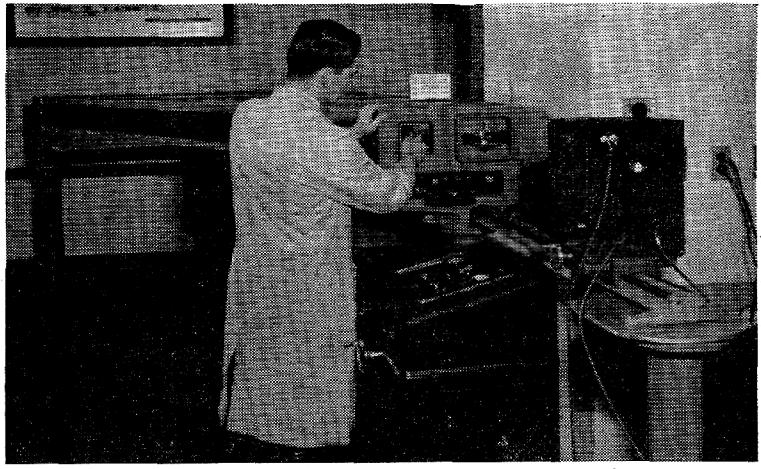


The Rotator (black box on table) was developed by FBI scientists of the serological unit to process blood samples



A grating spectrograph is used by an FBI scientist in examining evidence gathered by law enforcement officers

LABORATORY OF THE MONTH

• Analytical chemistry keynotes FBI crime laboratory work

A STEPPED-UP program involving the use of both infrared and ultraviolet spectrophotometers is under way as the Federal Bureau of Investigation Laboratory starts its 23rd year of service to law enforcement.

The million-dollar FBI installation with a staff of about 100 scientists and engineers, 35 technicians, and 35 clerical and administrative employees is a far cry from the laboratory of December 1932, which FBI director J. Edgar Hoover started with a technician and a microscope. Today this criminological laboratory is one of the largest in the world.

While the examining of physical evidence is the primary function of the laboratory, only about half of its time is devoted to this work. The need to keep abreast of new developments has required allocation of considerable time to research, development, and engineering on new equipment, processes, techniques, and training programs.

There are seven units in the Physics and Chemistry Section: the serological, chemistry and toxicology, spectrographic, petrographic, metallurgical, firearms, and hairs, fibers, and fabrics units. Other sections are devoted to documents and electronics.

With the recent acquisition of the newest infrared and ultraviolet spectrophotometric equipment and special color instruments, FBI scientists are beginning to explore the wide range of potential applications of such equipment. This is in addition to electron microscope and x-ray diffraction equipment. While much has been accomplished, one FBI scientist feels that the application to forensic science of such modern instrumentation has barely scratched the surface.

FBI scientists maintain close liaison with manufacturers of scientific apparatus and equipment to see how their new instruments may be applied to the unique situations encountered in law-enforcement work. In some cases the FBI has set up specifications for equipment which later have been used in entirely unrelated applications by industry. A high-power comparison microscope is typical.

In other cases, FBI scientists and engineers have designed and built equipment not obtainable elsewhere. Some of these, it is believed, may have potential applications in industry.

In addition to designing and engineering new equipment and apparatus, much research is devoted to developing specialized techniques and processes required for criminological

work. Standard procedures of classifying blood as to its human or animal source and its type, for example, do not envision work with months-old, dried, and dirt-contaminated blood in minute samples. The FBI has had to develop techniques to handle such samples.

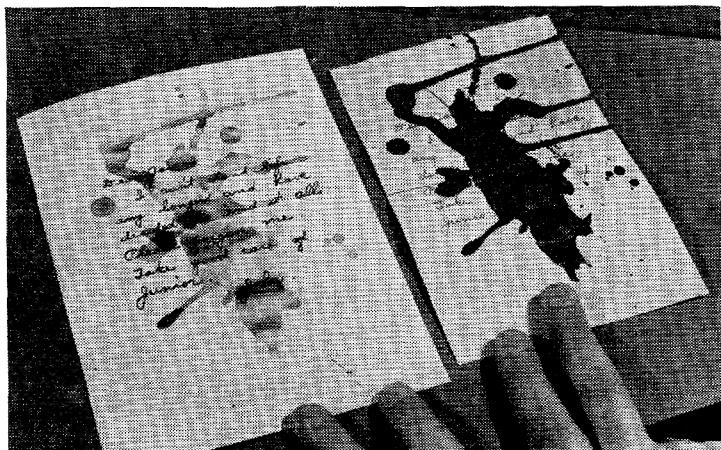
In a broad sense, every one of the seven units of the Physics and Chemistry Section is an analytical laboratory. In the serological unit, blood and other body fluids are analyzed. In the hairs, fibers, and fabrics unit, components of such materials are determined by physical and chemical means. The firearms unit does ballistic and explosives examinations.

