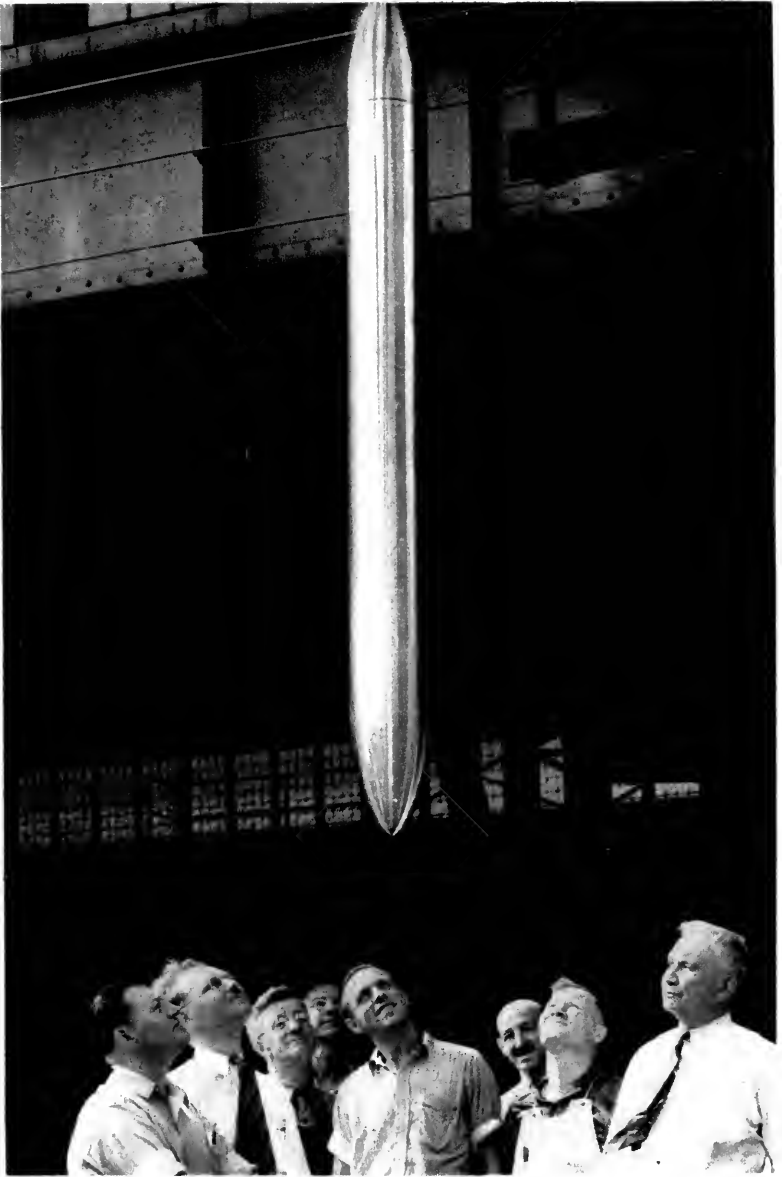


THE TIME CAPSULE

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THE ENVELOPE FOR A MESSAGE TO THE FUTURE
BEGINS ITS EPIC JOURNEY

THE BOOK OF RECORD OF
THE
TIME CAPSULE
OF CUPALOY

DEEMED CAPABLE OF RESISTING
THE EFFECTS OF TIME FOR FIVE
THOUSAND YEARS · PRESERVING
AN ACCOUNT OF UNIVERSAL
ACHIEVEMENTS · EMBEDDED IN
THE GROUNDS OF THE
NEW YORK WORLD'S FAIR
1939

SEPTEMBER 23 · 1938

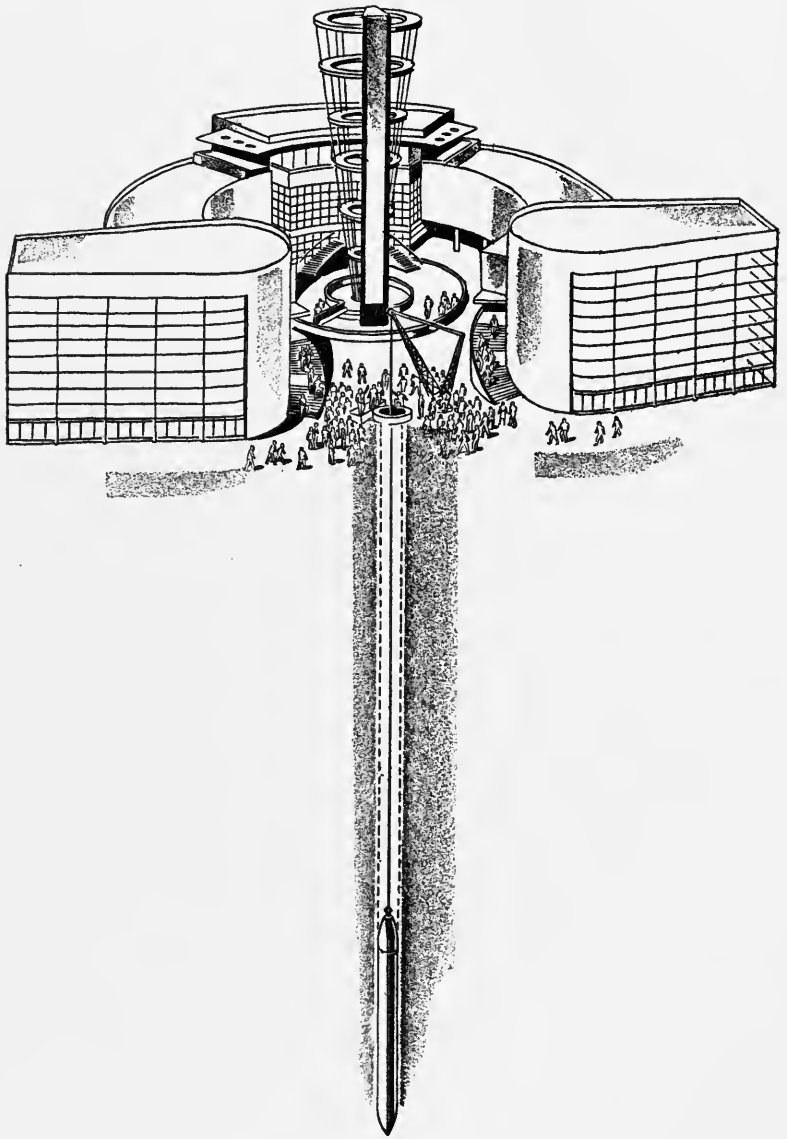
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WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
NEW YORK

PRINTED IN THE UNITED STATES OF AMERICA

*All the days of my appointed time will I wait,
till my change come.*

Thou shalt call, and I will answer thee.

