

## TECHNICAL NOTE

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### A Modern Medical Examiner Facility

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Within the past several years a number of new medical examiner facilities have been completed in Washington, D.C., Phoenix, Arizona, and Los Angeles, California. In July 1976, the Office of the Medical Investigator, an integral part of the Department of Pathology of The University of New Mexico, relocated into a newly completed facility located on The University of New Mexico Health Sciences campus. Within this combined structure, in addition to the offices and laboratories of the state medical investigator (examiner), are all the laboratories supporting the state health and environmental program and shared conference and teaching laboratories. The structure, completed at a cost of \$4.1 million in 1976, contains 740 m<sup>2</sup> (8000 ft<sup>2</sup>) for present medical investigator and medical school autopsy functions, pathology functions, and related teaching and research, and 2700 m<sup>2</sup> (29 000 ft<sup>2</sup>) for other laboratory services. The building is connected by a tunnel with the medical school and affiliated hospital. The area is officially designated the morphology suite because morgues as traditionally designed were repugnant not only to the public but to hospital personnel as well. There is 280 m<sup>2</sup> (3000 ft<sup>2</sup>) of unimproved interior space designated for future expansion, some of which is already being completed for the computer suite.

Considerable time was spent in attempting to design and equip this facility to ensure prompt accomplishment of modern medicolegal examinations. Several of the unusual features are presented so that they might assist others designing or equipping similar facilities.

#### **Basic Design**

Since much of the work for the medical investigator program is conducted by specially educated paraprofessionals, including investigators and pathologists' assistants, the designers of the facility took this into consideration from its inception (Fig. 1). Based on the kiva concept, the main examining room, spacious enough to accommodate selected groups of medical students, house officers, attending physicians, or paraprofessional and law enforcement students during the course of routine examinations, is virtually surrounded by the ancillary laboratories and offices. In these the paraprofessional personnel, when not engaged in assisting during autopsies or directly related duties, may perform several other

Received for publication 29 Dec. 1976; revised manuscript received 9 May 1977; accepted for publication 27 May 1977.

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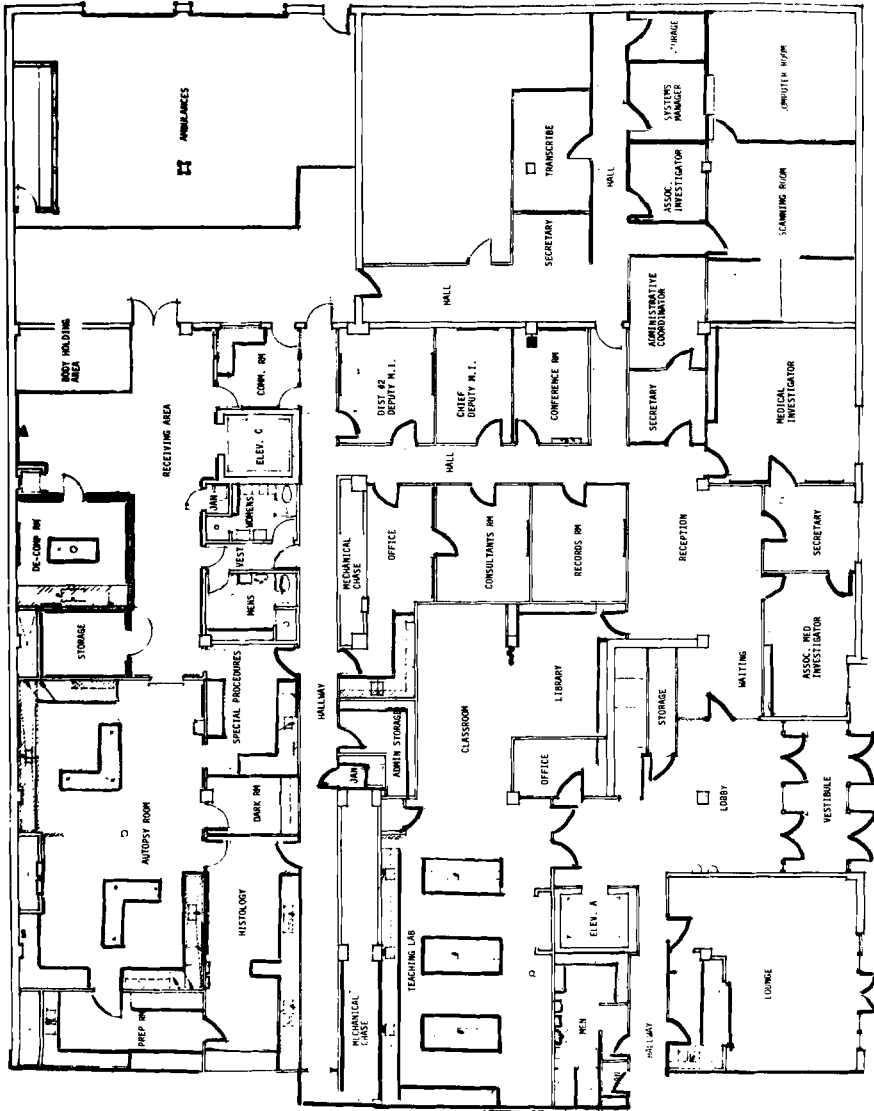


