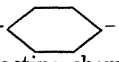

is an unusual compound, the iodine acting chemically as a positive ion. Hydrolysis or reduction produces elementary iodine.

It is probable that in the agar cup-plate tests against *T. gypseum* and *M. audouini* at least part of the activity of the compound is due to the liberation of iodine, as there is evidence that the latter is produced during the period of contact with the fungi. On the other hand, in the experiments with dried spores the role of free iodine is questionable.

The impregnated papers are in contact with the compound for very short periods of time, after which the excess drug is washed off. However, the usual difficulties in procedures of this sort are encountered. It is impossible to remove all of the active compound by washing, and there is always a possibility that traces of the drug remaining may exert some activity during the washing process. The filter papers, when tested after washing, give evidence of traces of positive iodine. The washing process itself produces no free iodine, since tests for this element in the wash solutions are negative.

References

1. EMMONS, C. W. Private communication.
2. KLEINBERG, J., NOVAK, M., and GERBER, V. *Proc. Soc. exp. Biol. Med.*, 1945, **58**, 238.

Letters to the Editor

Surface Measurements of Radioactive Phosphorus in Breast Tumors as a Possible Diagnostic Method

It has been shown repeatedly by assaying tissues that most experimental tumors take up relatively greater amounts of radiophosphorus (P^{32}) than normal tissues. In 1942 Marinelli and associate showed that after tracer doses of P^{32} to three human cases the beta ray activity as measured on the surface was greater over cutaneous lesions than over normal skin.

It occurred to me that the energy of the beta rays from radioactive phosphorus was sufficiently great that, if tumors in the subcutaneous tissues took up more P^{32} than the surrounding tissues, it should be possible to detect a difference by measurements on the skin surface. Therefore, in June 1945 preliminary investigations were started in the Division of Radiology, in cooperation with the Division of Surgery of the University of California Medical School, to study the differential uptake by breast tumors of tracer doses of P^{32}. The radioactivity on the surface of the skin over various types of breast tumors, over axillary nodes, and over supraclavicular nodes was measured with a Geiger-Müller counter a day or two before surgical removal. These measurements revealed that over tumors which were proven later to be malignant the activity was 25 per cent or more above that of comparative normal areas. Skin measurements over breast tumors which were later proven to be benign consistently showed less than 25 per cent difference between involved and uninvolved tissue. In March 1946 systematic studies were undertaken by comparing the activity measured on the skin surface over palpable breast tumors, adjacent areas of the same breast, comparative areas of the other breast, and the lymphatic drainage areas. In all but one of 25 patients the diagnosis based on preoperative surface measurements was confirmed by microscopical examination of the tissues after surgery.

These findings are so suggestive that this brief report is submitted with the hope that other investigators will try the method. A more detailed but still preliminary report on this subject will appear in the November 1946 issue of *Radiology*.

BERTRAM V. A. LOW-BEER
Department of Radiology, University of California Hospital, San Francisco

On Eugen Fischer

The note about Eugen Fischer, professor of physical anthropology, University of Berlin, and director of the Kaiser Wilhelm-Institut für Physische Anthropologie (*Science*, 1946, **104**, 161) brings to mind that he was one of the leading Nazi anthropologists who are morally responsible for the persecution and extinction of the peoples and races the Nazis considered "inferior." He was the first Nazi rector of the University of Berlin and took over this post when decent scholars withdrew or refused to do business with the Nazis. His address delivered at the inauguration ceremonies (29 July 1933) was entitled: "The Conception of the 'Völkisch' (Nazi) State in the View of Biology." This address foreshadowed the official execution of the principles of "racial hygiene" as taught by the Nazis.

If anyone, he is the man who should be put on the list of war criminals.

FRANZ WEIDENREICH
American Museum of Natural History

Effect of 2,4-Dichlorophenoxyacetic Acid on the Development of Anjou Pear Scald

The inhibiting action of growth-regulating chemicals on the development of apple scald has been reported by Schomer and Marth (*Bot. Gaz.*, 1945, **107**, 284–290). Treatment of apples at time of cold storage with α-naphthaleneacetic acid, β-indolebutyric acid, and a mixture of these two compounds with α-naphthalene acet-

amide and β-naphthoxyacetic acid resulted in a decrease in the amount of scald which developed when the fruits were transferred to a temperature of 70° F. That another type of scald which occurs on Anjou pears (Henry Hartman. *Ore. agric. exp. Sta. Bull.*, 1931, 280, 1–8) can be controlled by treatment with 2,4-D is indicated by the results of experiments conducted during the 1945–46 season.