—JOB XIV: 14-15.



THE TIME CAPSULE

A SEGMENT OF OUR TIME PRESERVED
FOR FUTURE GENERATIONS



WHEN WE SURVEY THE PAST and note how perishable are all human things, we are moved to attempt the preservation of some of the world's present material & intellectual symbols, that knowledge of them may not disappear from the earth.

For there is no way to read the future of the world: peoples, nations, and cultures move onward into inscrutable time. In our day it is difficult to conceive of a future less happy, less civilized than our own. Yet history teaches us that every culture passes through definite cycles of development, climax, and decay. And so, we must recognize, ultimately may ours.

By the same reasoning, there will rise again a civilization of even vaster promise standing upon our shoulders, as we have stood upon the shoulders of ancient Sumer, Egypt, Greece, and Rome. The learned among that culture of the future may study with pleasure and profit things now in existence which are unique to our time, growing out of our circumstances, needs, and desires.

Five thousand years ago, during a period of invention, development, and science rivaling that of our day, recorded history began. It would be pleasant to believe

that we might leave records of our own day for five thousand years hence ; to a day when the peoples of the world will think of us standing at history's midpoint.

Whether we shall be able to transmit such a segment of our time into the future depends not only on our ingenuity at selection and preservation, on the excellence of engineering, metallurgy, chemistry, and other intellectual disciplines, but also in large measure on those who come after us, and their willingness to cooperate in such an archæological venture across the reaches of time.

We pray you therefore, whoever reads this book, to cherish and preserve it through the ages, and translate it from time to time into new languages that may arise after us, in order that knowledge of the Time Capsule of Cupaloy may be handed down to those for whom it is intended. We likewise ask : let the Time Capsule rest in the earth until its time shall come ; let none dig it up for curiosity or for any other reason. It is a message from one age to another, and none should touch it in the years that lie between.

PREPARATION OF THE CAPSULE

HOW long the Time Capsule will remain in the earth, or what experiences await it, we have no way of knowing. But if, as is our hope, it rests untroubled until the year A.D. 6939, there may be people capable of discovering and raising it, of reading and studying the contents.

We imagine they will be able to reconstruct, through archæological techniques like those developed in our own time, the hard structures of our culture : our architecture, our dams and roads, our houses, and our general

physical appearance, as indicated by our skeletons. But certainly many of the perishable things of our culture will have been lost in the course of time, unless special efforts are made to preserve them.

In these matters we have taken counsel of archæologists, historians, metallurgists, engineers, chemists, geophysicists, and other technical men of our time. We have given much study not only to the selection of the items to be preserved, but also to methods of preserving them for so long a time & of leaving this message about them.

Our first concern was the construction of the Time Capsule itself, a problem of great complexity. Our experience with artificial materials is too short to give us certain knowledge of their ability to withstand the corrosive effects of thousands of years, yet the older mineral materials, including stone and glass, are too brittle and too difficult to work, are liable to breakage from pressure or earthquake, and are too difficult to detect when buried in the earth.

We have decided that the best possible material is a metallic alloy of high corrosion resistance & considerable hardness, of nonferrous nature, and preferably containing a high percentage of copper. Of all the tools used by ancient peoples, those of stone and copper have come down to us from farthest in the past.

It happens that a copper alloy fulfilling these specifications has recently been developed. Known as Cupaloy, it is 99.4 per cent copper, .5 per cent chromium, and .1 per cent silver. This material may be tempered to a hardness similar to that of mild steel, yet has a resistance to corrosion equal to pure copper. In electrolytic reactions

with ferrous metals in the soil, it becomes the anode and therefore will receive deposits, rather than suffer corrosion, should such action take place. It is our belief that a properly constructed capsule of Cupaloy will withstand the naturally destructive forces of five thousand years, and by its strength protect the contents from the accidents of time.

The Time Capsule is seven feet, six inches in length, and eight and three-eighths inches in diameter. Its Cupaloy shell consists of seven cast segments, all segments except the last solidly screwed together, sealed with molten asphalt, and burnished. The last section, closed after the placing of the contents in the Capsule, is shrink-fitted on tapering threads.

The inner crypt of the Capsule is a space six & a half inches in diameter & approximately six feet, nine inches in length. Within it is a Pyrex glass envelope embedded in a petroleum base wax. The objects to be preserved are enclosed in the glass, from which all air has been exhausted. The spaces left between the objects in the crypt have been filled with an inert gas, nitrogen, the inactive element which makes up four-fifths of our atmosphere.

The materials inside the crypt have been selected for permanence and have been treated, so far as possible, to give them resistance to time. Material which would ordinarily be published in books has been photographed on acetate microfilm; a method that not only promises permanence but also makes possible the concentration of much information in small space. Where paper was necessarily enclosed, we have used only the finest 100 per cent rag, fulfilling the specifications of the United

States Bureau of Standards for permanence. Metal parts which might be subject to attack by moisture have been coated with a thin layer of wax. No acids or corrosive substances are included in the crypt's contents or in the materials with which the Time Capsule is sealed, nor are any materials included which are known to decay or dissociate into corrosive liquids or vapors.

The Time Capsule is die-stamped with this message :

TIME CAPSULE OF CUPALOY, DEPOSITED ON THE SITE OF THE NEW YORK WORLD'S FAIR ON SEPTEMBER 23, 1938, BY THE WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY. IF ANYONE SHOULD COME UPON THIS CAPSULE BEFORE THE YEAR A. D. 6939 LET HIM NOT WANT ONLY DISTURB IT, FOR TO DO SO WOULD BE TO DEPRIVE THE PEOPLE OF THAT ERA OF THE LEGACY HERE LEFT THEM. CHERISH IT THEREFORE IN A SAFE PLACE.

The Time Capsule was deposited fifty feet deep in the earth on the site of the building of the Westinghouse Company, on the grounds of the New York World's Fair 1939, by A. W. Robertson, chairman of the Board of Directors of the Westinghouse Electric & Manufacturing Company, at 12 o'clock noon, September 23, 1938, the exact moment of the autumnal equinox of that year.

RECOVERY OF THE CAPSULE

WHEN the time has come to dig for the Time Capsule, look for it in the area known as the Flushing Meadows, Borough of Queens, New York City, on the site of the New York World's Fair 1939.

