not surprising to those who know Julian M. Earls that he earned two degrees in a single year but what is surprising to them is how he found the time to do it.

Dr. Earls, Chief of the Environmental Health Office at Lewis, last month was awarded a Master's degree in environmental health (his second Master's degree), and a Doctorate in radiological physics both from the University of Michigan.

The 30-year old manager and environmentalist has amassed an impressive list of honors and achievements through his participation in a wide range of activities in the community and in his profession.

Earls was named to head the now major management staff office when he was only 25 years old and just three years after he joined Lewis, making him one of Lewis' youngest executives at that time.

He is a past member of Lewis' Equal Employment Opportunity Committee and presently serves as a vice-chairman of Lewis' Incentive Awards Committee. Because of his expertise in health physics, Earls serves on several of Lewis' safety and environmental health committes.

His outside activities are divided between his professional life and community activities — particularly the black community.

"I am a very fortunate man," Earls says with conviction. "To share whatever expertise I possess to help uplift those less fortunate than I is the very least I can do."

As a result of his convictions, Dr. Earls' community involvement are many.

He serves on the Board of Directors of the Opportunities Industralization Center, an organization to assist the underemployed and unemployed; serves on the Cleveland Youth Motivational Task Force sponsored by Blacks in Management organization; chairman of the Boy Scouts of America's Organization and Extension Committee; serves on Cleveland Board of Education's Advisory Panel for Environmental Education; organized and is president of the Cleveland Chapter, National Technical Association, an organization for the advancement of blacks in science and engineering; a member of Black Exchange Program sponsored by the National Urban League to inspire black college students to prepare for a wide range of careers; and is president of the Cleveland Chapter, Norfolk State College, his undergraduate alma mater.

He has taught mathematics at Cuyahoga Community College since 1968.

These numerous activities have not gone unnoticed. Earls was selected by the Jaycees as one of the Outstanding Young Men in America in 1971, and as a Distinguished Young Black American in 1973.

Earls is a member of the Health Physics Society and the American Nuclear Society. And probably as a diversion from all the other activities, the busy manager has earned a brown belt in karate.

Movie earns photography award

A 15-minute color motion picture film produced by the Photographic Branch has earned an honorable mention in the 1973 Industrial Film Award sponsored by Industrial Photography magazine.

Entitled "Protective Clothing in Handling Xenon Lamps," the film shows how and why these lamps are very dangerous, and the testing of different types of material that should be worn to protect against the flying fragments.

Key persons responsible for making the film are John G. Ewashinka, engineer; Clifford W. Brooks, cameraman and film editor; and Arthur L. Laufman, producer and director.

A two-page spread showing some of the pictures from the film will appear shortly in upcoming issues of Industrial Photography and Photographic Methods for Industry magazines, according to Laufman who heads the Motion Picture Section.

Center happenings

Sunday Bowling

The NASA Sunday Night Mixed Bowling League is looking for new members. They bowl at Stardust Lanes at 7 p.m. For more information call Glen Cowgill at PAX 6167 or Margaret Alley at PBX 8003.

Men's Bowling

Men interested in bowling in the Thursday 6:15 p.m. League please call Arlington Adams, PAX 6113.

Women's club sponsors development seminar

The Lewis Business and Professional Women's Club, under the auspices of its parent organization, BPW District 4, is sponsoring a leadership and development course which began here September 4 and will last for eight consecutive sessions.

Teaching the course, which is limited to Lewis BPW members, is Dorothy R. Croft, bylaws chairman of the Ohio State Federation of BPW clubs.

Mrs. Croft is a past president of the Berea BPW and is presently serving as its parlimentarian. An active BPW member of 17 years, she has served on many committees at both the state and national levels.

The personal development course is designed to develop leadership potential; as a vehicle for learning more effective communications and self expression; and as training toward understanding more of BPW's objectives.

The course is being held in the small dining area of the main cafeteria beginning at 6 p.m.

Welcome...

(Continued from page 1)

that she's looking forward to a dynamic, interesting, and personally fulfilling assignment as a new "Lewis man."

Richard C. Clapper is returning to work in the Personnel Division after spending a year in an exchange program with the City of Akron, where he helped in its personnel department.

Robert G. Ragsdale, former Lewis employee, has returned to the Power Systems Division.

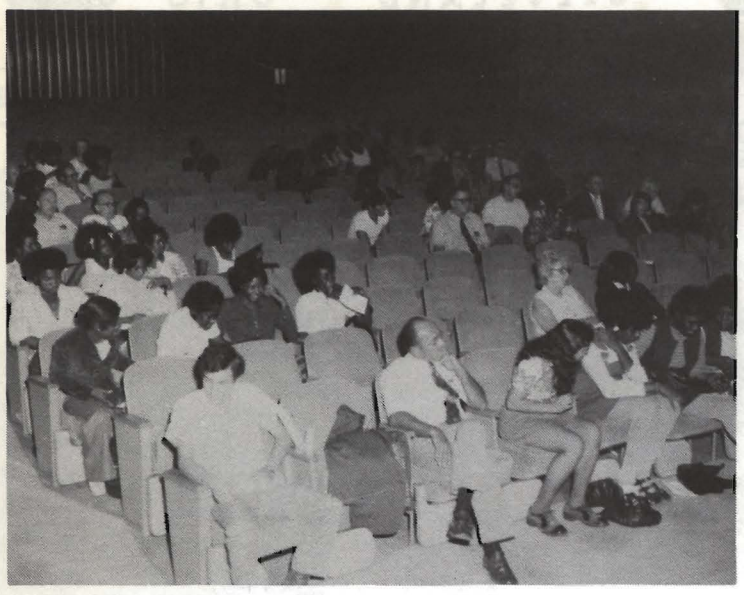
Martin Cunningham is joining Lewis. He comes from the Lyndon B. Johnson Center, Houston, and will serve as chief of the Scientific Computing Branch.

Gregory Clark, former SNYC summer student here who worked in the Print Shop, has returned there as as off-set pressman.

Two Co-op students, **Dale Beebe** from Purdue University, and **Joseph Kolecki** from Cleveland State University, have joined Lewis on a fulltime basis. Beebe is assigned to the Spacecraft Technology Division and Kolecki also is assigned to the same division.

Have a nice tour!

Fifteen Air Force Junior ROTC students from Westland High School of Galloway, Ohio recently toured the Center with their advisors and two reporters from nearby Lockbourne Air Force Base. Before starting the tour the group had to stop in the Administration Building Lobby at the desk of Mary Ruth Osgood. Here, as she has done hundreds of times in the past, Mrs. Osgood passes out NASA literature and badges prior to sending them on their t[illegible]. (Martin Brown photo)



SNYC students and some of their supervisors listen as Curtis Wilson (right), Director of Black Studies Program at Cleveland State University, delivers the principal address at the awards ceremony. The ceremony signaled the close of the SNYC summer job program at Lewis. (Don Huebler photos)

Students end summer work...

(Continued from page 1)

are still there," he stated.

Curtis encouraged the students to use their votes in order "to bring purity to the electoral system."

"You are living in the best of times. Mankind is making more technical advances than ever before and there is more social awareness. Get involved," he urged.

The students received a certificate bearing photos of them at their places of work in recognition of their participation in the program. The certificates were signed by Director Bruce T. Lundin and Cleveland Superintendent of Schools Paul Briggs.

Others on the program who made brief remarks to the students were Robert P. Allen, Chief, Manpower Programs Branch; Lawrence Duda, SNYC Project Supervisor, Cleveland Board of Education; Jerome Seppelt and Leroy McCreary, SNYC Program Coordinators; and Harold Ferguson, Chief, Lewis Equal Employment Opportunity Office.

Thank you

"My thanks to all my friends at Lewis for their kindness and expressions of sympathy during the illness and death of my mother, Mrs. Adele Luchini." **Orlindo Luchini and family**

"Thanks, everyone, (Cleveland and San Diego offices) for remembering me with cards, flowers, gifts and phone calls while I was in the hospital and during my convalescence from surgery." **Judith A. (Judi) McCauley**

"I'd like to thank all of you personally for the warm farewell given to my wife, Marilyn, and I, as I retire from government service to start a new career. My wife and I both have been thoroughly uplifted by the well wishes expressed by you.

The helpful and friendly relationships that I have had with you will remain as my most treasured memory. I include here every kind of talent at the laboratory because I learned that all of you are necessary to make something do. To me this is Lewis — the highly skilled and dedicated collection of unusual individuals that are capable, willing, and ready to work together toward difficult worthwhile goals. The people of Lewis are a great national asset that I hope and pray will be recognized and utilized to help solve the many problems that face our country." **Frank Rom**

"In 30 years at the job, I have made many friends. So upon my retirement, for the wonderful dinner, all my gifts, the flowers, and courtesies extended to my wife and daughter, I want to send my deep appreciation to all the men who attended this most memorable event. I shall remember it always." **Warren E. Poc /Jr.**

Tour stops...

(Continued from page 1)

terial at the atomic level.

Over the last three decades, Lewis has had an active part in the development of solid film lubricants. It has been demonstrated that excellent performance can be obtained with solid lubricants such as graphite, molybdenum, and teflon under extreme conditions where liquid lubricants cannot function. The life of a solid lubricant film is often determined by how well the solid adheres to the coated substrate. Lewis has pioneered the use of vacuum system processes of ion plating and sputter coating. Both methods give highly adherent films that have good lubricating properties.

(MPL) "Materials for Man"

Lewis has long been involved in the development of materials to meet the ever increasing demand for higher and higher temperature devices.

Other work at Lewis includes applying knowledge of fatigue to improving the reliability of structures; contributing to the development of lower cost manufacturing processes for high temperature superalloys; advancing the technology of ceramic materials to replace heavier metallic materials; developing higher temperature turbine machinery components and cheap automobile antipollution devices; and advancing the field of composite technology.

During the past two years Lewis engineers have developed an entirely new and what promises to be an extremely accurate method of predicting fatigue life in advance of service. Called the strainrange partitioning method, it can be applied to all types of complex cycling loading spectra. It takes into account the effect of temperature as well as mechanically applied loads and is equally applicable to all metals.

Reduced weight and the ability to withstand ever higher temperatures are major goals of materials research for jet engines. A totally different class of material called ceramics affords great promise for substantial improvements in these properties. Lewis research has shown other ceramics, namely silicon carbide and silicon nitride to be most promising for certain turbomachinery applications.

'Wild things have rights, too,' Brown insists

"Wild things have a rightful place on this earth, just as man does. Therefore, man is going to have to come to an arrangement with the animals, a compromise, which will require some sacrifice in economy or pleasure on man's part."

Because of this belief, William F. Brown, Jr., Head of the Fracture Branch, Materials & Structures Division here, has been donating his time and effort for the past three years to the International Fund for Animal Welfare (IFAW).

The IFAW, centered in New Brunswick, Canada became known to the public several years ago for its efforts to stop the slaughter of baby harp seals near the Gulf of St. Lawrence. Through advertisements that Brown's wife, Carol, wrote for newspapers and television, the IFAW encouraged the public to protest to the Canadian government and to make contributions to help further the work of the Fund.

Over 88,000 people from 30 countries responded, creating enough pressure to stop the slaughter in the Gulf. In addition, last October the Marine Mammal Protection Act was signed, which prohibits import into the U.S. of any products from the baby harp seals or from other young marine mammals.

A polar bear lift was IFAW's next project. A large garbage pile near Churchill, Canada made an attractive stopping point for the bears on their route north. When the local people began to shoot the polar bears, the IFAW arranged to have the bears drugged and then transported to a point where they would by-pass Churchill on their migratory path.

Brown emphasizes that "much of the solution to how man is going to relate to other living things will be through the application of engineering principles." For example, the IFAW used this approach to stop the Canadian blueberry farmers from killing robins this summer. Because their natural food source was greatly reduced by indiscriminant forest spraying, the robins went to the unsprayed blueberry fields for food.

A search at the Cleveland Public Library and recourse to the NASA Recon system produced information on bioacoustics as a means of bird control. This method scares the birds by using their natural alarm sounds.

As a result of his search, Brown and the California expert on bird sounds, Gordon W. Boudreau, flew to Canada and demonstrated the effectiveness of natural alarm cries in moving robins from the blueberry fields. Backed by public protests generated through newspaper advertising, the IFAW convinced the Canadian Government no' 'o issue licenses this year for the killing of robins; and with the help of the Canadian Wildlife Service a comprehensive program will be developed to save both birds and blueberries.

As in engineering, successful bird control programs require the application of scientific methods. The bird's general behavior and feeding habits must be carefully studied and an integrated program developed. This may involve weed control, insect control, or selective cutting of trees. Unfortunately, the Canadian blueberry growers had invested a large amount of money in electronic bird sound synthesizers. These devices scare the birds for a short time, but soon the birds become used to the sounds. In contrast, the birds will always respond to their own alarm sounds if these are applied correctly. Brown found that the growers are naturally concerned with profit. He believes that engineering-type cost-benefit formulas can be applied which justify natural alarm systems.

The campaign to save the robins was brought to a successful conclusion in less then three months. Brown stated, "Never in my experience has a wildlife conservation and ecological issue been resolved so quickly and favorably." He attributes the success of the IFAW to the fact that it concentrates on one specific goal, and then uses the media to sell it.

The IFAW is not done with its work, for it believes that wildlife needs constant protection from the senseless depredations of man. IFAW is now engaged in a campaign to halt the slaughter of harp and hooded seals off the coast of Labrador by the Norwegien-based fur industry.

