is not over yet. The land that has been recovered has been held, and now a further and determined effort is being made to recover the submerged territory, which hundreds of years ago was included within the coast line of the Netherlands. The present attempt does not contemplate the recovery of the whole of the Zuyder Zee, but if the plans do not miscarry, it is certain that nearly 800 square miles of land will be reclaimed within the next third of a century at an estimated expenditure of $48,000 000.

The scheme contemplates the construction of a huge dike across the Zuyder Zee, the location of which will be determined by the favorable conjunction of shallow water and adjacent islands. Nine years out of the thirty-three which is the estimated time for the construction of the whole scheme will be occupied merely in the construction of this dike, whose total estimated cost will be $17,000,000. When the dike is completed, the herculean task of pumping dry the huge lake thus formed will commence, and considerations of economy will lead to its being carried on by means of the typical Dutch windmills which form such a picturesque feature of a Holland landscape. Although the work of drainage is to extend over a quarter of a century, the returns on the enormous expenditure of the capital will commence simultaneously with the pumping, and as it is estimated that the drained land, on account of its extreme richness, will have a market price of $300 an acre, it can be seen that this great undertaking is likely to become a paying investment long before it is finally completed.

AMERICAN APPLES AT HOME AND ABROAD.

Since the West and Northwest entered extensively into apple-growing, the so-called "off years" in this crop no longer affect the markets as they did fifteen and twenty years ago. One season of great scarcity then, with extremely high prices, would often be followed by a year of superabundance, when the markets would be glutted with apples, which were difficult to dispose of at any price. The thousands of acres of apple orchards in the great West prevent an old-fashioned famine in apples, and the improved methods of exporting the fruit, and the numerous factories which make cheap jellies and preserves, tend to distribute the abundant crops so well that unprofitable prices do not rule in the markets in good seasons.

The present harvesting season of the apples is now in progress, and the official reports indicate an "off-season," which ten years ago would mean an apple scarcity this winter that would make the fruit an expensive article of diet. But prices will advance only a trifle over those of last season. The factories will consume fewer marketable apples, and depend more upon the apple waste, such as cores and peelings, for their supply. These jelly factories in good seasons buy apples on the trees, but in years like the present they can make their apple sirup-jelly from the waste of the canning factories. There are some 130 factories in the country engaged in canning this fruit and making cheap jellies and sirups. In the aggregate they have an annual capacity of over 200,000,000 jars of jelly alone. The jellies made from the apple waste are almost as good and wholesome as those manufactured from the whole apples. The cores and peelings, and small, inferior apples are ground up and the juice extracted from them. This juice or sirup becomes the foundation of the cheap jellies, and not chemical compounds as some suppose.

The West has become such an important factor in the apple problem that it is estimated that these comparatively new orchards could supply all the apparent needs of the markets if half the trees in the country failed to produce anything. At first the sudden flood of this fruit from Kansas, Missouri, Nebraska, Michigan, and other Western States completely demoralized the Eastern markets, reaching a climax in 1896, when apples in New England were offered on the trees at 15 cents a barrel and hand-picked Baldwins delivered on the cars at 40 cents a barrel. The orchards in the West were planted in 30, 50, and 100 acres, and in order to prevent growers from going into bankruptcy a great flood of the apples was rushed to Europe. The exports of our apples have consequently grown to phenomenal proportions, and without this demand the crop would prove a financial failure every season.