The appointed year will be, according to our common way of reckoning time, the 6,939th year since the birth of Christ. According to the Jewish calendar it will be the year 10699; according to the Chinese, the 36th year of the 160th cycle; according to the Mohammedan, the 6,469th year since the birth of the Prophet; according to the Buddhist, the 7,502d year since the birth of Buddha; according to the Shinto [Japanese], the 7,599th year since the birth of the first emperor, Jimmu Tenno.

If none of these ways of reckoning the years has survived, it still may be recognized by calculation from astronomical data. In the year 1939 there will be two eclipses of the moon, falling respectively on May 3d and October 28th. There will be two eclipses of the sun—an annular eclipse on April 19th, the path of annular eclipse grazing the North Pole of the earth, and a total eclipse on October 12th, the total path crossing near the South Pole.

The heliocentric longitudes of the planets on January 1st at zero-hours Greenwich [midnight] were

Mercury	175°	55'	42"
Venus	124°	43'	32"
Earth	99°	40'	29"
Mars	192°	4'	2"
Jupiter	339°	12'	22"
Saturn	17°	30'	45"
Uranus	46°	23'	31"
Neptune	171°	32'	3"
Pluto	120°	17'	

The mean position of the North Star [Polaris or Alpha Ursæ Minoris] on January 1st will be Right Ascension, 1 hr. 41 min. 59 sec.; North Polar distance, 1° 1' 33".8.

[10]

In the opinion of our astronomers, such a combination of astronomical events is unlikely to recur for many thousands of years. By computing backward from their time, people of the future will therefore be able to determine the number of years that have elapsed since our time.

The Capsule lies buried at exactly the point where the centerline of the Westinghouse plot intersects the centerline of the great halls of the Westinghouse World's Fair building. By A. D. 6939, it is probable, all present-day landmarks, city surveys, and other such aids for locating such an object will have disappeared. The spot may still be discovered, however, by determination of the latitude and longitude. The exact geodetic coordinates [North American Datum of 1927] are :

Latitude	40°	44'	34".089	north of the Equator
Longitude	73°	50'	43".842	west of Greenwich

These coordinates, surveyed by the United States Coast and Geodetic Survey and given to the thousandth part of a second of arc, are accurate enough to locate an object one-tenth of a foot or less in diameter at a particular position on the surface of the earth.*

It may be that due to shifts of the earth's poles, differences in method, or other causes, this calculation will still not give the exact spot. It may also happen that the Time Capsule will sink or migrate from the point of deposit during the ages. Seekers may nevertheless still find it by the methods of electrical prospecting such as are used in our day for the location of minerals, water, buried metallic objects, and deposits of salt and oil.

*See page 43.

If electrical instruments similar to those of our time are used to locate the Capsule, it should be indicated by the distortion of a magnetic field, the increased conductivity of the soil, or other such indications. Certain steps have been taken to increase the Time Capsule's responsiveness in this respect. The soil in which the Time Capsule is buried is fairly homogeneous, and though there are scraps of metals, mostly ferrous, buried in it, these should all have disappeared by corrosion before many centuries have passed. On account of the softness of the soil, however, the Capsule may have settled to a greater depth. This possibility should be taken into account.*

When the Capsule at length has been located, a problem will still remain, for if the land is swampy & wet, as in our day, adequate methods must be devised to recover it. The Capsule may be raised by sinking a caisson of such a type as to hold back the mud and water during excavation. Should this prove inexpedient, it may be possible to freeze the soil by cold brine circulating in pipes driven into the earth around the site. When the soil is frozen it may then be dug in the same manner as hard earth.

The Capsule is provided with an eye to which lifting apparatus may be attached. It is likely, however, that this ring may have disappeared through erosion. In this case, the Capsule should be raised gently with a sling.

When it has been brought up out of the ground, let the finders beware, lest in their eagerness they spoil the contents by ill-considered moves. Let the Capsule be transported with the utmost care, at once, to a warm, dry place. Cleanse the outside of mud, slime, or corrosion.

*See page 39.

Then cut off the top carefully at the deeply scored groove which has been left to guide the saw.

Should gas rush out when the inner glass is punctured, or when the saw penetrates the crypt, let there be no alarm, for this is a harmless gas enclosed as a preservative.

THE CONTENTS OF THE CAPSULE

WITHIN the limitations imposed by space, the problems of preservation, and the difficulty of choosing the truly significant to represent all the enormous variety and vigor of our life, we have sought to deposit in the Time Capsule materials and information touching upon all the principal categories of our thought, activity, and accomplishment; sparing nothing, neither our wisdom nor our foolishness, our supreme achievements nor our recognized weaknesses.

We have included books and pictures that show where and how we live: some in apartments like dwellers in cliffs, but comfortably; others in detached houses; still others moving about the country in homes mounted on wheels.

We have set forth the story of our architecture, by which we have reared soaring pinnacles into the sky.

We have described the offices and the factories where we work, the machines that write, compute, tabulate, reproduce manuscript a thousandfold, sort out, and file; the machines that stamp and fashion metals; the machines and methods with which metals are knit together by electricity and cut apart by gas; the complex techniques of mass production, with which articles that consist of scores of different materials, requiring hundreds of oper-

ations to assemble, can nevertheless be sold among us for a few cents.

We have described in text and picture the arts and entertainment of our day; the games we play; the history & development & present attainments of painting, sculpture, music, the theater, motion pictures, and radio.

We have included copies of representative newspapers & magazines of this day, containing news, articles, fiction, and advertisements broadly characteristic of our period. We have also included a novel, the most widely read of our time. For good measure we have added specimens of our cartoons and "comics," such as daily and weekly delight millions in our newspapers and in our moving picture theaters.

Ours is a day of many faiths. We have provided descriptions of the world's religions, numbered their followers, and enclosed the Holy Bible, a book which is the basis of the Christian faith. We have provided outlines of the world's principal philosophies. We have discussed the all-pervading and effective educational systems of our time, and told in text and pictures the story of the training of our young.

We have included a copy of our Constitution, and something about our government, under which we live as free men, ruled by our own elected representatives chosen at regular intervals by the votes of all, both men and women. We have included, also, a history of our country and a chronological history of the world.

Our scientists have measured the speed of light and compared the distances of the planets, stars, and nebulae; they have charted the slow evolution of primal proto-

plasm into man, fathomed the ultimate composition of matter and its relation to energy, transmuted the elements, measured the earth and explored it, harnessed earthquake, electricity, and magnetism to probe what lies beneath our feet ; they have shifted the atoms in their lattices and created dyes, materials, stuffs that Nature herself forgot to make. The stories of these achievements have been set forth in the Time Capsule.

