INVENTION OF AN ITALIAN MAY PUT AN END TO WAR

Giulio Ulivi Has Detonated Explosives at a Distance of Several Miles by Using Infra-Red Rays and Says World's Fleets and Forts Are at the Mercy of His Apparatus.

THERE is a story that Archimedes of Syracuse burned the Roman fleet off Sicily in 230 B. C. through concentrating the sun's rays by means of a huge concave mirror and projecting them so that the tow and pitch in the vessels' seams became ignited. Not less wonderful have been the stories that have been told in cable dispatches during the last year of the Italian engineer, Giulio Ulivi, and his curious apparatus, which, it has been reported, could detonate explosives at a great distance and without any material contact.

According to the late Russian philosopher, I. S. Bloch, author of "The Future of War," conflicts between nations will cease because of two reasons: The excessive cost of maintaining men and armaments and the fact that the latter shall have reached their maximum of deadliness. Hence, if the stories concerning Signor Ulivi be true, and he is able to blow up all war craft within a radius of several miles, it logically follows that he has invented the most formidable war machine of the age—a machine whose death-dealing capacity has reached the maximum suggested by Bloch.

We first heard of Signor Ulivi a year ago, when, on the invitation of members of the British Admiralty, he left his laboratory at Asnières, France, and succeeded in blowing up some mines off Portsmouth without any contact by wire. The Admiralty officials who witnessed his experiments remained unconvinced, and after a few weeks Ulivi returned to Asnières to continue his investigations.

Tests in France.

We next heard of him in August, when he had been induced to repeat his experiments at Havre. Here he is said to have received a subvention from the French Government. Gen. Joffre, Chief of the General Staff; Gen. Curières de Castelnau, Assistant Chief of the Staff; Capt. Cloitre, the personal representative of the Minister of War, and Commandant Ferrie, Chief of the Wireless Service, were ordered to observe his work.

The first test was made at Villiers-sur-Mer. Ten submarine mines were placed at intervals of 600 yards. Signor Ulivi exploded them all at a distance of from three to four miles, "as if by magic," one of the officers remarked.

"This is marvelous," Gen. Joffre was reported by L'Eclair and other papers to have exclaimed, "but what we want in case of war is to blow up the powder deposits and ammunition stores in a fortress or on board a vessel. Can you do that?"

"I can," replied the inventor.

Preparations were at once made. Caissons of ammunition were placed in an old fort and covered with cement. Signor Ulivi detonated them with astounding facility. For three nights, so the correspondents sent by the Paris journals reported, the officers who had come to see the tests were unable to sleep.

"They saw the enemy's ships blown up twenty miles out at sea, fortresses fly into the air at the touch of magic buttons, and all the enemy's airships and powder supplies wiped out of existence in a few seconds. What was war coming to if they had such a wonderful secret at their command?"

Their illusions, however, it is alleged, were soon dispelled, or, at least, their convictions were shaken when they demanded that the inventor should have no hand in arranging the explosives to be detonated. It is also stated that an Italian officer disguised as a newspaper correspondent had a hand in bringing about the disillusion.

Be that as it may, Ulivi suddenly became very uncertain in performing his experiments. His explanations seemed to be awkward, and in many cases contrary to well-known scientific facts, as if he were not conversant with them or misunderstood them. Sometimes his allegations were contrary to his own theories, as when he said that the F-rays, by means of which the explosions were produced, traversed only metallic receptacles—yet the mirror he used was a steel reflector, which, he had said, the rays did not traverse.

The French officers finally went back to Paris in disgust. Their reports are, of course, confidential, but the correspondent of L'Eclair stated on his own responsibility that Ulivi had evidently contrived to place with the explosives a detonation powder which would ignite at a comparatively low temperature, and he added that "the result of the experiments was telegraphed the world over. The success was said to have been marvelous. But a doubt has arisen. The F-rays, invented by a professor of Nancy, are an illusion."

