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119th AAAS MEETING

St. Louis, Mo., December 26-31, 1952

The list of hotels and their rates and the reservation coupon below are for your convenience in making your hotel room reservation in St. Louis. Please send your application, not to any hotel directly, but to the AAAS Housing Bureau in St. Louis and thereby avoid delay and confusion. The experienced Housing Bureau will make assignments promptly; a confirmation will be sent you in two weeks or less. Share a room with a colleague if you wish to keep down expenses. Mail your application now to secure your first choice of desired accommodations. All requests for reservations must give a definite date and estimated hour of arrival, as well as date and approximate hour of departure.

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<th>HOTELS AND RATES PER DAY</th>
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<tr>
<td><strong>Hotel</strong></td>
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<tr>
<td>CHASE</td>
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<tr>
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<tr>
<td>JEFFERSON* D</td>
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*Hotels starred have sessions in their public rooms. For a list of the headquarters of each participating society and section, please see Association Affairs, Science, July 25, or The Scientific Monthly, August.

D = downtown hotel; the other hotels (not downtown) are for the mathematicians primarily.

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J. G. HUTTON  

**Plant Control:** The control of processes by remote and automatic means may be said to have had its beginning with the birth of the electron tube and hence the electronics industry. The almost instantaneous receipt of an electric signal, even at a considerable distance from its source, and the ease with which many physical and chemical changes can be converted into electrical impulses, opened the way for automatic control even in the most complicated processes.

In the petroleum and chemical industries many attempts have been made in recent years to provide new and improved methods for determining accurately both qualitatively and quantitatively the composition of mixtures in either gaseous or liquid form.

Perhaps the most versatile, and as a result, the most useful of the methods, is that based on the principle that certain materials selectively absorb infrared radiation. By comparing an unknown mixture against a standard, analyses can be made. In the case of hydrocarbon mixtures the technique can not be extended beyond those containing six or more carbon atoms, however.

The mass spectrometer in contrast can be used for the analysis of most mixtures whose components are fully vaporized at a pressure of some 40 microns at normal temperature. Its range of usefulness may be extended by heating the sample introduction system, the upper temperature being limited only by the thermal properties of the material of the system. By this relatively simple expedient, hydrocarbon mixtures containing components with 40 carbon atoms have been analyzed. Except for the high initial cost, delicaey and bulk, the mass spectrometer would be directly useful for process control.

Such objections may be overcome by the use of a mass spectrometer utilizing the cyclotron resonance principle. The tube is positioned in a uniform d-c magnetic field and an rf voltage applied to suitable electrodes to produce a periodically varying electric field whose axis is perpendicular to the magnetic field. Ions are produced in the analyzer region of the tube by bombardment of neutral gas molecules with an electron beam whose axis is coincident with the magnetic field. Under the influence of the combined electric and magnetic fields, the ions are accelerated and have an orbit of increasing radius—an Archimedes spiral. When the natural period of an ion of given mass is equal to the periodicity of the electric field, the particle assumes a resonant condition and acquires sufficient radial displacement to be absorbed or collected by a suitably placed electrode. Particles of different mass, having a different natural period, will not resonate. As a result such particles will be out of phase with the electric field and will not gain sufficient energy to reach the collector. By varying the electric or magnetic fields, or both, ions, representative of all molecules in a gaseous mixture, may be separated and collected.

F. E. CREVER  

**Bit Weight Control:** The improvements in control components and techniques of analyzing control systems in the past decade have made precise control of power equipment practical for industry generally. It is no longer considered sufficient to provide power equipment to augment man’s efforts; rather, the convenience of automatic and precise control is often desired. Typical of this trend is the General Electric automatic bit weight control for rotary drilling. Not only does the system provide a means of handling the hundreds of thousands of pounds of piping, but also it provides an automatic system to regulate the weight on the bit and to limit the speed of the lowering of the bit. This is provided through two simple settings of the quantities involved on knobs provided for the operator. The system utilizes the regulating properties of the amplidyne generator controlling power equipment to perform these functions. More recently amplistsats have been developed so that the advantages of static regulating equipment are being applied to the many control applications necessary to continued progress in industry.

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