Our engineers & inventors have harnessed the forces of the earth and skies and the mysteries of nature to make our lives pleasant, swift, safe, and fascinating beyond any previous age. We fly faster, higher, and farther than the birds. On steel rails we rush safely, behind giant horses of metal and fire. Ships large as palaces thrum across our seas. Our roads are alive with self-propelling conveyances so complex the most powerful prince could not have owned one a generation ago ; yet in our day there is hardly a man so poor he cannot afford this form of personal mobility.

Over wires pour cataracts of invisible electric power, tamed and harnessed to light our homes, cook our food, cool and clean our air, operate the machines of our homes & factories, lighten the burdens of our daily labor, reach out and capture the voices and music of the air, & work a major part of all the complex magic of our day.

We have made metals our slaves, and learned to change their characteristics to our needs. We speak to one another along a network of wires and radiations that enmesh the globe, and hear one another thousands of miles away as clearly as though the distance were only a few feet. We have learned to arrest the processes of decay ; our

foods are preserved in metal or frost and by these means we may have vegetables and fruits in any season, delicacies from foreign lands, and adequate diet anywhere.

All these things, and the secrets of them, and something about the men of genius of our time and earlier days who helped bring them about, will be found in the Time Capsule.

How our physicians have healed the sick, controlled pain, and conquered many diseases, has been recounted there ; how we have suppressed epidemics through the enormous undertakings of our system of public health ; how our drugs and biologicals are compounded, and the enormous and varied list of them.

There are included samples and specimens of the new materials of our time, created in the laboratories of our engineers and chemists, on the looms of our mills, and in the forges, furnaces, and vats of our factories.

There are also samples of the products of our farms, where machinery has turned scarcity into abundance ; where research has produced plants never seen in nature ; where science now is able to produce plants even without soil.

There are also many small articles that we wear or use ; that contribute to the pleasure, comfort, safety, convenience, or healthfulness of our lives ; articles with which we write, play, groom ourselves, correct our vision, remove our beards, illuminate our homes and work-places, tell time, make pictures, calculate sums, exchange values, protect property, train our children, prepare our food.

Believing, as have the people of each age, that our women are the most beautiful, most intelligent, and best

groomed of all the ages, we have enclosed in the Time Capsule specimens of modern cosmetics, and one of the singular clothing creations of our time, a woman's hat.

That the pronunciation of our English tongue may not be lost, a "Key to English" has been prepared and printed in this book. That our vocabulary may not be forgotten, we have included in the Capsule a dictionary, defining more than 140,000 common words and phrases. That our idiom may be preserved, we have provided also a dictionary of slang and colloquial expressions. Finally, that our method of writing may be recovered, should all other record of it disappear, we have included a book in which the Lord's Prayer is translated into three hundred different tongues; also the fable "The Story of the North Wind & the Sun" translated into twenty-five languages. These may serve, as did the trilingual Rosetta stone, to help in the translation of our words.

In the Capsule there are only two actual books of our time, in the size and form to which we are accustomed. These are this book and the Holy Bible. All the rest have been photographed page by page on microfilm, which by the small space it requires has permitted us to include on four small reels the contents or equivalent of more than seventy ordinary books—enough in their usual form to fill the Capsule's crypt several times over. A magnifying instrument is included, with which the microfilm may be read.

Should those who recover the Capsule wish to know our appearance, and how we dress, act, and talk, there have been provided two reels of significant and typical scenes of our time, in pictures that move and speak, im-

prisoned on ribbons of cellulose coated with silver. If knowledge of machines for projecting these pictures and voices has disappeared, the machines may nevertheless be recreated, after recovery of the Capsule, from photographs and descriptions.

Each age considers itself the pinnacle & final triumph above all eras that have gone before. In our time many believe that the human race has reached the ultimate in material and social development; others, that humanity shall march onward to achievements splendid beyond the imagination of this day, to new worlds of human wealth, power, life, and happiness. We choose, with the latter, to believe that men will solve the problems of the world, that the human race will triumph over its limitations and its adversities, that the future will be glorious.

TO THE PEOPLE OF THAT FUTURE
WE LEAVE THIS LEGACY

A KEY TO THE ENGLISH LANGUAGE

DR. JOHN P. HARRINGTON

ETHNOLOGIST, BUREAU OF ETHNOLOGY

SMITHSONIAN INSTITUTION

WASHINGTON, D. C.

*Our years are like the shadows
That o'er the meadows fall,
Are like the fragile wildflower
That withers by the wall—
A dream, a song, a story,
By others quickly told,
An unremaining glory
Of years that soon get old.*

AFTER five thousand years all the spoken languages of the present time will have become extinct or so altered as to require a key for their understanding. The English language spoken in the United States today, if not replaced by some other natural or invented tongue, will have suffered complete reforming many times over through the laws of linguistic evolving—laws which though proceeding in regular paths will, because of their complexity, work the apparent result of radical havoc. Books of the present day, through chemical change, will have disappeared.

Records of the Etruscan language of ancient Italy in Greek letters which are easily readable have amply survived to the present time, but no one has been able to understand the words and their meaning. We have a whole book in Etruscan, but no one can understand it. The key

to the deciphering of ancient Egyptian was found in a brief chance inscription, the trilingual Rosetta stone, made for another purpose and never thought of at the time as being useful as a key. If the Etruscans, Egyptians, or other ancient peoples had planned to make a key for us, what would have been their procedure? If all connecting links had been removed, how could such a people have conveyed to us the pronunciation, grammar, and vocabulary of their language?

This question was propounded to the Smithsonian Institution with the result that it was decided that a mouth map would be necessary for the transmittal of pronunciation, diagrams for the conveying of grammatical categories, and the coinage of a list of "high-frequency English" words for the preservation of essential vocabulary.

The Rosetta stone was a key in that it gave a brief sample of translation. The deliberate scientific depicting of English of today for the people five thousand years from now will give adequate clues entirely independent of any furnishing of translation. It shows by a picture of the human mouth where each of the various sounds of speech comes from and with such clarity that the articulation can be re-enacted. It shows by cartoon-like diagrams the putting together of words. It shows by the development of a "high-frequency" vocabulary the vital constituents of the English of the present time.

