The CenterScene

Atop the Great Wall of China are, from left, Cliff Fry, Chief, Office of International Activities; Rupe Southard, Chief, National Mapping Division; and Eric Anderson, Chief, Office of Geographic and Cartographic Research.

## SCIENTIFIC AND TECHNICAL COOPERATION WITH THE PEOPLE'S REPUBLIC OF CHINA

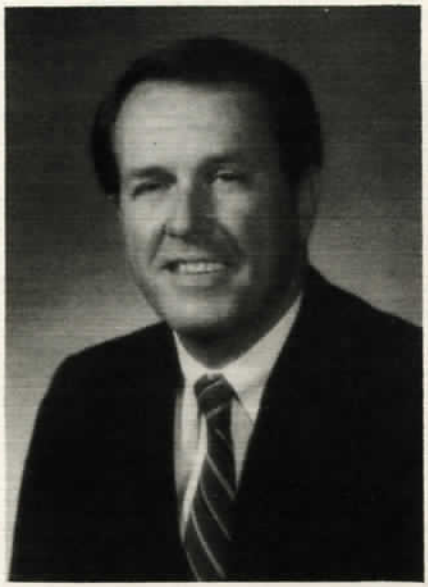
Don Lauer

During the period of July 28 to August 9, 1985, I joined Rupe Southard, Roy Mullen, Cliff Fry, and Eric Anderson (all with U.S. Geological Survey's/National Mapping Division in Reston, Virginia) for a visit to The People's Republic of China (PRC). The objectives of our trip were (1) to sign Annexes to the Protocol for Scientific and Technical Cooperation in Surveying and Mapping Studies between the U.S. Geological Survey and the PRC's National Bureau of Surveying and Mapping, (2) to develop Work Plans for Annex 2 (Geographic Information Systems), and Annex 3 (Remote Sensing Applications), and (3) visit PRC mapping facilities.

A comprehensive schedule for the two-week visit was prepared by our Chinese hosts and included a mix between technical discussions, mapping facility tours, and opportunities for sightseeing. We entered the country on Sunday, July 28, traveling from Hong Kong into Guangdong Province to Guangzhou (formally called Canton), the largest city in southern China. On Sunday, the mapping facilities in Guangzhou were closed for the day, so we visited a few historic sites typical of southern China, and that evening were presented with an elaborate Chinese banquet. A Chinese dinner banquet generally lasts two or three hours, involves a dozen courses, requires numerous toasts, and includes technical discussions—translated by an interpreter. The following morning we traveled by China Airlines to the city of Wuhan, the capital of Hubei Province, located on the banks of the Yangtze River. The Technical University of Surveying and Mapping is located in Wuhan. We toured the university, examined the surveying and mapping laboratories, and presented lectures on the U.S. National Mapping Program, satellite remote sensing, and geographic information systems to the university's faculty and staff. On Tuesday, July 30, our Chinese hosts gave us the opportunity to see some of the countryside in central China. We took a 16-hour, overnight train ride from Wuhan through southern Hubei Province, through Hunan Province, and to the city of Guilin in Guangxi Zhuangzu Autonomous Region. Little business was conducted during this excursion to Guilin; instead, our Chinese hosts wanted us to see some of the beautiful scenery in south-central China. Guilin is located in the center of a spectacular region of uplifted and eroded limestone formations that rise sharply to several thousand feet and are covered with semi-tropical vegetation. The valleys surrounding these formations are fertile and lush, making this area one of the most productive agricultural regions of China. To fully appreciate the landscape we took a six-hour boat trip down the Lijiang River. It was back to business on Friday, August 2, as we flew from Guilin to Xi'an in Shaanxi Province. Xi'an is the ancient capital of China and is on the historic Silk Road which led from east Asia through central Asia to eastern Europe. Xi'an was the capital of China for about 2,000 years, up until about 1,000 years ago. A large provincial mapping center in Xi'an conducts mapping projects throughout western China. We toured its facilities and again presented lectures on U.S. programs and activities. On Sunday, August 4, before leaving Xi'an for Beijing, we were taken into the country to view an archaelogical site that is considered one of the most spectacular in all of China. The emperor of China circa 200BC chose to take his army with him in his afterlife. He did so by making life-sized pottery figures of each soldier in his army. The entire army, now referred to as the terra cotta army, was buried with him in his tomb. There are about 7,000 soldiers, horses, and chariots buried in this tomb—which was only recently discovered and is still in the excavation process.