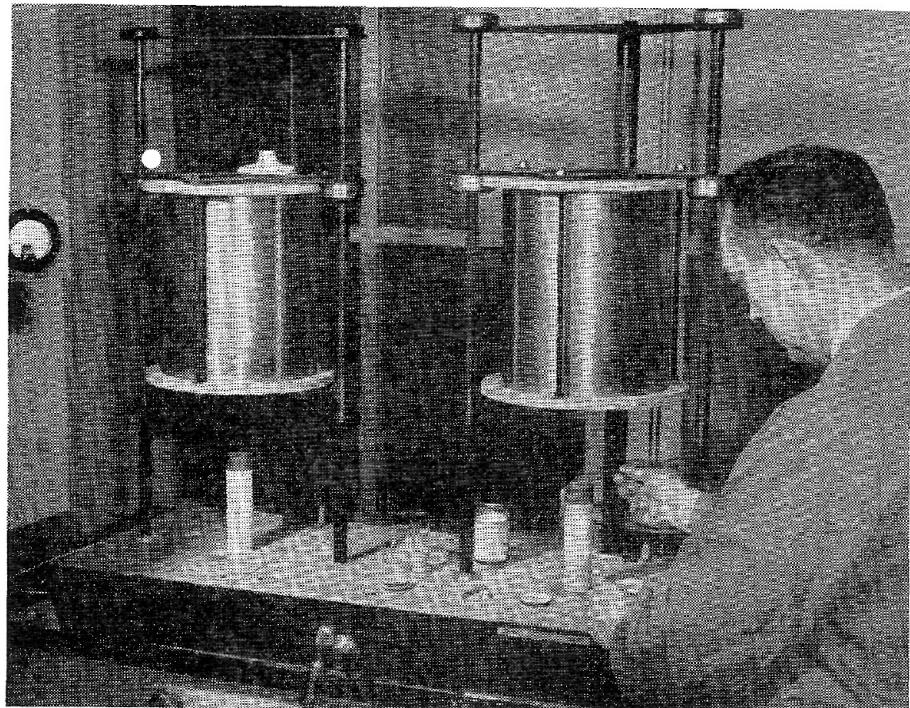
The chemistry and toxicology unit does all types of macro- and microanalyses. The spectrographic unit handles the minute samples. In the petrographic unit, analyses are made of minerals, ceramics, and materials used in safes. The metallurgical unit analyzes all types of metals and alloys and has soft x-ray equipment for special investigations.

Except to state that they are using radioactive isotopes in some unique ways FBI scientists decline, for security reasons, to amplify applications of these new tools.

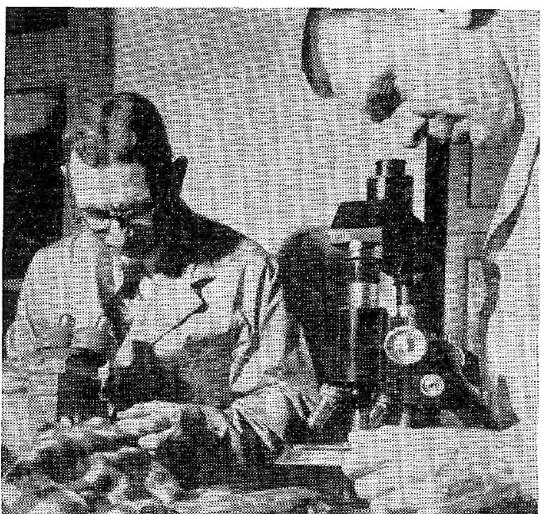
(Continued on page 33 A)

Contents of an ink-stained suicide note are made visible through use of infrared photography





A differential thermal analyzer has been developed by FBI scientists to compare soil samples. The movable steel-jacketed portion is an electric furnace. The samples, placed in ceramic cups, are compared by noting temperatures at which water of hydration and molecularly bound water come off and the temperature at which decomposition occurs



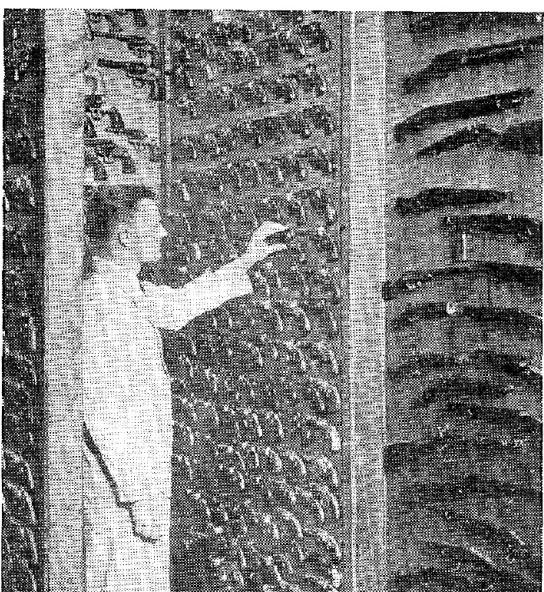
Microscopic examination of hairs and fibers by FBI chemists is part of normal routine in handling many types of evidence



A recording type infrared spectrophotometer, used by FBI chemist, is one of the newest pieces of equipment in the FBI laboratory arsenal to fight crime



A technique in determining the presence of poisons in the extracts of organs as applied in the FBI laboratory



A portion of the firearms reference collection in the FBI laboratory