THE SOUNDS OF ENGLISH

THE present English has thirty-three sounds. It is plain that the pronunciation cannot be transmitted to the people of the far future by traditional inherited spelling with

its enormous irregularities. It is equally clear that if peculiar symbols be given to some of these thirty-three sounds, it will be bothersome for typewriter & newspaper equipment which has only the twenty-six letters. The letter *j* therefore is used instead of the inverted *e*, which last would require a special type, and digraphs, & in two instances trigraphs, are used instead of special vowel and consonant letters.

English has eight vowels [or sounds whose hemming amounts to mere cavity-shape resonance] and twenty-five consonants [whose hemming amounts to closure, violent restriction, or closure followed by restriction].

The vowels are all pronounced between the *k* and the *y* consonant positions, that is, between the back-of-the-tongue and the middle-of-the-tongue positions. The vowel with highest raised back of the tongue, that is, nearest to the *k* consonant position, is *u*; the vowel with the highest raised middle of the tongue, that is, nearest to the *y* consonant position, is *i*. *w* is here classified as a lip sound, though it is simultaneously a back-of-the-tongue sound. The other vowels have intermediate positions between the extreme *u* and *i*, *a* being the most open and *j* the most central positioned. The digraph *ae* stands for a vowel midway, perhaps, between *e* and *a*; *ao*, for a vowel midway, perhaps, between *a* and *o*. Vowels occur short and long. Since the letter *c* always stands for *k* or *s*, it is not needed for regular consonant duty and is here pressed into service as a long mark, being written as a silent character after a vowel where it is necessary to mark it as being long. Many vowels are long in English by simple rules, and in such instances the length sign *c* is not writ-

ten. In fact, vowel length needs to be written in English only after *u* and *i*, to distinguish the long from the short varieties.

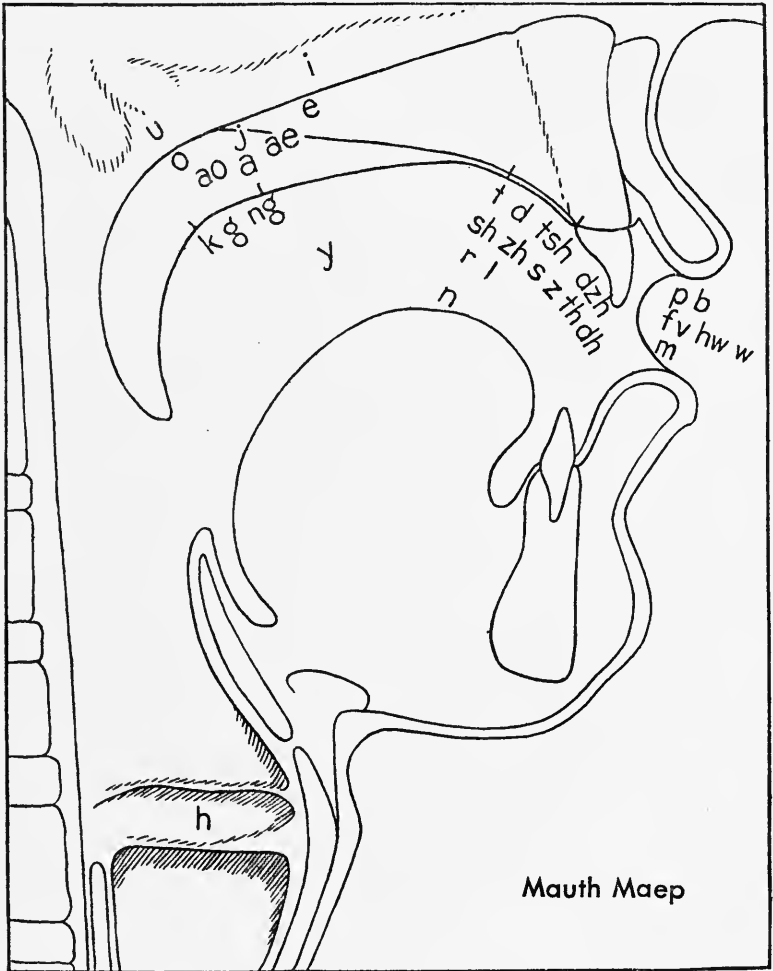


ILLUSTRATION 1, SHOWING EXACTLY WHERE EACH OF THE 33 SOUNDS OF 1938 ENGLISH IS FORMED IN THE ORAL CAVITY.

Vowel diphthongs are only four in number: *ui* [rare], *oi*, *au*, *ai*.

The complete closure consonants of simple form are *k*, *t*, *p*. Those which have the closure with the voice going simultaneously are *g*, *d*, *b*.

Restriction consonants of simple form are *h*, *sh*, *s*, *th*, *hw*. Those which have the restriction with voice going simultaneously are *y*, *zh*, *z*, *dh*, *l*, *r*, *w*.

Consonant diphthong of closure plus restriction of simple form is *tsh*. The same with the voice going simultaneously is *dzh*.

Consonants with the mouth completely hemmed but the nose open are *ng*, *n*, *m*.

The English language, like others, proceeds in syllables. Each syllable consists of a vowel or vowel diphthong, plus or minus consonant trimmings.

A word consisting of more than one syllable has one of its syllables, most commonly the next to the last, high and loud. Such a high and loud syllable is said to be accented. One-syllable words may or may not be high and loud, but it makes little difference to the understanding, whereas polysyllabic words are distorted if the highness and loudness are placed on the wrong syllable.

All sounds are made in the tract between the larynx and the lips. The points of articulation are the glottis of the larynx, the back of the tongue, the middle of the tongue, the front of the tongue, and the lips. Only *h* comes from the larynx. Only three consonants [*k*, *g*, *ng*] come from the back of the tongue. Only *y* comes from the middle of the tongue. By far the greatest number of consonants come from the flexible front of the tongue. That

is why “language,” derived from the Latin word *lingua*, “tongue”, is frequently called “tongue” in the various idioms of the world. From the front of the tongue come thirteen consonants [t, d, sh, zh, s, z, th, dh, tsh, dzh, l, r, n]. From the lips come five consonants [p, b, hw, w, m].

Exercise on the Provenience of Vowels and Consonants

Vowels		Consonants			
put	pit	hit	den	dhen	pin
not	hui	kit	shin	tshin	bin
waotjr	boi	get	aezhur	dzhin	faen
fadhjr	bau	sing	sin	letjr	hwen
bjrd	bai	yuc	zingk	rjn	wen
maen	mucn	ten	thin	nic	men
men	mict				

THE GRAMMAR OF ENGLISH

THE noun shows only two forms: singular, referring to one object, and plural, referring to two or more objects. This difference is shown by Illustration 2 which depicts the singular, “bird,” as distinguished from the plural, “birds.” A possessive case is the only remnant of earlier case formation and is formed like the plural by adding *s*, but distinguished orthographically by placing an apostrophe ['] before the added *s* in the singular and after it in the plural: “bird’s,” “birds’.”