The second week of the visit was spent in Beijing, the nation's capital. A dinner banquet on Monday evening in the famous Beijing Roast Duck Restaurant got us off to a good start. Several days were taken to refine the

(Cont. on page 2)



## UP FRONT

The signing of the Landsat commercialization contract between the Federal Government and the Earth Observation Satellite (EOSAT) Company brings new challenges to the EROS Data Center and the Landsat program.

The most visible change is to users of Landsat data. EOSAT is now the point of contact for ordering Landsat products and all prices and product types will be established by EOSAT.

For the Data Center, changes in the LANDSAT/EOSAT arena will be gradual. It will be at least eighteen months to two years before construction is completed on EOSAT facilities, including a new Landsat 6 and 7 data processing system, at company headquarters in Maryland. Until EOSAT launches Landsat 6 in 1988 or 1989 the Data Center will continue to receive, store, and process Landsat data for the National Oceanic and Atmospheric Administration (NOAA), much the same as it has done since 1982. As the commercial operator, EOSAT will market Landsat data, operate Landsats 4 and 5, and retain all Landsat revenue. After the launch of Landsat 6, EDC is expected to continue to generate products from the Landsat archive which will remain at the Center.

The Data Center has a long-standing commitment to remote sensing research, development, and training. These activities will not only continue but will increase, since the Landsat legislation passed in July 1984 calls for significant land remote sensing research, development, and technology transfer by the Department of the Interior.

The Landsat legislation also specifies the establishment of an historical Federal satellite land remote sensing data archive for the long-term preservation of valuable scientific data from domestic and foreign satellites. Data for this archive will be obtained from EOSAT and from the operators of future Earth observation satellites, including systems to be launched by France, Japan, India, the European Space Agency, and Canada. An agreement between the USGS and the Department of Commerce establishes the EROS Data Center as the site for this National Remote Sensing Archive. The upcoming transfer of the National Digital Cartographic Data Base to EDC will further the research and development capabilities of EDC and will complement the remote sensing data base.

Data Center management extends congratulations to EOSAT and assures our new colleagues that we intend to cooperate with them in every way to ensure the continuity of the Landsat program. We believe in the future of Landsat and we are committed to help it succeed.

*Allen H. Watkins*

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(China - Cont. from page 1)

wording in the Annexes and to develop the detailed Work Plans. Our Chinese hosts arranged time on Wednesday, August 7, for us to travel north of Beijing to view and climb the Great Wall of China. Indeed, it was a spectacular site considering its enormous size (about 40 feet wide at the base and 30 feet high), its age (about 2,000 years), and its length (about 3,000 miles). The Great Wall is now a national shrine for the PRC and government funds are being used for renovation and maintenance. While in Beijing, visits were made to the Research Institute of Surveying and Mapping, the Cartographic Publishing House, and the National Bureau of Surveying and Mapping Headquarters Office. On Friday, August 9, our last day in China, the two Annexes were reviewed, revised, translated into Chinese, and signed, and Work Plans for these Annexes covering the next 18-month period were finalized.

The EROS Data Center will have primary responsibility for carrying out the work associated with Annex 3 on the applications of remote sensing to cartography. EDC will send Bill Draeger and Bruce Quirk to China in November 1985 to present a series of lectures on remote sensing systems, digital image processing, and case study applications. In February 1986, the Chinese will send two people to the U.S. to become familiar with National Mapping Division facilities, programs, and operations. They will spend one week in Reston and two weeks in Sioux Falls. In the summer of 1986, China will send two people to the U.S. for a two-month period to engage in detailed studies of remote sensing data and uses of digital processing systems. They will spend two weeks in Reston, six weeks at EDC, and about four weeks visiting other U.S. facilities. In the fall of 1986, EDC will send two people to China for a one-month period to work on specific data processing tasks using remote sensing data acquired over a Chinese test site and using National Bureau of Surveying and Mapping data processing hardware and software systems. A joint report will be prepared at the end of this 18-month period.

