Creating color-coded images using the uminous flow of numbers is converting the map of colorful swatches and surprisingly, into a computer. The result is a map that the entire area has the same soil type or chemistry, that could save them an enormous amount of field work," says Guinness.

Remote sensing also can reveal the potential mineral deposits. Scientists in Remote Sensing Laboratory, the data they collect cannot be adequately represented in photographs. Our work makes possible the display of many more dimensions of information."

Up to now, remote sensing has typically been restricted to desert areas where vegetation does not obstruct instrument readings. "The trouble is, most of the world is not desert," says Edward A. Guinness, senior research scientist in the Remote Sensing Laboratory. Guinness is part of a research team which has found that the way trees reflect light can provide clues as to what lies beneath the surface.

The images produced at WU reveal subtle color differences in the tree canopy — differences indiscernible to the naked eye. As indicators of soil composition, these color images could have a great impact on the mineral mining industry. Vast tracts of previously inaccessible territory could be opened up for geologic exploration.

But more importantly, remote sensing could also revolutionize the costly hunt-and-dig method now used by mineral mining companies. "If they could take a sample from a given area and know, from the color patterns on the (computer-generated) map, that the entire area has the same soil type or chemistry, that could save them an enormous amount of field work," says Guinness.

Remote sensing could also reveal distribution of species, areas of stunted growth, and shortened growing seasons — all indicators of potential mineral deposits.

Still, researchers caution that such results should be treated as preliminary. "We're still a long way from proclaiming 'Aha! Copper, here. Silver, there.'" Guinness says.

But the technology of future decades is certain to advance the capabilities of remote sensing, Landsat's current imaging spectrometer, for example, has only about half a dozen spectral channels with which to measure reflected light. "We're recommending that an imaging spectrometer with 256 channels be flown in the 1990s," says Arvidson.

"That should give us 40 times the information Landsat can give us today."

Paul Dunnout
German night of song featured at Steinberg

The third annual Liederabend, a German "evening of song," during which the German poet Johann Wolfgang von Goethe, will be present. At 8 p.m. Friday, Oct. 19, in WU’s Steinberg Auditorium. Admission is free and open to the public.

Soprano Margaret Boyer, who was featured in the 1982 Liederabend, again will perform. The former professor at Fombonne College now teaches privately in Richmond, Va. She holds bachelor’s and master’s degrees in music from Southern Illinois University-Edwardsville, and a doctorate from WU. She studied for two years at the Staatliche Hochschule fur Musik and Darstellende Kunswerke in Stuttgart, Germany, concentrating on the study and performance of Lieder, German songs from the Romantic period of the early 19th century. She also has studied and performed at the Aspen School of Music in Aspen, Colo.

The featured pianist is Richard Becker, who has taught piano on the music faculty of the University of Richmond since 1979. He holds a bachelor's degree in music and a performer's certificate from the Eastman School of Music in New York, and was awarded a fellowship to perform at the Harvard Chamber Music Seminar. He studied at the University of Texas before embarking on his master's degree and a teaching appointment at Boston University. He made his New York debut on May 14, 1980, at Alice Tully Hall.

The Liederabend is sponsored by the WU German department and the Goethe Institute. St. Louis. Egon Schwarz, Rosa May Distinguished University Professor in the Humanities and professor of German, will lecture on Goethe's poetry during the program.

Liederabend will feature music by Franz Schubert, Hugo Wolf and Robert Schumann. Schubert was at the forefront of the development of Lieder during the Romantic Movement. The lyrical poems of Goethe, in particular, were a great source of inspiration to Schubert and other composers.

For more information, call the German department at 889-5160.

Suzanne Scates, manager of publications in the School of Engineering, and Rhonnie Washington, WU assistant professor of black studies and drama, portray Jenny and Macheath in "The Threepenny Opera."

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The Edison Theatre stage will be transformed into the Soho section of London when WU’s Performing Arts Area (PAA) and Department of Music present Bertolt Brecht and Kurt Weill’s “The Threepenny Opera” at 8 p.m. Oct. 19 and 20 and 2:30 p.m. Oct. 21. News of the operas place in the 1830s, before and during Queen Victoria’s coronation, centers on Macheath, a ruffian criminal, and his rollicking escapades. Beggars, thieves and corrupt officials relate the story in song, dialogue and dance.

