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THE TRANSMISSION OF CODE MESSAGES

How American Notes Are Sent Across the Atlantic—Britain Spends \$17,000 a Day on Telegrams to United States.

What the diplomat calls 'notes' are the official messages exchanged between ambassadors, consuls, and the Government. During the present European war the amount of this correspondence has been much greater than before. The notes from the United States to its representatives in Germany and other European countries are, of course, in a cipher known only to the officials who send and receive them. Even the cabinet operator who transmits them knows nothing of their contents. The code message is composed of ordinary words, used apparently in a meaningless way. Thus 'Peniston' in one code means 'Can't make an offer.'

Every Government has a special cipher compiled by its experts. The cipher is, however, a somewhat defective method of securing secrecy, as it is almost impossible to baffles the cipher unraveller. During the Spanish-American war the Spaniards were surprised at the seeming laxity of the Americans in allowing a certain cable to be used by them; and they poured through cipher messages which were duly received and acknowledged by their agents. The senders and recipients little dreamed that every message which was sent by that cable passed first through the hands of the Americans, and was read by them. To the surprise of the Spaniards, the supposed secret messages led to operations that disastrously foiled some of their movements.

How the notes are enciphered, coded, guarded against errors, cabled, deciphered, and yet their secrecy preserved is one of the features of interest concerning these international communications. While important papers come through the American State Department, and always bear the signature of the Secretary of State, it is generally known that President Wilson composes some of the more important notes, which are then considered by the Cabinet, and later by the legal staff.

Before an important note is placed on the wire it is generally the custom to check the accuracy of the cipher by deciphering it and comparing the result with the original. When a note of this kind is transmitted, only those having access to the code-book, or a clever cipher unraveller, would be able to understand a word of it.

The code-book is the cipher dictionary. The books from which the symbols are taken—the latter represented by figures and letters, and sometimes by groups of both, with spaces—are kept in lockfast safes when not in use, and none but trusted persons employed in this particular branch of the American State Department work have access to them. The code-books of the State Department are guarded with the same vigilance as the code of the navy.

An account of the method by which President Wilson's notes were despatched to the German Foreign Minister recently appeared in the "Telegraph and Telephone Age." After the Secretary of State had affixed his signature, he handed it to the chief clerk of the State Department, who had the pages of the notes, consisting of approximately fifteen hundred words, distributed among the cipher clerks, and the work of enciphering began. Before important notes are placed on the wire, it is, as already mentioned, the custom generally to prove the accuracy of the coding by deciphering and comparing the result with the original. The Lusitania note was tested in this way, and did not leave the hands of the chief cipher clerk until he had satisfied himself that when decoded by the Ambassador in Berlin it would be identical, word for word, with the note as the President wrote it. The first page was coded at 2 p.m., and an operator began to telegraph it from the State Department to the Commercial Cable Company's office at New York. At this stage the message was in the form of a stream of dots and dashes, which the operator in the cable office retransmitted into the same coded form in which it existed at Washington. As the sheets were written up by this man they were handed to the cable operator, who proceeded to transmit it over the submarine cable in another disguise: The same system of Morse code employed on land lines is not used for submarine cabling, and another system, known as the Continental cable code, is used. Messages, instead of being hand-keyed, are sent by an automatic transmitter. The nearest example to the operation of this machine is an automatic pianoplayer. As in the latter, the musical composition is disguised in a maze of perforations in a paper roll, so in the

cable transmitter the message exists in the form of a procession of small round holes in a continuous strip of paper. Simultaneously with the clicking of the automatic transmitter in the office of the cable company, the signals are received on a recorder at the distant end on a paper tape which runs through the recorder, and a delicate glass siphon draws a fine ink-line on it. When no signals are passing, this line lies in the middle of the slip perfectly straight. When a 'dot' arrives the siphon draws a little hump above the line, while if a 'dash' is sent the hump is below. Thus the signals in a message are represented by a continuous line full of hills and valleys. Hopelessly unmeaning as this line may appear to the uninitiated expert operator is able to read it as quickly and with as much certainty as if it were ordinary print. The expert receiving operator translates this as fast as the siphon traces out the mysterious symbols, and if one were to compare the copy he makes it would be found identical with the coded message which a few minutes ago was being keyed on from Washington to New York.

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Once more it is despatched over other wires, until finally it is typed out for the last time in its coded form and then comes the very difficult and lengthy process of decoding, performed with the help of the key in the hands of the Ambassador at Berlin.

At the outbreak of the war Germany had eleven submarine cables. Five of these—the most important of all—landed at Borkum. Two of the cables ran to the Azores, and placed Germany in communication with the United States. One went to Brest, another to Vigo, and another to Tenerife. As all these cables passed through the English Channel, they were promptly cut. Between England and Germany there were seven cables, and communication by these, at once passed under British control. Looking out for an outlet on the north, Germany might seek to send and receive messages through Denmark, Norway, Sweden, and Holland; but such messages would reach Britain or France, and so fall under the eye of vigilant censors. In the south Germany was equally unfortunate. The cables laid east and west in the Mediterranean are the property of the Eastern Telegraph Company, a British concern, and land on British soil. Should Germany wish to telegraph to Africa she would find herself in the same dilemma—the certainty of her telegrams passing through British hands. She would be no better off if she tried to telegraph to India or China overland, as there are no lines she could use except such as are controlled by the Allies.

Perhaps nothing has contributed more to the commercial supremacy of Britain than her enterprise with regard to the submarine cable. During the last sixty years Britain has excelled all other countries in her quick communication with the remote parts of the world. Europe received its news through London. When at last other countries sought to free themselves from this monopoly they had to seek British aid. When France and Germany desired to possess cables of their own to America, they had to get Britain to manufacture and lay the cables for them. In late years factories for the making of cables have been established by Germany at Ordenham, by France at Calais, and by Italy at Spezia. The foreign manufacturing subsidies, and the awakening of Governments to value of cables has been remarkable. Until a few years ago the submarine telegraphs were all in private hands, the capital being wholly subscribed by the public. There are at present no fewer than two thousand nine hundred and thirty-seven cables, and of the various Governments the British hold the largest number.

Of the messages sent by the submarine cables, 90 per cent. are on business. It is estimated that the British spend about \$17,000 a day on telegrams to the United States, \$5,000 a day on cables to Australia, and another \$5,000 a day on cables to India, South Africa, China and the East.

The rate for ordinary telegrams to New York is 20 cents per word, but the price to some of the states is considerably higher. The cheapest ordinary message to Canada costs the same per word as to New York.

500 Killed, 1500 Wounded in Dublin Riot

A British sergeant, who says he had the leave of his life, was caught in Amien Street Station, Dublin, after returning from Belfast. He refused his name. He had a sniping battle with a Sinn Feiner, hidden behind a crane on the south side of the Liffey, potting soldiers and unloading transports. After five hours' exchange of shots he finally hit the rebel in the head. He was probably the last sniper to be killed.

In Dublin itself the rebels have never numbered more than three thousand, and of these eight hundred men have been either killed or wounded. The military casualties will not reach nearly that figure. At least 500 rebels were killed and 1,500 wounded in the seven days' fighting in the streets of Dublin, it was estimated by soldiers who completed a canvass of the city.

The rebellion was well planned in many respects. There was to have been special prices for necessities. I was shown a printed list with the heading, "Long live the Irish Republic!" showing boots at three-pence a pair, whiskey four pence a bottle, bread free, and flour a penny a pound.

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