Employment Committee Solicits Resumes

The CSW Employment Committee is accepting résumés of experience for its employment file, which is now in operation. Grant C Edwards, Committee co-chairman, states that many Washington area employers in the chemical field have indicated willingness to use the file in filling vacancies.

Job seekers may use their own discretion in composing résumé statements, since the Committee has decided against use of a standard format. However, all statements should include information on the age, sex, education, and marital status of the applicant The description of experience should emphasize the positions most recently held. The Committee requests that résumés be limited to two pages, unless the candidate has had over 20 years of experience

All résumés and requests for information should be sent to

Grant C. Edwards, Co-chairman
CSW Employment Committee
c/o Harris Research Laboratories
6220 Kansas Ave., N E
Washington 11, D C

Committee Appointments Announced

Three appointments to committee chairmanships were recently announced by CSW President William J. Bailey.

Anthony M. Schwartz of Harris Research Laboratories is chairman of the Committee on Professional Relations and Status of Chemists, succeeding Amos G. Horney

Sister St. John Nepomucene of Trinity College is chairman of the Committee on Education, succeeding Lloyd N Ferguson

Charles L Gordon of the National Bureau of Standards is chairman of the new Special Committee on Tellers.

Committee chairmen are Robert S Tipson, Programs, Ronald B. Ross, New Members, Frederick A. H. Rice, Membership, and Willard D Hubbard, Entertainment.

Sun-time Replaced by Atomic Clocks

By R. Stuart Tipson
National Bureau of Standards

Since the beginning of civilization, the motions of the sun, earth, moon, and stars have served mankind in measuring the passage of time. Mean solar time is based on measurement of the earth's rotation about its axis, and is found by observing stars as they transit across the meridian. However, until recently, the most uniform time-intervals available were those derived from astronomical observations of the orbital period of the earth Such time, known as ephemeris time, is derived by observing the revolution of the moon around the earth and is more precise than mean solar time because it is independent of the earth's rotation, which varies slightly from time to time Ephemeris time has been measured with a probable error of 2 parts in 10^9 over a three-year period, for longer measurement times, a higher precision is expected

In 1956, the International Committee of Weights and Measures adopted the ephemeris second as the fundamental unit of time, and four years later, the General Conference on Weights and Measures affirmed this action.

However, timing accuracies of better than 1 part in a billion are now needed in the tracking of satellites, the control of long-range rockets, astronomical observations, and radio communication To meet this ever-increasing need for greater accuracy, the National Bureau of Standards has been investigating atomic-frequency standards, which are orders of magnitude more precise than the rotation of the earth for time-interval determinations The cesium-beam standard is essentially an atomic-beam spectrometer excited by a crystal oscillator driving a frequency-multiplier chain The separation between the oscillating fields inducing the atomic transition is 164 cm. and the spectral line width is 90 to 140 cycles per second. There is an interaction between the magnetic moment of the nucleus and the magnetic field produced by the valence electron. The nuclear dipole moment precesses rapidly in the field supplied by the electron One group of hyperfine structure levels is associated with one direction of the electron dipole moment, and the other, with the opposite direction, if the atom makes a transition from the upper to the lower level, a quantum of energy is released, and, in the reverse situation, a quantum is absorbed. The spectrometer emits a signal only when the excited atoms go through a quantum transition. The exciting signal from the frequency-multiplier chain has a frequency almost equal to this transition frequency so that, if there is an output from the spectrometer on excitation by the signal generator, the generator frequency must be the same as the transition frequency of the cesium atom. When the spectrometer output is at a peak, the frequency of the signal generator is known within ± 0.2 cycles per second or 2 parts in 10^{11}. The separations of the quantum states of an isolated atom are constant with time, and provide a stable, reproducible standard of frequency and time interval when there is a very small perturbation of the atomic system.

Comparisons have been made between two dissimilar cesium-beam, atomic-frequency standards, and it was found that beam devices in which the oscillating fields in each are 55 cm. apart can have precisions of ± 2 parts in 10^{12} over a period of a few hours. The frequency difference between the two machines was $1\,0 \times 11^{-11}$, and this remained constant within $\pm 2 \times 10^{-12}$ over a 9-month period By improving the machine, greater accuracy (by at least one order of magnitude) will probably be achieved.