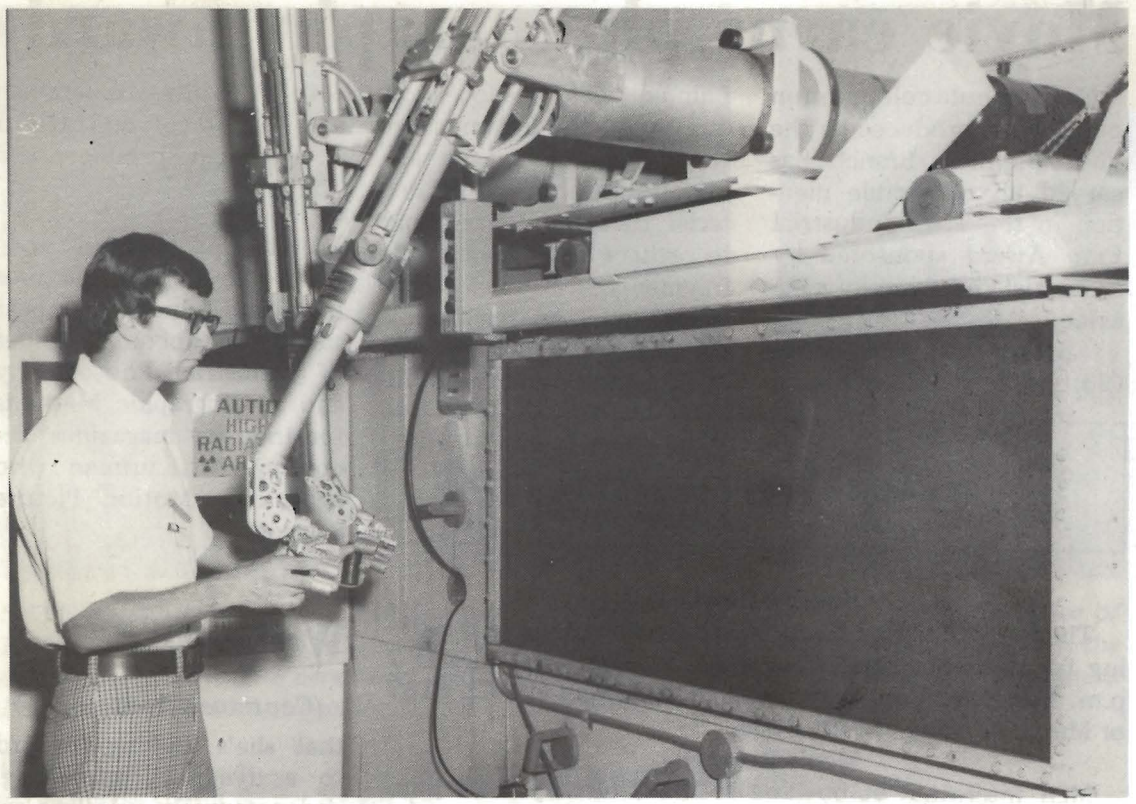
Keeping the Gulf free from the commercial hunters will require continued monitoring. In addition, IFAW hopes to establish tourism in the Gulf area during the time of the spring seal nursery. That way it may be very difficult to start the hunt again in the presence of tourists. Ultimately, the IFAW hopes to convince the Canadian Government to establish a national park in the Gulf, Brown said.

Anyone who is interested in learning more about IFAW and its work may contact Brown at PAX 4272.

THE LEWIS NEWS presents the Lewis Research Center story in terms of its people, its purpose and its progress. Published on alternate Fridays, the News is produced by the Public Information Office, Lewis Research Center, National Aeronautics and Space Administration, 21000 Brookpark Road, Cleveland, Ohio 44135.

News items should be phoned into PAX 2140, or sent to Room 118, Ad Bldg., Mail Stop 3-11. Deadline is ten days prior to publication.

Editor . . . . . Charles Mitchell



Dale A. Krismanth uses manipulators to pick up a cobalt source inside the radioactive area.

Betty J. Morrow, SNYC summer student, is instructed on office procedure in the Environmental Health Office by secretary Del B. Zatroch (right).

Guardians against health hazards

On September 14, 1972 the NASA Deputy Administrator approved several administrative changes at the Center. Among them was the establishment of the Office of Environmental Health.

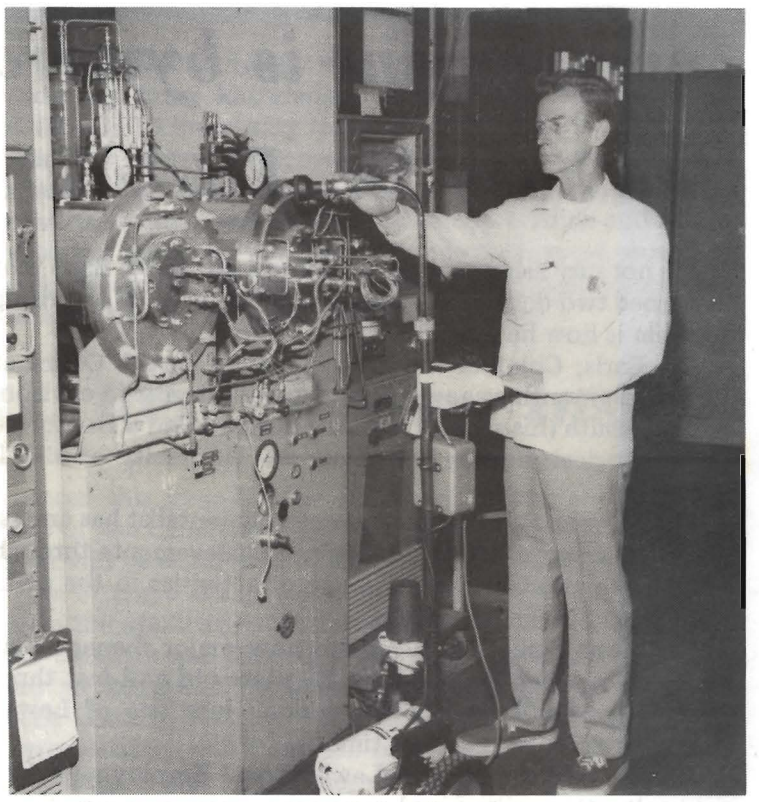
Headed by Dr. Julian M. Earls, the office is responsible for recognizing, measuring and recommending control of hazardous factors in work environment here which can cause illness, disease or even death.

Hazardous factors may be found in areas associated with the handling and distribution of foods, potable water, sewage and industrial waste disposal, air and water pollution, solid waste, and even insect and rodent control.

Laboratories are used to study, analyze, and evaluate possible hazardous elements.

"Environmental health has been given, rightfully so, an exceptional mandate to expand and progress to a point of national importance rather than remain in the poverty of existence it had enjoyed in the past," Dr. Earls explained.

In addition to the other duties performed by the office, "just keeping abreast of the relevant environmental laws and regulations is a monumental task," he said.

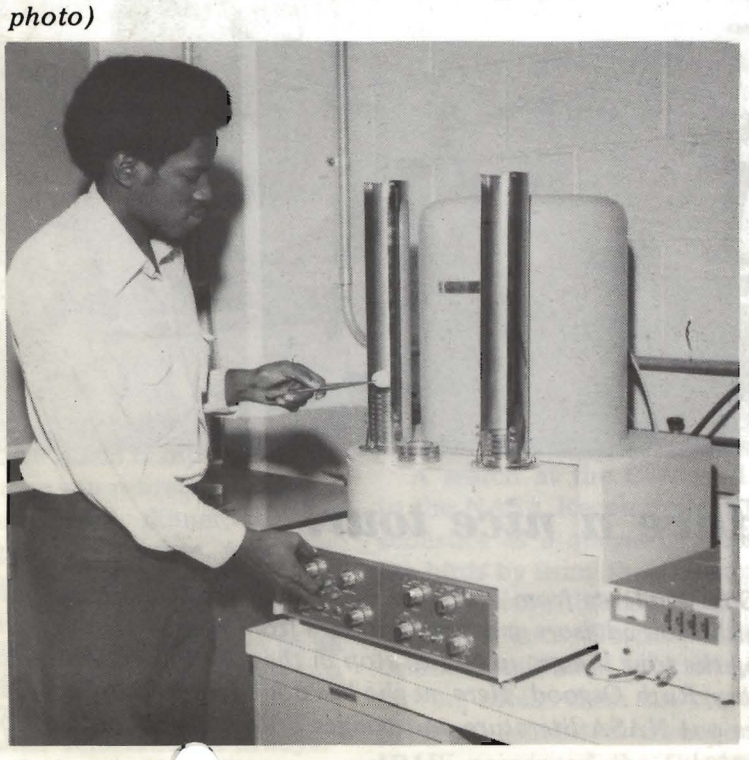


Paul D. Savage collects samples from a hydrogen furnace.

Photos by

Paul Riedel

David C. Hammer (left) and Dr. Julian M. Earls display some of the radiation monitoring equipment used by personnel in the Environmental Health Office. (John Marton photo)



Robert L. We[illegible] processes radioactive samples.

Charles W. Hozc[illegible]akes noise measurements at an air compressor.

A preview of things to see here next month

Between September 19-21 more than 1500 leaders of business, industry, labor, government and universities will visit the Center at the invitation of Lewis.

On September 23, employees, their families and friends are invited to an open house here. And on September 29-30 Lewis will initiate its celebration of NASA's 15th year as an agency by inviting the public to an open house to see work that is being done at Lewis as well as NASA.

During September 19-21, visitors will hear 25-minute talks on nine different aspects of Lewis' work.

In this issue, the Lewis News will carry a synopsis of talks at five of the stops; the September 7 issue will carry synopsis of the remaining four.

(10 x 10 wind tunnel) "Quieting the Fleet"

As NASA's principal field center specializing in aircraft propulsion, Lewis has worked for a number of years on ways to reduce aircraft noise. Research focuses on two main sources of noise in aircraft engines: jet noise, produced as the hot jet stream exits from the engine and mixes violently with the atmosphere; and machinery noise, generated primarily by the fan, but contributed to by other turbomachinery as well.

Noise research results will be further evaluated in the Refan Program. This approach is to replace the present two-stage fan with a larger and quieter single stage fan, and add acoustic treatment to the nacelle in a limited number of present engines. To maintain the proper airflow conditions to the engine core, two booster stages must be added to the engine compressor.

The Refan program focuses on reducing the noise of DC-9 and 727 transports. It would be expensive to refan the entire fleet, however; if it were done, modifying these planes should reduce noise-affected areas near airports by 75% or more.

Ground tests with a refanned 727 are to begin in 1974, and flight tests with a refanned DC-9 in 1975.

A substantial amount of technology which has been derived from the noise research programs at Lewis and under contract has been incorporated in the "Quiet Engine." The Quiet Engine far exceeded the program goals of operating at 15 to 20 effective perceived noise decibles lower than engines powering the DC-8 and 707 aircraft.

(Zero-G) "Big Boost from Rockets"

During the past 10 years, Lewis has conducted 54 operational rocket launches. These launches carried into space useful payloads, each designed to serve mankind in some special way.

Also, the high technology requirements of launch vehicles became "technology drivers" that created or advanced entire industries. For example, a new industry that is still expanding today is the semiconductor industry, the world of solid state diodes, transistors, and integrated circuits. These names, unknown less than 25 years ago, can be found today in mail order catalogs. The number of products based on the advance in the semiconductor field range from power for humans hearts to pocket computers.

The successful development of launch vehicles has opened the door to space and thereby, a whole new dimension to the future of man.

(9 x 15 wind tunnel) "Powered Lift"

Aircraft that could use short runways, perhaps 2000 to 2500 feet long, much shorter than conventional aircraft require, would permit greater flexibility in using present airports and would permit new airports to enter the transportation system. But such aircraft must be quiet.

Lewis is advancing the technology pertinent to quiet propulsive lift for short-haul commercial jet planes. One of the objectives is a high-work turbine to drive the engine fan at the high bypass ratio required.

Another objective is variable pitch blades. The purpose of the variable pitch blades is to reverse the air flow after landing to stop the aircraft in a shorter distance than is possible with present thrust reversers. Tests show that about two-thirds of the total normal thrust of the engine can be obtained for braking purposes when using variable pitch blades.

(ERB) "Space Electronics Technology"

Lewis has been conducting several programs that contribute to the efficiency and utility of communication spacecraft such as the Communications Technology Satellite (CTS) being developed by Canada in a cooperative program with Lewis.

Five major programs include work in high power spacecraft broadcasting tube technology, contoured beam antennas, high voltage phenomena, solar array technology, and thruster for station keeping.

SPHINX, an acronym for Space Plasma High Voltage Interaction Experiment, is a spacecraft that was designed to obtain engineering data applicable to high voltage systems such as the rf amplifiers and high voltage solar arrays that will be exposed directly to the space plasma.

(ERB) "Clean Energy"

The Center has major research and development capabilities for energy conversion, both through energy conversion studies since 1961, and extensive aircraft gas turbine work since 1945.

Energy conversion work has ranged from developing radiation resistant solar cells to large rotating machinery generators run by boiling liquids (Rankine cycle) or hot gases (Brayton cycle).

Technology from machines like the Lewis low cost aircraft engine and from cooled turbine blades also is pertinent to the national effort to meet the mushrooming demand for power.

A new turbine facility at Lewis is being designed to operate cooled turbines in gases at up to 4000° Fahrenheit and at pressures of 560 pounds per square inch. This facility has the highest temperature and pressure capability of any similar facility in the country.

gather as one big family

The song, "I Talk to the Animals," could well have been written for Albert H. Walz and Leo Sienkiewicz of the Test Installations Division.

They work in the Space Power Research Laboratory whose northern side abuts an untapped wooded area which abounds with many wild animals and birds.

Each morning before they begin work, either Walz or Sienkiewicz makes a series of short whistles which bring the animals to a feeding station. The animals answer back in their own inimitable way, and within minutes, all the animals and birds of the area gather around their benefactors to feast on stale bread, wild life bird seeds, raw peanuts, corn-off-the-cob, sunflower seeds and oats.

"Occasionally, a stray dog or cat will come to feed, but we chase them away so the wild life won't be afraid to come here," states Walz who has erected bird feeders and cleared an area for the wild life and birds' feeding station.

Sienkiewicz and Walz take an inventory and make a shopping list of food the animals and birds will need for the coming week.

On weekends they send their wives on shopping jaunts for old stale bread, suet which is used to feed the birds in winter, and for different types of bird feed.

"The wives sometimes complain about the curious looks they get when they insist on day old bread and only the fat from beef," Walz says with a wry grin.

The feeding stations, Walz says, have brought all the animals in the area together as one big happy family. The chipmunk plays with the raccoon. The squirrel wrestles playfully with the rabbit. And the birds swoop down and land gently on the backs of animals without as much as a whimper from them. It's a wild kingdom without the survival of the fittest concept.