Without making the least effort to reply to his detractors, Signor Ulivi returned to his workshop at Asnières, where he spent a week in destroying his plant. He then packed up and went to Rome. Paris called him a charlatan whose journey resembled a disgraceful flight. Rome received him with open arms. The Italian Government sent him to Florence, fitted up a laboratory for him there, and gave him a satisfactory subvention.

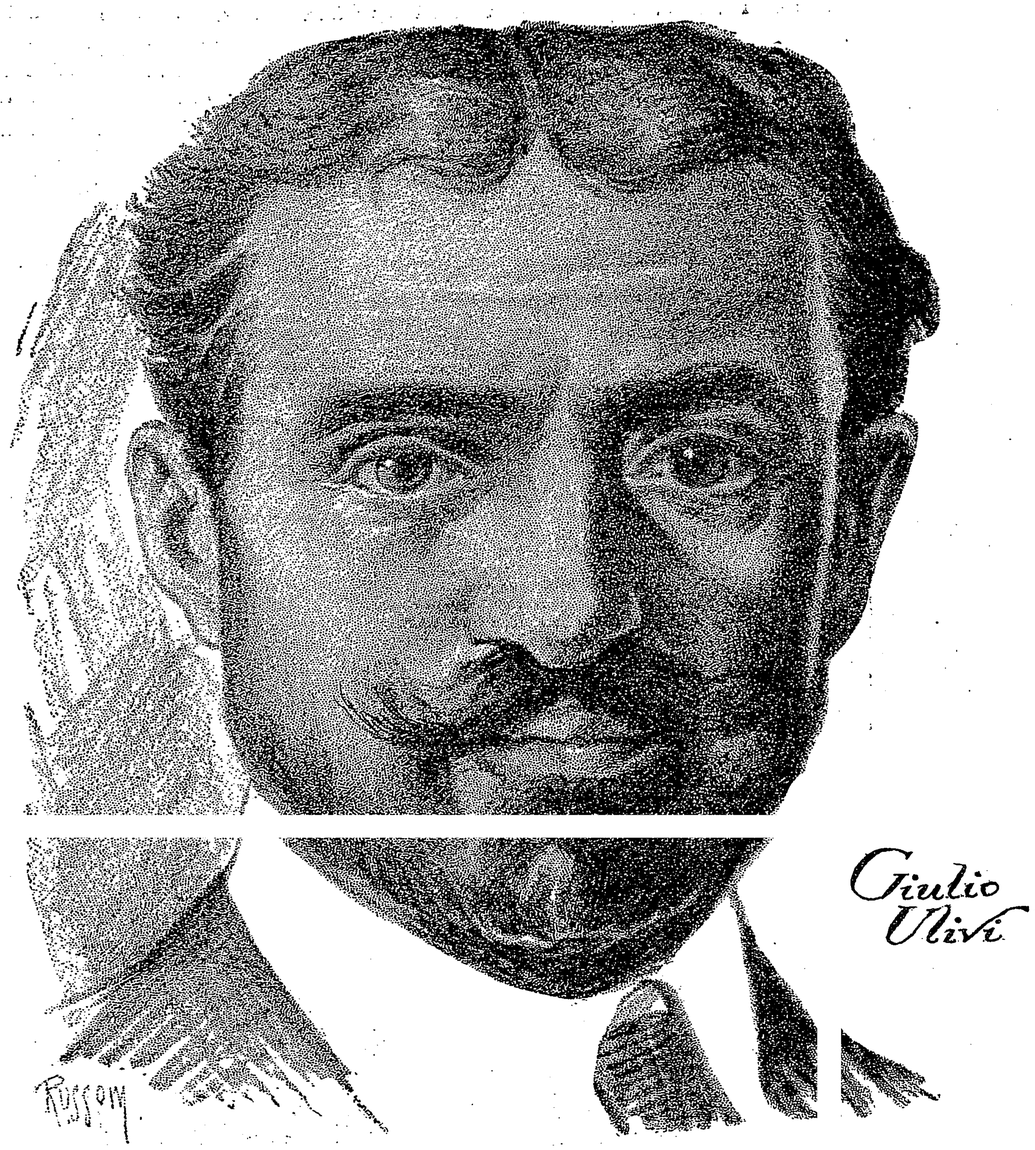
On May 14 he repeated before Admiral Fornari and Col. Torretta, representing the Government, and a large crowd of spectators, the experiments he had performed last August in France. This time, however, the explosives were prepared in the Government arsenals and without any opposition on the part of Signor Ulivi.