When asked what my impression of China, my answer has been, "Rapid change." I expected to see a lot of the old China in terms of the people's activities, clothing, and customs. Instead, I viewed a country that is rapidly westernizing itself. With the encouragement of the Government, free enterprise is beginning to flourish, and there is a great emphasis among the Chinese to modernize their country with assistance from the western nations. The scientific and technical exchange between the Geological Survey's National Mapping Division and its Chinese counterpart is part of China's thrust to modernize industries and scientific institutions.

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## EDCEA Notes

**Terry Bobbie**

The EDCEA summer picnic was a smashing success with the largest attendance ever and, according to attendees, the most fun and the best food in the history of the annual summer event.

The Association has experienced a remarkable success in the sale of T-shirts, jackets, and caps with the new EDCEA logo designed by Wendell DeGeus, winner of the logo contest.

EDCEA's most recent good-will project was to collect needed items for the Sioux Falls Humane Society.

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## EDC FEDERAL WOMEN'S PROGRAM

**S. Jean Paulson**

The August EDC Federal Women's Program featured Darice Huber and Melissa Radigan from Norwest Bank speaking on real estate financing and investment strategies. They discussed how to utilize excess cash to build equity and generate income through investments in money market accounts, certificates of deposit, government securities, tax-free municipal bonds/zero-coupon bonds, and real estate.

The September "Lunch and Learn" seminar was a review of programs and facilities of the YWCA, presented by Bonnie Glidewell.

Mary Lou East inspects the new telephone instruments which are capable of simultaneous voice/data communications. The ROLMphone 120, left, is a single line telephone with 10 configurable buttons for single button access to system features, volume control, and internal one-way speaker capability (someone can talk to the caller through the speaker, but the caller can only answer back through the handset). The ROLMphone 240 is a multi-line telephone with 24 configurable buttons of which up to 11 can be telephone lines, volume control, and an internal two-way speaker function.

# NEW TELEPHONE SYSTEM FOR EDC

Brent Lowell

About three years ago, due to the difficulties with maintenance, the U. S. Geological Survey recognized the need to replace its existing obsolete telephone equipment at a number of locations. At the same time, the telephone industry was being deregulated, thus allowing private ownership of telephone equipment. The USGS analyzed the alternatives of continued leasing-versus-purchase and decided it would spend less by buying new state-of-the-art equipment. The initial systems to be replaced were in Reston and Menlo Park, with procurement completed in 1984. Those systems were both awarded to Rolm Corporation and installation is in progress.

The Eros Data Center was not included in the initial procurement but it was recognized that our system would also need replacing because the present system is no longer manufactured and there is an acute shortage of spare parts. It is difficult to manage; spiraling communications costs dictate the need for better management control, and the existing installation has reached its full capacity in many areas of the building, thus precluding provision of needed extensions and intercom service. Due to technology advances, the cost of the new system will not exceed current costs and will provide lower costs in future years while giving EDC great flexibility when additional capabilities are required.

With these considerations in mind, EDC was given permission to begin the necessary procurement actions to replace its current telephone system in 1986.

This effort culminated in a contract awarded to Norstan Communication Systems on September 27, 1985, for a telephone system manufactured by Rolm Corporation similar to the equipment currently being installed at both the Reston and Menlo Park USGS facilities.

The new systems will provide EDC users with a long list of features from which to choose. Included are **abbreviated dialing** through which a user can substitute one-or-two-digit codes for frequently dialed numbers, **automatic call back** for when a user reaches a busy number (the system will automatically make the connection when the called line is free), **call forwarding** to forward a user's incoming calls to another phone, **call hold** to allow a user to hold any call in progress while consulting or placing another call, **push-button dialing**, **call pick-up** to answer a phone at another user's desk, **conference calling** for up to eight parties, **call transfer** to allow a user to transfer an existing call to another extension, **last number redial** where the system records the last number dialed by a user and will redial it when signaled by the user, **voice mail** to record messages as an alternative to hand written notes. All of the above features can be activated by the user without operator assistance.

The new systems will also handle data communications at speeds up to 56 Kbps simultaneously with voice communications over the same wiring. Data devices can be plugged into the telephone instrument without the use of modems, extra wiring, or the time required to procure and install them.

The first installation phase of the new system will be engineering, which includes preparation of the equipment room, determination of how and where to run cabling, and definition of the type of phone instrument and features for each user. Management of each Branch and Section will be involved in determining instruments and features for their respective groups.

