## TRACER USE

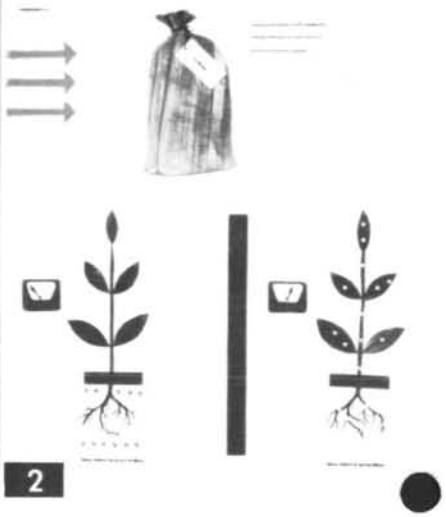
1. Like the alarm clock in Captain Hook's crocodile, radioactive isotopes allow the tracing of things they label.

2. Tagging of fertilizers with radioisotopes tells where, when and how fertilizer should be applied.

3. Radioisotopes can be used to tag and trace insects, rodents and other pests.

4. Photosynthesis: sunlight + green plant + $CO_2$ + water = sugar. But how?
Sunlight + green plant + radioactive $CO_2$ + water = sugar. Here's how!

5. Radioisotopes can permit the following of insecticides in plants and the study of their effects on insects.


# RADIOISOTOPES IN AGRICULTURE

**Some panels from IAEA's exhibit organized in connection with the fourth session of the General Conference, Vienna, September 1960**

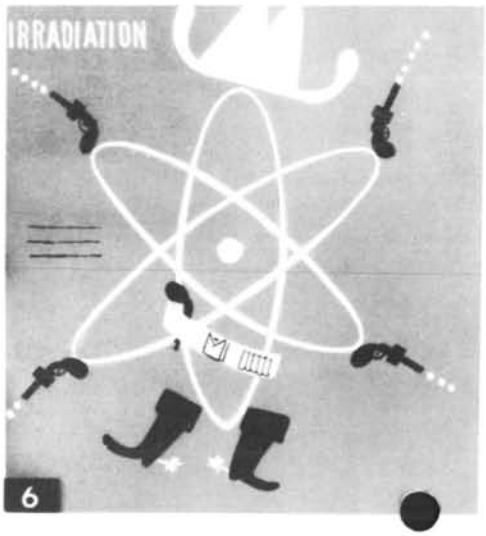
## IRRADIATION

6. Radioisotopes give off radiations which are like atomic bullets. Radiation can be used to affect biological systems or to trace the atomic "gunman" as he moves from place to place.

7. Radiation can improve the storage of foods; for instance delay the sprouting of stored potatoes, prolong the freshness of soft fruit, kill insects in stored grain.

8. Radiation can sterilize male insects and thereby destroy populations of specific pests.

9. Treatment of seeds or plant with ionizing radiation leads to genetic change, which can be used to develop disease resistance, new flower color, stiff straw, ability to respond to fertilizer and large fruit.




## MEASURING

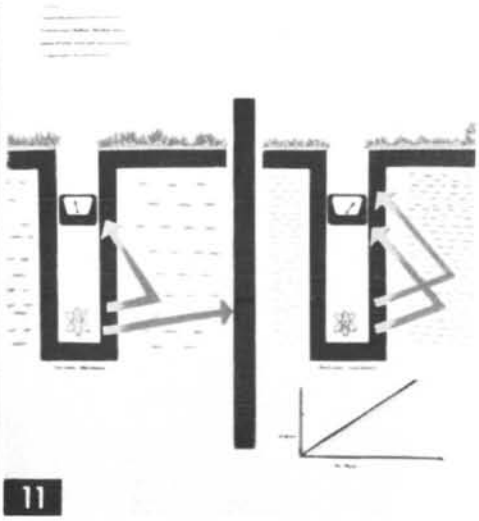
10. Radiation from tracer atoms of radioisotopes is determined by "detectors" of various kinds, including Geiger, proportional and scintillation.

