

SECRETS OF CIPHER CODES

Elaborate Systems of Cryptography Employed by Governments.

THREE GENERAL METHODS IN COMMON USE

Complicated Transposition of Letters and Characters to Deceive Out-riders—Arbitrary Codes of Commercial Houses.

When, thanks to the exertions of the ever amiable and intelligent Wu Tingfang, the first memorable dispatch was received from Mr. Conner announcing the safety of the legations in Peking, disbelief in the authenticity of the message was widely expressed. Subsequent events proved that the doubters were mistaken, but during the discussion a question of considerable importance was raised—would it be possible for the Chinese or any other foreigners to forge such a dispatch, or, in other words, would it be possible for an outsider by any possible means to master the secret cipher code in which the diplomatic dispatches are written? For obvious reasons it is impossible to explain the American diplomatic code, but it may be of interest to outline the general principles upon which such ciphers are constructed. As this message, like the majority of diplomatic dispatches sent nowadays, came by the telegraph, we may limit ourselves to the discussion of ciphers which are capable of this mode of transmission. We need not then concern ourselves with cryptograms which are based on any system of arbitrary signs, marks, devices or hieroglyphics, but only with those which express themselves through the medium of letters of the alphabet or numerals. With these limitations the systems of cipher making may be epitomized under three heads:

- 1. The giving of words or letters an arbitrary significance. Here it is in the simplest form. The key is a series of numbers, for example, 2, 11, 9, 8, 5, 10, 7, 3, 6, 1, 4. Our message is "Let an attack be made at once"—twenty-three letters. Divide this up into groups of eleven letters and transpose, thus:

Commercial Ciphers. By far the commonest system of cipher is that used by the majority of large commercial houses. It consists in the use of words, or, rather, collections of letters, for phrases. Thus, "A. L. E. X. I. S." may mean "The market is advancing," "B. A. G. S. H. O. T." "Supplies of iron low," the meaning being entirely arbitrary. The construction of such codes is an industry in itself, and there is one large house in New York with a considerable number of employees whose sole business is the compilation of such codes for various commercial houses. In some cases the code book contains as many as 200,000 phrases, each with its separate symbol; such a volume will surpass a family bible in bulk and occupy upwards of a year in its construction. Occasionally, when the cost of telegraph tolls is a consideration, the numbers affixed to the symbolical words may be used instead of the words themselves, and when it is desired to keep the correspondence a secret from clerks and others who may have access to the code book the relations of the symbols and phrases may be changed. Thus, "A. L. E. X. I. S." being translated by phrase No. 4, symbol No. 5 by phrase No. 10, and so forth.

The main objection to the fixed code system lies in the circumstance that it only permits of the transmission of a limited number of phrases. Consequently it is not available for dispatches the matter of which can not be expressed solely by the use of such set phrases. A more elastic method is one commonly known as the dictionary cipher, which is also largely used in commerce as well as by diplomats. The correspondents having agreed upon some book, say a certain edition of Webster's dictionary, they arrange that the words contained in the dispatch shall be interpreted by words a certain distance removed in the columns of the dictionary. Thus, a dispatch may be received reading "Bull Collier." The recipient will look up the word Bull and count down from it seven lines, the number agreed upon—and find "buy," and in the same manner, counting fifteen from "Collier," arrive at copper. The dispatch will then be interpreted, "Buy copper."

A Royal Code. The system of giving letters an arbitrary meaning is one very largely employed in diplomacy. The secret cipher used by the German emperor for communicating with the federal princes of his empire will serve as an example.

The emperor writes down the twenty-five letters of the German alphabet—there is no 'j'—in a horizontal line, indenting it the space of a single letter. This is repeated twenty-four times, with the difference that all the lines, except the first, begin at the margin, and each with a different letter in

the order of the alphabet. The diagram then will appear thus:
a b c d e f g h i k l m n o p q r s t u v w x y z
b c d e f g h i k l m n o p q r s t u v w x y z a
c d e f g h i k l m n o p q r s t u v w x y z a b
d e f g h i k l m n o p q r s t u v w x y z a b c
e f g h i k l m n o p q r s t u v w x y z a b c d
f g h i k l m n o p q r s t u v w x y z a b c d e
g h i k l m n o p q r s t u v w x y z a b c d e f
h i k l m n o p q r s t u v w x y z a b c d e f g
i k l m n o p q r s t u v w x y z a b c d e f g h
k l m n o p q r s t u v w x y z a b c d e f g h i
l m n o p q r s t u v w x y z a b c d e f g h i k
m n o p q r s t u v w x y z a b c d e f g h i k l
n o p q r s t u v w x y z a b c d e f g h i k l m
o p q r s t u v w x y z a b c d e f g h i k l m n
p q r s t u v w x y z a b c d e f g h i k l m n o
q r s t u v w x y z a b c d e f g h i k l m n o p
r s t u v w x y z a b c d e f g h i k l m n o p q
s t u v w x y z a b c d e f g h i k l m n o p q r
t u v w x y z a b c d e f g h i k l m n o p q r s
u v w x y z a b c d e f g h i k l m n o p q r s t
v w x y z a b c d e f g h i k l m n o p q r s t u
w x y z a b c d e f g h i k l m n o p q r s t u v
x y z a b c d e f g h i k l m n o p q r s t u v w
y z a b c d e f g h i k l m n o p q r s t u v w x
z a b c d e f g h i k l m n o p q r s t u v w x y

