

least one or two days. Otherwise he returns to work at once.

The probing, injection of an antiseptic solution and draining usually done in treating such wounds is, in Dr. Bow-

en's opinion, harmful. He described experiments showing that in the probing tissues uninjured by the nail are injured and opened to infection.

*Science News Letter, June 6, 1942*

## PHYSICS

## Three Rocket Weapons in Use By Both Germans and Russians

### Rocket Projectiles Are In Use Against Airplanes, Tanks and, Upside Down, Against Armored Ships

**R**OCKET WEAPONS, reported in use by both Russians and Germans, are of at least three different sorts, the Harvard War Institute for newspapermen, meeting under the Nieman Foundation, was told by Prof. George B. Kistiakowsky, ordnance expert on the Harvard University faculty.

One of the weapons employing the rocket principle is a rocket-projectile fired from airplanes against other airplanes or ground targets. Since it can be discharged without recoil, a much heavier missile can be used than is possible with the very light cannon that are the largest type of ordnance now mounted on aircraft.

A second weapon is a multiple rocket projector said to be used by the Russians against German tank attacks. It can fire 20 or 30 shells at once, like an enormous shotgun discharge. Tanks find this extremely difficult to dodge.

Finally there is an "upside-down" rocket used by German planes in bombardments of the fortress of Malta, and against armored ships. This adds the force of the rocket-stream push to the attraction due to gravity, and obtains better penetration of the bomb against protected positions.

The high cost of modern war was rapidly reviewed by Prof. Kistiakowsky in the course of his unofficial backgrounding of ordnance information.

Despite the fact that the price of TNT declined from \$1.50 a pound in 1918 to 15 cents a pound just before the outbreak of the present war, military costs in general have gone up terrifically, due to the great increase in numbers of weapons needed, their rapid wearing out under present-day battle conditions, and their great complexity.

One half million dollar bomber is good for just about 20 operational flights if it is not destroyed in action. Adding

this rapid depreciation to the maintenance costs of airfield and other necessary servicing, the cost per flight for each bomber is about \$50,000, according to Prof. Kistiakowsky's estimates. And it costs all this to deliver only about \$600 worth of TNT.

It seems difficult to increase the efficiency of high explosives much beyond that reached by TNT. The "ideal" explosive (not yet produced) would according to chemical calculations develop at most about twice the smashing power of TNT. So we have to go in for enormous quantities. Allied explosives requirements in the first world war were about 250,000 tons a year. Now they are about four times that much.

*Science News Letter, June 6, 1942*

## AGRICULTURE

### Hybrid Alfalfa Is Good For Livestock and Soil

**H**YBRID alfalfa, produced by U. S. Department of Agriculture plant breeders in the same manner as the now famous and all but universally planted hybrid corn, promises great things both for feeding livestock and for rebuilding soil fertility and preventing erosion. Adaptation to regional climatic and local soil conditions, together with the stronger growth resulting from hybrid vigor, is expected to result in higher yields of hay and silage per acre, hence more meat and milk.

As yet, Department of Agriculture scientists emphasize, hybrid alfalfa seed is not ready for the market. The method is still on a limited experimental basis only—comparable to the point reached by hybrid corn about 20 years ago, when Vice President Wallace, then still a Midwestern farm editor, was just gaining the attention of corn breeders for his unorthodox but productive methods.

It is believed here, however, that the stage is about set for large-scale production and commercial distribution of hybrid alfalfa seed.

As in the production of hybrid corn, the new alfalfa comes from four carefully selected grandparent lines. Each has some quality or combination of qualities desired in the ultimate descendant—winter hardiness, drought resistance, high productivity, etc. The grandparent lines are paired and crossed, and selections from their offspring are crossed again, producing second generation hybrids combining all the desired qualities.

One considerable advantage in hybridizing alfalfa results from the fact that this plant is a perennial, and hence capable of propagation by cuttings, like rosebushes or grapevines. Once the desirable traits are fixed in the ancestral lines, these can be kept going indefinitely by vegetative reproduction, whereas the parental lines in corn, an annual plant, can be perpetuated only by constant inbreeding. It is expected that when hybrid alfalfa production gets on a permanent basis there will be "foundation plots" of carefully selected ancestor plants which will serve as constant reservoirs of desirable crop characters.

Another crop type on which farm plant breeders are hard at work is fall-sown grain much "grassier" than the winter wheats, oats and ryes now cultivated. The tendency has been constantly to cut down the amount of straw in winter grains and to concentrate on the seed. However, in Texas and other mild-climate grain-growing areas winter grains have proved valuable as winter pastures, and have often paid a profit to the farmer even when early-starting rust and other diseases have spoiled the grain crops themselves. Hence the search for new types of winter grains that will yield more as pastures, even at the possible expense of slightly smaller yields at the thresher.

*Science News Letter, June 6, 1942*

## ● RADIO

*Saturday, June 13, 1:30 p.m., EWT*

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Stephen Duggan, director, Institute of International Education, will discuss the work of the Emergency Committee in Aid of Displaced Foreign Scholars, of which he is chairman.

*Tuesday, June 9, 7:30 p.m., EWT*

Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.