

based on formulas known at present, do not seem to indicate the development of very large amounts of power. They are for the most part adopting a "watchfully waiting" attitude.

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#### NEW MECHANICAL LARYNX HELPS DUMB TO SPEAK

Three mutes, deprived of their voices as an unavoidable result of operations for cancer of the throat, spoke distinctly and clearly before an audience of medical men, using an artificial larynx, invented by Dr. John E. Mackenty of New York.

Sufferers from cancer of the throat have heretofore been able to save their lives only at the expense of their voices, for the radical operation necessary in such cases necessitates the destruction of the vocal apparatus, and after recovery the patients must breathe through an opening in the neck. The new device is strapped over this opening, and receives air which it sets into vibrations similar to those caused by the natural vocal cords. This vibrating column of air is carried to the mouth by a small tube, and there modified into human speech by the lips and tongue. The result differs from ordinary speech mainly in that it is a monotone.

The new device, according to Dr. Mackenty, represents practically a philanthropic contribution to mankind. There are so few persons who require it, and the possible sales are so far between, that his efforts to interest manufacturers to develop the idea met with no response. Finally, executives of the laboratories maintained by the American Telephone and Telegraph Company and the Western Electric company decided to undertake the work, even though no certain return of their expense was in sight. Using the knowledge of human speech acquired in their telephonic studies scientists of these laboratories have now produced a device which will enable many unfortunate people to talk again.

Not only will the artificial larynx add to its users' happiness and earning power, but it will remove one barrier to the proper treatment of cancer of the throat. In the early stages of the disease, when a radical operation offers a practical certainty of cure, sufferers have often hesitated because they dreaded the loss of their voices. Delay, even while trying other treatments, has usually allowed the disease to progress to a point where cure is impossible. With the fear of future silence removed, Dr. Mackenty believes that sufferers no longer will risk their lives, but will have the cancerous tissues removed and do their talking with an artificial larynx.

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#### ANARCHY IN THE HUMAN BODY

By Dr. Edwin E. Slosson.

The human system is ordinarily a well ordered empire. The numerous organs and innumerable cells carry out their diverse duties in close cooperation due the subordination to the central powers. If the body is attacked, say, by the cut of a knife or an army of microbes, the blood cells hasten to fill up the breach in the wall or to overpower the invading host. Because of the vigilance and well regulated activity of the cells, the ravages of wounds and disease may be staved off for seventy years or longer. And physicians have found that they can aid the

defensive forces of the body by sterilizing open wounds or injecting antitoxins to destroy the foreign invaders.

But in case of an internal insurrection, the physician is comparatively powerless for he has no medicine that will distinguish between loyal and disloyal cells since they are of the same nature and origin. Such a cellular insurrection is cancer and that is why no cure or preventive has been found for the disease like those for diphtheria and yellow fever. A similar situation prevails in international affairs. The League of Nations can intervene in the case of conflicts between nations but is powerless to prevent internal rebellion.

The cancer cells are carrying on the same commendable activities as the normal cells. They grow and subdivide at an amazing rate, but selfishly and without regard to the commonwealth. It is as if New York City should fall into the hands of anarchists who were incompetent to maintain the public services. For a time they would thrive on accumulated wealth and incoming supplies, but transportation would break down, the water supply and sewer system would fail, food would run short, and the population would perish from starvation and pestilence. The anarchistic colony would die at its center while continuing to spread into the surrounding country.

So the multiplying mass of cancerous tissue grows without developing, expands without organization, all cells of the same sort, equal in rank and alike in function; none in authority and none to obey; none to look after the interests of the community as a whole; none set to serve the rest as carriers or scavengers. So the cancerous colony, cut off from communication with general headquarters by lack of nerves, devoid of veins to relieve it of its waste products and of arteries to supply food and oxygen, dies and decays at the center, poisoned by its own pollution, while vigorously extending its conquests into the healthy tissue roundabout.

To "increase and multiply" is the only law recognized by cancer cells. Some break away from the parent community and start new colonies in some remote part of the body. That is why it is so difficult to cut out cancer completely with the knife. A few cells transplanted from one animal to another will flourish in their new environment. They will even grow in glass if kept warm and well fed. They seem to be immortal and capable of infinite expansion so long as living conditions are favorable. In one American laboratory a single cancer strain has been kept in continuous existence by transplanting for thirty years, and it is calculated that if all the branch colonies had been allowed to grow and given a chance to expand as they would, the mass of cancerous tissue would fill the universe, all starting from some one cell that had gone wrong.

Sampson Handley says in the recent report of the Cancer Research Laboratories of the Middlesex Hospital, England:-

"It has to be remembered that man with his millions of cells has evelved from a single cell. It is hardly a matter of surprise if occasionally one of these millions of trained subordinate cells reverts to the ancestral, independent type, behaves like a unicellular organism, owning no allegiance to the cell community, whose ruin is the final outcome."

What starts the revolt? What is the origin of the impulse to anarchy?

This remains a mystery although the problem has been the object of research in well equipped laboratories by skilled experimenters for many years. No microbe has

so far been found present in all cancers and certain to produce them. Cancer is not, as commonly said, an exclusive disease of civilized man. It occurs among primitive peoples and animals, and has even been found in fishes. Cancer is apt to start at some point of chronic irritation yet not all such irritation causes cancer.

Three ways are known by which cancer is caused and by which it may be produced experimentally. One is by action of the penetrating rays of radium or the X-rays. These may either stimulate or destroy the cancerous tissue according to their intensity and duration. Another cause is a minute parasitic worm, carried by cockroaches, and when rats eat the cockroaches they are likely to get cancer of the stomach. The third cause of cancer is some substance contained in minute amount in the higher boiling fractions or coal-tar and petroleum. Workers about shale oil and tar stills are apt to get large warts on their hands that sometimes become cancerous and chimney sweeps may get cancer from the soot. Coal tar put on the skin of mice will cause cancer but not on rats.

Until the cause of cancer is discovered, a cure can hardly be hoped for. But there are a few well authenticated cases of sponaneous cures, and recent experimentation points the way to a possible conquest of the disease. In the Middlesex Hospital certain hopeless cases have been treated by injecting doses of cancer cells that had been killed by exposure to radium rays, and encouraging results are reported from this treatment.

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#### ULTRA-VIOLET LIGHT FOUND DEADLY TO LOWER ORGANISMS

The invisible ultra-violet light beyond the upper end of the spectrum, which has come into general use in hospitals for the treatment of a number of human ills, kills many of the lower forms of life like a stroke of lightning, according to the results of researches made public by Drs. C. E. Barr and W. T. Bovie of Harvard University.

The efficacy of ultra-violet light has long been known to depend on its destructive effect on protoplasm, which is the living substance that forms the basis of all animals and plants, but the present experiments have shown for the first time with what rapidity this destruction takes place.

Drs. Barr and Bovie used living protoplasm in its simplest available form; the animals used in their experiments were amoebae, which are naked and unprotected bits of protoplasm of microscopic size that crawl about in stagnant water. Exposed to ultra-violet light for one-fourth of a second, an amoeba apparently suffered paralysis. It stopped moving and seemed dead, but after a time recovered. But if the exposure lasted three seconds, the animal was killed and its substance broken down at once. One second of exposure killed the animal, but the disintegration of its body was sometimes delayed for a short time. Successive exposures of a fraction of a second each, with intervals of one-half second between flashes, produced a cumulative effect, and the amoeba was killed when the sum of the successive brief exposures was approximately equal to one continued exposure long enough to be fatal.

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The tips of trees begin to grow weeks and sometimes months before the trunks begin to expand.

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