Singgyular aend Plucral—Singular and Plural.



bjrd



Illustration 2

bjrdz

The personal pronoun distinguishes three persons, see Illustration 3. The first person is the self of the speaking subject; the second person is the speaking subject addressed; the third person is the person neither originating the speech nor directly addressed. These three persons also have plurals: “I—we,” “you—you,” “he, she, it—they.” It will be noticed that only in the third person singular is gender distinguished: “he,” masculine animate; “she,” feminine animate; “it,” inanimate, also sometimes used when a lower animal is the object referred to, as: the sheep, it grazes.

The demonstrative pronouns have only two degrees of remoteness: “this” [here], and “that” [there]. The demonstrative adverbs “here” and “there” correspond.

Pjrsjn — Person



Illustration 3

Rjmocnes — Remoteness

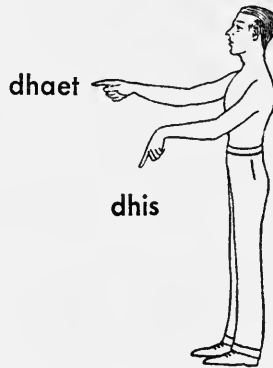


Illustration 4

Adjectives express permanent or acquired attributes of an object. They are often explained by giving the opposites, as in Illustration 5, where “young” and “old,” “black” & “white,” “short” & “tall” are contrasted.

Opjizits—Opposites

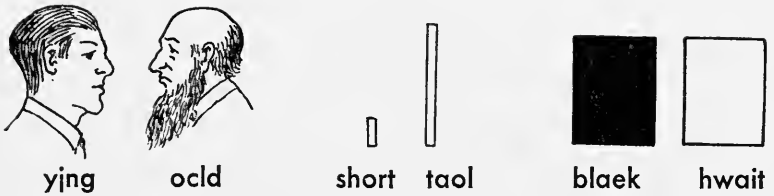


Illustration 5

Adjectives have three degrees of comparison, as in Illustration 6, good being the positive, better indicating that good is excelled as one racer excels another, & best indicating that good is excelled as one racer excels all.

Kompaerisjn—Comparison

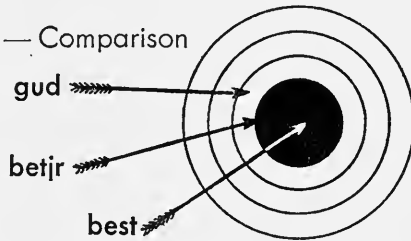


Illustration 6

Frequent verbs, that is, words denoting action or status, are shown graphically in Illustration 7, which gives: I lie, I sit, I stand, I walk, I run, I kick, I jump, I crawl, I climb, I descend.

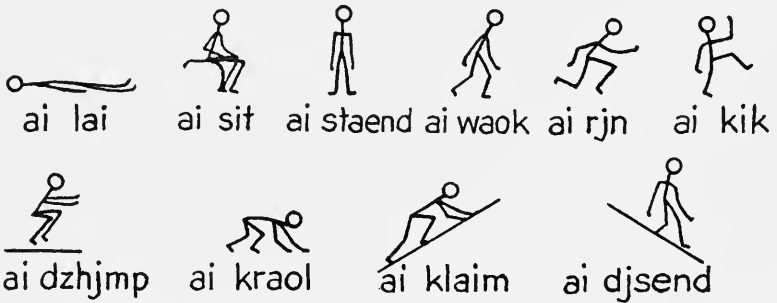


Illustration 7

Tensez—Tenses



paest

prezjnt

fyuctyur

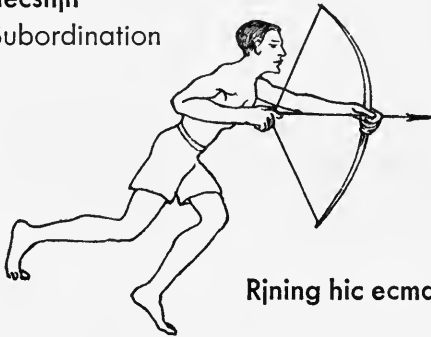
Illustration 8

The verb has three main tenses or times, well shown in Illustration 8, where the steamer in mid-water is the present, the port left behind indicates the past, and the port which is the destination is the future of the action.

The verb in 1938 English has still another expression: it is principal or subordinate. Illustration 9 shows the sentence: "Running he aimed," in which "aimed" is the principal verb and "running" the subordinate.

Sjbordinecshjñ

— Subordination



Rjning hic ecmd

Illustration 9

To illustrate these elements of English grammar, and as an exercise in 1938 English pronunciation, we give next a little story, The Fable of the Northwind and the Sun, written first in neo-phonetic spelling, followed by the ordinary English spelling.

DHJ FECBJL JV DHJ NORTHWIND AEND DHJ SJN

The Fable of the Northwind and the Sun

Dhj Northwind aend dhj Sjn wjr dispyucting whitsh woz dhj stronggjr, hwen j traevjljr kecm jlong raepd in j worm klock. Dhec jgricd dhaet dhj wjn huc fjrst mecd dhj traevjljr teck of hiz klock shud bic konsidjrd stronggjr dhaen dhj jdhr. Dhen dhj Northwind bluc widh aol hiz mait, bjt dhj moer hic bluc, dhj moer kloccli did dhj traevjljr foeld hiz klock jraund him, aend aet laest dhj Northwind gecv jp dhj jtempt. Dhen dhj Sjn shoer aut wormli, aend imicdijtli dhj traevjljr tuk of hiz klock; aend soc dhj Northwind woz jblaidzhd tj konfes dhaet dhj Sjn woz dhj stronggjr jv dhj tuc.

The Northwind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak. They agreed that the one who first made the traveler take off his cloak should be considered stronger than the other. Then the Northwind blew with all his might, but the more he blew, the more closely did the traveler fold his cloak around him; and at last the Northwind gave up the attempt. Then the Sun shone out warmly, and immediately the traveler took off his cloak; and so the Northwind was obliged to confess that the Sun was the stronger of the two.

As a further aid to translation and pronunciation, we have enclosed in the Time Capsule reproductions of this simply worded fable in twenty-five languages. We follow, here, with the English vocabulary most used in 1938—the thousand words most essential to our daily speech and thought. Taking a suggestion from the electrical engineers, we have named the vocabulary “High-frequency English.” We attach, also, two more illustrations, one showing an exterior view of 1938 life, the other an interior view, with common terms indicated.