Turning to the table you find b in the top horizontal line, and e, the first letter of the word to be disguised, in the first vertical. Then look for the intersection of the column in which b appears and the line in which e begins. The intersection will be at c, which will be the first letter of our cipher dispatch. In a similar manner we obtain the other letters. The dispatch will then read 'e. b. e.' The recipient will, of course, translate the dispatch by a reversal of the process of construction.

French Signs. Less complicated is the cipher taught at the great French military school of St. Cyr. It depends upon the position in the alphabet of the letters of the key word. Suppose, for example, that the key word be B. A. C. The second, first and third letters of the alphabet. Suppose the dispatch to be "destroy bridge." It will be rendered into cipher as follows, each letter of the third line, being formed by writing, the same, the next or the second following letter, according as a, b or c falls under it:
d e s t r o y b r i d g e
n a b c b a c b a c b
e e v v r q z o t j d i f

The last line is the form of the message. Both the St. Cyr system and that used by the German emperor, as described above, have the merit that the value of the letters is not constant. There are numerous systems in which a new alphabet is constructed, but these can easily be deciphered by an expert working on the principle of the average frequency and relative positions of letters.

The transposing of letters is an easy and obvious system. Here it is in the simplest form. The key is a series of numbers, for example, 2, 11, 9, 8, 5, 10, 7, 3, 6, 1, 4. Our message is "Let an attack be made at once"—twenty-three letters. Divide this up into groups of eleven letters and transpose, thus:

1 2 3 4 5 6 7 8 9 10 11
1 e t a n a t t a c k
1 2 3 4 5 6 7 8 9 10 11
b e m a d e a t o n c e

—which would make the following message, using the key—
2 11 9 8 5 10 7 3 6 1 4
e k a t n o c t a l a
2 11 9 8 5 10 7 3 6 1 4
e c o t d n a m e b a e

The letters are merely placed in the order indicated by the numbers in the key. The second letter of the original in the first place, the eleventh in the third and so on. There are many systems in which numerals take the place of words or letters, some very simple and obvious and others highly complicated. Prince Bismarck, whose messages usually would not bear publication, had a cipher of this class for communicating with ambassadors. His cipher contained only about 500 words, by which the ambassadors had to make shift to express all they had to say. Each word or phrase was represented by a certain numeral in the order that the meaning of these figures might not become known by constant repetition each ambassador was instructed to disguise them by certain multiplications, additions, subtractions and divisions at certain seasons. Bismarck was very particular about this cipher. After concealing it he wrote out the twelve keys for the twelve embassies with his own hand and outside the ambassadors and the emperor no one has ever seen a copy.

Alphabetical Cryptogram. Another more ingenious, but probably less effective number cryptogram is that which is said to be employed on correspondence between the Russian and French foreign offices. The letters of the alphabet (in which "j" does not figure), are divided into five groups, each of five letters. In the correspondence the number of the letter in the group figures as the numerator of the fraction and the number of the group as the denominator. Naughts and dashes above the letters are used for dummies. Thus, if the message to be sent was "The car agrees," it would be written thus:
4 3 5 3 5 1 2 1 2 2 5 5 3
- - - - -

For telegraphic purposes, the message must be written straight along, it being arranged that denominator was to follow numerator, and dummies could be interposed, thus:
4 0 9 4 0 3 0 2 8 7 5 0 9 1
6 3 7 1 0 5 0 6 1 8 1 9 2 9 9 4 0 1 8 1 7
2 6 7 2 0 2 9 4 0 5 7 8 9 1 0 5 9 1 7 9
3 6 4

mechanical devices for the transmission of secret messages there are a multitude, but, as in the majority of cases they do not comply with the exigencies of telegraph, we will not concern ourselves with them. The instrument known as the "grille," however, can be utilized in telegraphic correspondence, and so merits description.

