

2. Business and industry.
3. Agriculture.
4. Home defense.
5. Psychology itself, where scientists must be given training for new duties and new students must be trained.

Mentally defective men have very little place in the mechanized military forces of modern warfare, Dr. Doll said. The psychologist's job in this area, therefore, is partly to keep mental defectives from induction.

But mental defectives can play an important part in national defense if properly directed by psychologists, he indicated.

In industry and in distribution, there are many tasks which can be done successfully by mental defectives, releasing mentally normal men for military duty.

In home defense, there are also tasks

that can be undertaken by the dull.

"It behooves us," Dr. Doll said, "to study the experience in this regard in England where the role of the mental defective in home defense has received special attention and has produced effective results."

On the farm, the unskilled tasks and social conditions favor the employment of mental defectives.

Anticipating the possible role of public institutions for the feeble-minded in case of war, Dr. Doll prophesied:

"It is not inconceivable that institutions for the feeble-minded might become hospital centers in respect to which many useful services might be performed by high-grade mental defectives, both men and women."

Science News Letter, September 13, 1941

If the moon had absolutely no atmosphere at all, Dr. Marshall said, meteors should strike its surface with their average space velocity of 30 miles a second. In that case, we ought to observe the larger ones striking as pinpoint outbursts equal in brightness to a first-magnitude star, and occurring once in every three or four days. Furthermore, if no air slowed them down, one or two craters large enough to be seen in our telescopes should be made on the moon every year. No permanent changes of this nature have ever been detected, although lunar formations a few hundred yards across have been repeatedly observed.

According to Dr. Marshall, the sizes of lunar craters, especially the hundreds measuring upwards of four and five miles, uphold the volcanic theory. A lunar crater 40 miles wide ought to be 10 miles deep, if formed by an explosion or by the impact of a huge meteor. But some lunar craters have floors which are level with or higher than the plain outside, or even dome-shaped, similar to the laccoliths found on the earth.

Laccoliths are terrestrial formations produced by the flow of lava and igneous material underneath the surface layers of the earth, causing a swelling upward into a dome or bubble. The bursting or subsiding of such bubbles has produced the craters of Hawaii, which are markedly different from the craters of volcanoes, such as Vesuvius.

Lava flows have covered great portions of the moon and the earth alike, making the so-called lunar seas and the formations which eventually became the moon's craters. Some lunar laccoliths are still seen in an arrested state, some have domes a mile or more high, others have begun to collapse. Dr. Marshall showed photographs of the moon illustrating all stages of such development.

The lunar atmosphere may contain carbon dioxide, the astronomer from the Franklin Institute said, and possibly oxygen, since these are the heaviest gases in the earth's atmosphere, and might remain on the moon long after lighter gases, such as hydrogen and water vapor had escaped. Even the theories of Sir James Jeans, which have been considered as conclusively denying the moon an atmosphere, do not prohibit the presence of carbon dioxide in appreciable amounts.

Observations of occultations of stars by the moon will not reveal this carbon dioxide air around it. Nor will the flashes of even brilliant meteors in the

ASTRONOMY

Moon's Craters Not Made By Meteor Bombardment

Earth's Satellite Has Atmosphere Which Protects Its Surface; Craters Mainly Due to Volcanic Action

AN OBSERVER on the surface of the moon would see as many "shooting stars" in its dark, star-filled sky as are seen at night here on the earth, declares Dr. Roy K. Marshall, of the Fels Planetarium, Philadelphia. This contradicts directly the statements found in most texts and popular books on astronomy that the moon has no atmosphere, and that the thousands of craters on the moon were formed by the impact of enormous meteorites during past ages.

Dr. Marshall presented his thesis before the American Astronomical Society, at Yerkes Observatory. His paper was presented for the purpose of bringing to the attention of astronomers existing theories which had been overlooked or forgotten, Dr. Marshall stated. This is particularly because popular writers have recently devoted so much space to the meteoric theory and so little to the proposal that the moon's craters are the result of volcanic action.

The tendency to compare Meteor Crater, a huge pit in the Arizona plateau, with the superficial appearance of lunar craters, has resulted in the misinterpretation of other facts about the

moon. For instance, our satellite has an appreciable atmosphere which is as effective in destroying meteors as is our own air. Owing to the low surface gravity of the moon, where a 150-pound man would weigh only 25 pounds, the density of the moon's air might be only one-millionth that at the earth's surface, but the two atmospheres would be of equal density at a height of 84 miles. Above this point, the moon's air would be denser than the earth's.

For the earth, the average "shooting star" starts to shine at a height of 80 miles, and so it would on the moon. It will not be slowed down as quickly in the moon's thinner air at lower levels, but would burn up just about as fast as in the earth's air. Seldom would a meteor strike the lunar surface hard enough to produce a crater, just as on the earth, where in the past 100,000 years or so only 200 or 300 meteorites have struck which could make real craters. The number for the moon is only 20 or 30 meteorites, and in that time there would be practically none producing craters as large as Meteor Crater, which is nearly a mile wide.

lunar skies be bright enough to be seen at this distance.