Brecht’s particular ironies are pertinent in an election year,” said Joseph R. Roach, PAA chairman and director of the production. “We have coincided the dates of the opera with the Beckmann exhibitis at the St. Louis Art Museum and Bixby Gallery, Edison’s Oscar Schlemmer Bauhaus Dances (Nov. 3), and the PAA studio production of ‘Swan Song’ (Nov. 16-18).

An ensemble of 10 student and professional musicians, under the baton of WU orchestra director Eric Townell, will perform the score, which is based on Marc Blitzstein’s Broadway version.

“Because the music has been cut up and used for every marketable production, we are restoring some pieces and using a work that was taken out of the original production,” said Townell, who has maintained contact with the Kurt Weill Foundation in New York to ensure authenticity of the score. “We want to adhere to Weill’s original intentions as much as possible,” he said.

The piece that will be restored in the WU production is an aria that was cut from the 1928 version because it was part of a scene considered too lengthy and difficult to perform. The music was provided by the Pennsylvania Opera Theatre.

The principal characters in “Threepenny” are: Macheath, portrayed by Rhonnie Washington, WU assistant professor of black studies and drama; Polly, acted by Anna shields, WU sophomore music arts major; Jenny, performed by Suzanne Scates, manager of publications in WU’s School of Engineering; Mr. Peaschum, portrayed by Richard Humphrey, an area actor; and Mrs. Peaschum, acted by Tracy Wise, WU senior language arts major.

Other University faculty and staff involved in the production include: Mary Henderson, visiting artist in voice, as vocal coach; Douglas Weeks, director of the Civic Chorus, as chorus coach; Gale Ormiston, visiting artist in PAA, as chorographician; Kevin Flynn, adjunct assistant professor in PAA, as lighting designer; Bonnie Catter, PAA artist-in-residence, as costume designer; and David Kruger, PAA artist-in-residence, as scenic designer. Andreae Rogal, a graduade exchange student from Cologne, Germany, is the dramaturg.

A photographic exhibition of artists who worked in Berlin in the 1920s and early 1930s will be on display in the theatre. The photographs were taken by Lotte Jacobi and are on loan from the Goethe Institute in St. Louis.

Tickets are $4 general admission and $3 for WU faculty, staff and all students. For more information, call the box office at 889-6543.

Law school co-sponsors conference to re-examine the death penalty

“The Death Penalty — A Re-examination” is the topic of a half-day conference to be held at WU’s School of Law from 1 to 4:30 p.m. Sunday, Oct. 21, in Mudd Hall.

The conference, which is free and open to the public, is the seventh Constitutional Conference sponsored by the School of Law and the St. Louis chapter of the American Jewish Congress.

Featured speakers include Jack Greenberg, professor of law, Columbia University Law School; Ernest van den Haag, John M. Olin Professor of Jurisprudence and Public Policy, Fordham University; Gene P. Schultz, professor of law, St. Louis University School of Law; and Carl P. Wellman, professor of philosophy, WU.

The speakers will focus, in part, on the constitutional question of what defines cruel and unusual punishment, the challenge of meeting in court’s stance on equitably administrated capital punishment laws, and the philosophic issues involved. They will present their differing views on the death penalty and will interact with the audience.

Greenberg, who will speak against the death penalty, has been named the conference’s Jerome W. Sidell Memorial Lecturer. Sidell, who died in 1978, was a St. Louis attorney, civic leader and former president of the St. Louis chapter of the American Jewish Congress. Greenberg, former director-counsel of the NAACP Legal Defense Fund and Educational Fund, has been active in segregation and integration cases, the campaign to abolish the death penalty and public interest law.

Van den Haag, who is the author of five books, including The Death Penalty: A Debate, will argue for the death penalty. Schultz specializes in criminal law and procedure and is the author of the book Criminal Offenses and Defenses in Missouri. He will present an historical overview.