Radio transmissions from NBS and other stations are controlled by master quartz-oscillators and are now being monitored by the cesium-beam frequency-standards Corrections to be applied to the frequencies broadcast are supplied on

Kistiakowsky to Receive Parsons Award

George B. Kistiakowsky of Harvard University, former special assistant to President Eisenhower for science and technology and an international authority on the science of explosives and explosions, has won the American Chemical Society's 1961 Charles Lathrop Parsons Award for outstanding public service.

Professor Kistiakowsky will be the fourth to receive the award, which is given not oftener than every three years to a member of the Society The previous recipients were Charles L. Parsons (1952), former secretary and business manager of the ACS; James B. Conant (1955), former president of Harvard University; and Roger Adams (1958), professor emeritus at the University of Illinois

The award consists of a scroll and the privilege of choosing the recipient of a $2,500 scholarship for graduate study in chemistry, chemical engineering, or some related field It will be presented to Professor Kistiakowsky on December 9, at a dinner meeting of the Society's board of directors in the Statler Hilton Hotel. ACS members and the public are invited Dinner reservations may be made with Ronald M Warren, at ACS Headquarters, 1155 16th Street.

As a member of the Science Advisory Committee, Professor Kistiakowsky has been one of the administration's chief scientific advisors in the ballistic missile program. He was on the von Neumann committee, which, in 1954, made the decision that the United States should embark on a top priority program to develop an intercontinental ballistic missile He also was one of the three U.S delegates in Geneva in 1958 for the East-West talks on prevention of surprise nuclear attack

Prior to Professor Kistiakowsky's appointment as presidential advisor, he had performed many Government services. He headed the explosives division of the National Defense Research Committee in 1940, and in 1944 was chief of the Explosives Division of the Los Alamos Laboratory of the Manhattan District, where he supervised the preparation of the explosives necessary to detonate the first atomic bomb Professor Kistiakowsky is widely known in the chemical profession for his achievements in chemical kinetics, molecular spectroscopy, and the thermodynamics of organic molecules

The new Parsons Award winner has received several high honors—including the Medal of Freedom, one of the nation's highest civilian awards, in recognition of contributions to the national security. He also has won the Naval Ordnance Development Award, the Exceptional Service Award of the U.S. Air Force, The King's Medal (British) for service in the cause of freedom, the Nichols Medal of the ACS New York Section, and the Willard Gibbs Medal of the ACS Chicago Section.

Honorary doctor of science degrees have been conferred upon Professor Kistiakowsky by Harvard, Williams College, Oxford University, and the University of Pennsylvania.

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a regular basis for those requiring the most precise frequency information. In terms of the ephemeris second, this frequency of the cesium transition is 9,192,631,770±20 cycles per second, and the probable error of 2 parts in 10^9 results from inaccuracy in the astronomical measurements For maintaining the constancy of the broadcast frequencies, the frequency of the transition is assumed to be exactly 9,192,631,770 cycles per second The precision of measurement for the atomic standards over a two-minute period is two orders of magnitude better than astronomical measurements made over a period of three years.

PR&S Notes

As announced elsewhere in this issue, St John Nepomucene, head of the Chem Department at Trinity College, has bee pointed chairman of the CSW Committ Education to fill the unexpired term of N Ferguson In taking up her Com duties, Sister St John has prepared the fo ing statement expressing her views on c activity in the field of aid to science educ —Ed

When the head of the chemistr partment in a small college (some over 700 students) in Washington ceeds as chairman of the Committe Education the heads of departmen large universities (with thousands) wishes to express the gratitude fel the aids to education received by colleges. They come primarily fro Government, industrial laboratories, the large universities, as well as fro Joint Board on Science Education. E rience has shown that from these so may be obtained speakers for class clubs, consultation and advice needed, and trips through an almos finite variety of laboratories with sp ists helpfully explaining the aim method of work and details of the intricate apparatus.

The National Science Foundatio special source, has wisely placed stre improvement of high school teaching by grants for teaching and research tutes in the history either of science chemistry itself, or in actual course in chemistry, the teacher in the college can broaden, deepen, and kee to date the knowledge to be passed From several sources, notably the and our ACS Petroleum Research F grants for research by undergraduate initiate a chain reaction whose re show only in alumni files. Some o smaller colleges have shared in the grants and the Mobile Laboratory Oak Ridge. At Trinity we are pa larly conscious of the Mobile Labora as it was on our campus for two w So with a grateful heart the new chai starts to work with the Committee, w aims to improve the caliber of teachi the colleges and high schools o greater Washington area.