The second phase will be installation of the cabling and wiring. The third phase will be the installation of the switching equipment, which is essentially a computer customized for communications purposes. The fourth will be installation of the telephone instruments.

Training will be provided for most users, including 2-3 hours of general user training and 2-3 days of system administration/manager training for personnel with direct system management responsibilities.

Both the old and new systems will be operational for a short time while the new system is going through acceptance testing. The final phase will involve the removal of the old system. Most of the installation and removal work will probably be done outside normal working hours so that the Center's daily routine will be disrupted as little as possible.

Discussions with Norstan indicate that phase one will begin in November 1985 with final transfer to the new system occurring sometime in February 1986.

## PECORA 10: REMOTE SENSING IN FOREST AND RANGE RESOURCE MANAGEMENT

Robert H. Haas

Some 340 scientists, engineers, conservationists, land managers, and students participated in the Pecora 10 Symposium held at Ft. Collins, Colorado, August 20-22, 1985. Participants indicated a high level of interest in all phases of remote sensing for the management of forest and rangeland resources. The symposium was preceded on Monday by four introductory tutorials on remote sensing and geographic information systems. A post-symposium field trip was conducted along the Poudre River west of Ft. Collins, which focused upon

(Cont. on page 4)

(Pecora 10 - cont. from page 3)

ecologically important study sites in the region.

During the 3-day conference, more than 50 papers were presented describing the present and future role of remote sensing for the management of forest and rangelands. Poster presentations provided an additional 35 summaries of applications results. A special Forum Session provided open discussion on the current status of remote sensing and spatial data base management of extensive renewable natural resources and the need for research support of these management activities.

The EROS Data Center (EDC) provided leadership in organizing and supporting the Pecora 10 Symposium. Ten scientists from EDC were authors or co-authors of contributed Pecora 10 papers. Several of these participants were also involved in organizing and moderating technical sessions. Support staff provided essential services prior to and during the meetings.

Bob Haas was Program Chairperson, Ray Byrnes was Logistics Chairperson, and Larry Pettinger was Special Activities Chairperson for the symposium.

## EDC/BIA FORT BERTHOLD COOPERATIVE PROJECT

**(Fourth in a series on EROS cooperative projects.)**

K.C. Wehde

The Fort Berthold Indian Reservation in North Dakota is the site for the testing of geographic information system (GIS) technology in cooperation with the Bureau of Indian Affairs (BIA) and the USGS/EROS Data Center.

The BIA needed a system that would allow it to: (1) update range survey information in a timely manner, and (2) use that information to implement a more concise method of determining land value in relation to its range payout system. The range payout system is a program which aggregates individual small ownership parcels (usually less than 160 acres) into larger land groupings called range units. The range units are leased for grazing and each participating landowner receives a payment based on the productivity of his land. Almost 200,000 acres of land are in the program.

These two issues are addressed in a cooperative project between the BIA and the EROS Data Center. A determination was made that a geographic information system be implemented, thus allowing the BIA to assess and update information within the data base either independently or simultaneously, according to its specific needs.

Four specific project objectives were identified:

(1) Develop a digital spatial data base for use in assessment and evaluation of management opportunities related to the rangeland and agricultural resources of the Fort Berthold Reservation.
(2) Develop a digital spatial data base for use in updating, refining, and performing range unit payout based on land productivity.
(3) Evaluate the general concept of microprocessor-based digital data bases for overall use in the field.
(4) Define procedures for integrating digital spatial data bases with existing tabular data bases of the BIA.

In order to access the extensive BIA tabular data bases and spatial data simultaneously, it was necessary to find a common link for all of the data within the data bases. In this instance, the common link for the BIA's tabular data bases was ownership parcel identification numbers. To link spatial to tabular data, a unique code was issued to each parcel in conjunction with the ownership parcel identification numbers.

Upon completion of the GIS, the entire Fort Berthold data base and all tabular data were downloaded onto a Remote Information Processing System (RIPS) microprocessor system. This system makes it possible for the BIA to answer a host of range management and resource questions with concise, up-to-date information. The BIA has determined that the use of microprocessors is a relatively inexpensive method to display information or produce maps.

More information on this project may be obtained from Jeff Eidenshink, Technique Development and Applications Branch.

