

cation of animals. The art of harnessing the energy of coal and oil in engines created the Power Age, the next great cultural advance.

Technological activity is stimulated or repressed by the existing social system, Professor White declares. Using the art of agriculture as an example, he points out that from 2000 B.C. to 1800 A.D. there was no fundamental improvement. The reason for such a cultural lag, even though the urge for security and efficiency was as great then as now, was that the social system obstructed technological advance, Professor White states.

To obtain more wealth, he explains, the ruling class merely increased taxes, rents or other levies upon the producers of wealth. If the masses produced more by increasing efficiency, it would only mean more for the tax-gatherers of the ruling class. Lack of incentive inherent

in the social system thus discouraged agricultural improvement for almost 4,000 years.

Professor White then discusses the inadequacy of our social system for our technological system: "At the present time our technology has outgrown our social system; the great forces of the Power Age are straining within the confines of institutions that were fashioned in stage coach days. The great wars of the Twentieth Century are expressions of this cultural conflict, and are chiefly significant for one reason: they are the means by which an old order is to be scrapped and a new one brought into being."

While not specifically describing social changes which may take place, Professor White predicts that they will be as profound and far-reaching as those effected by World War I, if not greater.

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vaccine, made from living, attenuated tubercle bacilli.

The suffocation of the tuberculosis germs must be done under carefully controlled conditions which include an absence of oxygen, presence of moisture and a temperature high enough to keep the germs' metabolism active. Under these conditions, the germs die partly as a result of self-sabotage. By continuing their living processes they deprive themselves of oxygen as they breathe, and since no more is supplied them, they suffocate.

Destruction of the germs by this method, Dr. Potter believes, is less likely than other methods to reduce or destroy the tuberculosis antigen. Antigen stimulates the body's defensive mechanism so that, when vaccination is successful, the body defenses are ever on guard in suitable strength to overcome fresh invasion of the germs that produce the antigen. This is the principle of vaccination in general. In the case of tuberculosis, the problem has been to find a way of getting enough antigen into the body to develop immunity without giving so much or giving it in such form, for example in living germs, that it will cause tuberculosis.

In his latest research, reported to the Society for Experimental Biology and Medicine, Dr. Potter used a vaccine from asphyxiated human-type tuberculosis germs to protect rabbits. Of 33 vaccinated rabbits, only four showed minimal lesions of tuberculosis when large doses of virulent germs were injected into their veins after the vaccination. Of 33 unvaccinated rabbits, 25, including three that died, showed frequent severe lesions.

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MEDICINE

Vaccine Against TB

► INCREASED possibility of preventing tuberculosis by vaccination is seen in research by Dr. Truman Squire Potter, of the Laboratory of Preventive Medicine of the University of Chicago, according to an announcement from the University.

The vaccine which Dr. Potter believes will be effective, although it has not yet been tried on human beings, is made

from tuberculosis germs that are killed by suffocating them. Vaccines against tuberculosis have in the past been made either from living but weakened strains of the germs or from germs that were killed by heat or chemicals. None of these has been generally accepted as safe and effective, although promising results have been reported with B.C.G.



CHRISTMAS PATTERN—The reason for the popular belief that the red leaves of the poinsettia plant compose its flower is clearly evidenced in this photograph, taken by Fremont Davis, Science Service staff photographer, at the United States Botanic Garden in Washington, D. C.

BOTANY

Laymen Often Mistaken About Poinsettia Flowers

See Front Cover

► WHAT APPEAR to be three-horned, grotesque creatures in the picture taken by Fremont Davis on the cover of this SCIENCE NEWS LETTER are actually the true flowers of a poinsettia plant. These naked pistillate and staminate flowers are clustered near the center of the whorl of brightly colored leaves which are popularly considered to be the poinsettia flower. (See SNL, Dec. 18) The cup-shaped receptacle on which the flowers are situated secretes a sticky substance that tastes sweet.

The leaves surrounding the real flowers develop a red pigment in place of the usual chlorophyll.

The "Mexican Flame Leaf," a native of Mexico and Central America, has a lesser known cousin in a variety with white bracts instead of red. There is also a double variety in which the colored leaves are branched.

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OPTICS

3-Dimensional Pictures Used to Teach Navigation

► TWO PICTURES, one superimposed on the other on a specially treated plastic sheet with the outlines seemingly not quite coinciding when viewed by the naked eye, do coincide when seen through special goggles, and stand out from the sheet as a single three-dimensional object. The three-dimensional picture is called a vectograph; the goggles are called polarizing three-dimensional viewers.

The three-dimensional vectograph can be thrown on a screen by any ordinary

projection apparatus, and viewed by a group of people simultaneously if each person is equipped with the polarizing three-dimensional viewers. These are small plastic pieces of specially prepared transparent material held in frames similar to ordinary eyeglasses.

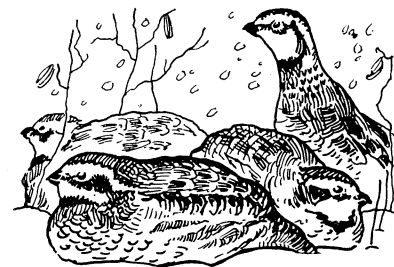
The new technique has recently been perfected by Prof. John T. Rule of the Massachusetts Institute of Technology, and is used by him in teaching aircraft navigation to military students. It eliminates the need for training men to interpret depth in flat charts by presenting life-like pictures of models of the heavens and the earth in three dimensions. Celestial navigation vectographs "teach students, easily, to see and think three-dimensionally," he states.

Formerly the only practical three-dimensional viewing device was the stereoscope. This, however, could be used by only one person at a time and was therefore of little use in a classroom. The vectograph process is the invention of Edwin H. Land and Joseph Mahler of the Polaroid Corporation.

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SPEEDS NAVIGATION TRAINING—MIT Prof. John T. Rule examines the globe which serves as a photographic model for three-dimensional pictures known as vectographs, which he uses in a new technique to teach military courses more easily and quickly. An instructor walking into the beam of a vectograph of this globe projected on a screen appears actually to be walking into the center of the earth itself.



Men of Good Will

★ "PEACE ON EARTH, good will towards men," is the version we commonly hear. A sentiment of grand, wide-hearted charity that takes in all mankind; so inclusive in its sweep, indeed, that few of us ever achieve the courage to believe in it and practice it fully.

Yet grand as it is, this expression limits itself. Strictly read, it offers good will only to human beings; that is, it is essentially simply a sociological ideal. It needs to be made much more inclusive, to take in the whole of the living complex of which man's life is an inseparable part. That is, it needs to become in the widest sense an ecological ideal.

A better translation, from this point of view, may be found in St. Jerome's version, which renders into English as, "Peace on earth among men of good will."

That is a far less easy-going way of putting the idea; for it will be noted that it places upon all of us the obligation to become men of good will before we can expect peace. It should, incidentally, cause a good deal of heart-searching in these days when some proposed "peace" terms fairly drip with the most vindictive ill will toward the foes we expect to defeat.

But that is not the present theme, nor is it the whole crux of the building of ultimate peace. Whoever aspires to be *homo bonae voluntatis*, and so worthy of peace in his own heart, should examine his conscience well, to be sure that he is doing whatever lies in his power to end abuses of forests, grasslands, natural waters and the creatures that therein dwell, and to bring about legitimate and temperate uses of the