Walz and Sienkiewicz have learned much about the habits and life styles of animals and birds who frequent their feeding station. They know the time of year when different animals will give birth; when they will bid them farewell in the winter; and when they will return the following spring. They have seen how the animals and birds protect and feed their young, and have learned many other things they did not know just four years ago.

"I have been a hunter all my life. I have killed bears, deer, and many other animals. I don't hunt or kill anymore. Now I want to devote the rest of my life to taking care of them," Walz said, as he picked up a handful of day old bread and began his familiar whistle to summon the wild life to breakfast.

Retirees

Benjamin S. Lalli wraps up 27 1/2 years of federal service this month. An offset press operator/leader in the Reproduction Section, Administrative Services Branch, Management Services Division, he joined Lewis in 1950. He will be moving to Tuscon, Arizona this summer. Lalli and his wife, Isabelle, have one son, David.

Bernard S. Torre is looking forward to visiting Las Vegas after he retires this month. He joined Lewis in 1946 after time with the Federal Security Agency, the War Department and the Army Air Force. For the past 11 years at Lewis he has been Head of the Purchase Section, Research & Facilities Procurement Branch, Procurement Division. He has five children.

possible grants, according to Harrison Allen, the Technology Utilization and Public Affairs Office. Allen coordinated the Lewis grant to Central State.

Lab bowling team finishes near top in national meet

Final audit of the 36th Annual Postal Employees National Bowling Tournament showed the NASA Rangers Bowling Team in 16th place.

The Rangers, from Buckeye No. 1 League, competed against 200 teams from eastern parts of the United States and Canada in Columbus, Ohio.

The opening day of the seven weekend competition was held for any team with government affiliation which wanted to participate.

The Rangers received $130.00 for winning 16th place, and in addition, their team score of 3026 won the team prize of $50.00 for the opening session.

The men who bowled this fine series were: William Benser, Fan & Compressor Branch, Fluid System Components Division; Harold Schum, Propulsion Turbine Section, Fluid System Components Division; John Gregory, Head, Propulsion Systems Branch, Chemical Propulsion Division; Patrick Donoughe, Reactor Components Branch, Nuclear Systems Division; and Lewis retiree Irving Johnsen. Benser's 645 series garnered 162nd place out of 3500 single events. Congratulations, fellows. Nice going!

Cut-off date set for new directory

Friday, September 7 is the cut-off date for submitting changes to a new Lewis telephone directory scheduled for distribution later this fall.

Changes in telephone numbers, location of personnel and mail stops which have not previously been submitted, must be reported by September 7.

Cleveland supervisors should send changes on Form C-405b to Karen J. Coleman, Mail Stop 3-18. Plum Brook supervisors should send changes to the Plum Brook Personnel Office, Mail Stop 7141-8.

Lewis News

LEWIS RESEARCH CENTER
CLEVELAND OHIO

15th Anniversary NASA 1958-1973

Vol. 10 No. 19 September 21, 1973

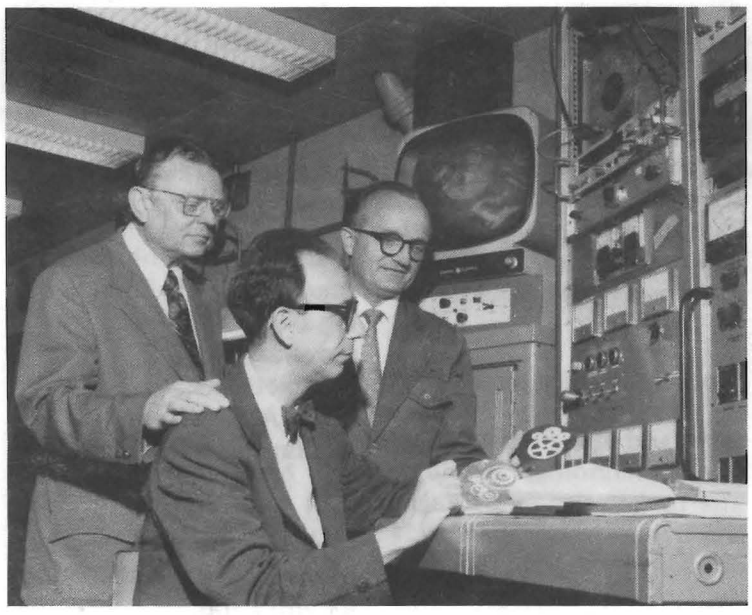
Open House for employees is this Sunday

Lewis employees will take on the role of hosts as the Center opens its doors this Sunday, September 23, to members of their families and friends. Cameras are permitted. They can get in between 10:30 a.m. and 3:30 p.m. by showing their badges. One badge admits one carload of people.

In addition to the hangar where a wide variety of NASA hardware will be featured, employees and their guests will see Lewis' work and hear five-minute talks at nine stops. The Lewis Supervisor's Club will staff the tour stops and serve refreshments donated by AFGE Local 2182. Club members also will help answer questions from employees and their guests.

The nine stops featuring Lewis' work are the 10 x 10 building, "Quieting the Fleet;" in PSL 3 and 4, "Cleaner Skies;" in EPL "Space Electronics Technology;" in center section ERB, "Clean Energy;" 9 x 15 wind tunnel, "Powered Lift;" Zero-G, "Big Boost from Rockets;" MPL, "Materials for Man;" west wing ERB, "The Impact of Wear;" and the Administration Building, "Servants in Space."

(Continued on page 2)



Inventors of new photographic system are, from left: Dr. Robert A. Lad, Dr. Charles E. May and Stanley J. Marsik. Dr. Warren H. Phillipp, also one of the inventors, is missing from the picture. (Don Huebler photo)

Developers of improved shaft seal are, from left: Robert L. Johnson, Chief of Lubrication Branch, Lawrence P. Ludwig, William F. Hady, and John Zuk. (Paul Riedel photo)

Two teams earn IR-100 awards

A new X-ray photographic system which has potential application in both industry and basic research, and a different type of seal for use on very high-speed compressors earned NASA's Lewis Research Center two of **Industrial Research Magazine's** coveted IR-100 awards for 1973. The awards were presented last night (September 20) at a banquet in Chicago's Museum of Science and Industry.

Lewis also accepted a special award from the magazine acknowledging that NASA has accumulated 10 or more awards.

Nine of the twelve awards given to NASA were submitted by Lewis. Lewis has earned at least one award every year except one since first entering the competition in 1966.

Industrial Research Magazine each year selects what it considers the 100 most significant new products developed during the year out of some 1000 entries from industries throughout the country.

The team of judges consists of Nobel prize winners and well known public figures. Dr. Werhner von Braun, formerly of NASA, inventor William P. Lear, and Nobel Prize Laureate Dr. Glenn T. Seaborg are members of the judging committee.

The new photographic system, developed by Lewis scientists Dr. Warren H. Philipp, Dr. Charles E. May, Dr. Robert A. Lad, and Stanley J. Marsik, uses nickel rather than the more expensive silver in X-ray and electron beam photography.

According to its inventors, the system has four advantages over the present system of r[illegible]ar films: nickel is abundant and inexpensive; the film has unlimited shelf life; it is insensitive to visible light, thus eliminating dark rooms and cassettes; an[illegible]e film development process is relatively simple.

A general patent has been issued to cover the entire photographic process. The idea for the new photographic system stemmed from a project to prepare pure metals by irradiation by this same team of researchers. The project rated an IR-100 award two years ago.

The other IR-100 award earned by Lewis this year involves the development of a shaft seal for turbines and compressors. The team of Lawrence P. Ludwig, Robert L. Johnson, Dr. John Zuk, and William F. Hady conceived a seal that combines low leakage characteristics and high-speed capability, but with little or no wear on the seal during high-speed operations.

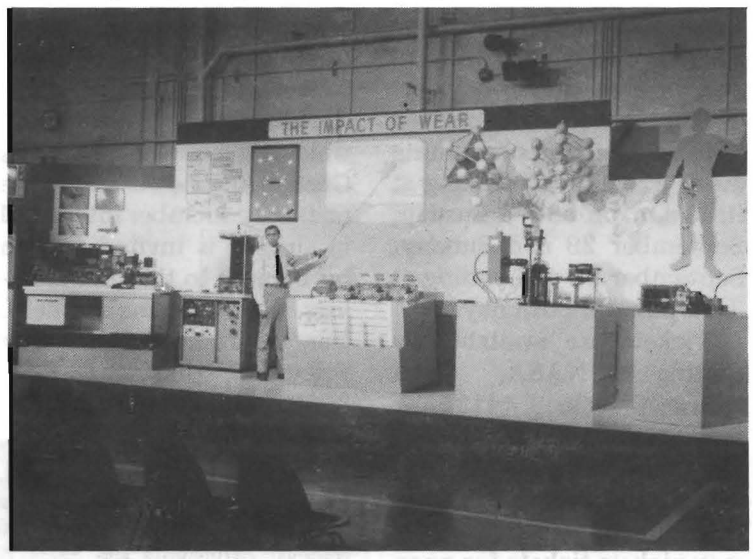
To accomplish these characteristics, the team, aided by several contractors, developed the concept of adding self-acting lift pads to conventional contact seals. The pads separate the sealing surfaces soo[illegible]ter start-up, and establish a very thin gas film between the sealing surfaces during high-speed operations. Contact occurs only at start-up and shut-down, thus subs[illegible]tially reducing wear on the seals.

The new concept in shaft seal developed by the Lewis team may have applications beyond improved aircraft turbine engines and space power generators in such devices as industrial compressors and gas turbine machinery for many purposes.

Leaders review technology

By the end of today, September 21, some 1400 leaders from business, industry, labor, the professions and government will have been briefed on Lewis programs and progress.

They came from all parts of the country to listen to talks and see exhibits reflecting the theme "Technology in the Service of Man."



Impact of Wear was one of nine tour stops featured here during the program, Technology in the Service of Man. Engineer speaking is William A. Brainard. (Paul Riedel photo)

Dr. James C. Fletcher, NASA Administrator was here on Wednesday, the first day of the program, to welcome people.

In commenting on the program, Lewis Director Bruce T. Lundin said, "It is an exciting time — a broadening of the application of our technologies to many purposes."

"Technology in the Service of Man" gave local, state and national leaders a broad review of Lewis' current activities and presented a few examples of the impact of aerospace accomplishments on all citizens. "In a sense," Lundin said, "it was a report on out stewardship of the resources of the Lewis Center."

The next issue of the *Lewis News* will carry highlights of the three-day activity.

Dr. Himmel to return

Dr. Seymour C. Himmel, one of NASA's top engineer-executives, has been named Director for Aerona[illegible]ics at Lewis.

He assumes the post on October 1, a date with special significance. It was 15 years ago on that day that the space agency [illegible]ame operational, and it was just over 25 years ago from that time that Dr. Himmel joined the Lewis Center as an aeronautical research scientist.

In his new position Dr. Himmel will oversee such ongoing aeronautics activities at the Center as: applying new engine technology to make present commercial aircraft much quieter; developing quiet, clean propulsion systems for short-haul aircraft of the future; reducing development costs and improving economics of aircraft engines; and advancing research on supersonic and hypersonic jet engine systems.

Since December 1971, Dr. Himmel has served as the Deputy Associate Administrator for Technology at NASA Headquarters in Washington, D.C. He has had responsibility for major aeronautics and space tech-

(Continued on page 2)

LEWIS BLOOD DONOR HONOR ROLL

FIVE, SIX AND SEVEN GALLON GIVERS — Thomas G. Donohoe, six gallons; Frank A. Dellatorre, five gallons; Donald R. Behrendt, six gallons. Not shown George R. Smolak, six gallons and Richard G. Schulke, seven gallons.

THR AND FOUR GALLON GIVE — Henry B. Curtis, four gallons; Ronald L. Danilowicz and Lonnie Reid, both three gallons. Missing is Thomas J. Toddy, three gallons; James E. Crouse and James H. Diedrich, both four gallons.

TWO GALLON GIVERS — From left: Chester R. Hardin, Anthony Colnar, Warren A. Moore, and Gilbert B. Chapman. Not shown: Ned Hannum, Kent S. Jefferies, and Robert J. Simoneau.

ONE GALLON GIVERS — From left: William J. Young, Paul W. Kuebeler, William E. Parkinson, and Dennis M. Sender. Not shown: Kenneth Guinta, Mary Hoyman, and Orlando W. Uguccini.

Huskey

Johnston

Lynch

Pelkowski

Shelley

Watkins

Six retire, pursue new activities

Donald R. Pelkowski, an electronic systems mechanic in the Space Power Facility Electronics Unit, Space Power Facility Operations Section, Space Power Facility Service Branch, Facilities Service Division, retired recently. He began his Federal career in June 1959 and has been employed at Plum Brook since October 1963.

John H. Lynch, a nuclear engineer in the Reactor Physics Section, Nuclear Support Branch, Reactor Division retired recently after working at Plum Brook for the past 11 years. He and his wife, Susan, have two children. He is looking forward to working as a musician.

Lorene A. Johnston retired recently. Before joining Lewis in February 1971 she was with DCASR as a contract clerk for about nine years. At Lewis she has been working as a clerk typist in the Secretarial & Clerical Unit in the Construction Division. She and her husband, Rober, have a daughter and a son.

Franklin J. Huskey wrapped up a 14 year government career recently. Huskey, a metal worker in the Mechanical & Gas Handling Unit, Mechanical Service Section, Facilities Service Branch, Facilities Service Division, joined Plum Brook in October 1962. He also served a 3 1/2 year stint in the U.S. Army. At Plum Brook he has worked primarily at B-3 on Centaur shroud testing. He has three sons and one daughter.

Max S. Watkins, a reactor mechanic in the Plant Maintenance Section, Facilities Service Branch, Facilities Service Division, has been working at Plum Brook since October 1961. He began his government career in 1944 by serving a two-year stint in the U.S. Navy. He and his wife, Evalynn, have three children. He is planning to work part-time at a mechanical maintenance job.

Charles E. Shelley, a reactor mechanic, winds up more than 18 years of federal service. He joined Plum Brook in 1961 and has been working in the Operations Service Unit, Reactor Mechanical & Laboratory Services Section, Reactor Service Branch, Facilities Service Division. He also has seven years of service with the U.S. Navy and the U.S. Air Force. He and his wife, Norma, have four children. Shelley, who says he really enjoyed working with the fine group of people at the center, is now looking forward to traveling and camping.

