of bleeding. For this purpose, the absorbable material is soaked in a solution of thrombin and applied to the bleeding surface. The thrombin usually causes prompt clotting. The advantage of using one of the new substances, rather than a cotton pledget, lies in that fact that a pledget made of absorbable material need not be removed before closing the wound. This prevents the recurrence of bleeding which follows the removal of cotton. The field of usefulness of such substances in the realm of general surgery, too, is wide.

In considering various substances for use in absorbable sponges, batting, thread, etc., one of us (M. Z.) proposed casein fiber prepared from milk. Such fiber, from cows' milk, has been used commercially for some years in textiles under the trade name of "Aralac."[4] It is plentiful, inexpensive, extremely uniform chemically, and has physical properties which recommend it for the present purpose. It is readily spun into thread, forms an easily manipulated batting, and can be steam-sterilized repeatedly and stored indefinitely.

In preliminary experiments here reported, pledgets of Aralac batting (30–150 mg total dry weight) were inserted into the subcutaneous tissue, temporal muscle, subdural and subarachnoid spaces and the substance of the brain itself in a series of six cats. Each operation was performed aseptically under sodium pentobarbital anesthesia, and the animals were allowed to survive for 11, 11, 12, 23, 35 and 46 days, respectively. At the end of these periods, the animals were anesthetized and the brains removed along with other tissues that had been in contact with the batting. None of the animals showed any ill effects from the insertion of the casein fiber, and each was in good health at the termination of the experiment.

At post-mortem, no Aralac was visible grossly in any specimen. Microscopically small amounts of the fiber remained in the three animals that were examined after 11 and 12 days. A few of the fibers seen were bordered by giant cells. The principal tissue reaction consisted of the presence of macrophages or, in a few instances, polymorphonuclear leucocytes and lymphocytes on the one hand, and fibroblastic and endothelial cell proliferation on the other. In the three cats which were allowed to survive the longest, no trace of fibers remained. Giant cells were very rarely found in the sections from these animals. The tissue reaction consisted chiefly of fibrous tissue proliferation and the presence of macrophages at or near the site of implantation.

In two of the experiments (11 and 12 days), the casein fiber was implanted on the left side and the same operative procedure carried out on the right side without implantation of fiber. On comparing the microscopic sections from the two sides in these animals the tissue reaction appeared to be slightly greater on the side where the casein fiber had been implanted. There was no evidence in any section that either the casein fiber itself or its breakdown products were particularly toxic to the cortical cells.

It appears from these preliminary experiments that casein fiber (Aralac) is rapidly absorbed after septic implantation in the brain, muscle or subcutaneous tissue of the cat. The absorption is accompanied by a mild cellular reaction similar to that produced by implantation of fibrin foam[1] or oxidized cotton.[2]

More extensive studies on the absorbability of casein fiber of various types and of plasticized sheets of casein are in progress, with particular attention to the possibility of antibody formation in the tissues or blood of the experimental animal. If the material derived from the casein of cows' milk should prove to have undesirable antigenic properties, the latter might be avoided by using casein from human milk.

EUGENE B. SPITZ
DIVISION OF NEUROPSYCHIATRY,
MONTEFIORE HOSPITAL, NEW YORK, N. Y.

MORRIS ZIFF
DEPARTMENT OF CHEMISTRY,
NEW YORK UNIVERSITY

CHARLES BRENNER
DEPARTMENT OF NEUROLOGY,
COLUMBIA UNIVERSITY

CHARLES DAVISON
DIVISION OF NEUROPSYCHIATRY,
MONTEFIORE HOSPITAL, NEW YORK, N. Y.

[4] The Aralac used in these experiments was kindly furnished by Aralac, Inc.

DISCUSSION

A NOTE ON THE NATURAL OCCURRENCE OF FLUOROACETIC ACID, THE ACID OF THE NEW RODENTICIDE "1080"

IN a recent article[1] the discovery of the value of sodium fluoroacetate, referred to as compound "1080," as a highly successful rodenticide by the joint work of the Economic Investigations Laboratory and the Wildlife Research Laboratory of the Fish and Wildlife Service is described. Subsequent to this publication, the writer and his colleagues learned of the work

[1] E. R. Kalmbach, SCIENCE, 102: 232, 1945.

of Marais[2] who investigated the toxic principle of *Dichapetalum* (*Chailletia*) *cymosum* (Hook) Engl., called "Gifblaar" and known as one of the most poisonous plants of South Africa. Following the previous attempts by Steyn[3] and Rimington,[4] Marais succeeded in the isolation of a toxic substance and identified it as fluoroacetic acid. The high toxicity of this fluorinated acid led him to suggest that the simple fluorinated organic acids might be a source of valuable poisons and insecticides.

