It is generally believed that the ancient Greeks were only theoreticalists and not experimentalists, Dimarogonas says. "With many philosophers this is true, but it is not applicable to everyone — certainly not Pythagoras nor Archimedes, nor Heron. The sciences of mathematics and mechanics and the theory of vibration, a subdivision of mechanics, were defined rigorously in the middle of the first millennium B.C. by Pythagoras and others. There is a small, but adequate body of literature to illustrate this."

"This is a surprising and illuminating find... it is the first time the word laboratory has been associated with one of the old boys."

— Richard Hartenberg
Northwestern University

Dimarogonas cites a passage by Boethius that describes a legendary incident in which Pythagoras (circa 570 to 479 B.C.) passed a metal shop — perhaps a precursor to the village smithy — and was struck by the different tones made by the striking vibrations of hammer on metal. Pythagoras conducted an impromptu experiment, finding to his surprise that the different vibrations were not a result of the variations in strength of the men swinging the hammers (the excitation), but rather the different sizes, or mass of the hammers.

He weighed the different hammers and noted their ratios and their relationship to sound consonances, establishing, says Dimarogonas, integer fractions and multiples of basic sounds made by musical instruments, as well as a rational method of measuring sound frequencies.

"Pythagoras employed the experimental method, upon which all science is based, and proved the natural frequency of vibrating systems. Furthermore, when he realized that the various tones were made by different hammer sizes and not the difference in arm strength, he conducted further experiments to prove that the natural frequency of a system is a property of that system and not something dependent on external excitation."

This last theory, which applies to any physical system, was previously thought to have been expounded only in the past 300 years, starting with Galileo's observation of the isochronism, or time-measuring property, of the pendulum. Not until the late 19th century, with the writings of British scientist Lord Rayleigh, was the theory explicitly stated.

Boethius also describes Pythagoras' later work in his home with several simple systems such as vibrating strings, pipes, vessels and circular plates and the dependence of their natural frequencies on dimensions as further proof that the Greek perfectly developed a laboratory to test sound and vibration principles. A drawing from Boethius' work shows Pythagoras happily hammering a series of bells in front of the public, which Dimarogonas had a laboratory, Dimarogonas assures.

Rarely recorded science
"This is a surprising and illuminating find," says Richard Hartenberg, Ph.D., professor emeritus of mechanical engineering at Northwestern University, who for 29 years has conducted further experiments to prove that the natural frequency of a system is a property of that system and not something dependent on external excitation.

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Economics scholar to give lecture; conference honors Minsky's work

Award-winning economics scholar and author Benjamin M. Friedman will discuss "Risks in Our High-Debt Economy: Depression or Inflation?" at 11 a.m. Friday, April 20, in Graham Chapel. The lecture, part of the Assembly Series, is free and open to the public.

Friedman, the William Joseph Maier Professor of Political Economy at Harvard University, also will be the keynote speaker at an April 20-21 conference that honors the work of Hyman Minsky, a professor of economics at Washington University. The conference, which focuses on financial risk, government policy and macroeconomic performance, is expected to attract more than 35 of the nation's leading economics scholars.

Minsky, an authority on monetary theory and financial institutions, is known for his interpretation of Keynesian theory as a prologue to his analysis of business cycles and for popularizing a principle, in this case the business cycle, that he has become conscious of the roots of these developments. Minsky, who died of a heart attack in 1997, was known for his interpretation of many of the nation's leading economics scholars. His work has been influential in the development of modern economic theory and policy.

"Minsky was a visionary thinker who pioneered many of the ideas that have become central to modern economics," Friedman said in a statement. "He was a brilliant analyst who was able to see the big picture and put it all together in a coherent framework. His work has been influential in shaping the way we think about the economy and its role in society."

Friedman is author of several books, including the 1998 Day of Reckoning: The Consequences of American Economic Policy Under Reagan and After, for which he received the George S. Eccles Prize from Columbia University for excellence in writing about economics. Friedman's research has focused on financial markets and monetary and fiscal policy.

Friedman is director of financial markets and monetary economics research at the National Bureau of Economic Research. He also is a member of the Brookings Board of Economic Activity and the Council on Foreign Relations. A former Marshall Scholar at Cambridge University, Friedman worked with the Morgan Stanley & Co. investment banking firm before joining Harvard's faculty in 1972.