The grille consists of a plate, usually of metal, with a number of holes in it. When he desires to send a message the writer inserts his grille upon a piece of paper and writes the words of his message through the apertures. Then he removes the grille and fills up the spaces with writing which has nothing to do with the matter to be kept secret. Of course, the whole is arranged so as to make sense and appear to be an ordinary telegraphic message about some unimportant subject. The recipient, however, is supplied with a similar grille, which he applies to the paper and reads what is seen through the apertures. When it is desired to use the grille in combination with the telegraph a sheet of paper is generally employed instead of a metal plate and both parties will use typewriters of the same make. Then, when the recipient receives the message in the ordinary telegraph blank, he will copy it out with his typewriter on a sheet of the size used by the sender. This done he can use his grille just as well as though he had the original dispatch. A curious device of this kind is used by the emperor of Austria, whose grille is in the form of a stencil of his coat of arms, the two-headed eagle. Occasionally, too, specially constructed typewriters are used, the letters recorded by which do not correspond with those marked on the keys. It is said that this is a plan occasionally adopted by some of the United States government departments.

The utmost care is of course exercised lest these various systems become known and all governmental ciphers are constantly being changed. In the navy the key and description of the cipher used is kept in a box in the captain's cabin and if any accident happens to the ship it is the duty of the captain to throw the box overboard. Most of the government ciphers are highly complicated, a fact which accounts to some extent for the peculiar construction of dispatches. General Shafter, for instance, it is said, never fully mastered the army code and that was the reason of the peculiar diction of his dispatches from Cuba. However complicated though they be, experts are of the opinion that governments might just as well use ordinary plain writing. By some means or other rival governments invariably manage to inform themselves of one another's methods and a cipher system has yet to be devised that shall be undecipherable.

T. G. KNOX.

STERILIZED BARBER SHOP. A Famous Shop in the Carrollton Hotel, Baltimore, Maryland. The barber shop in the Carrollton hotel, Baltimore, sterilizes everything it uses in the shop. The sterilizing is done by heat. The towels, the razors, the straps, the soap, the combs and brushes are all sterilized before being used on a customer. Where there is no sterilizer have the barber use Newbro's Herpicide. It kills the dangerous germs and it is an antiseptic for the scalp and for the face after shaving. All leading barbers everywhere appreciate these patent facts about Herpicide and they use it. "Destroy the cause, you remove the effect."

QUANT FEATURES OF LIFE. One of the greatest curiosities in the neighborhood of New York is now to be seen at the foot of the Palisades. Between two frame houses built there is a giant boulder twenty-five feet high and twenty feet wide, which fell from a great height, at the top of the Palisades, and sweeping down the front of the cliffs, uprooted big trees, tore up tons of loose stone and cut a wide swath the entire distance. Finally, after zigzagging from one side to the other, it rolled in between two frame houses and stopped there.

The people were asleep in the houses when the rock started. They had barely time to make their escape when it made its appearance at their front doors. They are now thanking their lucky stars that the enormous stone did not hit one of the buildings.

Commissioner Henry Meigs of the Bayonne (Long Island) Board of Health has announced that he proposes legislation relative to women's attire. "I propose," said he, "to introduce at the next meeting of this board an ordinance making it a misdemeanor for a woman to wear skirts or gowns that sweep the sidewalks. There is hardly any greater cause of contagion than these dresses, which gather up from the sidewalk germs of every description and carry them into homes to propagate and spread disease."

Dr. George A. Bradford agrees with Commissioner Meigs and enumerated several other sources of germs. "The collection of cigar stumps on the streets to be ground up into smoking tobacco and the promiscuous use of towels hanging on the front of counters in barrooms are two of them," he said.

Speaking of the trade in war relics just after the close of the Spanish war, a Havana correspondent of the Boston Transcript writes: "One live American we know of gave it out that he had bought the last Spanish flagstaff from Morro castle. A week or two later a man who might have been the flagstaff man himself was seen in the city could be got from the State—this same man was selling walking sticks said to have been turned from the aforesaid flagstaff. Some of these sticks were of oak, others of ebony—but nobody in those days questioned little things like that. The man might have made a fortune had he confined his business to walking sticks. He didn't, though. He began offering small articles of household furniture, then larger ones, and at last, becoming real bold, he tried to float a general furniture factory—all out of wood from this large flagstaff. That was his head-knell, and though the man is alive now, his sales are few and far between and are limited to walking sticks again."

For Homelessness. Benjamin Ingerson of Hutton, Ind., says he had not spoken a word above a whisper for months in a bottle of Foley's Honey and Tar restored his voice. Be sure you get Foley's.