FIG. 1—Floor plan of the New Mexico medical investigator facility.

tasks including preparing histologic specimens, developing X-rays, duplicating and developing photographs, cataloguing gross and microscopic teaching specimens and photographs, gathering special teaching materials, entering interesting teaching material into the computer system for easy retrieval, and doing special laboratory procedures such as impregnation of gross teaching specimens, insufflation of lungs, and other processes that enhance the value of the teaching material.

Many people have asked us about the size of the various rooms within this suite. The main autopsy room, 12 by 7 m (40 by 24 ft), may be divided into two separate rooms by a folding plastic soundproof curtain. Each of these can be a complete autopsy unit with a large L-shaped autopsy table.<sup>2</sup> The tables feature, in addition to completely concealed beneath-the-table plumbing, a large surface for dissection, a large tank for rinsing organs, and a compartment with built-in disposal and solenoid-activated rinse. On the table is a concealed manifold rinse (Fig. 2). "Hands-off" recording mechanisms provided over each



FIG. 2—One of the two autopsy units in gross examination room.

table are connected to a bank of four continuous tape recorders, each of which will accommodate up to 3 h of dictation.<sup>3</sup> One of these recorders is reserved at all times for homicide cases which are immediately transcribed, often before the gross dissection is completed; the remaining banks are used for routine dictation. Access to these is afforded each of the transcriptionists.

This large central examining facility is almost completely surrounded by counters, most of which are covered with stainless steel. These are mounted on brightly colored, relatively inexpensive, Formica®-covered, compressed wood cabinetry.<sup>4</sup> Access to this facility is

<sup>2</sup> Jewett Refrigerator Co., Buffalo, N.Y.

<sup>3</sup> Dictaphone Corp., Model 181 Recorder/Transcriber. Cost of complete installation, including three autopsy stations, four transcribing stations, a controller cabinet, and four continuous tapes was \$7020 in 1976.

<sup>4</sup> Lye Line Manufacturing Co., Enumclaw, Wash.

gained through a 1.2-m (4-ft) wide automatic electric "supermarket-type" sliding door.<sup>5</sup> Immediately adjoining the central examining facility is a reception area, 13.7 by 7.6 m (45 by 25 ft). This communicates with the interiorized ambulance dock through double doors. A 4.9 by 4.3-m (16 by 14-ft) operating room for decomposed and contagious bodies adjoins this reception area. It is completely equipped to stand alone for independent dissection with independent ventilation and constant change of air. The examination and ancillary laboratory portion of the facility, 12.2 by 29.3 m (40 by 96 ft), can be reached only from the adjoining men's and ladies' shower/locker rooms and the enclosed, windowed reception area, which is strategically located between the administrative area corridor, the ambulance dock, and the body reception room (Fig. 3). Within the adjacent laboratories,