VOCABULARY OF HIGH-FREQUENCY ENGLISH

THE THOUSAND MOST-USED WORDS OF ENGLISH IN NEO-PHONETIC SPELLING

(Editor's Note—Dr. Harrington has compiled this list following detailed statistical study of newspapers, magazines, books of varying calibre and purpose, and most especially the silent stream of thought, the words spoken every day, and the words most frequently used on the radio and recorded by phonograph. The list has been further improved by comparison with vocabularies given in the various books used for learning foreign languages, and especially with the statistical work of Professor Curme in determining the commonest words of German).



Illustration 10

Autdoctr Necmz (Outdoor Names)

1 smock (smoke) 2 skai (sky) 3 klaud (cloud) 4 barn (barn)
5 hecstaek (haystack) 6 tric (tree) 7 wudz (woods) 8 haus (house)
9 kau (cow) 10 fiold (field) 11 fens (fence) 12 rocd (road)
13 hors (horse) 14 aotomobicl (automobile)

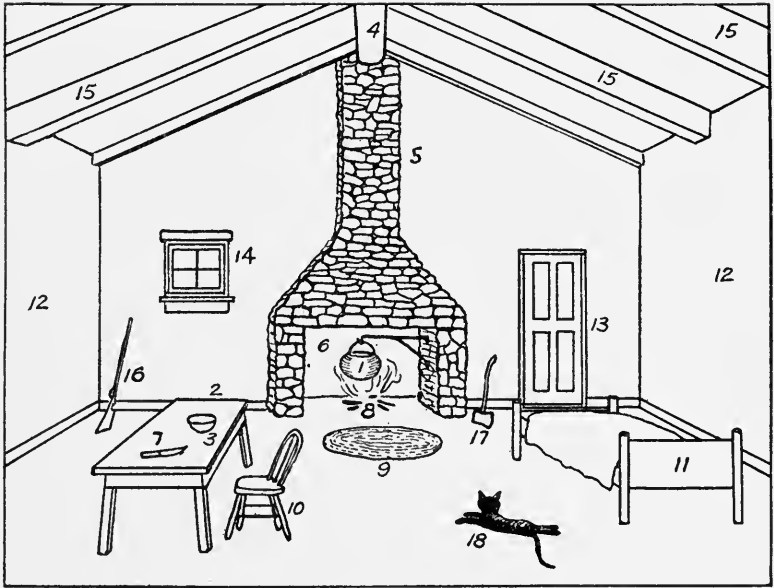


Illustration 11

Indocr Necmz (Indoor Names)

- 1 pot (pot) 2 tecbjl (table) 3 bocl (bowl) 4 ridzhpocl (ridgepole)
 5 tshimni (chimney) 6 fairplecs (fireplace) 7 naif (knife) 8 fair (fire)
 9 rjg (rug) 10 tshaer (chair) 11 bed (bed) 12 waol (wall)
 13 dochr (door) 14 windoc (window) 15 raeftjr (rafter) 16 gjn (gun)
 17 aeks (axe) 18 kaet (cat)

a

- aeftjr (after) aeks (axe) ai (I, eye) aidicj (idea) aijrn (iron)
 ailjnd (island) ais (ice) aekjnpjni (accompany) aekt (act)
 aem (am) aend (and) aengkjl (ankle) aenimjl (animal)
 aenjdhjr (another) aensjr (answer) aent (aunt) aepjl (apple)
 aer (air) aesk (ask) aet (at) aez (as) aol (all) aolredi (already)
 aolwecz (always) aot (ought) ar (are) arm (arm) art (art)
 aut (out) aur (our) awr (hour)

b

baed (bad) baeg (bag) baek (back) baengk (bank) baer (bear)
baeth (bath) bai (buy, by) baird (bind) bait (bite) baol (ball)
baot (bought) barn (barn) bau (bow) baujiz (bowels) baund (bound)
becbi (baby) becdbh (bathe) beck (bake) becs (base) bed (bed)
beg (beg) bel (bell) beli (belly) beri (bury, berry) best (best)
betjr (better) bic (be, bee) bicf (beef) bicnz (beans)
bict (beat, beet), big (big) bilding (building) bin (been) bitjr (bitter)
bizi (busy) bizniz (business) bjfocr (before) bjgin (begin)
bjhaind (behind) bjkazo (because) bjket (bucket) bjkm (become)
bjlicv (believe) bjloc (below) bjrd (bird) bjrt (birth) bjsaid (beside)
bjt (but, butt) bjtr (butter) bird (beard) bjrn (burn) bjrst (burst)
bjtjn (button) bjtwicn (between) blaek (black) blaenket (blanket)
blaind (blind) blecd (blade) blecm (blame) blecz (blaze) bljd (blood)
bloc (blow) bluc (blue) boeld (bold) bocn (bone) bocr (bore)
bocrd (board) boct (boat) bodi (body) boi (boy) bocl (bowl)
boks (box) born (born) boroc (borrow) botjl (bottle) botjm (bottom)
brait (bright) brau (brow) braun (brown) breck (break, brake)
brecn (brain) brecv (brave) bred (bread, bred) brest (breast)
breth (breath) bridzh (bridge) brik (brick) bring (bring)
brjdhjr (brother) brjsh (brush) brock (broke) brockjn (broken)
buk (book) bynctiful (beautiful)

d

daens (dance) daotjr (daughter) dark (dark) daun (down)
daut (doubt) dec (day) ded (dead) def (deaf) det (debt) deth (death)
dhaen (than) dhaet (that) dhec (they) dhecr (their, there) dhem (them)
dhen (then) dhis (this) dhicz (these) dhj (the) dhoc (though)
dhocz (those) dicl (deal) dicp (deep) dicr (dear, deer) did (did)
difjrjnt (different) dig (dig) dim (dim) dish (dish) djl (dull)
djn (done, dun) djrt (dirt) djrti (dirty) djst (dust) djz (does)
docr (door) dog (dog) doktjr (doctor) doljr (dollar) draeg (drag)
drai (dry) draiv (drive) drao (draw) draun (drown) dres (dress)
dringk (drink) drjngk (drunk) drop (drop) dzhob (job) dzhoin (join)
dzhjdzh (judge) dzhjmp (jump) duc (do)