Wellman, the author of five books including Morals and Ethics, will discuss “The Philosophies of Punishment.”

The conference is funded by grants from the Missouri Committee for the Humanities, the local arm of the National Endowment for the Humanities, and the St. Louis Commission for the Arts and Humanities.

For more information, call the American Jewish Congress office at 993-5505.

Margaret Boyer

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The conference is funded by grants from the Missouri Committee for the Humanities, the local arm of the National Endowment for the Humanities, and the St. Louis Commission for the Arts and Humanities. For more information, call the American Jewish Congress office at 993-5505.
Sarojini Balachandran recently joined the WU Libraries as head of science and engineering. Balachandran previously served as reference librarian and subject specialist in engineering and physical sciences at the State Polytechnic University in Pomona, Ca. She has written and edited several books, journal articles and book reviews. She earned bachelor's and master's degrees in physics from the National Institute of Technology at Madras, India, a master's in physics from Indiana State University, and a master's in library science from the University of Illinois at Urbana-Champaign.

Richard S. Branch has been named construction coordinator for the physical facilities department. He was responsible for construction in all areas of the Wortman Campus except the sports and recreation complex and the new business school. Branch earned a bachelor of science degree in urban studies and planning from WU in 1975.

William H. Butterfield, associate professor in the School of Social Work, served as head of the Missouri delegation to the National Association of Social Workers' (NASW) Delegate Assembly held Sept. 7-10 in Washington, D.C. The delegate assembly is the legislative body of the association and its policy. NASW is the largest professional association of social workers in the world, with more than 96,000 members.

Roy Curtiss III, professor and chairman of the Department of Biology, recently delivered a lecture at the National Institute of Dental Research in Bethesda, Md. Curtiss' study of two types of protein that cause bacteria to adhere to teeth and cause tooth decay has been named one of the Hilltop Campus except the physical facilities department. He was reconstruction coordinator for the physics department. He was reappointed chairman for the physics department. He was reappointed chairman of the Department of Biology, University of Missouri, in 1985.

Susan B. Lin, visiting professor of Chinese language and culture, presented a paper, titled "Tonal Development in Tong-guan Dialect," at the 17th International Congress on Indo-Tibetan Linguistics held Sept. 7-9 at the University of Oregon in Eugene. The paper was sponsored by the Chinese Language Union.


Clifford Will, associate professor of physics, recently won third prize in the 1984 Competition for Essays on Gravitation, sponsored by the Gravity Research Foundation. The annual competition draws essays from researchers in general relativity and gravitation around the world. His essay was chosen for the "Class of Ideal Clocks," which will be published in the Journal on General Relativity and Gravitation.

WU maintains consistent enrollment

Enrollments at WU for fall 1984 total 10,709 students — including 4,499 undergraduates, 3,614 graduate and professional, 2,227 evening, and 169 certificate and unclassified students. Last year's total enrollment was 10,901, a change of 1.8 percent. The announcement was made by Ralph E. Morrow, provost.

Graduate and professional enrollments were down 2.6 percent, reflecting a combination of seasonal fluctuations in class size and in numbers of graduates, as well as the national decline in the "baby boom" birthrate.

Undergraduate transfer student enrollment is 257, up from 204 in 1983.

Freshman class enrollment totaled 986, a decline of 72 from the five-year average of 1,058. In 1983, freshman enrollment was much higher than planned — 1,157.

"We had anticipated smaller freshman classes some years ago, due to the decline in population growth," said James W. Davis, vice chancellor and the University's acting director of admissions. "Like every college and university, we are concerned about the student body. In recent years, many regions of the country are experiencing declines of up to 30 percent in college-bound students.

Ira J. Hirsh named Mallinckrodt professor

Ira J. Hirsh, chairman of the Department of Psychology, has been named Edward Mallinckrodt Distinguished University Professor of Psychology and Audiology. The announcement was made by Chancellor William H. Danforth.

Hirsh is a member of the prestigious National Academy of Sciences, Hirsh is well-known for his work on hearing and the perception of speech. The Mallinckrodt professorship, which is free and open to the public, is sponsored by WU's George Warren Brown School of Social Work.