"I Followed Mrs. Pinkham's Advice and Now I am Well!"



Doctors Mystified. Grateful Letters from Cured Women.

A woman is sick; some disease peculiar to her sex is fast developing in her system. She goes to her family physician and tells him a story, but not the whole story. She holds something back, loses her head, becomes agitated, forgets what she wants to say, and finally conceals what she ought to have told, and thus completely mystifies the doctor.

Is it any wonder, therefore, that the doctor fails to cure the disease? Still, we cannot blame the woman, for it is very embarrassing to detail some of the symptoms of her suffering, even to her family physician. It was for this reason that years ago Mrs. Lydia E. Pinkham, of Lynn, Mass., determined to step in and help her sex. Having had considerable experience in treating female ills with her Vegetable Compound, she encouraged the women of America to write to her for advice in regard to their complaints, and being a woman, it was easy for her ailing sisters to pour into her ears every detail of their suffering.

In this way she was able to do for them what the physicians were unable to do, simply because she had the proper information to work upon, and from the little group of women who sought her advice years ago, a great army of her fellow-beings are to day constantly applying for advice and relief, and the fact that more than one hundred thousand of them have been successfully treated by Mrs. Pinkham during the last year is indicative of the grand results which are produced by her unequalled experience and training.

No physician in the world has had such a training, or has such an amount of information at hand to assist in the treatment of all kinds of female ills, from the simplest local irritation to the most complicated diseases of the womb.

This, therefore, is the reason why Mrs. Pinkham, in her laboratory at Lynn, Mass., is able to do more for the ailing women of America than the family physician. Any woman, therefore, is responsible for her own suffering who will not take the trouble to write to Mrs. Pinkham for advice.

The testimonials which we are constantly publishing from grateful women establish beyond a doubt the power of Lydia E. Pinkham's Vegetable Compound to conquer female diseases.

\$5000 REWARD Owing to the fact that some skeptical people have from time to time questioned the genuineness of the testimonials letters we are constantly publishing, we have deposited with the National City Bank of Lynn, Mass., \$5,000, which will be paid to any person who will show that he has secured a testimonial letter from a woman who has been cured by the use of Lydia E. Pinkham's Vegetable Compound, after having been treated by some other medicine, and who has been cured before obtaining the same.

"DEAR MRS. PINKHAM:—I have been thankful a thousand times since I wrote to you for what Lydia E. Pinkham's Vegetable Compound has done for me. I followed your advice carefully and now I feel like a different person. My troubles were backache, headache, nervous tired feeling, painful menstruation, and leucorrhoea. I took four bottles of Vegetable Compound, one box of Liver Pills, and used one package of Sanative Wash, and am now well. I thank you again for the good you have done me."—ELLA E. BRENNER, East Rochester, Ohio.

"DEAR MRS. PINKHAM:—When I wrote to you some time ago for advice, I really thought my days were numbered. I was so ill that I could not stand on my feet for fifteen minutes at a time. I had female troubles in many of their worst forms, inflammation and ulceration of the womb, leucorrhoea, bearing-down pains, headache, nervous and nervous prostration. My kidneys were out of order and blood in a bad condition. Every one, and even my doctor, thought I was going into consumption. I commenced to take Lydia E. Pinkham's Vegetable Compound and followed your advice faithfully for six months, with the result that I became a well woman, and it did not cost me nearly as much as a doctor's bill for the same number of weeks. I feel that your medicine saved my life."—MRS. SAMUEL BOST, 7 Cozy Ave., Oneonta, N. Y.

"DEAR MRS. PINKHAM:—I feel that words are but feeble to express a heart's gratitude, when there is so much to be thankful for as I have. I suffered with womb trouble for five years, and our family physician said an operation was needed; but I dreaded it, and reading of Lydia E. Pinkham's Vegetable Compound one day, I decided to give it a trial first. To my great joy I found that after four months' treatment I was strong and well; experienced no pain or trouble, and the Compound built up my entire system. I shall always bless the day I started to take your medicine; it proved my greatest good."—MISS SOPHIE BONHAM, 281 Oak St., Chicago, Ill.

"DEAR MRS. PINKHAM:—I want to tell you what your medicine has done for me. I believe it saved my life. I had womb trouble, and inflammation of the ovaries, and was troubled with flowing too much. I had two doctors, but they did me no good. After writing to you, I began the use of your remedies, and to-day I am well. I cannot say enough in your favor and shall always praise your Vegetable Compound."—MRS. FRED. LEO, Box 530, Skowhegan, Maine.