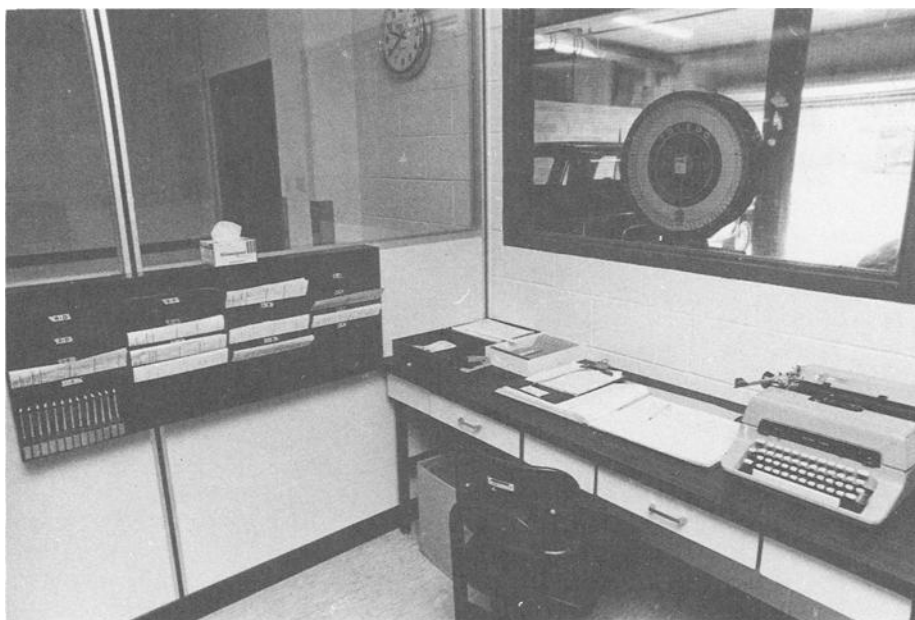


FIG. 3—Reception area, strategically located between body-receiving area, closed ambulance dock, and administrative area.

which vary from 4.9 by 4.3 m to 9.1 by 4.3 m (16 by 14 to 30 by 14 ft), all of the ancillary procedures incident to the postmortem examination and preparation of teaching material detailed above are incorporated. X-ray examinations are conducted by a modern portable instrument which is readily wheeled to any one of the three principal autopsy stations and which produces high-quality films suitable for examination of neck injury or for identification of bullet fragments.<sup>6</sup> These films are either developed on the site by using Polaroid® film and cassettes or transmitted to the rapid dry-developer within the University Medical Center. Separate locked areas for storage of clothing, trace physical evidence, volatile solutions necessary for histopathology preparation, and the trimmed and untrimmed tissue samples retained for a five-year period are close to the examining suite or one floor below.

<sup>5</sup> Clark Door Co., Crawford, N.J.

<sup>6</sup> Picker Co., Model 6365C, 200 MA Mobile X-Ray Unit. Cost in 1975 was \$9672.

### Body Storage Device

One of the most unusual features of this facility is the body storage device (Fig. 4).<sup>7</sup>

