AGRONOMY

Accident Started Research On Drought-Resistant Corn

Natural Selection Turned to Account Simply by Letting Plants Wilt, Watering Them, and Using Those That Recover

SCIENTIFIC discoveries are rarely, if ever, made as direct results of lucky accidents. But an accident may supply the tip that sets a scientist's active inquiring mind off on a long pursuit that eventually runs down important and useful facts. The legends of Newton's apple and Galileo's swinging lamp are good cases in point.

Research at Kansas State College, that promises to produce valuable strains of drought-resistant corn, had such a semi-accidental inception.

It started in 1931, when James W. Hunter, now with a large commercial seed house in Waterloo, Nebr., was a research assistant at the Kansas institution. He was growing large numbers of inbred seedling corn plants in greenhouse benches.

One spring day, being late for classes, he left the greenhouse in such a hurry that he forgot to open the ventilators. At noon when he came back, the temperature had climbed to 120 degrees.

Fortunately, he had finished work on the batch of corn seedlings, so that it was no calamity to find them all wilted and some of them dead. He noticed. however, that some of the plants still living were in much better shape than others.

He immediately watered all the plants and returned the next day to see what had happened. The badly wilted plants showed very little recovery, but the ones that had been in good shape the day before were just about as good as new.

Here was a lead. With two colleagues, H. H. Laude and Arthur M. Brunson, Mr. Hunter went to work in earnest. The research was conducted as a joint project of Kansas State College and the U. S. Department of Agriculture.

Essentially, the method pursued has been to harness the principle of natural selection. By exposing new strains, as they are developed, to conditions that will kill all but the fittest, researchers still continuing the work are automatically assured that the survivors will have the valuable features they are seeking.

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SOCIOLOGY

Modern Social Problems Studied in High School

STRIKES, riots, revolutions and international "incidents," bread lines, bank robberies, and automobile fatalities. All these may be traced to some failure of citizens to function properly in the social group or to some inadequacy of the social group in its relation to the individual.

Only the newborn lives alone. Perhaps even he must be considered as part of the first social group, the family. Certainly from the beginning of school days each of us is called upon to make concessions to what others want.

Yet even in high school and college the student may have no adequate idea of the extent to which he must adjust his own personality to fit in with the complexities of the adult's social life.

A preview is offered by a new textbook of Drs. Emory S. Bogardus and Robert H. Lewis of the University of Southern California and Los Angeles Junior High School, respectively, entitled *Social Life and Personality*.

Problems of adjustment in marriage and the family, training for health-giving and pleasure-giving recreation, the effect of various types of occupations on the personality and the individual reactions to occupational success or failure. These are matters in which young people of high school age have a vital interest.

They have a right, also, to unemotional, factual discussion of such problems as alcohol, and gambling. The automobile as an instrument of death in the hands of unstable, inexperienced adolescents and emotionally immature adults is another such social problem.

Young people need to know of the cultural and social value to them individually of art and music, religion and social service. They need to know how to plan for security in their old age.

Free discussion and a better understanding of the interrelations of the individual and society should serve to minimize the present-day frictions threatening civilization.

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PHYSICS

Still Much Mystery In Simple Happenings

ONE DOES not need to go to the latest atomic research to encounter baffling happenings in nature. There are paradoxes, yet unsatisfactorily explained, in even such seemingly simple things as the rupture, or breaking, of materials.

If you see one motor car towing another with a chain and see the chain break in two it seems simply that the application of too great a force has caused the break. The rupture is across the chain and the force which we say "caused" it was at right angles to the plane of the rupture. Every elementary physics textbook will back you up on this reasoning.

But the matter may, or may not, be so simple. Prof. Percy W. Bridgman, Harvard's profound scientist who studies the behavior of materials under extreme pressures, can throw some mental sand into your reasoning on this point.

Take one test which Prof. Bridgman describes (*Journal of Applied Physics*, August). Into a suitable chamber he slides a rod of glass, through tight-fitting collars, and leaves the two ends sticking out. Then, by hydrostatic pressure, he subjects the part of the rod inside the box to high pressure. When the pressure is great enough the rod breaks crosswise as though you had pulled too strongly on the ends.

Here is not a pull, but a push, which is applied not at right angles to the plane of the fracture but parallel to the plane. How would you explain that happening by the usual, simple concepts of force causing rupture? The answer is that you cannot. And thus we'll leave you with the paradoxical statement of Prog. Bridgman that "A body does not break because there are unbalanced forces acting on the atoms, but there are unbalanced forces acting on the atoms because the body breaks."

This leaves the situation about like the old question of the chicken and the egg, but it does indicate that there is still plenty to learn about the more simple things.

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GEOLOGY—CHEMISTRY

CO_2 Gas Wells May Yield "Air Fertilizer" For Crops

NATURAL gas is not always something to burn in cookstoves and industrial furnaces. Sometimes the gas that pours from the earth's veins is the least combustible thing in the world—carbon dioxide. Some wells yield carbon dioxide at pressures approaching 1000 pounds per square inch, and there is one "gasser" in Mexico that discharges 150 million cubic feet a day, enough to make 9,000 tons of dry ice.