Dr. Himmel...

(Continued from page 1)

nology programs carried out at NASA field installations.

During his career at Lewis, Dr. Himmel assumed increasing responsibility in project management. Among his major jobs, he managed the Atlas-Agena launch vehicle. During the 1963 to 1966 period, the Agena fired into orbit the first Orbiting Astronomical Observatory, the first Orbiting Geophysical Observatory, and the first Applications Technology Satellite. The rocket also sent Ranger and Lunar Orbiter spacecraft on fact-finding missions to the moon, essential steps before Apollo.

Open house...

(Continued from page 1)

The talks were abbreviated to accommodate the anticipated large number of employees and their friends who are expected to visit.

Friends unable to come with employees may come the week when Lewis opens its doors to the general public, Saturday and Sunday, September 29 and 30.

People attending the open house on those days will park in the NASA lot on the north side of Brookpark Road near the intersection of Grayton Road. They will be bused from the parking lot to the hangar.

From the hangar buses will leave at five minute intervals for five major facilities. Short five minute talks at each of the stops will discuss some of the work NASA is doing.

Admission to the Open House for the public will be by ticket in order to provide for an orderly flow of people through the laboratory. Tickets have been printed with starting times beginning every 15 minutes starting at 9:00 a.m. on both Saturday, September 29 and Sunday, September 30 and ending at 3:00 p.m. on both days.

Tickets are available by writing to NASA, Open House, Cleveland 44135, or from the Public Desk Services Desk of both the Cleveland Plain Dealer and Cleveland Press. Lewis employees may pick up tickets for open house to the public in the Public Information Office, Room 120, Administration Building.

Doerger dies

Friends former Lewis employee Katie Blanchard Doerger were saddened to learn of her death on Sept. 2 in Seal Beach, Calif. Many who worked with her in the Engineering Design Division remember her for her keen wit and wonderful sense of humor.

Choral group to rehearse

The Lewis Choral Group will begin its sixth season with rehearsals beginning Thursday, September 27, again under the leadership of Roger L. Smith. Rehearsal meetings will be each Thursday from 5:00 PM to 6:30 PM in the DEB Cafeteria. A schedule of performances of popular, show, patriotic, and folk music is planned.

New members are always welcome in the Choral Group. Any Lewis employee or family member interested in singing is invited to join by coming to the first meetings. No auditions are held. For information, call Bob Friedman, president, PAX 8032.

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Editor . . . . . Charles Mitchell

Lewis News

LEWIS RESEARCH CENTER
CLEVELAND OHIO

Vol. 10 No. 5

March 9, 1973

Members of the inspection planning committee selected by Director Bruce T. Lundin are from left to right, Elaine R. Quayle, Edward A. Richley, Hugh W. Harris, Dr. Walter T. Olson, chairman, Arthur R. Wycoff, Jr., and James J. Modarelli. (Martin Brown photo)

Director selects planners for September inspection

Responding to a request from NASA's Deputy Administrator George Low, Lewis Director Bruce T. Lundin announced that there will be an inspection of the Center from September 26-30 on the theme "Technology in the Service of Man."

Preliminary planning and organizing have been assigned to a committee composed of Dr. Walter T. Olson, chairman, Edward A. Richley, Hugh W. Harris, James J. Modarelli and Arthur R. Wycoff, Jr. Elaine R. Quayle is the office manager and secretary to the group.

The purpose of the September inspection is to show leaders from Government, education, labor, business and industry how the accomplishments and current programs of the Center are serving society.

About 500 guests per day will hear and see some nine different presentations on Lewis and NASA work.

Dr. Olson said, "This inspection is intended to make clear to an important segment of national leadership the total meaning and value of the work we do. This project is a large and difficult undertaking, and by the time the inspection is completed, literally hundreds of staffers will have been involved in it."

Headquarters for the inspection will be Room 122, Administration Building, PAX 8673, and PBX 6873.

Topics expected to be covered are Quieter Skies from Technology, Cleaner Skies from Technology, Breaking the Airport Bottleneck, Big Boost from Rocket Vehicles, Servants in Space, Power from Sunshine for Earth and other Spacecraft, New Know-How from Aerospace Technology in Bioengineering, in Environmental Engineering, in Safety, in Commerce and Industry, Some New Things in Physics, and Space Age Materials and their Promise.

Fertile flower

Women have been known to give multiple births due to taking fertility drugs, but what happened to cause this amyryllis, a South African plant, to grow twice as many sets of petals as it is supposed to is a mystery to Mindy R. Wolf. The Physical Science Division secretary says the plant grew eight sets of bright red petals, four more than usual. She is waiting to see if the plant at left, also an amyryllis, will bring forth the usual amount of petals and quit. (John Marton photo)

Credit union starts branch office here

Lewis has reached agreement with the Century Federal Credit Union to establish a branch office on the Center beginning Monday, March 26.

The credit union office will be located in Room W115 in the Engine Research Building (ERB).

According to the agreement, Century will provide staffing for the office on a five-day per week basis to provide such services as expediting the processing of loan applications for new and established members. The services will not include cashing checks or issuing traveller's checks.

Membership and services will be available to all Cleveland and Plum Brook employees, and Lewis exchange personnel.

Center is saddened by Cenzori's death

Joseph D. Cenzori, Chief of Lewis' Plant Protection Office since 1967 and employed here nearly 31 years, died suddenly from an apparent heart attack on January 28.

Cenzori, 60, began in the Construction Division in 1942 when the lab was being built. He then worked for a number of years as an electrician, and in 1953 moved into supervision of electrical services. Later, as Chief of the Plant Protection Office, he was responsible for overseeing Lewis' fire fighting and emergency reaction squads, and coordinated such activities as first aid training and Project STEEP.

His concern for human safety lead him to establish and teach defensive driving courses both to many Lewis employees and their families and to outside groups. His concern also was reflected in his activities with the Brooklyn Safety Council, which he served as president. He helped set up many safety programs under the Council's auspices.

A native of Wampum, Pennsylvania, and long time resident of Brooklyn, a Cleveland suburb, Cenzori is survived by his wife, Mary, and two children, Linda Marie and Joseph.

Employment picture brightens

The employment picture is brightening for more than 450 employees of Plum Brook Station who, two months ago, learned their jobs would end because of cutbacks in the space program.

To date representatives from 16 companies have visited the Station to interview personnel. Ford Motor Company, General Electric, Aerojet General, Teledyne Corporation, as well as many other firms, are interested. And while only six Plum Brook employees have accepted job offers so far, many others appear to have good employment prospects.

"I've been very heartened by the number of job possibilities we've seen," said Starr Truscott, Head of the Personnel Office at Plum Brook. "However, the search is by no means over," he added.

"One thing that is very important for prospective employers to understand," remarked Center Director Bruce T. Lundin, "is that we are forced to let go some of the very best people in their fields in the country. This cutback was made on the basis of having to eliminate whole areas of work at Lewis and Plum Brook. As much as we would like to transfer these people to other areas, we simply do not have the positions available to do it."

About one-third of the Plum Brook complement has undergraduate or advanced degrees, primarily in mechanical, electrical, nuclear and civil engineering. Others have majors in such diverse subjects as biology, metallurgy, chemistry, agriculture, mathematics and

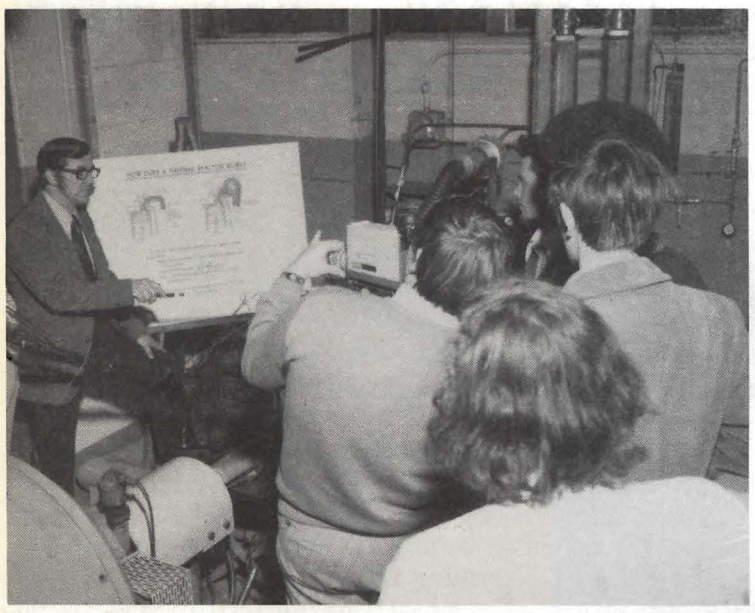
(Continued on page 2)

AWARENESS SERIES

"What's New in Automotive Power Systems?"

John J. Brogan, Director
Alternative Automotive Power Systems
Development Division
Environmental Protection Agency

Tuesday, March 20
4:30 p.m. DEB Auditorium



Student movie makers

Students from Cathedral Latin High School's Science club and their advisor recently visited the Lab and video taped the three research facilities toured — the Zero G, 10 x 10 and the thermal reactor test facility. The films will be shown in classrooms and placed in the school library to be loaned out to groups or students. One of the students films a presentation by Phillip R. Meng (left) in the thermal reactor test facility. (John Marton photo)

NASA NEWS SCOPE

Center named in honor of late President Johnson — President Richard Nixon has signed into law a Senate resolution designating the NASA Manned Spacecraft Center in Houston as the "Lyndon B. Johnson Space Center" in honor of the late President. In the statement following the signing, the President said, "Few men in our time have better understood the value of space exploration than Lyndon Johnson. It was he as a Senator who wrote, introduced and helped enact the legislation which created NASA. He called it the proudest legislative achievement of his years in the Congress. By his vision his work and his support Lyndon Johnson drew America up closer to the start and before he died he saw us reach the Moon, the first great plateau along the way."

LBJ Space Center holds science conference — More than 750 scientists from the U.S. and a dozen foreign countries took part in the Fourth Annual Lunar Science Conference March 5-8 at the Lyndon B. Johnson Space Center, Houston. Principal investigators who participated in the lunar scientific research phase of the Apollo project presented more than 250 papers including the preliminary results from Apollo 17 — the final Apollo lunar exploration mission. Scientists from the Soviet Union presented papers on their analyses of exchanged Apollo samples.

Marshall gets Skylab workshop mockup — Marshall Space Flight Center has received a full-scale mockup of the Skylab Orbital Workshop from contractor McDonnell Douglas Corporation of Huntington Beach, Calif. After arrival, it was placed in the Astronautics Laboratory and combined with other Skylab hardware to form a full-scale cluster of spacecraft, complete except for the command and service module. The laboratory cluster will be used for systems engineering and integration support to the Skylab mission scheduled to be flown this May.

Sounding rocket successfully launched — NASA newest sounding rocket, carrying flight-test instruments for the 1973 Skylab project and the 1974 Orbiting Solar Observatory (OSO-1) has been successfully launched from Wallops Station. The Aerobee 200, which climbed to an altitude of about 240 kilometers (150 miles), contained a number of sensitive instruments designed to map X-ray radiation from the Sun and stars, important for understanding their physical makeup, cannot be made on Earth because of the obscuring effects of our atmosphere.

LeSAC sponsors dance

LeSAC announces plans for a St. Patrick Day Dance to be held Saturday, March 17, in the DEB Cafeteria from 9 p.m. to 1 a.m. The popular "Belvederes" will play for your dancing pleasure and the $3 tickets ($3.50 for outsiders) include a light buffet and the usual refreshments. Purchase tickets now from your LeSAC ticket booster and make plans for a gala St. Patrick's celebration.

Thank you

"My heartfelt thanks to the wonderful people who made my retirement party a memorable occasion. I really appreciate the gifts and mementos I received and I'll always remember the friends I made during my 30 years with NACA-NASA." **Robert D. Scoppa**

Jobs...

(Continued from page 1)

physics. The other two-thirds largely comprise technicians who are journeymen, many of whom have undergone extensive four year NASA apprenticeship program.

The technicians include machinery repairmen, maintenance men in all skills (electrical, electronics, pneumatics, hydraulics, pipe fitting), millwrights, instrumentation specialists and lab technicians.

Employees who are in the technician category, in particular, hope to be able to find jobs in the northern Ohio area so relocation is not a problem.

About 170 employees, mainly personnel associated with operation of Plum Brook's nuclear test reactor, must be off the payroll by this July. Others, working with non-nuclear programs, must leave by July 1974.

They are being helped in their job search by an Outplacement Service Office set up at Lewis in Cleveland, and with a branch at Plum Brook, soon after the cutback was announced. The Outplacement Office, which hopes to find jobs for all those affected by the reduction in force, is subdivided into four groups. One group scours professional journals, classified ads and follows up other leads to jobs in industry. Another group assists employees in preparing resumes and presenting their job experience to prospective employers. A group with recruiting and statistical background helps in matching employees' skills with job opportunities. And another staff coordinates the interviewing schedule with prospective employers.

Lewis food manager offers healthy menus

A long term national strategy to prevent premature atherosclerosis (fatty substances in and fibrosis of the inner layer of the arteries) with a high priority has been launched by an impressive group of biomedical scientists.

Called the Inter-Society Commission for Heart Resources and working with the American Heart Association and leading nutritionists, they are developing menus, diets, and improving preparation techniques.

James R. Moran, Lewis Food Services Manager, has been in close contact with these two groups and has incorporated some of their recommendations at Lewis — "to keep the cholesterol down and the vitamin and mineral content up."

Moran states that the cafeterias are offering a low cholesterol selection each day: using leaner cuts of meat with all the visible fats trimmed; using cooking methods of baking, broiling, roasting and stewing and then discarding the fat which cooks out of the meat; and serving more chicken, turkey and fish.

"We do not use butter in our cooking but an all vegetable margarine that is made from soybean and cottonseed oils, both of which are poly-unsaturated vegetable oils," Moran stated. He went on to say that deep frying is now being cooked with poly-unsaturated liquid shortening and that skim and low fat milks are being used in preparing homemade soups. "Skim milk in half pints, yogurt in natural and assorted flavors, and a greater variety of salads and low fat cottage cheese also are being offered," he said.