## NCIC TO REPLACE INORAC SYSTEM

**(Courtesy of the Mid Continent Mapping Center's "Topographically Speaking")**

Robert M. Lemen

The INORAC (Inquiry, Ordering, and Accounting) system has been an integral part of the National Cartographic Information center since 1976. This data processing system, located at the EROS Data Center (EDC) in Sioux Falls, was designed to receive, process, track, and control inquiries, orders, products, and money. With the NCIC offices linked to this sytem, each site has the ability to do the customer accounting, ordering, and data searches (inquiries). The Burroughs 6900 is the computer that operates this system.

Because of the age of the present system and its limitations, it was decided to replace the entire system with one that would take into account the current INORAC capabilities and its shortcomings. Over the past several months, people from EDC, NCIC-Headquarters, and the Mapping Centers (collectively) have been involved in the design review for a new computer system that will replace the present INORAC system.

As the present system now operates, EDC is the focal point maintaining and overseeing the various operations involved.

The INORAC replacement will require each Mapping Center to be more independent in its operations. This new system, to be called DORRAN (Distributed Ordering, Research, Reporting, and Accounting Network), will consist of a Callans Unistar 300 Microcomputer at each site and a Gould Power Node 6006 Minicomputer at EDC, that will handle large data storage needs and heavy processing needs, while the multiple, site-located, multi-user microprocessors will be utilized for local processing and storage needs, small data bases, etc.

User documentation is being developed to address the operations, procedures, codes, etc., to perform the accounting, ordering, hardware operations, files maintenance, and systems management functions at the NCIC sites. I, along with others from the various sites, are presently working on this documentation.

The training will be conducted at all the sites in the following areas: hardware operations, ordering, accounting, files maintenance, and systems management (report generation, security, archiving, internal controls, operating routines, etc.).

Various tasks will need to be accomplished in converting from the INORAC system to DORRAN. Before moving accounting files from one system to the other, a lot of cleanup has to be done on the existing data, such as closing inactive accounts, writing off uncollectable receivables, refunding unused credits, etc.

The on-line research functions presently used on INORAC will not be a part of DORRAN. Since these functions can be done nearly as economically by manual methods (microfiche) as with on-line functions, it was decided that the cost of providing an on-line research function simply was not justified. These research functions include searches of photography and Landsat imagery through the main image file.

There are also plans for a software system to be developed to allow for the

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(NCIC - Cont. from page 4)

tracking, production, and reproduction of map separates. While this is being done as a separate project, the system will closely interact with DORRAN.

As the present system now exists, if the Burroughs goes down at EDC, the whole system is down, therefore halting operations at all sites. With DORRAN, if the minicomputer at EDC goes down, each site will not be able to communicate with the others, but will still be able to continue its own operations. The new system will be distributed, meaning that each Center will have full responsibility to changing accounts and orders from the old system to the new, for managing the operations of the system, and for certifying that all internal controls are being maintained. In essence, DORRAN will relieve site dependency on a central processor through this distributed processing.

DORRAN is scheduled to be operational in 1986. The target date has not been established.

An implementation committee, with representatives from each of the affected Centers, was formed to develop a plan for documenting, installing, testing, training, and following up after the implementation of the new system. This committee, which I was part of, met and made recommendations. Three major activities were identified by the committee as important activities that must be addressed to ensure an orderly transition to the new system, and to provide the training and standard operating procedures required to keep the system operating efficiently in the network environment.

The three major activities identified were: documentation, training, and conversion. People from the various sites were selected to serve on committees to address each of these activities.

Another software design project, the National Digital Cartographic Data Base, is currently underway to be directly linked to DORRAN. Implementation will not be until some months after the implementation of DORRAN.

The next several months will involve a great deal of effort from many people involved with this project. With the coordination of the various committees to meet the deadlines for the DORRAN development, we will see a vastly improved and more efficient system.

Volume 3 Number 4
October 1985

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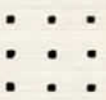
# PROBLEM SOLVING TECHNIQUES

S. Jean Paulson

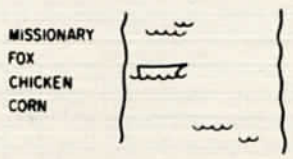
Everybody has problems, right? But some people seem to solve them more easily than others. William Lewis, in his book **Problem Solving Principles for Ada Programmers**, states that a combination of applied logic, psychology, and grit, together with some fundamental problem solving techniques, can benefit us all. While his book is intended to teach us to solve programming problems, the methods he describes are equally valuable in other situations.