Use should be made of this great natural resource, says Prof. Frank E. E. Germann of the University of Colorado. To some extent this is already being done, thanks to the rise of the dry-ice industry. Where it would be uneconomic to ship the carbon dioxide as a liquid in cylinders because of the long distance to market, dry ice is light enough, and loses so little in transit, that it can be made and transported at a profit.

But an even greater use can be found for the gas by piping it to market-garden regions and using it to "fertilize" the air around growing plants, Prof. Germann feels. Plants make food out of carbon dioxide in the presence of sunlight, and the three hundredths of one per cent. of the atmosphere which it now constitutes can be increased many fold by artificial addition, with great advantage to plant growth.

The most ready and obvious way of using carbon dioxide to enrich the air around plants would be in greenhouses, especially in connection with one of the methods of soilless cultivation recently developed, and possibly also with artificial light. However, Prof. Germann believes that it may even be possible to flood open fields with it, at least in low concentrations.

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CHEMISTRY

Heavier Kinds of Nitrogen And Sulfur Atoms Produced

WHEN a factory starts to produce a new kind of product, that's news. When the product consists of a kind of matter that has never been available before, that should be even bigger news.

At Columbia University in New York City, Dr. Harold C. Urey is engaged in manufacturing for scientific purposes relatively pure isotopes, kinds of atoms that a few years ago science did not realize existed.

Dr. Urey is a winner of the Nobel prize in chemistry for his discovery of what is now called deuterium, the kind of hydrogen that is twice as heavy as the common kind. Deuterium (D) is now available in the form of heavy water and otherwise in extreme purity and in sufficient quantity.

Scientists use deuterium to tag the way compounds behave during chemical reaction. They are finding that the heavy kind of hydrogen does modify the compounds in which it takes the place of common, light-weight hydrogen although it is not deadly as some feared—or hoped—when it was first discovered.

Now Dr. Urey is separating out two other isotopes, nitrogen (N) of mass 15 and sulfur (S) of mass 34, which is a much more difficult task. He uses a sort of giant still that is 150 feet tall, or rather would be if a very trick, non-valve pump for gases and liquids did not allow him to put the whole apparatus on one floor. The heavier atoms of nitrogen 15 (the common nitrogen is mass 14) and of sulfur 34 (the common sulfur is mass 32) tend to separate out at the bottom. He is treating raw materials by the ton.

Just now there are only scientific uses, but you never can tell just when some industrial use will be found. Costs? Per gram-atom, D is $10 commercial; N 15 is $180 and S 34 is $40, for materials used.

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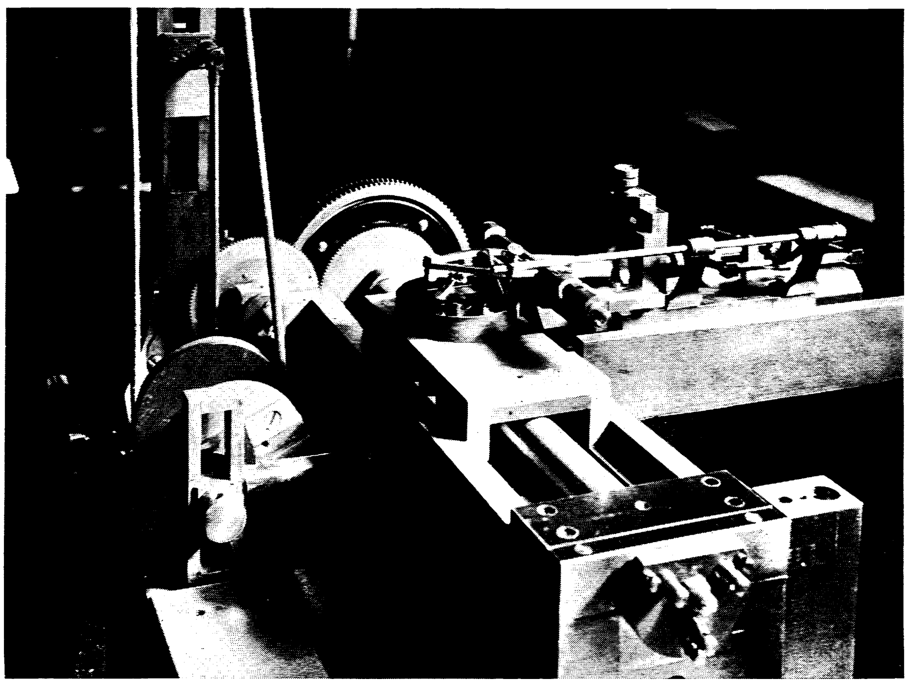

270,000 LINES TO THE INCH

Ruling more than a quarter of a million lines to the inch on metal plates, this machine prepares diffraction gratings for use in astronomy and physics, to split light up into its spectrum, much more accurately than is possible with a prism. The ruling engine, built at the University of Chicago by the late Prof. Albert A. Michelson, was exhibited recently at the Museum of Science and Industry in Chicago.