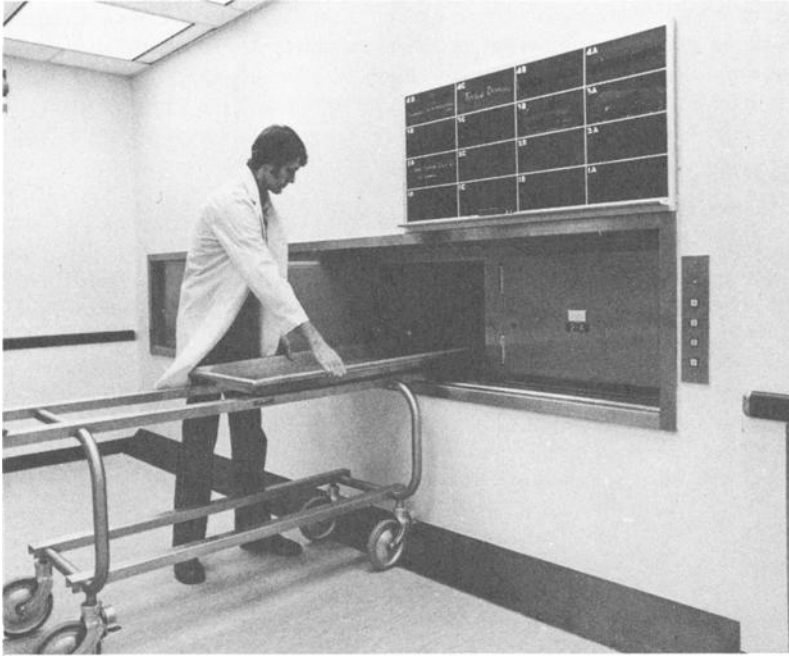


FIG. 4—Body storage device.

This unit consists of a rather conventional series of 16 stainless-steel-fronted crypts with individual access, measures 3.7 m (12 ft) wide by 2.9 m (9.5 ft) long, and contains four horizontal rows of four crypts with the first crypt on each level, on the extreme left, consisting of a freezer unit. The refrigeration equipment, or compressor, is located on the exterior ceiling of the box, and the combined unit rests on a 3400-kg (7500-lb) capacity lift which, in turn, is located at the bottom of a shaft 4.1 m (13.5 ft) wide by 2.9 m (9.5 ft) long by 8.2 m (27 ft) deep. The lift operates at a rate of 7.6 m/min (25 ft/min) and is regulated by push-button controls to stop at any one of the four horizontal levels to allow body trays to unload 0.7 m (2.3 ft) above the finished floor, through a 2.7-m (9-ft) long by 0.6-m (2-ft) wide double stainless steel sliding door, allowing access only to a single level of crypts at one time. Each crypt, with its separate door and lift-deactivator, contains an individually mounted carriage and telescoping rack with a removable tray which may be unloaded onto specially designed tubular frame stainless steel carts fitted with roller guides.

The fixed height of the body carts and the crypt access are further complemented by a standard 0.7-m (2.3-ft) height on all autopsy tables. The door of each crypt is drilled to accommodate a lock that affords security of personal effects and trace evidence on bodies

<sup>7</sup> The body box, refrigerator, and accessories were purchased from Jewett Refrigerator Co., Buffalo, N.Y., for \$29 000 in 1975. The cylinder lift with platform cost \$14 000; the stainless steel doors and frame, \$980. This does not include the cost of closing the remaining walls of the device. Included with the above costs are two of the transfer carts used to carry the trays after they are removed from the interior compartments.

placed within. The temperature of the freezing unit is maintained at  $-6.7^{\circ}\text{C}$  ( $20^{\circ}\text{F}$ ), while the crypts for routine body storage are maintained at  $4.4^{\circ}\text{C}$  ( $40^{\circ}\text{F}$ ). Outside of regular working hours university security officers permit access to the area by the contract ambulance service delivering and picking up bodies. For security reasons this portion of the facility is completely isolated from the remaining laboratory. Constant monitoring of the interior of the boxes is provided to the central university physical plant facility as one of several recorded alarm safety features. Removal of bodies from the device in the event of power failure is done by manual pumping and draining of the oil in the lift.

### Body Identification

The use of a remote television camera<sup>8</sup> for body identification precludes the need for any member of the family to enter the examination facilities of this unit. One of the unique features of this device is that the camera can be manipulated from the conference room by a joystick-like control that simultaneously provides for variation in the degree of magnification and focus of the lens fitted to the camera. An investigator or physician, having placed the body beneath the camera, may present any portion of the cadaver for viewing by family members who are in the conference room and, if desirable, may manipulate the lens for a close-up of any identifying features such as tattoos or serial numbers (Fig. 5). The silicon diode lens on the camera is provided to prevent burn-out of the camera by inadvertent exposure to an electronic flash (Fig. 6).