Social work leader to talk Oct. 18

Mark G. Battle, executive director of the 6,000-member National Association of Social Workers (NASW), will speak at 1:10 p.m. Thursday, Oct. 18, in Brown Hall Lounge. The lecture, which is free and open to the public, is sponsored by WU's George Warren Brown School of Social Work.

The lecture is free and open to the public.

Labor Department official, will discuss "NASW: Imperatives Approaching 1990s."

Battle joined NASW in June 1984, leaving his post as professor of social services management at Howard University School of Social Work in Washington, D.C., where he was also chairman of its department of macro-specializations.
Thursday, Oct. 11
10:00 a.m. Personal Computing Education Center Short Course, "001 Introduction to Computer Facilities." David Bennett, WU computer specialist. Free to WU community. To register and for location, call 889-5815.

4 p.m. University College Short Course, "Presidential Elections and American Foreign Policy." Henry Berger, WU assoc. prof. of history. Thursday, Oct. 11 (through Nov. 1, same time.) 104 January Hall. Cost is $50. For more info., call 889-6789.

Friday, Oct. 12
7:30 p.m. Inter-Years Christian Fellowship Meeting. Green Staffs Line, Wohl Center.

Saturday, Oct. 13
10 a.m. Tyson Research Center Open House tours hosted by Becky Milter, nature interpreter guide. Sponsored by the Friends of Tyson. (Also 2:30 p.m. Nov. 11 and Dec. 9.) For reservations, call 938-5546.

10:00 a.m. Women's Club members will get free apple-picking at Eckert's in Girard. A bring-your-own picnic will follow. For directions and more info., call Lorena Eger 721-1619, or Mary Wilson, 962-1490.

6:30 p.m. Political satirist Mark Ruskin will tell a 13th Anniversary Founders Day Banquet at the Khorassan Restaurant in the Chase Park Plaza Hotel. Cost is $25 per person. For more info., call 889-5122.

Sunday, Oct. 14
2-4 p.m. Marshall Magnier, a local naturalist, will lead a field trip to collect insects at Tyson Research Center. He will identify and discuss the insects found. Participants will be asked to write up their findings in the office building west of the Raptor Center. Sponsored by the Friends of Tyson. For more info., call 938-5546.

6-7 p.m. "Lewis Center Gala." A dedication ceremony and open house at the Lewis Center. 725 Kingsland Ave., University City. The center houses several of the fine arts. The opening will include an exhibit of recent works of art; WU professor James McGarrell.

Monday, Oct. 15
7:30-11 p.m. WU Go Club Meeting. Third fl., Women's Bldg. Lounge. For more info., call Lou Allerd. 725-9866.

Wednesday, Oct. 17
10 a.m. University College Short Course, "Theater and Drama," 8 and 10 a.m., WU assoc. prof. of Chinese. (Four Thursdays from Oct. 11 through Oct. 25.) For more info., call 889-6678.

7:30 p.m. Inter-Years Christian Fellowship Meeting. Green Staffs Line, Wohl Center.

LECTURES

Thursday, Oct. 11
1:10 p.m. George Warren Brown School of Social Work Colloquium, "Volunteers in Disaster Service." Philip M. Brown, WU doctoral candidate; Calvin Streeter, WU doctoral candidate; Michael Sherraden, WU asst. prof. of social work; and David Gisselbrecht, WU assoc. prof. of social work. Brown Hall Lounge.

2:30 p.m. Dept. of Mechanical Engineering Seminar, "Computer Aided Optimization of Steel Structures." Shojiro Gimbun, Dept. of Engineering, U. of Kansas. 216 Uehara Hall.

Friday, Oct. 12
8 a.m. Dept. of Psychology Colloquium, "Teen is More: The Value of Low Self-esteem." Jane Losteinger, WU prof. of psychology. 102 Eads.

11 a.m. Dept. of Civil Engineering Seminars, "Concrete Structures: Part I." Antonio G. dos Santos, prof. ofcivil engineering. Also sponsored by Monsanto and WU. Carl V. Mour, Aud. 560 S. Euclid.