"We are excited," says Moran, "because we are offering more variety in the menu using the latest techniques in food preparation, and offering dishes that not only look good but are good for you."

Retirement

Lawrence B. Moore, Head of the Rocket Service Experiment Section A, Rocket Systems Service Division, is looking forward to retiring next month with over 29 years of government service. He joined Lewis in 1944 and in 1958 transferred to Plum Brook. He has been a supervisor for 20 years and most recently was responsible for supervising aerospace mechanics at the hypersonic tunnel facility and cryogenic propellant tank site. He and his wife, Helen, have one grown son and five grandchildren.

Orlando A. Vlases has moved to LaHabra, California and will be working for an electronics firm now that he has retired. Before he joined Lewis in October 1962 he served 15 years with the U.S. Air Force. At Lewis he has been an electronic equipment specialist in the Instrument Utilization Office, Equipment & Utilization Branch, Equipment & Supply Division. He and his wife, Esther, have two grown children.

Nuclear society meets here

Is engineering really a profession? This is a question many engineers are asking these days.

The Northern Ohio Section of the American Nuclear Society members and friends plan to discuss this question at a meeting March 13 in the DEB Auditorium.

Points of view will be presented and questions answered by panelists Ernest Roberts of Lewis; James Schumar of Argonne National Laboratory; and R. Dale Oatney of the Ohio Society of Professional Engineers.

The social hour and dinner start at 6:30 p.m. If you can't make the dinner, come to the meeting which begins at 8:30. For reservations, call PBX extension 295.

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Editor ..... **Charles Mitchell**

Mrs. Marion Bishop surrounded by many of her collections, holds the first painting she purchased. It is an original oil painting, "The Rock," by James Seward, noted Cleveland artist. (John Marton photo)

Staffer displays home art treasures

Ideas on occupations or hobbies to pursue after retirement can come in strange and unexpected ways.

Take the case of Marion A. Bishop, secretary to Director of Space Technology and Materials G. Mervin Ault.

Mrs. Bishop has no immediate plans to retire, but when she does there will be a completely stocked art and flower studio in her home to make the transition to retirement life something to look forward to with anticipation.

The idea for her art and flower studio, aptly named "MarBi's", started to bloom when she began collecting more paintings than she knew what to do with and decided to sell some of them.

Then to add diversity and beauty to the studio, Mrs. Bishop designed floral and scenic arrangements; displayed original oil paintings by internationally and nationally known artists, and exhibited works by talented Lewis artists.

In her studio you will find carvings by William Morgan of the Materials and Structures Division; paintings by James G. Tupper of the Test Installations Division; and dimensionals by Bruce G. Chiccine of the Resources and Management Division, and plaques by his wife, Pat. (Some of their works are represented in the photograph).

The wide variety of items ranging in prices from 75 cents up to $750 includes stone rubbings, batiks, ebony carvings, horn carvings and selections from many hand-made floral and scenic arrangements.

"I feel that the artist who has been given the talent to portray God's beauties of man, of form and of nature can share his blessing through his work. And if I can help others find and enjoy his work, the use of my home and my time is worthwhile," Mrs. Bishop said.

TU Publications

The following new publications are available at Lewis' Technology Utilization Office, Room 228, Ad. Bldg., PAX 5233 or 8049.

TECH BRIEFS

Improved High-Temperature Gimbal Joint, J. R. Winemiller, S. T. Yee and B. H. Neal, Lewis Research Center, B72-10489.

Improved Method for Reclaiming Vacuum Diffusion Pump Oil, A. E. Buggele and Bendix Corp. under contract to Lewis Research Center, B72-10511.

Electronic Circuit Detects left Ventricular Ejection Events in Cardiovascular System, V. D. Gebben and J. A. Webb, Lewis Research Center, B72-10512.

Advanced Alloy Design Technique — High Temperature Cobalt Base Superalloy, R. L. Dreshfield, J. C. Freche, and G. D. Sandrock, Lewis Research Center, B72-10514.

FEB joins energy fight

The Cleveland Federal Executive Board has been asked by the Office of Management and Budget to inform Federal agencies in its area of important guidelines aimed at conserving energy, particularly fuel oil, this winter.

Called the "Action Plans for Power Conservation in Federal Facilities," it was prepared by the Government Conservation Group. The Group was established by the Office of Emergency Preparedness "to coordinate and direct the activities of Federal agencies in the Government-wide effort to conserve energy resources and to prevent a critical shortage in the supply of fuel oil which may develop in certain areas of the nation due to weather and a variety of economic factors."

The Group recommends the following conservation guidelines:

● The hours of operation for heating equipment should be kept to a minimum based upon identified occupant needs. Generally, occupant needs can be met by starting up heating equipment at 5-6 a.m. and shutting down at about 6 p.m. In the case of steam, the building can be shut down completely at night in many buildings, even in cold weather and without endangering plumbing and other piping. During weekends and holidays, particular attention should be given shutting down the equipment to the maximum extent possible. Make sure that unoccupied space is not heated. In cases where occupants require after-hours heating services, 24-hour steam lines should be provided so major building equipment can be shut down.

● Individual employees could be called upon to cooperate with facility managers by setting heating thermostats at the lowest level consistent with health of personnel. "This could result in a substantial reduction in fuel consumption," the guidelines read.

● Facility managers should insure that heating equipment is in good operating condition; that buildings insulations and weatherstripping are in good repair; and that exterior doors are kept closed, especially those on loading docks.

Speakers' Bureau

The Lewis Speakers Bureau announces that the following employees are scheduled to give talks during the next two weeks.

Marshall W. Dietrich will address the Lorain County-St. Vincent de Paul Particular Council at St. Peter Church in North Ridgeville on March 11.

On March 13 **Dominic Giomini** will speak to the St. John Lutheran Women's League and **Joseph A. Yuska** will give a presentation to the Fairview Park Pre-school PTA.

Also scheduled for March 13 are **David M. Herb** who will participate in Troop Scout 150's Ecology Show and **June C. Szucs** who will give a talk at the Family Night program sponsored by the Taft Elementary School PTA.

David M. Herb will speak at an assembly program at Elyria Elementary School on March 15 and on March 16 **Earl T. Bloam** will participate in Family Night at Windermere Masonic Lodge.

On March 19 **Robert B. King** will participate in the Eco-Week program at Mentor High School and **George V. Darchuk** will give a presentation at the Career Education Carnival at Greenbriar Junior High School on March 22.

AIAA looks at image

David R. Reyes-Guerra, executive secretary of the Engineers Council for Professional Development, discussed the importance of engineering public relations at the joint meeting of the Cleveland-Akron Section of the American Institute of Aeronautics and Astronautics (AIAA) and the Society of Professional Engineers, Akron District, held last month on the University of Akron campus.

According to Reyes-Guerra, the engineer's image is fuzzy "because people don't see him at work." "People fail to realize that engineers are the backbone of industry and perform an essential function in society just as doctors, lawyers, and teachers," he went on.

Reyes-Guerra advocates changing the engineering educational structure to suppress what he feels is adverse publicity concerning the high attrition rate in engineering colleges. He proposed to screen potential candidates prior to admission to engineering colleges.

Born in London, England, Reyes-Guerra was educated at San Diego State College, The Citadel, Yale and the University of Illinois.

GSA holds driving seminar at Lewis

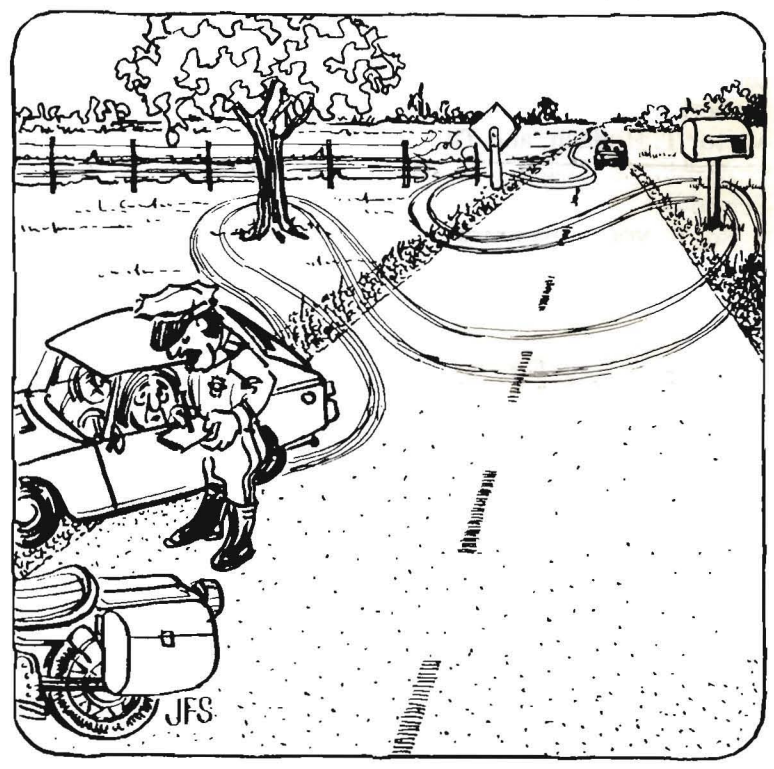
Thirty-six employees attended a four-hour Defensive Driving Techniques Course held here and presented by two experts from General Services Administration's (GSA) Washington, D.C. office.

The late Joseph D. Cenzori of Lewis and a representative from GSA's Chicago regional office coordinated the arrangements for the course.

During the presentations, the speakers touched on a wide range of causes for accidents including speed, tailgating, failing to yield right of way, and changing lanes without due caution.

Each of the participants received a plaque, and a letter stating that they attended the course. The letters go into their personnel files.

Prepared by the International Assn. of Business Communicators in cooperation with the Highway Users Federation.



"... AND DON'T TRY TO TELL ME IT WAS DEFENSIVE DRIVING!"

Outgoing chairman of the Lewis Incentive Awards Committee Charles S. Corcoran, Jr., (right), passes some of the committee's record to newly appointed chairman Robert C. Kohl. (John Marton photo)

Kohl named to head incentive committee

"I am sure that at Lewis, where innovation is a large part of our business, there are good ideas being generated every day. . .in test cells, shops and offices. I would like nothing better than to have my Incentive Awards Committee complaining that they are being overworked," states Robert C. Kohl, newly appointed chairman of that committee. He will serve for one year, taking over from outgoing chairman Charles S. Corcoran, Jr.

Last year the committee awarded $6225 to 31 employees whose ideas were adopted and put to use. Under the Incentive Awards Program, staffers are given cash for ideas that produce at least $250 in benefits which reduce operating costs, save man-hours and materials or improve the quality of work.

Robert W. Schmidt, Executive Secretary of the Incentive Awards Committee, emphasizes that cash awards can be made only if an idea is submitted in writing before adoption or within six months after adoption. "It's important that employees understand that there is a time limit. There have been a few cases where we have had to turn down an award for a very good idea because the originator waited too long to write it up and send it to us," Schmidt said.

The GS and Wage Suggestion committees which make up the Incentive Awards Committee membership, are composed of the following employees:

Comprising the GS Suggestion Committee are Julian M. Earls, vice chairman, Hugh A. Schoeffler, Richard D. Heath, Marguerite G. Jereb, and Robert C. Evans, while Robert M. Suhay, James E. Cairelli, Peggy L. Yohner and Robert Y. Wong will serve as alternates.

Wage Suggestion Committee members are James I. Bergstrom, vice chairman, Clyde J. Greer, Willie J. Napier, Andrew J. Benek, Jr., Harry Nicholson, and Robert J. Wills. Robert S. Redinger, Michael J. Haaser, William J. Neff, Victor T. Hudach, and Thomas J. Ocilka are the alternates.

Arthur R. Wycoff is alternate to executive secretary Schmidt.

So, if you need extra money for that vacation fund or something special, look around you. You may come up with a suggestion that will pay off.

BPW sets meeting

Do we recognize opportunity when it knocks? On Friday, March 16th, Genevieve Esgar, aeronautical scientist in the Fluid System Components Division, will be the featured speaker for the Lewis Business and Professional Women's Club meeting. A charter member of the Lewis BPW Club, Mrs. Esgar is the Lewis Federal Women's Program Coordinator, and is Chairman of the Federal Executive Board's Women's Committee.

The dinner meeting is open to all interested personnel. Reservations are to be sent to Susan Button, Mail Stop 86-4, or call PAX 2115, PBX 372 by Monday, March 12. Dinner will be held in the small area of the Main Dining Room at 5:15 p.m.

Pioneer 10 clears asteroid belt

Pioneer 10, on its way to Jupiter for man's first close-up look at that giant planet, has emerged unscathed from the Asteroid Belt.

The spacecraft has completed a 430-million-kilometer (270-million-mile), seven-month trip through the belt without suffering a damaging hit by high velocity asteroid particles.

Scientists now believe the belt offers relatively little hazard to spacecraft, according to the Pioneer 10 Project Scientist, Dr. John Wolfe, of Ames, which manages the project.

Reports of preliminary findings by Pioneer 10 experimenters also suggested that the belt may contain somewhat less material than previously thought — especially in the small particle sizes. The experimenters reported, in addition, findings on gradients going out from the Sun in the solar wind and magnetic field and on solar particles and the "intersellar wind."

Officially, Pioneer 10 flew through the Asteroid Belt from July 15, 1972 to Feb. 15, 1973. The spacecraft now has covered about 70 percent of its one-billion-kilometer (620-million-mile) flight path to Jupiter. It will arrive at the planet next December.

The asteroids are small bodies, most of them less than a mile in diameter, that travel around the Sun like the planets. Several hundred have been identified and named, but thousands more exist. Although some come in closer to the Sun than Earth's orbit and others go out beyond Jupiter, most of the asteroids travel in a doughnut-shaped region between the orbits of Mars and Jupiter.

Pioneer 10 entered the region occupied by most of the asteroids in mid-July when it was about 300 million kilometers (190 million miles) from the Sun, and it is now at the outer edge of the belt about 550 million kilometers (340 million miles) from the Sun. The spacecraft has covered about 70 percent of its one-billion-kilometer (620-million-mile) flight path to Jupiter. It will arrive at the planet next December.

