

nerves can not be patched when cut, but the break must be remedied by an entirely new outgrowth from the place of the cut to the muscle or sense organ controlled. It is just as though a telephone linesman were unable to use any of the old wire between the place of a break in the line and the subscriber's telephone and had to string entirely new wire.

This explains why when a finger or leg suffers a serious cut it may take weeks and months for normal feeling to be restored in it and why muscles have to be reeducated.

### How Alcohol Affects the Body

Prof. Speidel has found how alcohol affects the nerves. Other effects of alcohol on which medical scientists agree have been summed up in a recent book by Prof. Haven Emerson of Columbia University as follows:

1. Alcohol is a narcotic which, by depressing the higher centers, removes inhibitions.

2. Outside of the nervous system and the digestive tract, alcohol used as a beverage has little demonstrable effect.

3. It is a food, utilizable as a source of energy and a sparer of protein, but it is such only to a very limited extent.

4. It is improbable that the quality of human stock has been at all injured or adversely modified by the long use of alcohol, although the effects on the individual are often devastating.

5. The therapeutic usefulness and value of alcohol is slight.

6. It may be a comfort and a psychological aid to the aged.

7. It does not increase, and it sometimes decreases, the body's resistance to infection.

### Releases Inhibitions

8. By releasing inhibitions, it makes for social ease and pleasure, and herein lies one of its great dangers.

9. Its effects are best studied by changes of conduct.

10. It impairs reason, will, self-control, judgment, physical skill, and endurance.

11. It may produce situations from which crime and social lapses result.

12. It is a frequent destroyer of health, happiness, and mental stability.

13. Its use commonly lowers longevity and increases mortality.

14. It is used primarily for its psychological effect as a means of escape from unpleasant reality.

15. It constitutes an important community health problem.

*Science News Letter, September 15, 1934*

CHEMISTRY

# New Oxy-Nitro-Fluorine Gas Is Irritating, Explosive

## Warfare Use Considered Doubtful by Chemists Since Instability Makes it Unsafe to Handle

A NEW chemical substance, potentially an irritating war gas like phosgene, has been discovered at Massachusetts Institute of Technology. At the Cleveland meeting of the American Chemical Society, Dr. George H. Cady, chemist now employed by the United States Rubber Company, reported on a new compound of fluorine extremely explosive, and irritating to the lungs in a fashion similar to the war gas phosgene. The gas, never before known, was produced in a laboratory accident at Massachusetts Institute of Technology last May.

### Starts Coughing

Dr. Cady said: "When one inhales a small amount of the compound one starts to cough. A deep breath, even of fresh air, taken after a coughing spell produces still more irritation of the lungs. In this respect the gas is something like phosgene. A blanket of gas over the enemy's trenches would be destructive to life, and if the concentration were high enough an explosion could easily be produced."

An official statement issued by the American Chemical Society added:

"Dr. Cady's discovery attracted unusual interest among chemists in view of rumors reaching this country of new war gases developed in the laboratories of Europe and the possibility of utilizing certain known gases in warfare. Definite knowledge of such developments, however, appear to be lacking."

The accidental creation of the new fluorine compound resulted in a substance whose molecules consist of one atom of nitrogen, three atoms of oxygen and one atom of fluorine. The gas has the treacherous property of exploding violently when heated.

"I first learned of the explosive tendency of the gas quite suddenly," Dr. Cady's report stated, "when a large flask I was holding blew up. After that, the compound was prepared in a piece of apparatus something like a gun. The reaction of fluorine with nitric acid occurred in the barrel, and occasional ex-

plosions simply blew a metal disk away from the muzzle, doing no damage.

"At present no one can predict the future industrial importance of gaseous fluorine or compounds directly derived from it. It seems probable, however, that research of a purely scientific nature will create a demand for the commercial production of fluorine, and the free element may eventually occupy a position equal to that of the other halogens, chlorine, bromine and iodine."

Minimizing the possible wartime uses of newly discovered gases, Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*, declared:

"I think it is fair to say that to the best of our knowledge and belief, research since the war has failed to disclose any gases for field use that are more advantageous than those known and used during the World War."

Not only must a war gas or an explosive be destructive but it must do its damage when—and only when—it is desired. It must hurt the enemy but not the homeland forces. Dr. George H. Cady in reporting on his new fluorine compound declared that only when the violent instability of the compound has been overcome will the new gas be useful in war.