For example, one of the best ways to solve a problem is to use your imagination. Don't let convention unnecessarily limit your thinking. Consider the problem of connecting the nine dots shown below using only four straight lines while never allowing your pencil to leave the paper.

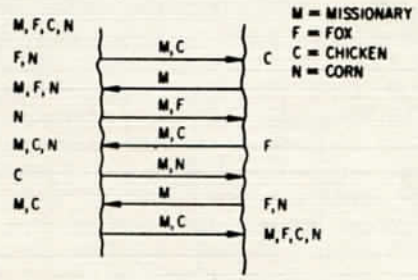


Many people fail to find the solution to this problem because they assume that all of the lines must lie within the boundary of the nine dots. However, by using your imagination, you can find the solution shown here.

Assuming additional constraints in a problem, such as an efficient solution, may make the problem impossible to solve. For instance, consider the problem in which a missionary, a fox, a chicken, and a bag of corn are to be transported across a river by a single boat. The boat will hold a maximum of only two items in any one crossing, and one must be the missionary. The constraints in this problem are that the chicken and fox cannot be left alone together since the fox would eat the chicken, and also the chicken cannot be left alone with the corn since the chicken would eat the corn.




A little study will convince you that the main problem is the location of the chicken. If you attempt to solve this problem using the least number of trips across the river, you will have added a new constraint to the problem that makes it much more difficult. Instead, we need to add three extra trips to prevent the chicken from being left alone with either the fox or the corn. First, the missionary transports the chicken to the other side and returns alone. Then he can arbitrarily move either the fox or the corn to the other side, returning with the chicken. The chicken is left on the original side of the river while the third object is transported to its destination. Finally, the missionary returns to move the chicken across the river once again.




If you've enjoyed exercising your brain on these problems, you can look forward to more in a future issue of the Center Scene.

# EDUCATION OPPORTUNITIES

The U.S. Geological Survey's National Mapping Division (NMD) Graduate School Education Opportunities for the 1986-1987 academic year will be announced later this month. Since 1980, 16 employees from the Division have been selected for the full-time academic program. Participants are provided with an opportunity to raise their level of competence, to broaden their technical understanding, and to develop new management skills and concepts. Funding for the program includes full payment of tuition, fees, and books, in addition to the employee's regular salary and benefits.

Applicants must be in the National Mapping Division and be permanent employees at the GS-9 or higher level, with at least two years of current experience with the Geological Survey. They must be educationally qualified for admittance to a graduate school appropriate for the education and they must be able to carry a schedule of full-time study. Employees who wish to discuss their interest in this challenging developmental experience may contact Marian Baker, Headquarters Training Officer, FTS 928-6223.

June Thormodsgard, Computer Systems Analyst, Technique Development and Applications Branch, attended graduate school at the University of Wisconsin - Madison, last year through the NMD Graduate School Education Opportunity.

In addition to the NMD graduate program described by Ms. Baker in the preceding paragraphs, other training

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# EMPLOYEE NEWS

## WELCOME ABOARD

K.C. Wehde

**Norman Bliss** joins the scientific staff of the Bioscience Applications Section in the Technique Development and Applications Branch. Bliss, who holds a bachelor's degree from the University of California, a master's degree from the University of Washington, and a Ph.D. from the University of Pennsylvania, taught environmental studies, land use planning, and remote sensing at the University of Wisconsin - River Falls, and was a consultant in computer mapping for erosion control plans. Norman and his wife, Melanie, have two sons, 6-year-old Andy and 3 1/2-year-old Eric. His hobbies include hiking, camping, skiing, and music.

**Luke Hieb**, Brandon, joins the Digital Applications Unit of the Data Management Section in the Data Production and Distribution Branch. Luke is a graduate of South Dakota State University, with a bachelor's degree in geography.

**Lynn Steenson**, a graduate of South Dakota State University, with a bachelor's degree in geography, joins the Data Management Section of the Data Production and Distribution Branch. Lynn's previous experience includes working for the Defense Mapping Agency Aerospace Center in St. Louis, Missouri.

