



A Flaming Paradox

**O**UT OF Fire comes Water.

This statement, which at first blush looks like one of the old paradoxical riddles of the Sphinx, is quite literally true.

The ancients, classifying all things into four primal "elements," air, earth, fire and water, thought of fire and water as the most completely opposite, the most antagonistic, the most incompatible, of all the four. Water quenched fire; fire, when it was the stronger, "destroyed" the water in a hiss of steam.

Yet modern chemistry shows that water is the direct product of fire in many cases—indeed in most ordinary fires that we see and use. To be sure, the theoretically "perfect" fire, resulting from the union of pure carbon and oxygen, yields the gas carbon dioxide and nothing else.

But very few of us ever get a chance to see pure carbon burning. It is hard to ignite graphite or diamond, which are about the only really pure forms of carbon at all frequently encountered. And to burn a diamond, moreover, implies a certain wanton wastefulness—a reminiscence of Cleopatra swallowing the famous wine-dissolved pearl.

Common fuels like coal, wood, oil and natural gas contain large amounts of hydrogen in addition to their carbon. With this hydrogen there may or may not be a certain amount of oxygen already bound up, but there is always less than the one-to-two ratio of oxygen to the hydrogen which expresses the chemical makeup of water. Such carbon-hydrogen compounds, with less than enough oxygen in them to satisfy the water-forming requirements, are known as "unsaturated" compounds, and the degree of their "unsaturation" is a measure of their value as fuels. For when they are burned, the hydrogen as well

as the carbon combines with oxygen, with the evolution of heat.

When the carbon combustion of such common fuels is complete, the end-product of its combination with oxygen is, of course, the same as that of the theoretically perfect pure-carbon combustion—carbon dioxide. When it is incomplete, carbon monoxide is produced as a half-way stage; but this may in its turn be burned to completion, producing carbon dioxide.

The burning of the hydrogen in these "unsaturated" gaseous, oily or tarry compounds yields the only end-product possible to such combination with oxygen. Water comes from almost all flames even more inevitably than

smoke. In fact, from a really good flame of ordinary fuel you should get no smoke, but you are bound to get water. That is why the air in an unventilated room heated by a gas grate soon becomes "heavy" and "steamy."

A flame of pure hydrogen-and-oxygen, producing nothing but water, is much easier to obtain than a flame of pure carbon-and-oxygen, producing nothing but carbon dioxide. Such a flame is one of the commonest of modern industrial tools—the flame of the oxy-hydrogen torch. The helmeted welder of the oxy-hydrogen torch actually cuts steel rails and I-beams with a little hot water.

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## PUBLIC HEALTH

## Spend Less On Alcohol, Tea: More On Improving Health

**S**PEND a little less on alcohol, tea, coffee, tobacco and cosmetics in order to have more to spend on preventing disease and improving human health.

Try to raise the general intelligence level.

Have the courage to apply what is already known about health and disease, and to search for further knowledge along these lines.

These three pieces of advice were given to health workers of America, Canada and Mexico by Prof. Haven Emerson of Columbia University, president of the American Public Health Association, in an address before the first general session of that organization.

Self-denial, increased general intelligence and courage are the three elements needed to further improve human health, he said.

Specific problems which he urged health workers to concentrate their efforts on are sanitation, diabetes, alcohol, industrial diseases, syphilis, and sex and marriage education including birth control.

Referring to the modern frankness of mind, act and speech, he urged that health officers attack the matter of sanitation with equal frankness of spirit and of language. We can not consider ourselves a civilized nation until every place of human habitation is equipped with the means for sanitary disposal

of human waste with its infesting and infecting organisms of disease, he pointed out.

The problem of checking the increase in diabetes must be met by teaching people to exercise the large muscles of their bodies more and to limit their intake of food, he believes. He sees the increase of this disease as a result of the machine age which has reduced man's muscular exertion to the use of the fine muscles of eye and finger and has insured, with but slight interruptions, a superabundance of food.

Years can be added to human life expectancy, the birth of wanted children assured and large vacancies can be created in hospitals and asylums when the race is washed clean of the pollution of syphilis, he declared. This is the most prevalent of all communicable diseases and one for the prevention of which we are doing the least. Yet practical knowledge of how to combat syphilis exists to a greater degree than for any other disease, except diphtheria, malaria and hookworm infestation. The disease exists in more than a third of the rural population, both Negro and white, of some southern states.

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Government chemists announce the important commercial discovery that apples retain their original color when cut, if they are sprayed at once with pineapple juice.