One of the key objectives of the Pioneer 10 mission is to determine the amount of the smaller dust particles in the Asteroid Belt. These, of course, cannot be seen from Earth.

Preliminary findings by the Pioneer 10 experimenters suggest that the distribution of dust particles between Earth's orbit and the far side of the Asteroid Belt seems to depend on particle size. There may actually be more of the very smallest particles (1/1000 mm diameter) appear to be evenly distributed all the way from Earth's orbit through the far side of the Asteroid Belt with no increase in the belt. One millimeter is 0.04 inches.

Still larger particles (1/10 to 1 mm diameter) were found all the way out but were almost three times as frequent in the belt as outside it.

Particles larger than 1 mm diameter appear to be very thinly spread — as many scientists expected. Preliminary analysis of Pioneer 10 asteroid telescope observations have not identified any particles larger than 1 mm, though further analysis may show some. (Pioneer 10 did not pass near any of the very large asteroids that can be seen from Earth by telescope.)

One explanation, among several, for the absence of small particles in the belt is that solar radiation may reduce orbital speed of such particles. Then solar gravity would cause them to spiral in toward the Sun. Larger particles with more mass would be less affected and could maintain their orbits.

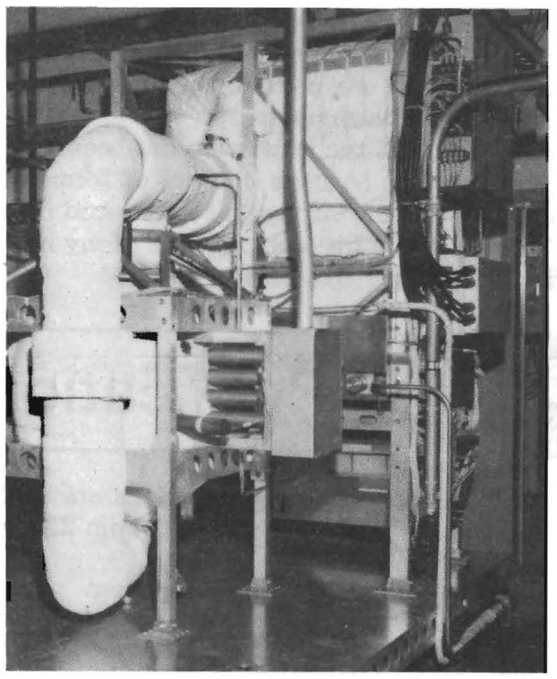
Pioneer experimenters also reported that as far out as 560 million kilometers (350 million miles) from the Sun solar magnetic field strength, solar wind density, and numbers of solar high energy particles all decline roughly as the square of the distance from the Sun.

The gigantic solar storm of Aug. 2, 1972, one of the largest ever observed, showed clearly that, as it moves but, the solar wind tends to slow down while its gases heat up.

Among solar high energy particles, experimenters have found the elements sodium and aluminum for the first time.

Researchers found that the neutral hydrogen of the "intersellar wind" appears to enter the heliosphere (the Sun's atmosphere) in the plane of Earth's orbit. This is about 60 degrees away from the direction of travel of the solar system through space.

They also measured helium atoms in interplanetary space for the first time. These atoms, too, are believed to be part of the interstellar gas. Some differences in incoming velocities of the interstellar wind have been observed compared with Earth satellite measurements made several years ago. These suggest the possibility of eddies or turbulences in gas.



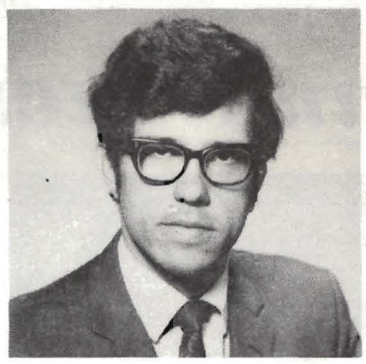
A push of a button

It only takes a push of a button to start up or shut down the Brayton Cycle Power Conversion System, pictured at right. Director Bruce T. Lundin, at right in above photo, with Eugene J. Manganiello (far left) and Bernard Lubarsky stopped by last week at W5 of ERB to see for themselves how the controls had been automated. The control panel, about six times smaller than the previous one, has one button for on and another for off. Primary advantage of the simplified start up and shut off procedures is that it makes it much easier to demonstrate the 2 - 15 kilowatt space power system to potential users visiting the center. (John Marton photo)

Dr. Rzasnicki

Cake

Chovan



Freedman

Savino

Toledo U. awards advanced degrees to six

Six staffers who studied at Lewis' on-site Toledo University program will be awarded advanced degrees in ceremonies at the University campus on March 23.

Supported financially by Lewis' Training Section, five will receive Master's degrees and one, Dr. Walter Rzasnicki, will be awarded a doctorate in mechanical engineering.

Dr. Rzasnicki has worked at Lewis since 1962. He holds a Bachelor's degree in mechanical engineering from Technical University, Warsaw, Poland, and a Master's degree in mechanical engineering from Carnegie Institute of Technology. He works in the Facilities Engineering Division.

Robert J. Baumbick will receive a Master's degree in electrical engineering. The Wind Tunnel and Flight Division employee earned a Bachelor's degree in electrical engineering from Fenn College in 1962 and began working at Lewis the same year. His picture is not shown.

John Chovan of the Facilities Engineering Division will earn a Master's degree in mechanical engineering. He did his undergraduate work at Case Institute of Technology, earning a degree in mechanical engineering.

James E. Cake who will receive a Master's degree in engineering science has been at Lewis since 1966. He holds a Bachelor's degree in mathematics from Union College, Schenectady, New York. Cake is assigned to the Spacecraft Technology Division.

Robert J. Freedman, a Wind Tunnel and Flight Division employee, earned a Bachelor's degree in electrical engineering from the University of Dayton. He will be awarded a Master's degree, also in electrical engineering from Toledo U.

Frank Savino of the Facilities Engineering Division will be awarded a Master's degree in mechanical engineering. He earned a Bachelor's degree in mechanical engineering from Newark College of Engineering. Savino joined Lewis in 1962.

Car crinkles increase here

Mauri K. Raita and Carmen S. Giarrizzo's cars are the latest ones to be heavily damaged by hit and skip drivers while parked on the Lab.

The past three reported accidents involving parked cars happened in the parking lot in the rear of the 10 x 10 Building.

Raita, of the Test Installations Division, reported that he parked his 1971 dark blue Ford station wagon about 11:30 a.m. February 15. When he returned at 3 p.m. another car had smashed in his left rear fender, causing $340 worth of damage. The fender will have to be replaced. "I can't figure how anyone could have hit me. There is more than ample parking space for everyone," Raita said.

Giarrizzo, also of Test Installations, stated that he parked in the same lot about 3 p.m. one afternoon in early February and when he returned thirty minutes later, someone had put a baseball-sized dent on his right front door which will cost him about $100 to repair. "Honesty is about the only solution to this type of accident," Giarrizzo said, adding, "but who will come forward to admit to something that no one else saw them commit?" Giarrizzo owns a 1969 dark blue Chevelle.

Charles R. Calire, Plant Protection Office, who investigates these and other accidents, says this type of accident does not present a major problem at Lewis. "Out of the more than 40 parking lots on the Lab, there were only five reported accidents of this type in 1972. We investigate when such an accident is reported, but if there aren't any witnesses, it is too costly for us to try and find the hit and run driver."

Carmen S. Giarrizzo (left) and Mauri K. Raita examine the damage to their cars by hit and skip drivers. Repairs to both cars will run into hundreds of dollars. (John Marton photo)

Answer Line

Questions submitted to this column need not be signed and can pertain to any area of concern or interest to you. Send questions to the Lewis News, Mail Stop 3-11.

QUESTION: Please explain the benefits as well as the restrictions embodied in the rules regarding disability retirement.

ANSWER: To be eligible for disability retirement, you must have become totally disabled for useful and efficient service in your present position, and have completed at least five years Federal civilian service. Application must be made to the Civil Service Commission before you are separated from the service or within a year thereafter. Disability retirement annuities are computed using the employee's years of creditable service and "high 3 average salary." The law guarantees a minimum annuity to disability retirees of 40% of their "high 3 average salary." If you recover from your disability before reaching age 60, your annuity will be continued up to a year or until you are reemployed in the Federal Government. You may hold a non-federal job and receive disability retirement benefits. However, if your income from wages or self-employment in each of two consecutive calendar years is 80% or more of the current salary of the position from which you retired, your earning capacity is considered to be restored. If you are reemployed after recovery or restoration of earning capacity, you need not repay any of the annuity you received in order to qualify for an annuity later on. If you are again disabled before reaching age 62, your annuity payments may be reinstated. Questions on disability retirement should be referred to the Employee Relations Office.

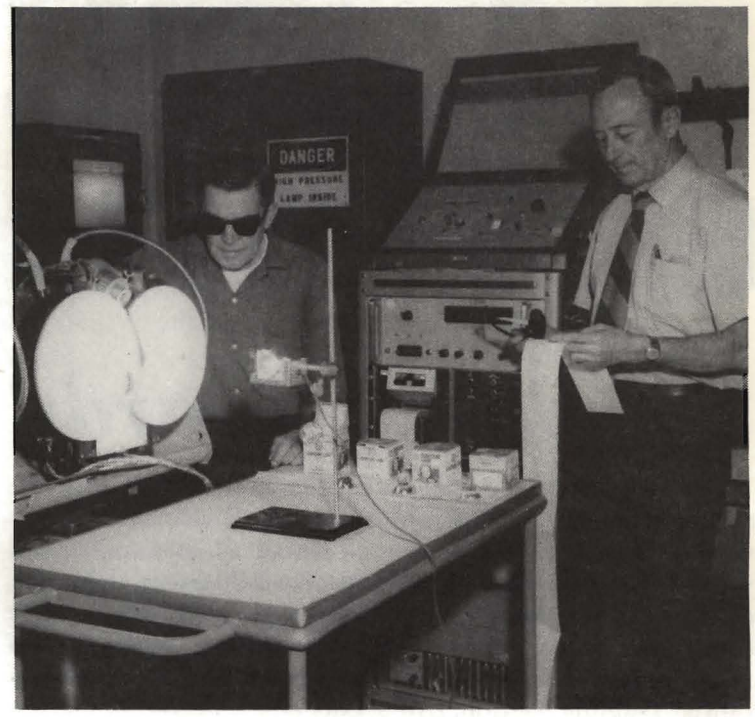
QUESTION: The importance of stressing professionalism in our work cannot be overemphasized. So why are we "professionals" invited to partake in monthly cut-outs, complete with tabs, dotted lines, scissors configurations and applicable paper clip locations. Indeed, the very thought of encouraging adults to partake in this activity without even considering initial cost and manpower loss is appalling. There must be a better way of promoting these otherwise excellent Awareness Series presentations.

ANSWER: The principal purpose of the AWARENESS Series is to bring to the staff of the Lewis Research Center speakers on broad topics that are of interest to them in which they might not otherwise have an opportunity to hear, says Awareness Chairman Edward A. Richley. The yearly program is made up of speakers and topics chosen by members of the Awareness Committee each of whom represent a segment of the Center staff. In a like manner, all publicity associated with the monthly programs is a result of ideas generated by the committee for the chief purpose of giving as wide as possible publicity coverage to the programs. The committee welcomes new and better ideas on how to promote the monthly programs and such ideas, if forwarded to the directorate representative will be considered by the committee. For general information of the staff, the Awareness Committee is comprised of the following members:

		PAX
Edward A. Richley,	Chairman	3155
Robert L. Allen	Engineering Services	3234
Robert Coltrin	Aeronautics	8154
I. Ken Frey	Space Flight Programs	8255
Richard Geye	Launch Vehicles	8593
Salvatore Grisaffe	Space Technology & Materials	2103
Lynne Konkoli	Management	3257
Donald Thoennes	Technical Services	3202
Calvin Weiss	Public Affairs	8001

Gettelman's men...

From left to right: Arthur D. Brenza, Stanley T. Kronen, William J. DeBarr and John H. Brown prepare program for new PSL data system.



William R. Smith (left) and Kenneth Yass measure spectrum of lamp used for solar power studies.

Engineers and scientists who need a measurement system which is not commercially available for certain special types of research, could well have it assembled by members of the Instrument Applications Office.

That is only one of the many duties for 32 men with extensive backgrounds in measurement systems and electronics who work under the direction of Clarence C. Gettelman.

Gettelman's office has four sections, each charged with specific functions to carry out the overall mission of performing design analysis and evaluation, and of developing complete systems for measurement, data acquisition and display for various lab experiments.

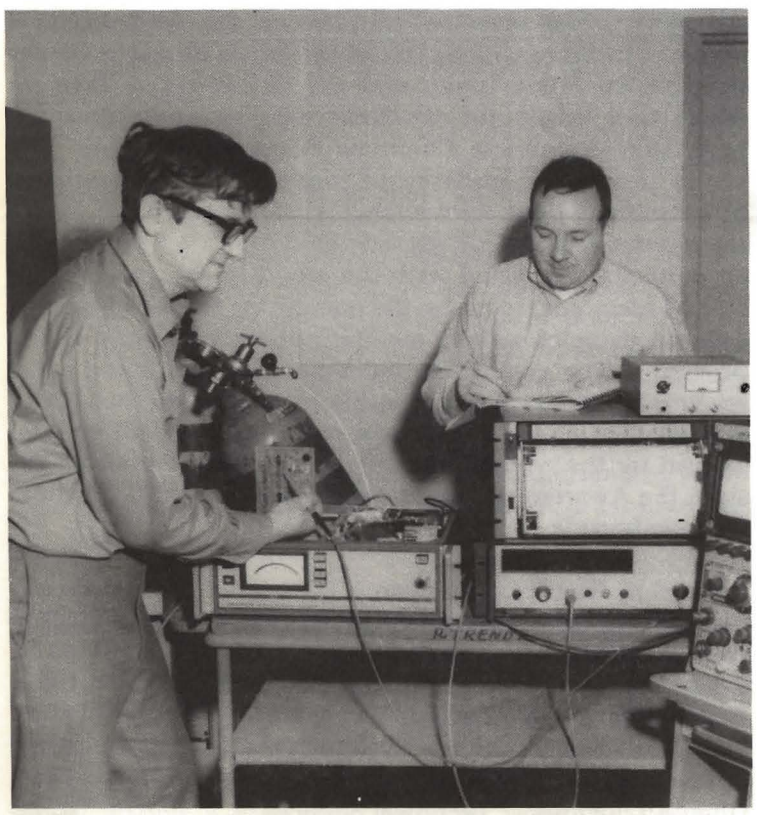
The Pressure-Temperature Section develops measurement systems for such areas as pressure, temperature, flow, force and gas analysis.