**Darrel VanderZee** joins the programmers of the Software Development Section in the Computer Services Branch. A graduate of South Dakota State University with a bachelor's degree in Mathematics and minors in Computer Science and Economics, VanderZee was a programmer for Burroughs Corporation, Minneapolis. Originally from Volga, Darrel and his wife, Lenae, live in Brookings where she is finishing school. Darrel enjoys hunting, fishing, camping, motorcycle riding, and photography.

## EMPLOYEE AWARDS

**Dave Bankers** received a special achievement award for his efforts, innovative ideas, and sense of responsibility that contributed to the successful implementation and utility of the EDC Intergraph Digitizing System.

**John Boyd** was honored for sustained special achievement in the implementation of film recording systems at EDC.

**David Carneggie** was recognized for the role he played in accomplishing the efficient, cost-effective move of the EROS Field Office to its new location on the University of Alaska campus.

**Landra Chamberlain** received a special achievement award for her dedication and efforts toward the preparation of necessary data elements and screening of color composite images for the Video Disk project in addition to completing her regular work duties.

**Mary Lou East** was recognized by a sustained special achievement award for outstanding performance in fulfilling her duties as secretary-stenographer.

**David Greenlee** received a special achievement award for his major role in the installation, implementation, and utilization of the ARC/INFO geographic information system capability at EDC which has resulted in the recognition of the National Mapping Division's leadership role in this technology throughout the U.S. Geological Survey and the Department of the Interior.

**Bernadine Johnson** was honored for special achievement in fulfilling her responsibilities as lead secretary for her branch, doing an excellent job while at the same time performing the duties of a vacant position in the office.

**Geneva Kluck** received special recognition for her consistently superior work attitude and her sustained excellent performance in the Micrographics Unit in Data Management.

**Charles Luden** and **Ron Schultz** were honored for their nationally recognized work as guest editors for two special issues of the Journal of Imaging Technology, the official publication of the Society of Photographic Scientists and Engineers. Both issues were devoted to the theme of Photographic Chemical Management.

**Lyndon Oleson** received a special achievement award for sustained superior performance in providing management direction for the design and development of scientific and administrative software.

**Bonnie Rave** was recognized for sustained superior performance in all aspects of her position, serving as secretary and stenographer for the staffs of two offices.

**Mary Richards** received a special achievement award for outstanding contributions and efforts to the spatial-filter software for image mapping production.

**Jeanne Schriever** was presented a sustained special achievement award for outstanding performance in all areas of her secretarial-stenographic position.

**Diane Stoick** was honored for her contributions to the success of EDC's Intergraph Digitizing System, for her responsibility in implementing solutions to user requirements, and for the final integration of the system.

**Glenda Theel** received special recognition for her dedication and sense of responsibility to her job in the Micrographics Unit in Data Management, which has resulted in high production and reliable products.

**Jan Van Roessel** was recognized for his development of the Vector Data Interface concept and for the extraordinary impact it has had toward research efforts and data conversions at EDC and the National Mapping Division, particularly in the area of current Geographic Information System Development.

(Education - Cont. from page 5)

and educational opportunities are available for USGS employees. Interested persons may check with Carol Van Winkle, EDC personnel office, for information on applying for job-related training or academic courses.

Technicolor Government Services, Inc., also declares that an employee training and development program is essential in maintaining a competent and efficient work force. Such a program can assist employees who need additional education so as to qualify for positions with greater potential. It also allows skills and abilities to be used to further the mission of EDC and Technicolor.

Assistance in acquiring an under graduate or graduate degree is provided to Technicolor employees within the guidelines of the Career Training Program. Application for this program requires the employee to submit a written request outlining the particular program, the degree sought, the relationship to EDC and Technicolor activities, and the schedule of courses. Upon approval the employee will be reimbursed upon successful completion of each course with a minimum grade of "C". Tuition is reimbursed at 50%.

Over the years many Technicolor employees have used the assistance of the Career Training Program to reach their goals. Bob Van Den Oever was able to achieve his Masters of Business Administration Degree with assistance from this program. So too was Dawn Schneider. Employees who are interested in the Career Training Program can see their Supervisor for information. Details can also be obtained from Tom Earley, Personnel Supervisor, TGS.

David Hastings has been notified that his biography will appear in the Second Edition of **Who's Who in Frontiers of Science and Technology**.