A further search of the literature on the genus, Dichapetalum, revealed that both Renner[5] and Power and Tutin[6] had examined the toxic properties of *Chailletia toxicaria* Don, a species notorious for poisonings among the natives of Sierra Leone, where the colonists had used it in poisoned baits for the control of rats, but the compound responsible for the lethal action of the plant was not found.

It is of considerable interest that the toxic fluoroacetic acid has been isolated from a plant source and that the work of the Fish and Wildlife Service on sodium fluoroacetate as an economic poison has progressed along parallel but entirely independent lines.

CLARENCE W. KLINGENSMITH
ECONOMIC INVESTIGATIONS LABORATORY,
FISH AND WILDLIFE SERVICE,
BOWIE, MD.

EARLY OBSERVATIONS ON ANTIBIOTIC SUBSTANCES IN PENICILLIUM GLAUCUM AND OTHER ORGANISMS AGAINST A VIRUS

THE quotation cited below was stumbled upon by the author, whose field is far removed from antibiotics, and is given for the benefit of the many hunters in the field of antibiotics.

The quotation is from a Russian paper by M. G. Tartakovskii, entitled "Ekssudatny tiff ili chuma kur" ("Exudative Typhus or Fowl Plague), published in *Arkhiv Veterinarnyki Nauk* (*Archives of Veter. Sci.*) v. 34 (1904), pp. 545–75, 617–66. The quotation following is from p. 642:

> Maggiora and Valenti report a mould contaminant that destroyed fowl plague contagion in a test-tube containing blood (mixed with a physiologic solution of NaCl) of a chicken that died of the disease. The kind of mould is not stated by the authors. I observed that under the influence of *Penicillium glaucum* the contagion of exudative typhus was destroyed if the blood was diluted in a physiologic solution of NaCl. Thick blood in a test-tube, covered with a heavy growth of mould, remained virulent.
>
> Especially instructive are the experiments of Centanni. If blood of chickens that died of fowl plague were added to bouillon media and inoculated with the intestinal bacteria of chickens (a form of *B. coli communis-Bacterium coli gallinarum*, which easily penetrates into the organs and blood and infrequently has given occasion to false discoveries) the contagion of exudative typhus perished within 24 hours. Centanni explained the rapid loss of virulence of excrements from birds that died of fowl plague due to the destructive action of the intestinal rods.
>
> It is possible that the action of intestinal bacteria hindered even intravitam accumulation of large numbers of microbes of fowl plague in the intestines, especially in the lower sections where *B. coli* is found in large numbers and where best conditions prevail for its development. Only in the intestinal form of fowl plague, when the local infection is the strongest, there is a prevailing accumulation of fowl plague microbes over the intestinal.
>
> It is interesting that, according to Centanni, a culture of bacilli of fowl cholera, under conditions described as *in vitro*, also destroyed the contagion of fowl plague.

J. S. JOFFE
NEW JERSEY AGRICULTURAL EXPERIMENT STATION,
NEW BRUNSWICK

DANGERS INHERENT IN SCATTERED CATHODE RAYS

AN incident which occurred in the department of radiology at the Massachusetts General Hospital in December, 1944, is particularly pertinent at the present time inasmuch as it has to do with burns caused by scattered cathode rays.

Six men, after very brief exposure to scattered electrons from a 1,200 kilovolt electrostatic generator which was under repair, experienced burns of varying severity. These burns had certain similarities to, but differed from, x-ray reactions, sunburn and thermal burns. Certain factors characterized them, one being an apparently limited depth of penetration. (Relatively thin layers of clothing appeared to stop many of the electrons.) The burns showed three distinct phases of reaction, the latter phases making their appearance as the earlier ones were healing. The second and third phases developed both in areas previously uninvolved and in old healing areas.

The extent of scattering of cathode rays had not been appreciated, nor had the medical literature contained articles dealing with that phase of cathode irradiation. In order that this experience at the Massachusetts General Hosiptal may not be duplicated, publication of a detailed account seems necessary, and this report will appear in the January, 1946, issue of *Radiology*.

LAURENCE L. ROBBINS

[2] J. S. C. Marais, *Onderstepoort Jour. Vet. Sci. Animal Ind.*, 18: 203, 1943; 20: 67, 1944.
[3] D. G. Steyn, "Digest of Vet. Education and Research," 13th and 14th Reports, Part 1, 187, 1928.
[4] C. Rimington, *Onderstepoort Jour. Vet. Sci. Animal Ind.*, 5: 81, 1935.
[5] Renner, *Jour. African Soc.*, 1904: 109.
[6] F. B. Power and F. Tutin, *Jour. Am. Chem. Soc.*, 28: 1170, 1906.