The Optics Sections is responsible for developing sensing techniques and instrumentation for solar simulation, flow visualization, high speed photography, optical spectroscopy and thermal radiation.

The Electronic Measurement Section designs special purpose measurement systems and evaluates commercial electronic systems which best meet the Center's needs and requirements.

The fourth section under Gettelman is the Data Systems Section. There, experts determine the capacity of analog and digital computers to perform on-line control and display functions, and update and modify existing systems to meet new data recording and processing needs.

Seth B. Wise (left) and Frank A. Friswold monitor paper tape punch for computer control probe actuator system.

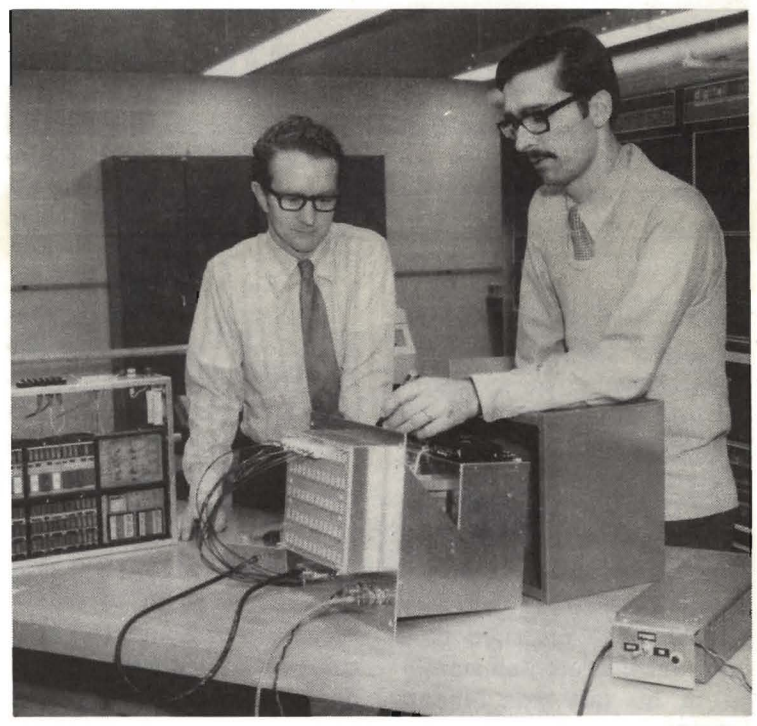


Norbert J. Dunn (left) and Ted W. Nyland check analyzer for use in project GASP.

Photos by

Martin Brown

...devise ways to measure



Donald J. Sinclair (left) and Daniel J. Lesco test instrument modules for engine test facility.

Richard C. Booth (left), David R. Englund, Jr., and Steve Sufilka assemble pollution measurement system.

Lewis News

Vol. 10 No. 5 March 9, 1973

Members of the inspection planning committee selected by Director Bruce T. Lundin are from left to right, Elaine R. Quayle, Edward A. Richley, Hugh W. Harris, Dr. Walter T. Olson, chairman, Arthur R. Wycoff, Jr., and James J. Modarelli. (Martin Brown photo)

Director selects planners for September inspection

Responding to a request from NASA's Deputy Administrator George Low, Lewis Director Bruce T. Lundin announced that there will be an inspection of the Center from September 26-30 on the theme "Technology in the Service of Man."

Preliminary planning and organizing have been assigned to a committee composed of Dr. Walter T. Olson, chairman, Edward A. Richley, Hugh W. Harris, James J. Modarelli and Arthur R. Wycoff, Jr. Elaine R. Quayle is the office manager and secretary to the group.

The purpose of the September inspection is to show leaders from Government, education, labor, business and industry how the accomplishments and current programs of the Center are serving society.

About 500 guests per day will hear and see some nine different presentations on Lewis and NASA work.

Dr. Olson said, "This inspection is intended to make clear to an important segment of national leadership the total meaning and value of the work we do. This project is a large and difficult undertaking, and by the time the inspection is completed, literally hundreds of staffers will have been involved in it."

Headquarters for the inspection will be Room 122, Administration Building, PAX 8673, and PBX 6873.

Topics expected to be covered are Quieter Skies from Technology, Cleaner Skies from Technology, Breaking the Airport Bottleneck, Big Boost from Rocket Vehicles, Servants in Space, Power from Sunshine for Earth and other Spacecraft, New Know-How from Aerospace Technology in Bioengineering, in Environmental Engineering, in Safety, in Commerce and Industry, Some New Things in Physics, and Space Age Materials and their Promise.

The inspection of the Center originally scheduled for September 26-30, has been re-scheduled to September 19-23, a week earlier. The new dates were set by the inspection planning committee to avoid a religious holiday.

Answer Line

Questions submitted to this column need not be signed and can pertain to any area of concern or interest to you. Send questions to the Lewis News, Mail Stop 3-11.

QUESTION: We read of all the good things our Outplacement Service Office is doing. How many job offers have been received by those serviced to date?

ANSWER: According to Morton H. Krasner, Head, Outplacement Service Office, they do not require employees to report job offers because it is considered personal information. Voluntary information given them as of March 23 showed that 15 professionals out of 85 Nuclear Systems Division members have already received one or more job offers.

QUESTION: How can we be expected to meet critical program schedules on research work during preparation for a show, inspection, etc., when we receive blanket refusals to do other than show work from support personnel and their supervisors? We end up with zero priority for relatively extensive periods.

ANSWER: For the number of test rigs and facilities currently active, Lewis is clearly in a limited support manpower situation. The present RIF is further accentuating the problem. Obviously, Center management must and is examining its R&D programmatic requirements so that we can more effectively deploy our support manpower.

It is also clear that the agency has set a high priority on the Fall Triennial Inspection. Now, perhaps, more than ever before, the importance of the Inspection lies in NASA's need to communicate its technology contributions to the Community, Industry, and the Congress. There is adequate time now for planning the necessary logistical support so as to minimize the impact on critical program schedules. We are hard at work on this aspect. So far as James F. Connors, Director of Technical Services knows, there have been no blanket refusals by Technical Services supervision to do research support work because of show commitments.

Ask top management...

QUESTION: Why doesn't NASA do more towards selling the place, constructive public relations. People are concerned with themselves—how about NASA's contributions relative to medicine, surgery, pollution, aircraft safety, computers, aircraft noise reduction, instrumentation, function monitoring, metallurgy, better commercial products, advancing ceramics, their future potentials, and so forth.

LUNDIN: This is a very common and understandable question. The trouble is it has a very complicated answer. I have tried to put all this complexity in one chart which probably does some violence to completeness. I've tried to list "difficulties" on one side and "pluses for Lewis" on the other side; it's our job as managers to try to use the pluses to overcome the difficulties. One of the difficulties is also one of our strengths. This is the uniqueness of NASA. I was recently rather surprised to realize that NASA is alone among civilian agencies in having large field centers. The other departments of the government really don't understand the importance of a field center. We're frequently confronted with questions such as, "what do you need these big field centers when other agencies just spend the money out of Washington."NASA, I might emphasize here, lives in a highly political environment. No one can fully understand that without working in Washington for a spell. Lewis is therefore a technical service organization imbedded in a mission agency. And that introduces difficulties in understanding and communication. We've got to earn our way by the service we provide and in doing so we've got to take care we don't step on the perogatives of other agencies. Every effort to try to help can be interpreted as an effort to take something away from somebody. Another difficulty is a diffierence of opinion on the philosophy of the role of government. Many people believe that government shouldn't do something that industry can do. This is the rationale of taking NASA out of the communications activity. All of the things that were contained in this question also have a high non-technical component. They involve economic, social, political and other elements. Nothing is purely technical here and the technical content has to be effectively matched with the socio-economic and political realities. This takes time, patience, and understanding. When you're trying to develop new roles for yourself, you don't want your first efforts to be a failure. We have, however, been very successful so far on our automotive pollution work with The Environmental Protection Agency, in my negotiations with NSF on solar energy, on the joint endeavors I mentioned with the Air Force, and our fine record of working with the Army. These are all good marks. We're going to have an inspection here this fall as you know. The theme will be "Technology in the Service of Man." This will enable some 1500 national leaders to visit the center. That will help be a plus for us and we have our tradition of service which is many ways is a great help. We also have a very clear and unique role in the NASA family.

Open House for employees is this Sunday

Lewis employees will take on the role of hosts as the Center opens its doors this Sunday, September 23, to members of their families and friends. Cameras are permitted. They can get in between 10:30 a.m. and 3:30 p.m. by showing their badges. One badge admits one carload of people.

In addition to the hangar where a wide variety of NASA hardware will be featured, employees and their guests will see Lewis' work and hear five-minute talks at nine stops. The Lewis Supervisor's Club will staff the tour stops and serve refreshments donated by AFGE Local 2182. Club members also will help answer questions from employees and their guests.

The nine stops featuring Lewis' work are the 10 x 10 building, "Quieting the Fleet;" in PSL 3 and 4, "Cleaner Skies;" in EPL "Space Electronics Technology;" in center section ERB, "Clean Energy;" 9 x 15 wind tunnel, "Powered Lift;" Zero-G, "Big Boost from Rockets;" MPL, "Materials for Man;" west wing ERB, "The Impact of Wear;" and the Administration Building, "Servants in Space."

(Continued on page 2)

Inventors of new photographic system are, from left: Dr. Robert A. Lad, Dr. Charles E. May and Stanley J. Marsik. Dr. Warren H. Phillipp, also one of the inventors, is missing from the picture. (Don Huebler photo)

Developers of improved shaft seal are, from left: Robert L. Johnson, Chief of Lubrication Branch, Lawrence P. Ludwig, William F. Hady, and John Zuk. (Paul Riedel photo)

Open house...

(Continued from page 1)

The talks were abbreviated to accommodate the anticipated large number of employees and their friends who are expected to visit.

Friends unable to come with employees may come the week when Lewis opens its doors to the general public, Saturday and Sunday, September 29 and 30.

People attending the open house on those days will park in the NASA lot on the north side of Brookpark Road near the intersection of Grayton Road. They will be bused from the parking lot to the hangar.

From the hangar buses will leave at five minute intervals for five major facilities. Short five minute talks at each of the stops will discuss some of the work NASA is doing.

Admission to the Open House for the public will be by ticket in order to provide for an orderly flow of people through the laboratory. Tickets have been printed with starting times beginning every 15 minutes starting at 9:00 a.m. on both Saturday, September 29 and Sunday, September 30 and ending at 3:00 p.m. on both days.

Tickets are available by writing to NASA, Open House, Cleveland 44135, or from the Public Desk Services Desk of both the Cleveland Plain Dealer and Cleveland Press. Lewis employees may pick up tickets for open house to the public in the Public Information Office, Room 120, Administration Building.

...and went away impressed!

The diversity of the Lewis program and the benefits to mankind came out loud and clear in the presentations. Without exception, the comments from the members of my group were very complimentary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

NASA is involved in some wonderful programs for the betterment of life for all mankind through the application of techniques and knowledge derived from space projects and other scientific endeavors. NASA has a record to be proud of, a fine story to tell and told it very well through this program.

ORTON COMPANY
CLEVELAND, OHIO 44115

Dear Bruce:

The Lewis "inspection" -- "Technology in the Service of Man" -- was absolutely outstanding!

I have nothing but praise for every facet of it; the subject matter, the way it was presented, the displays and demonstrations, the speakers, and the logistics were all great. I heard many comments, from both NASA people and from our outside guests, and all of them were favorable, expressed in superlatives.

If I have to single out one element of the tour, above all others, it would have to be the speakers -- the young men who demonstrated so well that NASA is still the best high technology agency in the world.

Please pass on my congratulations and sincere appreciation to all who were responsible for this outstanding event.

With best regards,

Sincerely yours,

George

George M. Low
Deputy Administrator

I found your program yesterday resulting in one of the more informative and interesting days I've spent in quite a while. I'm sure few of us realized the breadth of activity being carried on by NASA.

GENERAL ELECTRIC COMPANY
WILMINGTON, MASSACHUSETTS 01887

I want to thank you for the opportunity of attending the NASA presentation on "Technology in the Service of Man." The presentation was very informative, extremely well done and helpful in understanding the role of NASA in today's technology. The whole affair was very professionally handled and made good use of my time.

LEO A DALY

PRECISION SCIENTIFIC — SUBSIDIARY OF GCA CORPORATION

We had no previous idea as to the depth of creative science that is done at your Center. Obviously, there is no other way that such large scale research can be accomplished except under the auspices of our Federal Government and we hope that your programs continue to be supported.

