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ARMORED TRAINS.

It is probable that the Franco-Prussian war was the first campaign in which protected trains and locomotives were used on the field of battle. In the various sorties from Paris the French troops were frequently assisted by the fire of light field pieces carried on cars, and when the communists were holding the capital against the troops at Versailles an armed train operated upon the railway in the direction of Château Breçon and is said to have achieved its object in silencing the batteries which the regulars were endeavoring to establish in that position. This experience perhaps gave rise to the belief that the French were the originators of the utilization of permanent lines of railway for the transport of artillery capable of being brought into action while upon the rails themselves. Captain Fisher's armorclad train was used during the first stages of the campaign against Arabi. It was built at Alexandria by a party of bluejackets, and was composed of a locomotive and a number of trucks protected by iron rails, iron plates and sandbags. The engine was placed in the middle of the train, while a Nordenfelt machine gun was mounted on the leading protected truck and a 40-pounder on the next. The latter could by means of a small crane carried with the train be quickly mounted and dismounted, one minute sufficing from the halting of the train to remount and fire the gun. Two empty trucks were run in front to explode any mines which might have been laid. The cars behind the engine conveyed a detachment of skirmishers.

There was not an opportunity for any great use of this train, although on one occasion it did do admirable work. Since that time France and Germany have recognized specially constructed armor trains as formidable units of fighting equipment, but none are as complete as that possessed by the First Sussex Artillery Volunteers of England, which has perhaps the most complete train of its kind in the world. The truck was specially constructed for the gun which is mounted on an ordinary field carriage and consists of a turntable pivoted on the center so that it can be turned in any direction. The gun detachment is protected by a plating 6 feet high around three of the sides. The gun is fired through an opening, and the recoil is checked by a hydraulic brake on its own carriage. By an ingenious arrangement of cross girders it can be run out and supported on blocks, and a broad base may be obtained for the truck when the gun is fired at right angles to the rails. To insure stability the truck can be secured to the rails by strong screw clips. The remainder of the train is made up of an ordinary locomotive and two steel-plated vans conveying a Maxim gun, the men, horses and the projectiles.

Armored trains mounting field pieces and machine guns are being extensively employed by the American troops in the Philippines, and the successful issue of the fight at Calumpit was attributed to the opportune arrival of such a flying battery. The main objections to the practicability of the armored train is noted in The London Daily News. It is suggested that the enemy, with a few men carrying small quantities of dynamite, could easily destroy the roadbed. They could undoubtedly do this if the defender's cavalry remained idle, but armored trains should always be accompanied by a strong force of cavalry. In the hastily constructed British and Boer armored trains, machine guns or very light field pieces are given as armaments. Trucks carrying such guns and soldiers should, of course, be protected by bullet-proof mantlets, but it was a mistake to make them very thick, with the idea of keeping out shells.

THE NEW CENTURY.

Although it has not yet arrived, this long-awaited twentieth century, many of those who may never live to see it are vexing themselves with the question: When will it begin? In the daily and weekly press we find a fierce epistolary battle raging between those who believe that the year 1899 marks the close of the nineteenth century and those who hold that not until 1901 shall we cross the threshold that divides us from a new era. Our own mail brings us many an inquiry from anxious readers who have not yet decided whether they be living in the nineteenth or twentieth century.

Trivial as these disputes may appear, they are not without a certain value. Without sharply defined divisions of time we could hardly grasp the world's history or place the leading events in our own lives.

It seems so difficult to understand that 1800, 1900, 2000, designate not the beginning, but the end of a century, that one naturally inquires the origin of the error. It may be that the mistake is due to a kind of optical illusion. The year 1900 marks the beginning of a new series of numbers; and nothing seems more natural than that it should therefore be considered as the first year of a new cycle. But though our reason may tell us that the new number with its two ciphers stands for the end and not for the beginning of a century, our eyes still betray us. It is a triumph of sense over intellect—an error, surely, but one into which many famous men have fallen.

When in 800 A. D. Charlemagne introduced the calendar which commences with the birth of Christ, he too thought he was beginning a new century. When Peter the Great decreed that our chronology should be used in his dominions after the year 1700, he made a similar mistake. Throughout the world's history those two ciphers have deceived men. And the error has been handed down to our own day. The Paris Exposition will be inaugurated, surely not to celebrate the death, but the birth of a century; and still it will be held in 1900. The Emperor William has decided *ex cathedra* that the new century begins January 1, 1900, but this delusion is hereditary, as he shares it with his grandfather, the late Prince Consort, who was of the same opinion. Lord Kelvin, great mathematician and physicist as he is, also holds the same view. The Roman Church, which has always paid great attention to the calendar, and has done much to preserve it, has decided that the year 1900 should be a year of jubilee as being the last of the century.

The problem is not so easily solved as may be imagined. It is evident that there never was a year 0, that the century must begin with a 1; it is equally evident that even as a dollar contains 100 cents, so a century is composed of 100 years. But then there arises the confusion of numbers and their values, the contradiction between ordinal and cardinal. When an Italian speaks of his *cinquecento* (*mille cinquecento* in other words), he refers not to the fifteenth but to the sixteenth century; and thus he writes all his centuries with a cardinal number one less in value than the ordinal number in his mind.

When we write 1899, the number 18 designates not the eighteenth, but the nineteenth century; and we are constantly compelled to correct a seeming error in our chronology. It is here that our eyes deceive us. So accustomed are we to the intentional misreading of our centuries, that we naturally consider the first two numbers in 1900 to stand for the twentieth century.