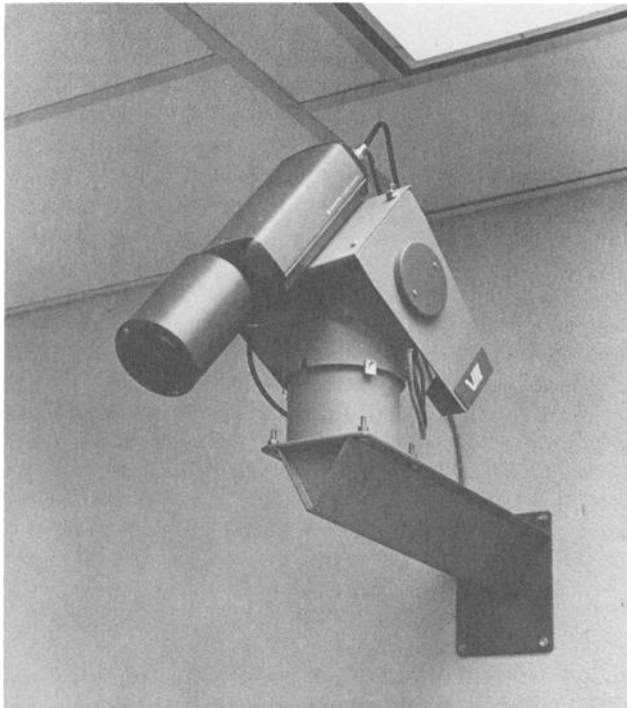


FIG. 5—Television camera for identification. Note electric zoom lens and pan/tilt base.

<sup>8</sup> Sanyo Model VCS-5350 silicon diode camera with electric zoom lens and remote control. This \$2100 unit was mounted on a \$500 Vicon pan/tilt indoor 24 VAC Model V340PT device with a remote control head. This, in turn, was attached to a Conrac SNA 23/C monitor, enclosed with a metal housing, costing \$560. Installation cable and other ancillary features brought the total cost of the system, installed, to \$3580.

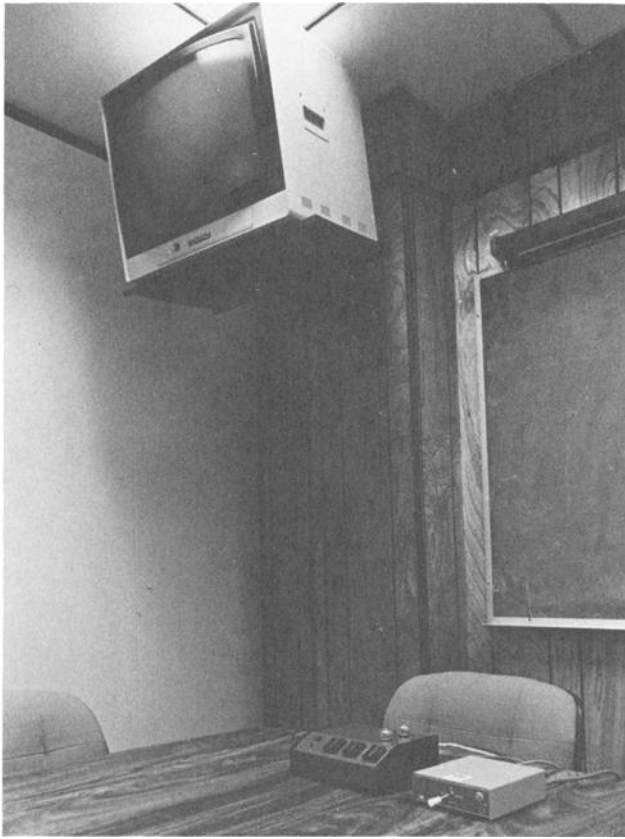


FIG. 6—*Television monitor and controls in conference room.*

### **Specimen Storage**

Members of the staff had to do much searching to find several other features at a reasonable cost, including devices to support plastic bags containing gross specimens retained for teaching. Specimens, placed in doubly sealed plastic bags containing a small amount of formalin and fitted with a brass grommet in the top (as at the Armed Forces Institute of Pathology), are suspended from chrome-plated clothing carriers by conventional paper clips (Fig. 7).<sup>9</sup> These are mounted on the underside of each specimen storage shelf at convenient intervals.