Liverpool is by far the greatest distributing point for American apples, and as high as 100,000 barrels of our apples have been sold there in one week, and at remunerative prices. London, Glasgow and Hull also receive immense cargoes of American apples, and absorb on an average from 20,000 to 30,000 barrels a week during the season. The apples are sold in Liverpool by the auction system. A large room is provided for the buyers and the auctioneer. In the center of this room there is a portable platform or a freight elevator, where samples of the lots to be disposed of are exhibited. An auctioneer who has a line to dispose of has forty minutes at his disposal, and if his goods are not all sold in that time he must temporarily stand aside to make room for another salesman. Monday, Wednesday, and Friday are the auction days, and a single auctioneer may dispose of 10,000 to 15,000 barrels in a day. The apples are catalogued, and those brands which have a reputation for honesty and good packing frequently sell without sampling. One barrel from every lot of twenty is opened on the portable platform and the contents dumped into baskets, and another barrel is simply opened on the face end From an examination of these two samples the buyer judges the lot of twenty, and makes his purchase accordingly. Only tight barrels are delivered to him; "slack" barrels, where the apples rattle, are rejected. These latter sell separately, and usually from 50 to 75 cents a barrel less. When a purchaser's bid is accepted he can take his twenty barrels, or as many more of the same brand as he desires, at the same price. The apples are delivered to the purchaser direct from the steamer's dock, which saves the cost of double cartage.

Ocean rates for apples of course vary, but they usually run from 40 to 65 cents per barrel. The charges in Liverpool for dockage, insurance, advertising, sampling, town dues, and for labor of handling, amount to about seven pence English money, and the auctioneer's commission for selling is 5 per cent. The cost of getting the apples to the steamer on this side varies likewise according to the distance they have to be shipped. Picking apples in the East costs from 12 to 20 cents per barrel, according to the skill of the pickers and the amount of apples to handle. Special pickers have in recent years entered the field to contract for whole orchards, and they do the work so much better that the loss to the farmer is greatly reduced. Carelessly picked and packed apples usually yield little profit to the producers. New apple barrels cost about 17 cents, which must be added to the cost of harvesting; and sorting, heading and getting to railroad shipping points, about 8 cents more. Thus a barrel of apples costs the farmer from 40 to 46 cents before the transportation charges to the city are made. These latter cannot be estimated, on account of the differences in the distance from the markets. The cost of delivering a barrel of apples from a town in Kansas to New York is very much higher than the Hudson River growers have to pay when they send their fruit down by boat.

Our yellow Newtown or Newtown Pippin is probably the greatest favorite in England, and it often sells for two or three times as much as any other apple. This variety was introduced in London by Benjamin Franklin in 1758, and has been a prime favorite ever since. Next to this the red varieties are chiefly in demand. The Baldwin is a good apple for export, for its high color pleases the English, and it has good shipping qualities. More apples of the Ben Davis variety are grown to-day than any other, because in the West it does better than almost any other type of this fruit. It is a good keeper and shipper, and sells faily well abroad. In the East this variety does not do as well as in the West. The Rhode Island Greening, Northern Spy, and Winesap are other great favorites at home and abroad, and they are raised in large quantities in this country and Canada. G. E. W.

THE TRUE INVENTOR OF THE TELEGRAPH.

BY HEILEMAN WILSON.

At the close of this century, when the seeming perfection of the wireless telegraph excites the wonder and admiration of the world, it is interesting to look back and note the first steps toward telegraphy, and also to learn of the first true inventor of the electric telegraph. In rude forms, even among the most savage nations, there has always existed some system of communicating intelligence by signals, which during the daylight might be of almost any type, though at night luminous ones of necessity had to be used; but neither of these signals was visible in fogs, and so for days there could be no communication at all. This interruption happened most notably at the time of the battle of Waterloo, in consequence of a fog coming on during the transmission of a message from the seat of war to the admiral commanding at Plymouth. The words which reached the admiral were: "Wellington defeated;" this much of the message reached the admiral in the morning, and was the cause of great anxiety until a clear afternoon revealed the cheering words, "the enemy."

The electric telegraph, like everything else of permanent value, has been a growth, and the first step toward it was made something over a hundred and fifty years ago, in both France and England, when an electric shock was made to successfully pass through an iron wire a distance of six thousand feet in less than a quarter of a second; this was the French experiment. In England it was attempted on an even greater scale, for not only was the electric current transmitted a distance of two miles, but it was proved beyond the possibility of doubt that electricity passed instantaneously. The philosophers who made the discovery seem to have been satisfied with the result attained, for they attempted no application of the valuable fact, and it was reserved for a Scotchman living at Renfrew to suggest that messages might be sent by electricity along wires passing from one place to another. This—as it was then considered—remarkable idea was submitted in the form of an article to The Scots Magazine, Glasgow, 1753. The article bore the initials "C. M.," and this is the only name we shall ever have for the first inventor of the electric telegraph.