In a few days he will attempt to perform still more amazing feats on the Nettuno testing grounds near Rome. At Florence he exploded floating and stationary mines sunk in the Arno. At Nettuno, where his experiments will not endanger the lives of the crowd, he will attempt to ignite shells flying through the air and a magazine protected in exactly the same manner as it is on a warship.

How Apparatus Works.

Naturally, Signor Ulivi permits no one to examine his apparatus, but its general nature has been imparted to at least one person. But before any attempt is made to describe it, a few words should be written concerning the forces he employs.

The modern theory of physics has established an intimate connection between the phenomena or radiated energy, (heat and light,) and those of electric vibrations. Maxwell and Hertz were foremost in bringing about these discoveries. Any warm body, solid or fluid—that is, any body above the absolute zero, which is



273 below freezing, centigrade—radiates heat. This radiation is explained by admitting that the atoms of the body in question are in constant vibration proportional to the heat. Such vibration is radiated in all directions with a velocity of 300,000 kilometers a second—that is, the velocity of light. If the temperature of the body be below 500 degrees centigrade, the radiations are not visible, but may be felt; if the temperature be above 500 they are visible, that is incandescent.

As the temperature is increased and the vibrations of the atoms of the body become more rapid, other luminous rays are emitted which correspond to the colors of the spectrum; these united, as it were, become absolute white at about 2,000 degrees.

The different colored rays vary in number of vibrations just as the notes of music do, and from red to violet may be considered an octave. But below the red and beyond the violet there are radiations, and these are called, respectively, "infra-red" and "ultra-violet" rays. The exact mechanics of these rays is unknown, yet they have been generated, isolated, and their effect on various bodies investigated.

It was while experimenting with the infra-red ray, or the F-ray, as it is sometimes called, that Giulio Ulivi noticed that when a ray struck certain metallic surfaces it penetrated these surfaces, emitted sparks, and sometimes fused them. This discovery was made in a curious manner. Near the laboratory where he worked at Asnières was a stable. One day a stableman came to him and said:

"I know that sparks are sometimes struck by horses' shoes from stones, but the shoes of my horses have sparks even in the stable. You are a scientist. Can you not tell me why?"

Signor Ulivi left his laboratory with his apparatus still working in the hands of an assistant, and accompanied the stableman to the stable. There he saw the shoes of the horses giving forth sparks. After thinking the matter over for a few moments he called to his assistant to stop his infra-red machine. He did so and the sparks immediately ceased. Later, at night, with the room in darkness, he started his machine, and immediately saw a burst of sparks in all directions wherever there were metal surfaces. All his subsequent researches were conducted with the idea of regulating the direction of the ray in such a manner as to produce sparks when and where desired.

Ulivi's apparatus consists of two parts: a wave projector and a generator of infra-red rays. The former has all the appearance of a common projector; the latter consists principally of electric batteries, regulators, and a wireless telegraphic apparatus, including a mast and a telephonic headgear.

"I cannot at present," said Signor Ulivi, the other day in Florence, "go further into the details of my apparatus."

He was at Monte Senario, over ten miles away from the Arno, when on May 14 he exploded the mines that had been placed in the river. It was observed that he wore the telephonic headgear, while each hand rested upon a lever. With the left he searched for the metallic receptacles containing the explosives to be detonated. With the right he generated, directed, and controlled the rays.

The rays from the generator, after reaching the metallic mass, rebounded, producing return waves, just as in the case of the return sound waves which form echoes. These return waves produced a buzzing in the telephone receiver, and informed the operator that the mass had been located. Then Signor Ulivi focussed the mass by manipulating the regulators, and thus determined the distance by the intensity of the buzzing. It then only remained to project the infra-red ray in the proper direction, and in the proper quantity to ignite the metallic mass and detonate the explosive therein contained. This was done by pressing a button with a finger of the right hand.