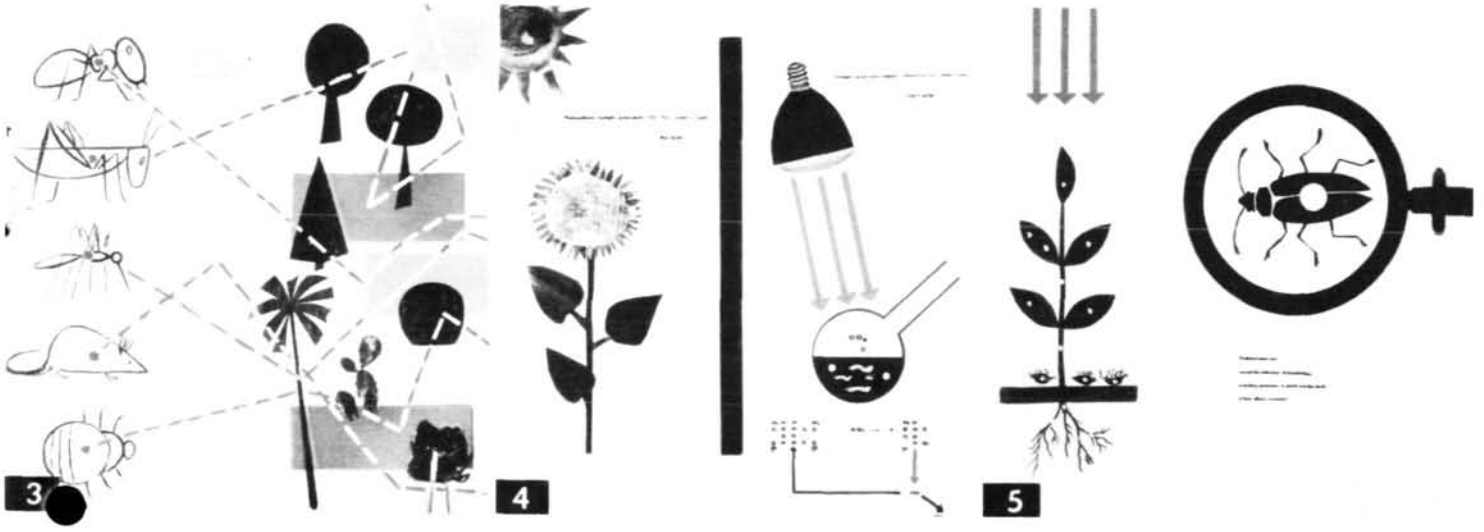
11. Radiation can measure the amount of water in the soil. Neutrons from a radium-beryllium source bounce off water molecules and are counted. The more water, the more bounces.

12. Activation analysis. Exposure of biological material to irradiation with neutrons induces radioactivity in some of their constituent atoms. The beta or gamma radiation emitted can be used to estimate the amounts of some elements present. Here radiation from manganese-56 produced during the capture of neutrons by ordinary manganese allows the determination of that element in individual seeds.

13. Radiation can measure the growth of plants such as sugar cane. The more dense the growth, the smaller the amount of radiation that passes through.