The plan of "C. M." was to have a set of wires, equal in number to the letters of the alphabet, stretched horizontally and parallel between two given points, and each of them about an inch from the one next to it. At the end of every twenty yards the wires were to be fixed on glass to some firm body to prevent them from touching the earth and also from breaking by their own weight. The battery—or the electric gun barrel as it was then called—was to be placed at right angles with the ends of the wires and about an inch below them. It was now necessary to contrive some scheme for forwarding messages, and for this purpose the plan of "C. M." was to suspend a ball from every wire, and about the sixth of an inch below the balls were to be placed bits of paper, each in its order bearing a letter of the alphabet. These bits of paper, or some other light substance that would be easily attracted, were to rise to the electric balls, and were so contrived as to resume their proper place when dropped.

All this being done, "C. M." proposed to converse with his distant friend in this manner: Having set the electrical machine going, let it be supposed he wished to open the conversation with the word *when;* then with a piece of glass or some other non-conducting substance, he would strike the wire, *W*, so as to bring it into contact with the battery, then strike the remaining letters of the word in the same way; almost instantly the correspondent at the other end of the line would observe the several letters rise in order to the electrified balls at his end of the wires; as each letter rose, it was to be written down on a piece of paper. But in the event this method should prove tiresome, "C. M." suggested that instead of the balls, a set of bells equal in number to the characters of the alphabet and decreasing in size from the bell, *A*, to the bell, *Z*, might be suspended from the roof, and from the horizontal wires there was to be another set of wires reaching to the several bells. Then the man who began the conversation was to bring the wire in contact with the battery, and the electrical spark, working on bells of different size, would inform the correspondent by the sound what bells, or wires, had been touched. Of course, to understand the language of these chimes, without writing down each letter, required some practice.

In all his plans it was evident that "C. M." had not heard of the experiments and discoveries in the transmission of electricity in England, for he seemed to fear that the force of the electric current would diminish, as, so far as he appears to have known, it had never passed further than thirty or forty yards, or at all events it might be drained off by the surrounding air. To prevent this last interference he invented a scheme of insulation, which was simply to cover each wire with jeweler's cement.

Here then we have an electric telegraph nearly a hundred and fifty years old, and although exceedingly crude when compared with the many improvements of the present day, yet, since it could swiftly and accurately convey intelligence, it must be admitted that "C. M." was the true inventor of the electric telegraph, and that every step made since that time, however wise and valuable, can be viewed in no other light than an improvement on the idea of an unknown man. It is singular that the ingenious inventor should not have found some way of diminishing the number of wires; but he does not seem to have had any idea that his invention would be adopted, and so he probably contented himself with a general view of the principle.

VOLTA'S VISIT TO PARIS.

M. Mascart, who was one of the delegates sent by France to the Volta Centenary at Como, delivered an address on that occasion which is of interest as recording the visit made to Paris by Volta in the early part of the century. The proceedings of the Academie des Sciences for the year 1802 show that Volta repeated his experiments before the physical section of that body and was awarded a gold medal in consequence. It was after these experiments, which naturally excited great interest among the scientists of the time, that the Academy, upon the suggestion of Napoleon, founded an annual prize of 3,000 francs to be awarded for electrical researches. Besides this, Napoleon, at that time First Consul, had the sum of 6,000 francs awarded to the savant. Some time after, he wrote from Italy to the Minister of the Interior, saying, "I wish to make an award of 60,000 francs to any person who by his experiments or discoveries will make a step in the electrical science comparable to those made by Franklin and Volta." Subsequent history shows that the Academy prize of 3,000 francs was awarded to Sir Humphry Davy, Gay-Lussac and two others. The prize founded by Napoleon was not given under the first empire. Napoleon III. re-established it, and the republic continued the tradition. Under the name of the Volta prize it was awarded to Ruhmkorff, Graham Bell and Gramme.