For information on the lecture, call 889-4620. For information on the conference, call 889-5632.

Two art workshops will be offered

Two workshops, one on "seeing more color," and the other on landscape painting, are being offered by the University's Fine Arts Institute. Both programs are designed for adult artists in the local community.

Phyllis Patten, an artist whose watercolor and oilstick still lifes can be seen in St. Louis' Lucien Gallery, the Missouri Botanical Garden and the St. Louis Art Museum, will conduct the "Seeing More Color" workshop from 9 a.m. until noon on Mondays, Wednesdays and Fridays, May 30-June 18, in Bixby Hall. Patten has been a faculty member of the School of Fine Arts for 32 years. This is the last summer school class he will teach before retiring. Registration is $225 and must be received by April 15.

For more information on either workshop, call the Fine Arts Institute at 889-4043.

Science lab

a laboratory appearing this early that I know of. And it is the first time the word laboratory has been associated with one of the old boys.

Literature, or the lack of it, is what makes between the Pendulum's properties and advancing its applica-

Understand that is subject to different oscilla-

tions and, at times, involving the apparatus. But Dimarogonas contends that the pendulum was known and used by the ancient Greeks long before Galileo measured its motion in the 17th century. The pendulum and its variants are major components of a wide assort-

ment of machinery, most notably the clock. It is known to everyone who has read the "Pendulum," or the "Pendulum," or observed catapaults in action in "Spartacus," "Cleopatra" or any of the lesser sixties in movies of that genre.

"To say Galileo is the inventor of the pendulum is quite simply absurd, just as it is erroneous to say Newton developed his own laws of physics on his own, when these of some laws were ready were written by earlier Greeks and other ancients," Dimarogonas says. "Yet this is all too often the way history is depicted in texts. Both men should be credited with making their principles known and under- standable to many. But we must be conscious of the roots of these developments."

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NOTABLES

Shirley K. Baker, dean of university libraries, has been appointed to serve on the Association of Research Libraries’ Committee on Bibliographic Control. The three-year appointment calls for participation in examining issues and setting future activities for the association.

Mario A. Blanc, Ph.D., assistant professor of Spanish, chaired three sections of "The World of the 19th Century Peninsular Literature" at the CHISPA in New Orleans, "Peninsular Literature" at the Mountain Modern Language Association Conference in Las Vegas and "The Persian Narra- tive" at the Mid-West Regents Conference at the University of Kansas.

Dorsey D. Ellis Jr., J.D., dean and professor of law, was a panelist at the Deans’ Workshop on "Legal Education and Admission to the Bar at the mid-winter meeting of the American Bar Association." The meeting focused on "Enhancing Numbers and Opportunities in Law Schools and in the Profession."

Raymond L. Hilgert, D.B.A., professor of management and industrial relations at Washington University, was selected as "Motivation and Leadership Styles," as part of a special development program for Wash- ington University’s Division of Student Affairs.

Marae Kun, Ph.D., director of undergraduate business student services in the John M. Olin School of Business, moderated the session on "Perspectives for Professorial and Executive Students" at the annual confer- ence of the Professional Council on Educational Advising in Houston.

Van McElwee, instructor in the Performing Arts Department, had the broadcast rights to a videotape "Inside" purchased by Canal in Paris, France. The work will be shown in France, Monaco and Switzerland for six months. The Downtown Community Televi- sion Network, in New York, has purchased two of McElwee’s works in March.

James McCarrell, professor of fine arts, had his works exhibited through the Arts in a Public Place program at the Adams Gallery in New York City. Exhibited works included one large canvas and mixed media drawings on monotypes, which were executed while he was a student at the University of Kansas.

P. Jean Milburn, assistant dean and director of MBA admissions and financial aid in the John M. Olin School of Business, recently was appointed a director of the Conserva- torium for Graduate Study in Manage- ment at the Conservatorium in 1967 at Washington University by Sterling Schoen, Ph.D., emeritus professor of management, who feels "many university efforts should form a network" to encourage students at the graduate level and become business managers. Milburn also is advising the selection committee for the first catalog of the newly established Kenyon Institute; jointly sponsored by the Graduate Management Admission Council and the National Association of College of Business to encourage high school minority students to consider a business career.