14. Radiation can measure the density of soils. The more dense or packed the soil, the smaller will be the amount of gamma radiation passing through.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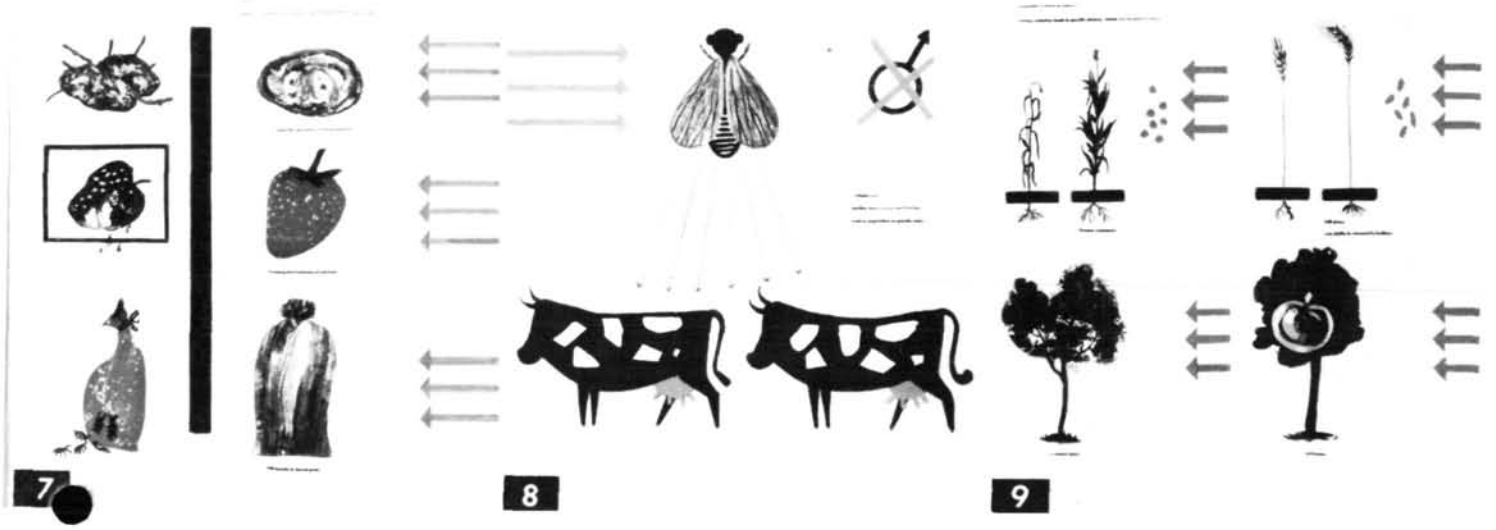
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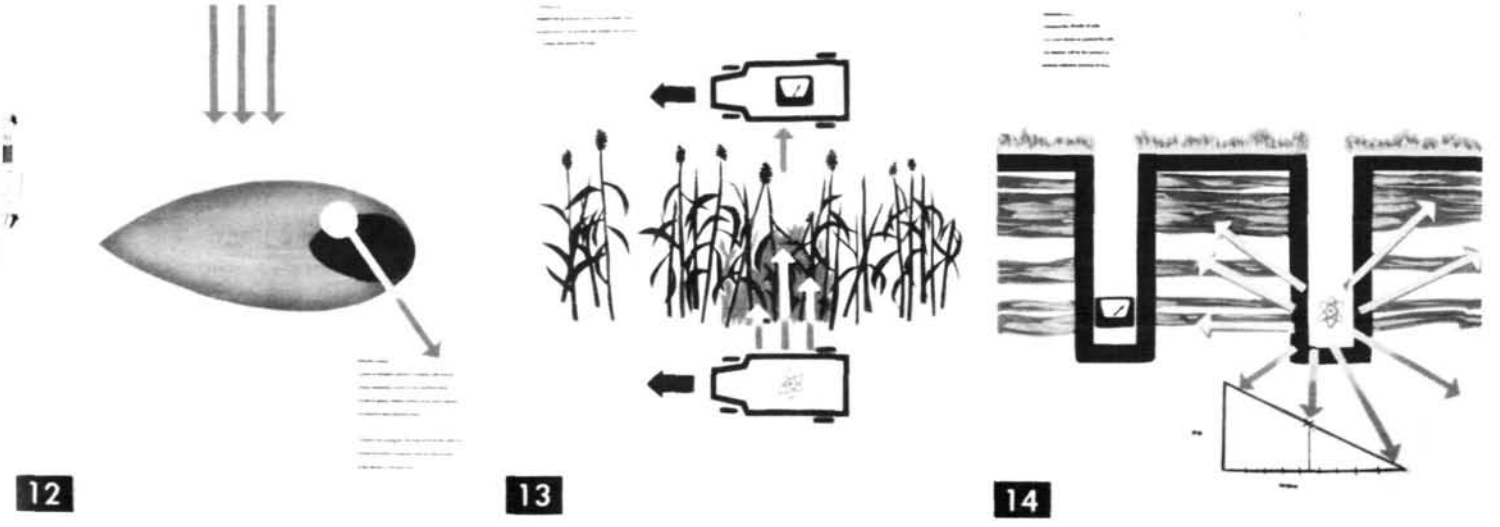
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