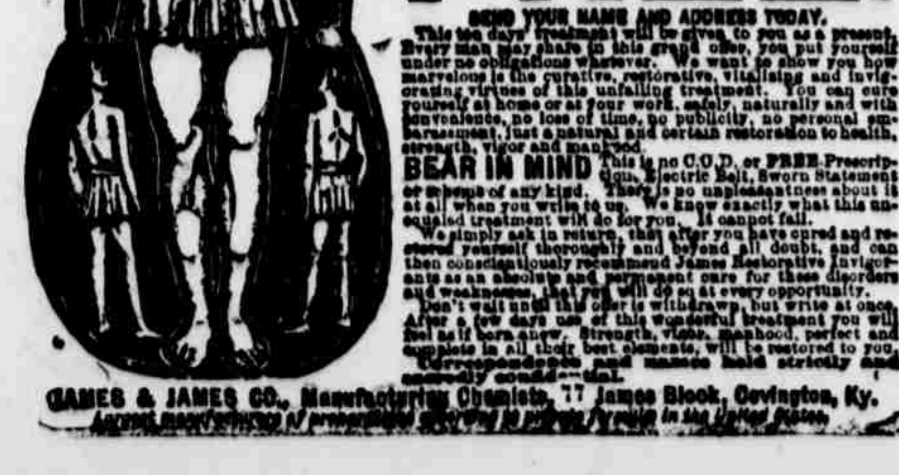
December 28, 1899. "DEAR MRS. PINKHAM:—I feel that it is my duty to write and tell you of the benefit I have derived from the use of Lydia E. Pinkham's Vegetable Compound. I wrote to you last June and described my sufferings. I took seven bottles of your medicine and was cured of my troubles. Last September I was taken with a very bad kidney trouble. I was away from home and was obliged to return. I started to take your medicine again and was soon well. When I wrote to you last summer I weighed only one hundred and five. I now weigh one hundred and thirteen. I am very grateful to you for the good advice you gave me, and would recommend your medicine to all who suffer from female weakness."—MRS. B. CUNNINGHAM, Oakland, Ill.

Every Woman is interested and should know of the marvelous MARVEL Whirling Spray. The new Vaginal Syringe. The best remedy for all kinds of Vaginal and Menstrual troubles. Full particulars and directions will be sent on receipt of ten cents. Ask your druggist for it. If you cannot supply it, write to MARVEL Whirling Spray, 100 West Madison St., Chicago, Ill. Ask your druggist for it. If you cannot supply it, write to MARVEL Whirling Spray, 100 West Madison St., Chicago, Ill.

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RELIGIOUS. The American Missionary Association has now over 700 missionary workers in its widely varied fields. Rev. Mr. Sandford of Shiloh, Mo., recently baptized 23 persons in one hour and thirty-seven minutes. Rev. Richard Lewis Howell, one of the best known Episcopal clergymen of Washington, D. C., has a project for the erection of a magnificent edifice in that city, to serve as a meeting place for the communicants of all religious denominations. Because of failing health Rev. Dr. Samuel E. Appleton has resigned the rectorship of the Protestant Episcopal Church of the Mediator in Philadelphia after forty-one years' service. He has been made pastor emeritus. Kan., advertises in the local paper: "There still remain a few vacant seats at the regular services in the Baptist church of this city. The pastor will, and can, preach better sermons if the seats are all filled with worshipful attendants. Will you not come?" The salary of Rev. Frank Crane, the new pastor of the People's church, Chicago, as successor of Rev. Dr. H. W. Thomas, is to be \$2,500 per annum, which is the largest salary paid any clergyman in Chicago. The People's church plans to carry on its work on an elaborate scale. Twenty thousand dollars a year will be spent. Good music is to be one of the features of the services. According to Bishop Chandler of the Methodist Episcopal Church South, the negro colleges of the south are better endowed and equipped than are the colleges for the whites, and their superiority in that respect increases every year. Booker T. Washington, says the bishop, can get more money for his school by an hour's speech in Boston or New York than any president of a white school can get by a year's campaign among his own people, and that condition, if it continues for twenty-five years, is apt to work injury to both races. Rev. Thomas Theodosius Carter, the last of the great figures of the Oxford movement, died at the advanced age of 83 years. He was for many years rector of Clermont, near Windsor, being the incumbent of a beautiful old church in which Queen Victoria occasionally worshipped. Twenty years ago he gave up the cure to become warden of the House of Mercy at Clermont and to take direction of the Community of St. John the Baptist, better known as the Clermont Sisters, which he founded. The order is the largest and richest for women in England. It numbers over 50 members, many of whom come from the aristocracy. The above testimonials are not genuine, and the above testimonials are not genuine, and the above testimonials are not genuine.

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