A hundred years ago the same wordy war was waged; a hundred years hence it will be renewed; and thus it will go on as century after century comes rolling along. It is a venerable error, long-lived and perhaps immortal.

THE ELECTRIC FISH OF THE NILE.

In a recent lecture before the Royal Institution of Great Britain, Mr. Francis Gotch gave a most interesting lecture on the formidable fish found in the rivers of northern and western Africa (Malapterurus electricus), of which Science publishes an abstract. Photographs were shown of the drawings upon the interior of the tomb of Ti, showing that the fish was recognized as remarkable by the Egyptians 5,000 years before the Christian era. Living specimens of the fish were also displayed, and the structure of the electric organ was then described. It is situated in the skin, inclosing the whole body of the fish, and has a beautiful and characteristic appearance when seen in microscopic sections. Each organ consists of rows of compartments and each compartment has slung athwart it a peculiar protoplasmic disk shaped like a pelate leaf with a projecting stalk on its caudal side. Nerves enter each compartment and end in the stalk of each disk. By these nerves the impulses can reach the organ. The arrival of such impulses at the nerve terminations evokes a state of activity which is associated with the development of the electromotive charges of considerable intensity. The shock is intense, the current traversing the whole organ from head to tail and returning through the surroundings. It stuns small fish in the neighborhood, and can be felt by man, when the hand is placed near the fish, as a smart shock reaching up the arm to the shoulder.

Recent investigations carried on at Oxford by the lecturer were then described. A series of photographic records of the displacement of the mercury of a capillary electrometer in consequence of the electrical disturbance in the organ was shown. These records exhibited the time relations, mode of commencement and manner of subsidence of the shock, and demonstrated its similarity to the electrical changes known to exist in nervous tissue during the passage of a nervous impulse. Each effect consists of a rhythmical series of electrical changes occurring one after another in a perfectly regular manner at intervals of 1-100 to 1-300 of a second, the rate depending upon the temperature. The potency of the organ as a weapon to be wielded by the fish is thus enormously increased by its resemblance to a self-loading and self-discharging automatic gun. The total electromotive force of the whole organ in a fish only 8 inches long can reach the surprising maximum of 200 volts, at any rate in the case of an initial shock. The attainment of this maximum is due to the simultaneous development of perfectly similar electromotive changes in each of the 2,000,000 disks of which the organ is composed.

The remarkable character of the nervous connection of the organ was then described. Each lateral half of the organ, although it has a million plates receiving nerve branches, is innervated by one single nerve fiber, and this is the offshoot of a single giant nerve cell situated at the cephalic end of the spinal cord. As regards the nervous impulse which the fish can discharge through this nerve cell, experimental results show that the fish is incapable of sending a second nervous impulse after a preceding one until a period of one-tenth of a second has elapsed, and this interval is rapidly lengthened by fatigue to as much as several seconds. The inability of the central nervous system to repeat the activity of the organ obviously presents disadvantages to the use of the shock as a weapon for attack or defense, but such disadvantage is more than counterbalanced by the property of the organ alluded to, of self-excitation, since a whole series of shocks continue to occur automatically in rapid succession, provided that an initial one has been started by the arrival of a nervous impulse sent out from the central nerve cell.

UNEARTHING FOSSIL REMAINS.

A photograph was recently sent to this office of some interesting fossil recently discovered in Nest County, Kansas. The specimen is of very unusual form, and was claimed by the owner to be a fossilized gall sac or bladder. It was found quite near the remains of a Tylosaurus mosasaur, photograph of which was also taken. The photograph was submitted by the editor to the Museum of Natural History for an opinion in regard to the identity of the object. Prof. Henry Fairfield Osborn, in his reply to the editor, called attention to a fact which it is well to bear in mind. He says, after examining the photograph: "The mosasaur is so badly injured that it is of no value to any one. I am glad to see that you are giving so much attention to these general scientific matters. I hope you will disseminate the view as widely as possible that the first thing to do after discovering a fossil is not to dig it out, but to leave it alone and to write to some representative museum, either the American Museum of Natural History or the United States National Museum, reporting the discovery and asking for instructions. In this way the commercial value of the specimen will be very much enhanced." It is a well known fact that the unearthing of fossil remains requires the greatest care and calls for knowledge on the part of the operator. We are only too happy to call attention to Prof. Osborn's timely advice, especially at this time, when the discoveries of fossil remains are becoming more frequent, and a knowledge of the work that has been carried on in the West by the many scientific expeditions which have been sent there during the past few years is being more fully understood and appreciated.

CONGRESS OF PHOTOGRAPHY IN 1900.

Preparations are now being made for an international congress of photography, to be held in Paris next year. A committee has been appointed for the purpose, under the presidency of M. Janssen. This committee is sub-divided into five sub-commissions, which will have charge of the five sections and will prepare the programme of the work to be carried out in the sessions of the congress. These five sections are constituted as follows: 1. Physical questions relating to photography. 2. Photographic materials. 3. Photographic chemistry. 4. Terminology and bibliography. 5. Legal and professional questions. All applications for admission to the congress, for which the fee is fixed at 10 francs, as well as all other communications, should be addressed to the general secretary, M. S. Pector, 9 rue Lincoln, Paris. Among the members of the committee may be mentioned Messrs. Vidal, Lippmann, Braun, Lumière and Molteni.

GERMAN explorers have been engaged for some time in excavations on the site of the palace of Nebuchadnezzar. According to The Architect, there was discovered in August a column which bore a representation of the Hittite god. The figure corresponds with one found in Sandskirli, which is now in the Berlin Museum. It is supposed that both works were taken as part of the booty in some ancient expedition.