Blows Up Any Explosive.

Since the experiments at Florence, Signor Ulivi no longer has to depend upon the intensity of the buzzing to inform him of the distance he is from the object he desires to ignite. He has invented an apparatus which registers correctly such distance. In various conversations he has imparted the following information:

He was asked: "It is possible, then, to blow up any explosive contained in a metallic case?" He replied: "Certainly. And they must find new means for protecting ammunition from the infra-red rays. For example, if you could imagine an explosive within a spherical mass of metal, said mass having no joints and being composed of the same material throughout, then, indeed, my apparatus might fail to detonate it. Not otherwise. If such a receptacle for an explosive could be conceived it would, of course, be useless. Hence I may say without any exaggeration that the fleets of the world, as well as all forts and depots of ammunition, are at the mercy of my apparatus if it can be placed within ten or fifteen miles of them."

He was asked: "What other useful applications might your apparatus have?"

"Several, and of great importance. Such as, for instance, the discovery of ore mines and the locating of ships at sea in foggy weather."

"Can you locate a mass of metal with precision?"

"Absolute position is impossible, but I can locate with an error of 1 per cent."

"Then on May 14, if within 100 or 200 meters of the bombs upon which you were experimenting there had been other explosives—"

"They would have been detonated; that is why the last bomb I detonated with a certain amount of delay; I could feel between me and the bomb the presence of another bigger metallic mass, and suspecting that it might be the magazine of the cavalry barracks near by, I waited until the bomb had been floated by the current of the Arno further away and I could feel that it was isolated, and then I detonated it."

"But suppose that your rays had found in their circuit a loaded revolver in the pocket of some one?"

"There would have been no danger. The revolver cartridges are so small that the telephone would not have registered them. The mass must be in direct proportion to the distance; the bigger the mass the further away you have to locate your apparatus, and vice versa."

"Some one would like to know why you do not experiment at short distances?"

"It has seemed to me most important to reach greater distances. My apparatus works only beyond 250 meters. For shorter distances a weaker apparatus would be necessary. It is like balances; the scales on which you weigh hay would be useless for gold."

"The public always hear that waves are spherical; for example, one of the inconveniences of wireless telegraphy is that the waves cannot be directed to a certain point, but that they travel in all directions."

"True. The waves are spherical, but it is true, too, that they can be made cylindrical by the means of concave reflectors. The wireless telegraphy could thus have cylindrical waves, but as the waves are very long, the reflectors would have to be gigantic, almost infinite. My waves, on the other hand, are very short and consequently need only small reflectors, which are easy to manipulate. And then the cylindrical waves produced by their means can be thrown in one direction only, just as a ray of sunlight is reflected from a flat mirror."

Those who may now or hereafter feel prone to accuse Giulio Ulivi of sharp practice with the English and French Governments may be reminded that he is by birth not only an Italian, but a Florentine. He is only 34 years of age and is described as an inventive genius, a sort of Edison, who can invent or discover something every day.

Constantly Inventing.

One of his first inventions was to record the exact speed of a motor car at any given moment, which, it is said, put an end to the system of police traps, which flourished in France at that time as much as they do now in American suburbs. If a car was noted by a policeman as having exceeded the speed limit, the automatic record was there at once to prove what the exact speed was.

Giulio Ulivi was next asked by an Italian firm to supply them with some improvements in aviation. He set to work, and in a few weeks produced an aeroplane of an entirely new design. What became of it is not known, as he has scarcely finished one invention when he turns to another. After the aeroplane he devoted himself to farming implements and invented a motor plow and motor machinery for agriculture.

About four years ago he began to study wireless telegraphy and telephony. He dabbled in light and heat and their relation to electricity. He discovered the effect of the ultra-violet rays upon organisms, and how they might be employed to clear water of microbes. This led him to experiments with the infra-red rays, which still occupy his attention.

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