### Not Safe Enough

While the compound may find industrial uses, its present status as a war gas can be compared to the frequent announcements of the discovery of super-explosives more powerful than dynamite or TNT. In most cases such substances give violent explosions but are unsuitable for general use because they blow up on the slightest provocation, either from heat or shaking. Not only must an explosive or gas give violent reactions but it must be capable of being handled safely even by unskilled labor.

Massachusetts Institute of Technology officials declared that no chemical research conducted in their laboratories

is designed either directly or indirectly to develop warfare gases. The statement was forthcoming in a reply to a Science Service query.

"No research here is directly or indirectly designed to develop warfare gases," said Dr. Frederick G. Keyes, head of the M. I. T. department of

chemistry. "Dr. George H. Cady long has been working on fluorine compounds on a purely scientific basis. The fact that this and many commonly used gases are poisonous is no indication whatever that they are developed for warfare."

*Science News Letter, September 15, 1934*

## PUBLIC HEALTH

## Dysentery Is Threatening Health of the Nation

**A**MEBIC dysentery continues to threaten the health of the American people, in the opinion of Dr. F. W. O'Connor of Columbia University who pointed out the importance of tropical diseases in the United States at the meeting of the American Public Health Association at Pasadena.

"In the future greater attention should be paid to the question of amebic dysentery because the usual number of carriers of the parasite in this country has doubtless been augmented by a number of persons in different parts of the states who became carriers as the result of the Chicago outbreak but did not develop symptoms," Dr. O'Connor explained.

From six to twelve million persons in the United States are subjects of this disease, Dr. Alfred C. Reed of the University of California Medical School gave as an estimate.

### Two-Fold Danger

The danger from carriers of amebic dysentery is two-fold, Dr. O'Connor pointed out. Not only are they probably spreading the disease to others who may become seriously ill but the carriers themselves may at any time develop the disease in malignant form. Development of liver abscess as a result of amebic dysentery infection is a particularly grave complication which threatens the so-called healthy carrier and the apparently cured case, Dr. O'Connor said. He emphasized the danger of relapse in patients who had been treated and apparently cured of the disease.

The recent epidemic in Chicago shows that the very progress of mankind may not only bring new evils in its train but may upset the biological balance between parasite and man, Dr. O'Connor said.

The Chicago epidemic was traced to sewage contamination of drinking water in two hotels as a result of faulty plumbing. But such conditions probably exist in other cities. Outbreaks of amebic dysentery as severe as the one in Chicago last year may occur in other parts of the country at any time, especially under conditions of guest strain such as large conventions bring, Dr. O'Connor said.

*Science News Letter, September 15, 1934*

## ENGINEERING

## Super-Power System For Great Britain

**A** PROPOSAL to link all the electrical generation plants of Great Britain into one super-power system is advanced by Prof. Francis G. Bailey. The scheme would make possible the use of the lowest grade coal and other forms of cheap power now wasted.

The cities of England, Prof. Bailey declared, are admirably adapted to such a plan for "to a large extent, the population has gathered around the coal pits, and there are practically no large towns, except seaports, that do not lie within easy reach."

The new plan calls for the use of the lowest grade and waste coal which now amounts to about 10 per cent. of all the coal raised in England. At present the waste coal must be used—if it is used at all—at or near the mines. A small part of it is employed to generate power for running the mines but much of it is burned, for this is the cheapest way to get rid of it.

Shipping such low grade coal to a point where it might better be used is uneconomical for it costs just as much to transport it as high grade coal and yet its heat-producing value is small.



### ONE FOR EVERY PURPOSE

*The meticulous golfer with his big bag of carefully matched sticks, one for every imaginable kind of lie, has nothing on this dusky Goajira Indian, of Colombia. No two of his arrows are alike, yet each is excellently adapted for a particular type of game—including human targets. Photo by A. J. Weston.*

Under Prof. Baily's plan such low grade coal would be turned into electrical power at the mine head or at the place where coal is cleaned, and then sent over high-voltage transmission lines to all points. It is three times as cheap to transmit electrical power as it is to ship coal from which an equal amount of power may be derived, Prof. Baily points out.

*Science News Letter, September 15, 1934*



### NEW INDUSTRIES FOR OLD

an address by

**Dr. E. R. Weidlein**

Director, Mellon Institute of Industrial Research

Wednesday, Sept. 19, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.