"But that they occur must be as certain as that the brighter flashes which

would occur on an airless moon have never been observed," concluded Dr. Marshall.

Science News Letter, September 13, 1941

shire training camp and will go to Newfoundland posts for duty in November, according to reports received by the War Department.

Making good, in their case, means chiefly that the canine recruits have built up their fitness, by a strict regime of conditioning, like athletes, so that they can stand a winter of work in the cold. Antarctic exploration work is hard on dogs. Some of the canine veterans had become afflicted by snow blindness, as humans are when their eyes cannot stand the glare on ice and snow. The snow-blind dogs would run around wildly, and could not see well.

Newfoundland winter will be a comparatively mild experience for these dogs, the Remount Division of the Quartermaster Corps believes. Cold will be far less severe than South Polar blizzards. The dogs can have a better diet. Besides Army sergeants with veterinary medical knowledge, the dogs' trainers include a man who worked out several tight-packed rations for the Antarctic.

If the Antarctic dog veterans make good, the Army expects to expand the sled dog branch of the service, since dogs can be valuable in transport in the North beyond railway heads and in the interior. Huskies at their training kennel in Wonalancet, New Hampshire, are reported apt at learning "Gee" and "Haw" commands, just as army mules do.

Like soldiers on maneuvers, Army dogs are using ersatz equipment when need be. To imitate winter snow conditions in snowless New Hampshire in summer, the sergeant in charge of the dogs rigged up a sled on wheels with a hand brake.

Science News Letter, September 13, 1941

MILITARY SCIENCE

Anti-Aircraft Gunners Use Red Glasses

THE "red world of war" becomes a literal vision to anti-aircraft gunners firing tracer shells from the small-caliber pompoms—37 and 40 millimeter pieces that spit out rapid streams of death like over-size machine-guns. The gunners are now equipped with red glasses, because through them they can see the flaming course of the little shells in better contrast against the sky. The new glasses are said to work better than even binoculars with filters, especially on hazy days.

Science News Letter, September 13, 1941

NUTRITION

Three-Fourths of World Ill-Fed In Normal Times

Only Hope for Improving Human Nutrition Lies in World Wide and Economic Peace After This War

THREE-FOURTHS of the world's 2,000,000,000 people depend so heavily on potatoes and cereal crops for food that their bodies are likely to suffer damage from the ill-balanced diet.

So it appears from an impressive survey of what the world is accustomed to eating in such comparatively good times as the years before 1939. Dr. Merrill K. Bennett of the Food Research Institute, Stanford University, has reported the survey to the *Geographical Review* (July). He finds low income levels to blame for a great deal of the world's monotonous diet habits. And he declares that the only hope for improving human nutrition lies in a world-wide and economic peace, as well as a military and political peace, after the present war.

"The United States, with 130 million people, is conspicuously the largest national group in the world," Dr. Bennett states, "to enjoy a diet composed of cereals and potatoes to as small an extent as 30 to 40%."

All the other six countries that have national diets of this standard total together only about 85 million people. These are: Switzerland, Sweden and the United Kingdom in Europe; Canada, Australia and New Zealand.

All of Asia, excepting Japan, lives on 80 to 90% cereal and potato fare, in terms of calories. So does a great area of Africa, and also European Soviet Russia, says Dr. Bennett. The Americas and Australasia probably have no national groups accustomed to this degree of monotony, he points out. Japan is in the class of having a diet from 70 to 80% in the grain and potatoes class.

Southern Europe and most of South and Central America eat 60 to 70% cereals and potatoes; the rest of Europe ranges from 40 to 60%. A really liberal diet, according to one American nutri-

tionist, would contain only 21% of this food.

To illustrate for Americans the monotony of such diet, Dr. Bennett shows that an American man who lived on 80% cereals and potatoes, and consumed 3,000 calories of energy value a day, would have just 600 of those calories in foods other than grain and potatoes.

One liberal serving of beef or chops would alone use up the 600. Or instead, he might add these to his day's ration of one pound of white potatoes and one and one-quarter pounds of flour or meal: an apple, half an ounce of sugar, an ounce of bacon, half an ounce of vegetable oil, an ounce and a half of dried beans, half a pound of cabbage. These would add up to 600 calories. "Flavoring materials," most Americans would call this, says Dr. Bennett.

Religious taboos and other psychological factors may keep some countries in a groove of eating an ill-balanced diet and suffering the consequences in malnourishment, but Dr. Bennett concludes that the chief reason for this condition in the world is poverty. Nations, like families, he says, presumably eat mainly cereal foods and potatoes because they cannot afford variety.

Science News Letter, September 13, 1941

ZOOLOGY

Antarctic Dog Veterans Join Up for Army Service

THEY DIDN'T register for defense duty, but nearly 40 dog veterans that saw hard exploration service with the U. S. Antarctic Expedition in 1939-1940 are among the "selectees" who will aid American defense in the North this winter.

Thirty-seven out of 40 sled dogs have already made good in their New Hamp-