

NUCLEAR PHYSICS-MEDICINE

Atom Age Hypo Syringes

Lead-enclosed syringes are protecting scientists from harmful radiation to which they are exposed while treating patients.

➤ **HYPODERMIC** syringes for the atomic age are getting coatings of lucite and even lead.

Exposure to radioactive chemicals day after day can cause serious injury and shorten life. Patients getting the chemicals for treatment do not get the daily, life-long exposures. But X-ray and radium specialists who give the treatments might. And because such chemicals are being used more and more, there is increasing danger to the specialists giving the treatment or using them in the search for better methods of treating disease.

Radiogallium, one of the newer radioactive chemicals under study for its possible use in bone diseases, gives off such strong gamma rays that dense lead shielding of the hypodermic syringe proved necessary to protect the scientist studying it.

Shields of this type, for standard hypodermic syringes from very small ones an inch and a half long to big jobs measuring almost seven inches and holding about an ounce of fluid, have been designed by scientists at the Naval Medical Research Institute at Bethesda, Md. The lead-shielded syringes are a little awkward to handle, since they weigh about four and one-half pounds and are very much larger than the ordinary glass syringes. At the Naval Hospital where they have already been used for injections in patients, doctors avoid the difficulty by first inserting in the vein a

hypodermic needle attached to a rubber tube used for giving salt or sugar solution. The needle of the lead-shielded syringe is then inserted into the rubber tubing.

A slot milled in the lead shield lets the doctor see the level of fluid as he draws it up into the syringe and whether there are air bubbles in it. A dark-colored solution of the radioactive chemical makes it easier to see the fluid level, bubbles and so on, and for the same reason the inside surface of the shield is coated either with a phosphor activated by radioactive emanations or with some luminous dial paint.

The lead shielding cuts the amount of rays reaching the doctor to well below the amount considered a safe daily dose.

For radioactive chemicals that emit alpha and beta rays instead of gamma rays, a two-piece shield of the plastic, lucite, gives enough protection to the hands of the doctors. These chemicals include two kinds of carbon, iron, phosphorus, sulfur, copper and strontium.

Details of the shield designs are reported in the journal, *SCIENCE* (July 1), by Comdr. H. C. Dudley, J. F. Bronson and R. O. Taylor of the National Naval Medical Center. The shields are not yet on the market. Comdr. Dudley and associates have applied for a government patent and will make the design public property so that any manufacturer can make them

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NUCLEAR PHYSICS

AEC Inventories Atoms

➤ **INVENTORY** problems involving uranium 235, it is suggested by the Sixth Semi-Annual Report of the Atomic Energy Commission, just released, are by no means as simple as those faced by King Midas of the golden touch.

The legendary king, who transformed all his surroundings, including his courtiers and his young daughter, into gold, had only to store his wealth in a vault and keep track of the tonnage on hand.

Present day alchemists have their assay problems infinitely complicated by the fact that they cannot lock up their treasure until they are ready to use it. Their trouble is not in changing one heavy metal into another. That process goes on spontaneously. Their difficulty comes in determining how much of which metal is in any one container at what moment.

Their material is not only in constant

state of change, but it is accompanied by radiation in deadly quantities and end-products that are fantastically poisonous. It is often impossible to get close enough to the material to assay it at all.

The Atomic Energy Commission announces in its report completion of the first part of its program to account for stocks of radioactive material in its modernized bookkeeping system. Perpetual inventories of such materials have been established, even though the materials themselves are far from permanent.

If a banker had to keep accounts in a world where gold dollars in his vaults slowly changed into copper pennies, and some of his coins were in liquid and gaseous form, as well as metal, he would understand better the problems of cost accounting among the atoms. The Atomic Energy Commission points out that their

accounting system is unique, yet they have succeeded in devising a unified system applicable to all industrial organizations contracting with them on atomic energy research.

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CHEMISTRY-ENTOMOLOGY

Outmoded Phonograph Helps in Testing Insecticides

➤ **EVEN** though your family may have long ago discarded that old style phonograph, the one which played wax cylinder records, the U. S. Department of Agriculture is putting this out-of-date instrument to good use, in money-saving tests of insecticides.

Replacing the record holder of the phonograph with a screen cage, the Department scientists place a white mouse in the cage, turn the crank several times, and give the mouse a shower bath as it is rolled over and over. The shower is not of water, however, but a sprayed insecticide solution. The entomologists use this device in searching for a chemical which will prove effective in



LEAD-SHIELDED SYRINGE— Comdr. H. C. Dudley of the Naval Medical Research Institute fills a lead-shielded standard hypodermic syringe with a radioactive chemical solution. In front of the lead-guarded container is an ordinary hypodermic syringe of about the same capacity, one-third of an ounce, as that he is filling. The syringe at left on the tray is shielded in lucite. The tube showing inside his glove is an electroscope for detecting the amount of radiation getting to his hands and body.