Anjou pears obtained from the Medford, Oregon, district were treated by immersion for 2–3 seconds in 0.1 per cent aqueous solutions of Carbowax 1500 containing 10, 100, 500, and 1,000 ppm 2,4-D. The control fruits were treated with 0.1 per cent Carbowax solution only. Following treatment, the fruits were allowed to dry, packed in plain paper wraps, and stored at 31° F. At 2-month intervals during a period of eight months samples from each treatment were transferred to 65° F. and ripened for 7–8 days.

No scald developed on any of the treated or untreated pears ripened following, 2, 4, or 6 months storage. After 8 months storage, however, severe scald developed during ripening on the control fruits and on the sample treated with 50 ppm of 2,4-D. None developed on the pears treated with 500- or 1,000-ppm solutions, and only a slight amount on the 100-ppm sample. While these data are considered to be preliminary, they indicate that 2,4-D used at an optimum concentration has a positive inhibiting action on the development of the type of scald peculiar to the Anjou pear.

In addition to the effect on the inhibition of scald, treatment with 2,4-D in concentrations of 100 ppm and higher resulted in the development of a more uniform yellow color during ripening. This was especially apparent on the samples ripened late in the storage season.

ELMER HANSEN

Oregon State College, Corvallis

Comments on "A Relativistic Misconception"

C. Roland Eddy's Letter to the Editor (*Science*, 1946, 104, 303) convinced me that the law of conservation of mass holds for elementary particles, but I must reserve doubts about this law applying to matter by the beakerful or universeful.

Most physical chemistry textbooks state that when an exothermic reaction takes place, there is a loss of mass that can be calculated from Einstein's equation, $E = mc^2$, and that this loss is much too small to be measured on present-day balances. This assertion is not incompatible with Mr. Eddy's statements concerning the conservation of mass in elementary particles, but the two points of view taken together lead to an interesting conclusion.

The reason that the reactants, when weighed in their beakers, should have less weight after reacting is that this weighing determines the sum of the *rest* masses of the particles, which sum *does* decrease when energy is released.

However, as Mr. Eddy has shown, the sum of the masses of the particles which have engaged in the reaction is the same. Increases in their velocities make up for decreases in their rest masses.

Therefore, except for bodies at a temperature of absolute zero, as far as mass is concerned the whole (mass of an entire body) is less than the sum of its parts (masses of the individual particles composing the body)!

MARSHALL E. DEUTSCH

2391 Davidson Avenue, New York City 53

The article by Eddy (*Science*, 1946, **104**, 303) was read with interest. It seems to the author that Eddy's views would have been much clearer if he had stated in what sense he was using the term mass. In current textbooks and articles, mass is used sometimes to mean quantity of matter, *i.e.* electrons, protons, neutrons, and various combinations of these elementary particles, and at other times mass is used to mean inertia. It is also to be noted that all matter has inertia and that radiation has inertia, though radiation is not matter according to our present concepts.

Apparently Eddy, in his article, is using mass in both senses without distinguishing how the term is being used. For example, he says the equation $E = mc^2$ "does not state that a mass, m, can be converted into an energy, E . . ."; and later he says that "it was assumed that M is essentially at rest," where "M is the mass of the fissionable nucleus plus the neutron added to trigger it off." In these cases it is evident that mass is being used to mean matter. Near the end of the article he says that "the mass of a photon is $h\nu/c^2$," where evidently mass is used to mean inertia. Thus, would not the article be clearer if the term mass were used in only one sense, e.g. mass being defined as inertia? The main points of the article then would be as follows:

Einstein's equation, $E = mc^2$, states that a body of inertia (mass) m, can be converted into energy, E, and it also states that a body of inertia m contains an amount of energy, $E = mc^2$. Examples of the transfer of inertia of matter to energy are found in nuclear reactions and in the annihilation of a positron and an electron.

According to our present theory, when a fission occurs, there are the same kind and number of elementary particles of matter after fission as before, but the sum of the inertias of the remaining particles is less than the sum of the inertias of the initial particles. The difference in these inertias is called the mass (inertia), m, that has disappeared; and the energy that appears in the form of kinetic energy and gamma radiation equals mc^2. This may be thought of as a transfer of energy from one form to another form, or as the mass (inertia), m, being converted into energy. The quantity of matter in this case remains unchanged.

According to our present theory, when a positron and an electron unite, these two pieces of matter disappear, and usually two photons appear. If the positron and electron had no kinetic energy when they united, the energy of each photon equals mc^2, where m is the rest mass (inertia) of the electron as well as of the positron. This is another case of mass (inertia) m being converted into energy. But in this case matter disappears or is annihilated. The converse is also found to be true. A photon of sufficient energy in a strong electric field dis-