Gloria W. White, vice chancellor of personnel at Washington University, is the director of the Personnel Accreditation Institute’s (PAI) board of directors. PAI is a research and accrediting non-profit organization founded by and affiliated with the Society for Human Resource Management (SHRM). PAI exists to recognize human resource professionals who have, through demonstrated professional experience and the passing of a rigorous examina- tion, the institute’s defined standards as a professional in human resource or a master professional in human resources. SHRM is the world’s largest professional membership organization dedicated exclusively to the advancement of human resource management.

Gerbild Schole Williams, Ph.D., professor of German and comparative literature and chair of the German department, presented papers on early modern German literature at the 16th-century Studies Conference in Minneapolis and the annual confer- ence of the Modern Language Asso- ciation in Washington, D.C. She also will talk on early modern German and French literature at the 25th annual meeting of the Modern Language Association being held in Toronto this month and at a conference on Early Modern Languages and Professions in the Early Modern Period organized at Amherst College. She has been invited to be a visiting scholar at the University of Lausanne, Switzerland, in June 1990. During that time, she will work and meet with students and colleagues in early modern studies. She also will participate in a conference on late medieval didactic literature at the University of Lausanne and St. Gallen, Switzerland.

Dr. Stuart D. Yoak, Ph.D., university registrar, delivered a presentation at a recent meeting of the Association of Collegiate Schools of Business. The address concerned the number of data and the security needs associated with student record data.

Have you done something noteworthy recently?

Have you: Presented a paper? Won an award? Been named to a committee or elected to an officer of a professional organization? Received a grant? Published a book? Won an award? Won a grant? Exhibited work at an exhibition? Spreads the good news. Contributions regarding faculty and staff achievements are gladly accepted and encouraged. Send a brief note to: Anthony Koe, The Record, 1-5 p.m. weekdays and 1-5 p.m. weekends. Include a phone number.

Business school will present four alumni awards and Dean’s Medal

The John M. Olin School of Business will present four distinguished alumni awards annually as well as the school’s Dean’s Medal during a dinner on April 18 at the new Ritz-Carlton Hotel in Clayton. The Dean’s Medal of Exceptional Service to the school will be presented to Vernon W. Piper, B.B.A. ’35, and his wife, Marion K. Piper, who manage 22 overseas offices that together have provided $200 million redevelopment of an urban center in San Jose, Calif., has been the cornerstone of his 24-year career. His firm recently moved into hotel development, ownership and manage- ment. For more information on the dinner, call Jill Williams at 889-5872.

Award-winning poetry critic to give talk

Helen Vendler, William R. Kenan Jr. Professor of English and Language and Literature at Harvard University, will give the Phi Beta Kappa/Sigma Xi lecture at 11 a.m. on Wednesday, April 18, in Graham Chapel.

The Vendler’s lecture, titled "Some Phi Beta Kappa Poems," is part of the Assembly Series. The lecture is free and open to the public.

Vendler, who is the first woman to receive a university chair at Har- vard, is a leading critic of English poetry. Her essays have appeared in the New Yorker and the New York Review of Books. She has been a judge for the Poli Biannale Prize and for the Guggenheim Foundation awards in literary criticism.


U.S. poet laureate and Edward Mallarckid Distinguished University Professor of English at Washington.

The official St. Louis Earth Day celebration will be held on the national April 22 date in Forest Park.

Earth Day

Public awareness is a good start- ing point," emphasizes Sari, "but action is what’s necessary to ensure the planet’s safety for the generations to come. We need an Earth Day everyday.”

The father who comes home for the holidays finds himself absorbed in the evening providing counsel to a group of endangered species, says an article in the Feb. 19 New York Times. For various reasons, the father has no time to listen to his Conway-West, Long, instructor of women’s studies, and his wife’s heart and minds of today’s fathers are in the right place — if only their bodies could be there. The story also appeared in the Detroit Free Press on Feb. 20, the Portland Oregonian Feb. 21 and the Post Dispatch Feb. 23.

Fine arts graduate students display work

Paintings, prints, sculptures and glasswork by Washington University Fine Arts graduate students are on exhibit through March 15 at the Gallery of Art in Steinheil Hall. The exhibit, entitled "Retrospect: a display of works that marks the end of their formal training and the beginning, for most, of their professional careers."