9 a.m. Dept. of Computer Science, "Success in Ottoman History." Cornell H. Fleischhacker, WU prof. of history. Gerhard Reading Room, Graeme Hall. Also sponsored by Student Life.

Friday, Oct. 19
11 a.m. Departments of Computer Science and Electrical Engineering Seminars, "Parallel Machines and Algorithms for Logic Synthesis." Mark A. Franklin, WU prof. of electrical engineering and computer science. 509C, Bryn Mawr.

11:30 a.m. Biomedical Engineering Program Seminar, "The Spirit of Antiquity: Giovana Battista Piranesi, Roberts-Corliss Field Center." George Friman, Bixby Gallery, 700 S. Euclid Ave.

2:30 p.m. McDonald Lab for Psychical Research Seminar, "What Do You Do With a Flawed Experiment?" Michael A. Thalbourne, research assoc. at McDonald Lab 117 Eads.

PERFORMANCES

Friday, Oct. 19
8 p.m. The WU German Department and the Goethe Institute will sponsor a Liedertafelabend, "an evening of song," featuring lyrics by Goethe, performed by soprano, Karin Beutter, and tenor and baritone, Kay Beck. Ilona Schwarz, WU Rosa May Distinquished University Professor in Humanities and professor of German, will lecture on Goethe's poetry. Reception following. Steinberg Auditorium.

Free.

8 p.m. The WU Performing Arts Area and Department of Music Present "The Three-penny Opera" at Edison Theater. The production is directed by Joseph Rieuch, chairman of the FAA. (Also Oct. 20, 26 and 27, same time. Edison.) General admission is $4; WU faculty, staff, students and other students, $3. For more info., call the Edison Theater box office at 889-6545.

Out. 11-20


EXHIBITIONS

"Old Master Prints," Through Oct. 28. Gallery of Art, print gallery. 10 a.m.-5 p.m., weekdays. For evening hours, call 889-5490.

"From Aiken to Zukofsky: An Exhibit in Celebration of 20 Years of Collecting," Oct. 15 to Nov. 1. Open Library, 5th level. Special Collections. 8:30 a.m.-5 p.m., weekdays.

"Modern Art from the Permanent Collection," Through Nov. 4. Gallery of Art, upper gallery. 10 a.m.-5 p.m., weekdays. For evening hours, call 889-5490.

"U.S. Presidents and Politics," Oct. 15 to Nov. 3. Open Library, 5th level. Regular library hours.

"Classics in the Neurosciences," WU School of Medicine; Medical Library Annex. 615 S. Taylor. Through Dec. 31. Open weekdays, 8:30 a.m.-5 p.m.


"The Spirit of Antiquity: Giovana Battista Piranesi, Roberts-Corliss Field Center," Through Nov. 25. Gallery of Art, lower gallery. 10 a.m.-5 p.m., weekdays. 15 p.m. weekends. For evening hours, call 889-5490.

SPORTS

Saturday, Oct. 13
1-6:45 a.m. Men’s Cross Country, WU Invitational. Forest Park.

1:30 p.m. Football, WU vs. Washburn College, Francis Field.

Sunday, Oct. 14
1:30 p.m. Soccer, WU vs. Grinnell College, Francis Field.

Wednesday, Oct. 17
2:30 p.m. Volleyball, WU vs. Missouri Southern.

Thursday, Oct. 18
7 p.m. Women’s Volleyball, WU vs. Webster University, Francis Field.

Saturday, Oct. 20
1 p.m. Women’s Tennis, WU vs. Ill. Central. WU Tennis Courts.

2 p.m. Women’s Volleyball, WU vs. Millikin. U. Women’s Bldg.

Calendar Deadline

The deadline to submit items for the Nov. 1-10 calendar of the Washington University Record is Oct. 18. Items must be typed and state time, date, place, nature of event, sponsor and admission cost. Incomplete items will not be inserted. If available, include speaker’s name and identification and the title of the event; also, name of institution and telephone number. Address items to King McElroy, calendar editor, Box 1142.