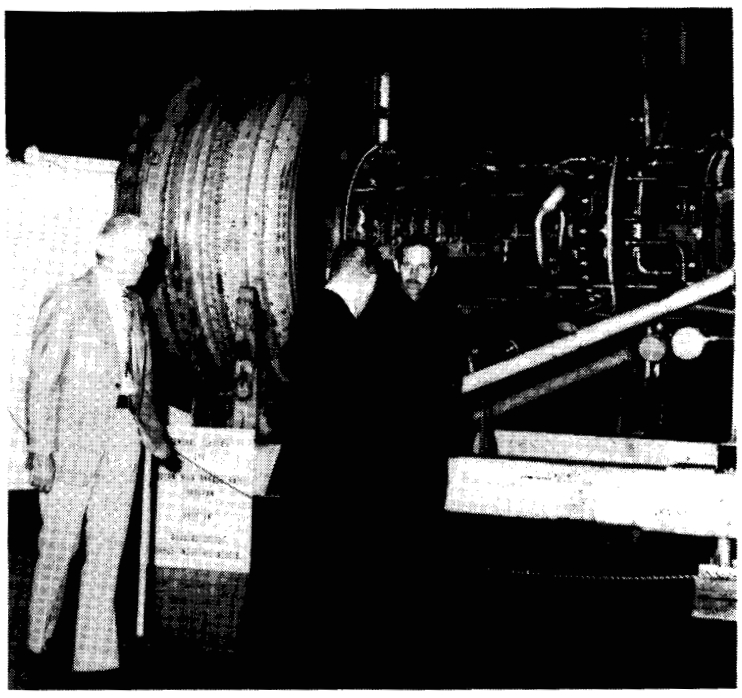
It was a very pleasant as well as an educational day and the apparent "esprit de corps" that has been developed in your people was a delight to see. Congratulations on a well organized event and best

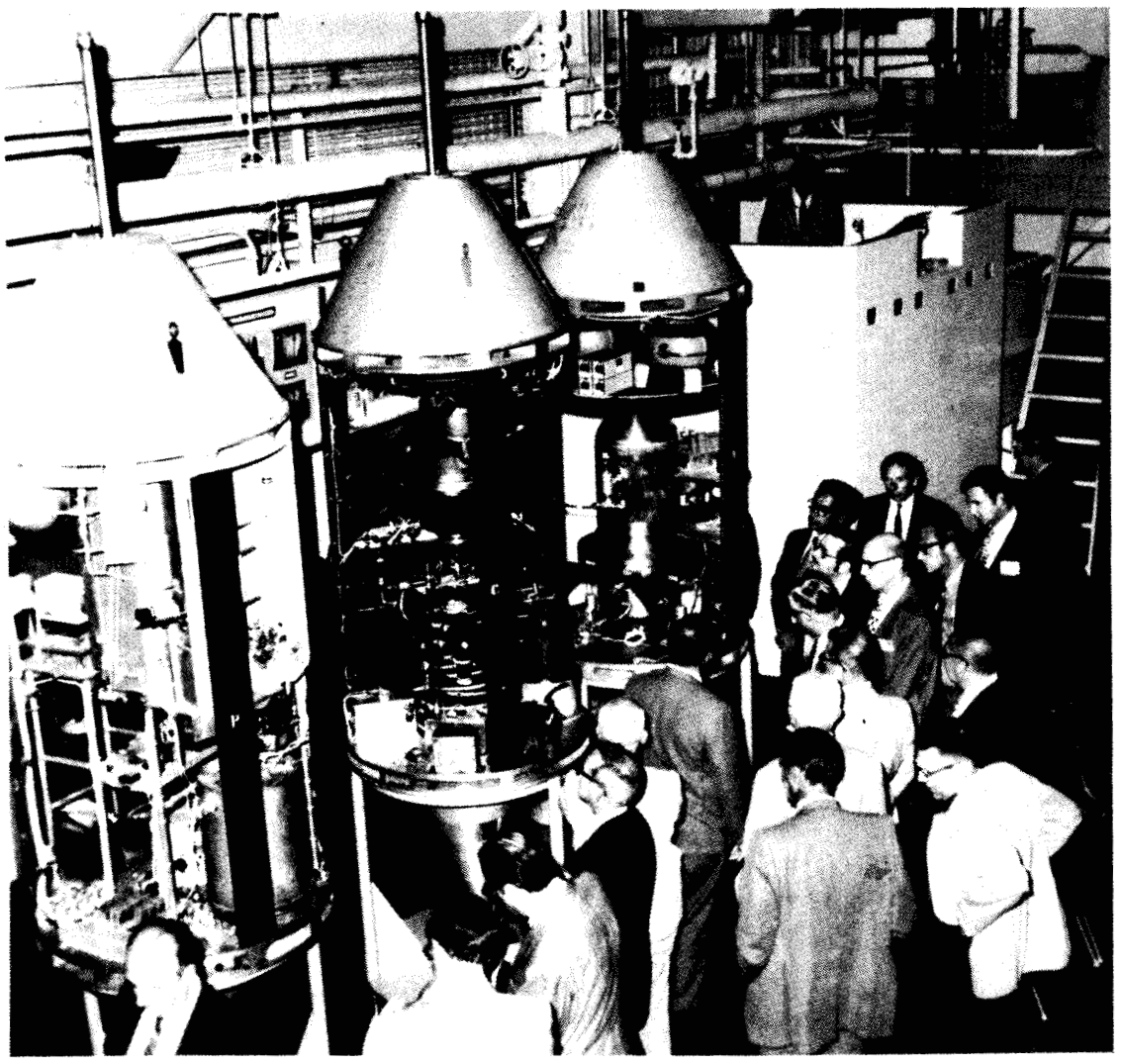
Dear Mr. Lundin:

I do want to thank you for a very enjoyable day spent on Wednesday, September 19, 1973 at Lewis Research Center. The presentations were very interesting and extremely informative and the men who made them were excellently good. I do appreciate the opportunity to visit Lewis Research Center and want to thank you for inviting me.

I write in behalf of our Rotary Club President Louis Hehman as well as myself in our effort to tell you how much we appreciated, learned and enjoyed on last Wednesday, September 19, when we had the privilege of visiting your Lewis Research Center. We certainly want to thank you again for including us. It was a stimulating, informative, challenging and fascinating experience. You certainly are doing a great job and we appreciate it.

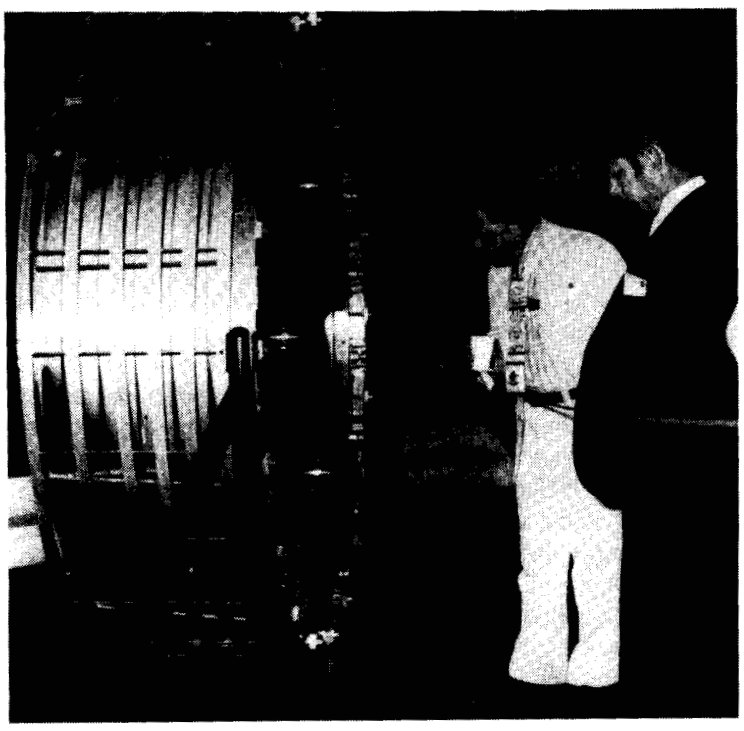
National, state,local leaders came...

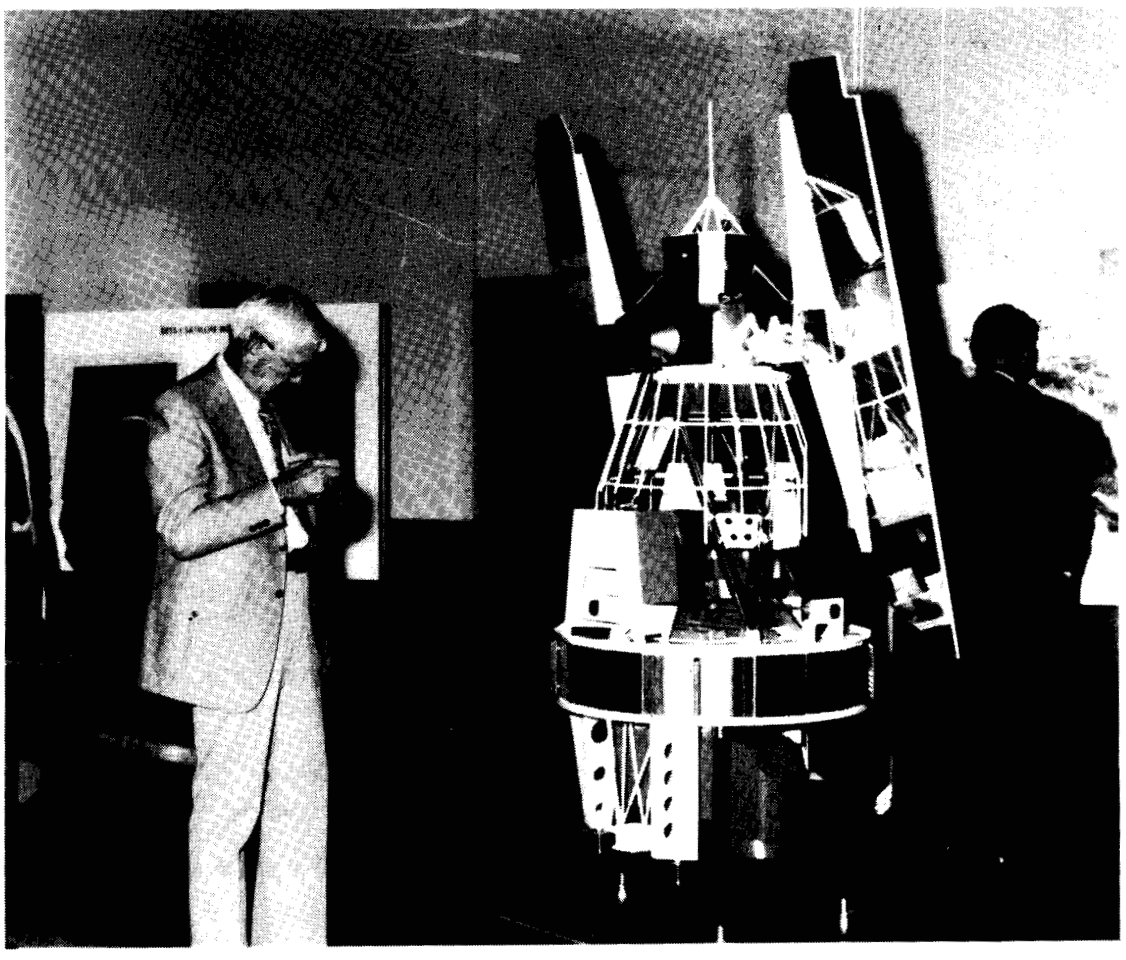




Photos by

Don Huebler





THE LEWIS NEWS presents the Lewis Research Center story in terms of its people, its purpose and its progress. Published on alternate Fridays, the News is produced by the Public Information Office, Lewis Research Center, National Aeronautics and Space Administration, 21000 Brookpark Road, Cleveland, Ohio 44135.

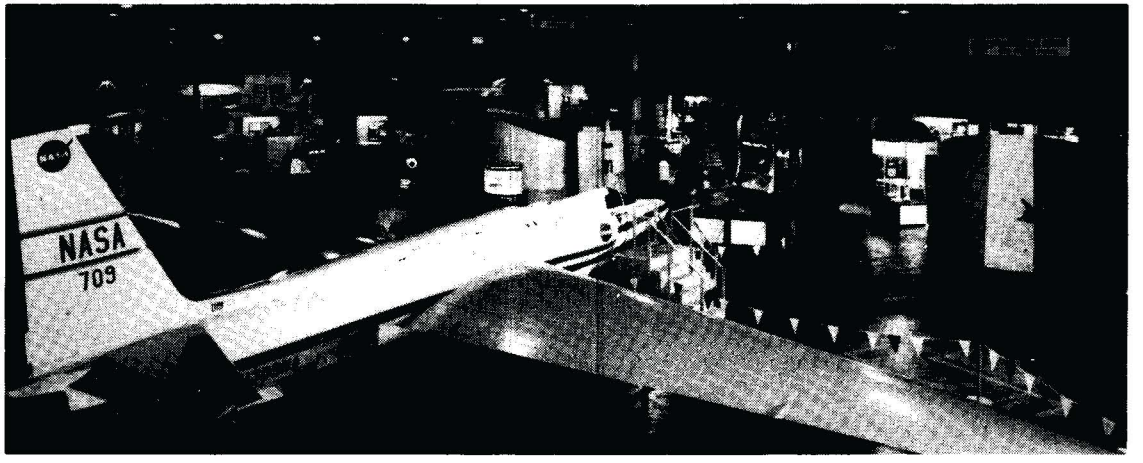
News items should be phoned into PAX 2140, or sent to Room 118, Ad Bldg., Mail Stop 3-11. Deadline is ten days prior to publication.

Editor . . . . . Charles Mitchell

Technology Utilization and Public Affairs

Dr. Walter T. Olson
Director

Lewis' 1973 Inspection program, "Technology in the Service of Man, certainly rates as one of the year's highlights for the Center. This multi-media presentation was seen in whole or in part by about 22,000 people, including 891 invited V.I.P.'s. Congratulatory letters, comments of appreciation, requests for technical data, and continuing use of the informational material are testimony that it served its purpose of acquainting attendees with Lewis and its work.



Less conspicuous, but potentially of great importance were activities to renew and strengthen the Center's relations with the energy industries. A booklet illustrating the applicability of Lewis' technology to ground based electric power was prepared to assist the Director and Center management in presenting the Center's capabilities both to government and to industry. New contracts in the electric power industries were added to those generated by the 1968 Technology Utilization conference with that industry. And we have started a dialog with representatives of the natural gas industry regarding similar technology transfer efforts.

During the year, the Technology Utilization Office handled 2000 queries on Lewis innovations. Two of these innovations were IR-100 winners, — a nationwide citation of the 100 most outstanding technical developments.

NASA's 15th Anniversary was noted with a flurry of news releases, increased radio and TV activity, and special exhibits in a number of cities. Other Lewis activities in relating to the public in our 6-state area can be summed up: 66 news releases; 500 press inquiries; 180 tours for 9000 people; another 21,000 visitors at open houses; 245 speeches to 41,000 people; "total impact" programs to uncounted thousands in three cities; 13,000 general interest mail replies with 200,000 pieces of literature, mostly to schools; 1149 Spacemobile demonstrations before 240,700 people; and 11,000 film-loan requests for an estimated audience of 1,600,000.