### **Labels**

Another problem encountered by virtually all medicolegal examination facilities that routinely collect many individual specimens from numerous cases is that of preparing labels. We selected an electric, foot-activated, dial, plastic-card embosser (Fig. 8).<sup>10</sup> The

<sup>9</sup>These devices are tie racks or clothing racks customarily installed as store fixtures. They are available in 25-, 30-, 41-, 61-, 76-, 91-, 107-, and 122-cm (10-, 12-, 16-, 24-, 30-, 36-, 42-, and 48-in.) lengths in addition to the 51-cm (20-in.) lengths used at this facility. They are manufactured by Knappe and Bougt Manufacturing Co., La Miranda, Calif. and cost \$5 each in 1976.

<sup>10</sup>Pitney-Bowes Model 7965, purchased in 1975 for \$1400. The desk-top imprinters were Pitney-Bowes Model 7108, which included shifting plates for nine-line spacing and cost \$239 each in 1975.

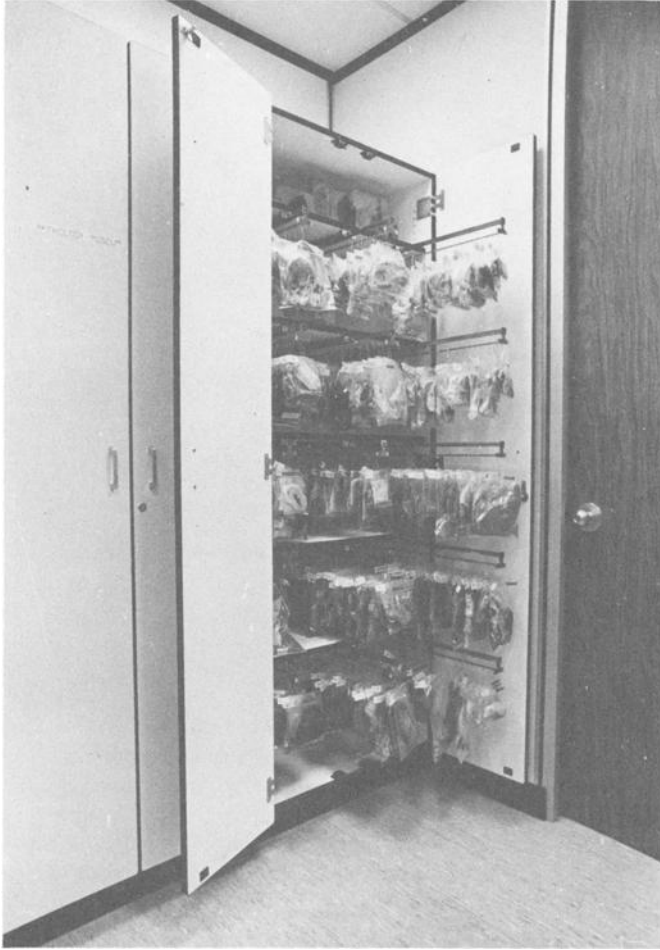


FIG. 7—Sliding racks for storage of plastic-bagged gross specimens, mounted on underside of shelves.





FIG. 8—Foot-activated electric embosser for preparing plastic plates to imprint labels.