The free exhibit, titled "MAF ’91," features works by six of this year’s degree candidates: painters Charles Caldeymore and Shelton Hendrickson; sculptors Ronald Stephen Gurowitz, and Moira Lewis; glassmaker Ben- jamin Menghie; and printmakers Robin W. Rubin, B.S.B.A. ’48, is chairman of the executive board, Rubin, Brown, Connors, & Co., the largest one-office accounting firm outside of New York and Chicago. The firm has grown from a partnership that Rubin formed in 1952 to become the 58th largest accounting firm in the country. Wolf, M.B.A. ’81, is managing partner, Wolf-Seamon-Battery, a leader in the real estate development business. Wolf’s award-winning $200 million redevelopment of an urban center in San Jose, Calif., has been the cornerstone of his 24-year career. His firm recently moved into hotel development, ownership and manage- ment. For more information on the dinner, call Jill Williams at 889-5872.
**LECTURES**

**Thursday, April 12**

9:30 a.m. Dept. of Internal Medicine 14th Annual J. Jerome Fiance Visiting Professor of Medicine, "Affl A 1 Antithrombin Deficiency: Mutations, Current Therapy and Strategies for Treatment," Po-Ying Chen, chief, pulmonary branch, National Heart, Lung and Blood Institute, National Institutes of Health, Clinton Amphitheater, 950 Auditorium Ave., WU.


4 p.m. Assembly Series Lecture, "The Way of the Sun: From Rejection to Acceptance," Alice Erh-Tsai Yeh, Chair, Professors of Science Policy and Management. Room 103 McMillan Hall.


**Friday, April 13**


11 a.m. Dept. of Cell Biology and Physiology Seminar, "Regulation of Muscle Properties by Brain-Derived Neurotrophic Factor," by J. Simon Hall. Room 458 Louderman.

12:15 p.m. New York University Delacorte Theater "Fang Lizhi, Science and Democracy," at 8 p.m. Monday, April 16, at 9:30 p.m. Both Sun. films can be seen for the double feature price of $3. Both films can be seen for $3, Brown Hall.

6:30 p.m. Dept. of Romance Languages and Literatures Film Series, "The Road to Utopia," performed by the Hillel Jewish Student Association. For more info., call 727-8255.

**Saturday, April 14**

11 a.m.-3 p.m. Olin Library, level 5. 8:30 a.m.-5 p.m. weekdays. "Exhibition of works by juniors in the University's Visiting Artists Program," by electronic mail to p72245ac at WUVMC. If available, include speaker's name and identification number, place, nature of event, sponsor and admission charge. For more info., call 727-6674. "Exhibition of works by juniors in the University's Visiting Artists Program," by electronic mail to p72245ac at WUVMC. If available, include speaker's name and identification number, place, nature of event, sponsor and admission charge. For more info., call 727-6674. "Exhibition of works by juniors in the University's Visiting Artists Program," by electronic mail to p72245ac at WUVMC. If available, include speaker's name and identification number, place, nature of event, sponsor and admission charge. For more info., call 727-6674.

**FILMS**

**Friday, April 13**

7 p.m. Dept. of Romance Languages and Literatures French Film Series, "Le Reveur les Enfants." Free. Language Lab, Room 210 Ridgley.

7 p.m. Filmboard Series, "The Bicycle Thief," 12 Brown Hall.

8 p.m. Filmboard Series, "Fang Lizhi, Science and Democracy," at 8 p.m. Monday, April 16, at 9:30 p.m. Both Sun. films can be seen for the double feature price of $3. Both films can be seen for $3, Brown Hall.

**Sunday, April 15**


8 p.m. Edson Theatre "OAVATIONS!" Series Presents "Psycho," screened by the WU Film Department. For more info, call 889-9574.

**Wednesday, April 18**

7 p.m. and 9:30 p.m. Filmboard Series, "Antima and Od Last," the WU Film Series. "Antima and Od Last," the WU Film Series. "Antima and Od Last," the WU Film Series.


**Thursday, April 19**

12 p.m. Women's Tennis, WU vs. DePaul U. Kelly Baseball Field.

12 p.m. Friday, April 20

11 a.m. WU Varsity Golf, WU vs. St. Louis University.

3 p.m. WU vs. Principia College Tennis Center. WU Tennis Center.

**Friday, April 20**

6:30 p.m. Newman Center Good Friday Liturgy. Newman Center Chapel. For more info., call 725-3954.

Saturday, April 21

5:15 p.m. Newman Center Holy Thursday Liturgy. Newman Center Chapel. For more info., call 725-3954.