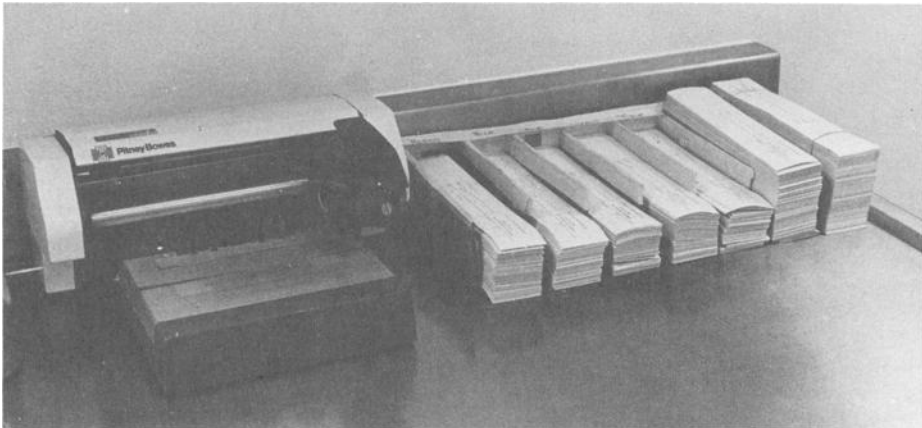


FIG. 9—Desk-top label imprinter used to complete evidence and specimen labels/seals.



FIG. 10—PDP 11/34 computer used for anatomic pathology service and research.

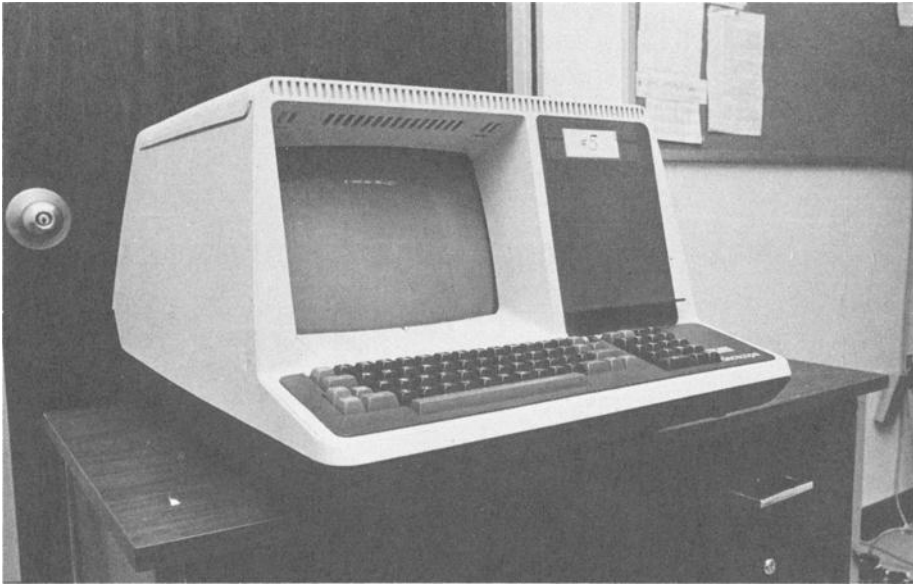


FIG. 11—Cathode-ray terminal used as computer input device from administrative area.

labels, in any quantity, are readily completed with relatively inexpensive hand-operated imprinters (Fig. 9). With these, all of the regular forms and labels necessary for identifying and sealing specimens and evidence are imprinted. The labels provided are paper strip with removable backing. It is impossible to remove these labels intact from glass jars, screw-top tubes, or paper envelopes. Each label is initialed and dated by the examiner responsible for collecting the evidence.

### Computer

Another feature of the New Mexico facility is the computer. The basic unit is a Digital PDP-11/34 CPU in a 53-cm (21-in.) chassis (Fig. 10). Within this are 32K words of parity core memory. This unit has been interfaced with three terminals and uses the MUMPS-11 operating system (Fig. 11). Further discussion about the computer capability, its application in on-line storage of essentials of all New Mexico medical investigator cases, and a number of separate programs which support accounting and research projects will be detailed in a subsequent technical report.

### Acknowledgment

The architect of record for this facility was Richard R. Halford and Associates, Santa Fe, N. Mex.

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