e

ecbjl (able) eck (ache) ecm (aim) ect (eight, ate) ecti (eighty)
ecticn (eighteen) edzh (edge) eg (egg) empti (empty) end (end)
enemi (enemy) eni (any) entjr (enter) evjr (ever) evri (every)

f

fadhjr (father) faekt (fact) faest (fast) faet (fat) fain (fine) faind (find)
fair (fire) fait (fight) faiv (five) faol (fall) far (far) farm (farm)
fecs (face) fedhjr (feather) fel (fell) fens (fence) fiold (field) ficl (feel)
ficr (fear) ficut (feast) fifti (fifty) fifticn (fifteen) fiks (fix)
finggr (finger) finish (finish) fish (fish) fjrst (first) flaeg (flag) flaet (flat)
flai (fly) flaur (flower, flour) fling (fling) flocln (flown) flocl (floor)
floct (float) fluc (flue, flew, flu) foold (fold) focr (four)
focticn (fourteen) fols (false) for (for) fork (fork) form (form)
fors (force) forti (forty) forwjr (forward) frend (friend) fresh (fresh)
fric (free) frjm (from) frjnt (front) fruct (fruit) fucd (food) fucl (fool)
fulclish (foolish) ful (full) fut (foot) fyuc (few) fyuctyr (future)

g

gaedhjr (gather) gaes (gas) gaid (gulde) gaon (gone) gardjn (garden)
get (get) gecv (gave) giv (give) gilti (guilty) gjn (gun)
gjrl (girl) gjts (guts) glaed (glad) gljv (glove) glaes (glass) goc (go)
goold (gold) goct (goat) got (got) graes (grass) grec (gray)
grecp (grape) grect (great) gricn (green) grip (grip) groc (grow)
gud (good) gudbai (good-bye)

h

haef (half) haemjr (hammer) haend (hand) haendkjr (handkerchief)
haeng (hang) haepi (happy) haer (hair) haet (hat) haev (have)
haez (has) haed (had) hai (high) haid (hide) hard (hard) hart (heart)
hau (how) haus (house) hect (hate) hed (head) held (held)
helth (health) hic (he) hicl (heel, heal) hip (hip) hiecr (hear, here)
hict (heat) hidjn (hidden) hil (hill) him (him) hit (hit) hiz (his)
hjndred (hundred) hjnggr (hunger) hjnggri (hungry) hjnt (hunt)
hjr (her) hjrt (hurt) hjzjnd (husband) hoel (hole, whole) hoeld (hold)

hocz (hope) holoc (hollow) hop (hop) horn (horn) hors (horse)
hot (hot) huc (who) hucm (whom) hucz (whose) huf (hoof)
huk (hook) hwaer (where, wear, ware) hwai (why) hwail (while)
hwait (white) hwedhjr (whether) hwen (when) hwicl (wheel)
hwiskjrz (whiskers) hwiski (whiskey) hwisjl (whistle) hwip (whip)
 hwitsh (which) hwjt (what)

i

icr (ear) icst (east) ict (eat) icvn (even) icvning (evening) if (if)
 il (ill) in (in) ingk (ink) it (it) its (its) iz (is)

j

j (a) jbjv (above) jdhjr (other) jfredc (afraid) jgen (again)
jgenst (against) jgoc (ago) jkaunt (account) jksept (except)
jkros (across) jlaiv (alive) jlektrik (electric) jlevjn (eleven)
jmjng (among) jn (an) jndjr (under) jndjrstaend (understand)
jnjf (enough) jnkjl (uncle) jntil (until) jp (up) jpjr (upper)
jraund (around) jrli (early) jrn (earn) jrth (earth) js (us) jv (of)
 jvjn (oven) jwec (away) jweck (awake)

k

kaebedzh (cabbage) kaef (calf) kaen (can) kaer (care) kaeri (carry)
kaet (cat) kaetjl (cattle) kaetsh (catch) kaind (kind) kaof (cough)
kaol (call) kaot (caught) kar (car) kard (card) kau (cow)
kaunt (count) keck (cake) kecm (came) kept (kept) ketjl (kettle)
kic (key) kik (kick) kicp (keep) kil (kill) king (king) kis (kiss)
kraek (crack) krai (cry) kreczi (crazy) kraim (crime) krjsh (crush)
kruked (crooked) kjmpaenyjn (companion) kjntri (country) kjp (cup)
kjt (cut) klaim (climb) klaud (cloud) klicn (clean) klicr (clear)
klocs (close) klok (clock) klocz (close) kloth (cloth) koold (cold)
kocm (comb) kocrn (corn) koct (coat) kofi (coffee) koljr (collar)
kopi (copy) kopjr (copper) kornjr (corner) kost (cost)
kotjn (cotton) kucl (cool) kud (could) kukd (cooked) kuk (cook)
kwaijt (quiet) kwait (quite) kwestshjn (question) kwicn (queen)
kwik (quick) kwoliti (quality) kworel (quarrel) kyucr (cure)

I

lec (lay) laef (laugh) laend (land) laengwedzh (language)
laemp (lamp) laest (last) lai (lie, lye) laif (life) laijn (lion)
laik (like) lain (line) lait (light) lao (law) lecdi (lady) leck (lake)
lecm (lame) lect (late) led (lead, led) leczi (lazy) left (left) leg (leg)
les (less) let (let) letjr (letter) levjl (level) licd (lead) licf (leaf)
licn (lean) licst (least) licv (leave) lift (lift) lip (lip) list (list)
litjl (little) liv (live) ljk (luck) ljmp (lump) ljv (love) ljrj (learn)
loc (low) locd (load) locjr (lower) lok (lock) long (long)
los (loss) lost (lost) lots (lots) lucs (loose) luk (look) lucz (lose)

m

maed (mad) maen (man) maeri (marry) maetjr (matter) maetsh (match)
mai (my) mait (might) mark (mark) mauntjn (mountain)
maus (mouse) mauth (mouth) mec (may) mecbic (maybe)
mecd (made, maid) meck (make) medisin (medicine) melt (melt)
men (men) meni (many) mesh (mesh) met (met) metjl (metal)
mezhr (measure) mic (me) mjd (mud) mjdhjr (mother) mjni (money)
mjnth (month) mjsh (mush) mjshcn (machine) mjst (must)
mjtsh (much) micl (meal) micn (mean) mict (meet, meat)
midjl (middle) milk (milk) mis (miss) mocr (more) mocst (most)
morning (morning) mucn (moon) mucv (move)

n

naif (knife) nain (nine) naintcn (nineteen) nainti (ninety)
nais (nice) nait (night) nau (now) necbjr (neighbor) necl (nail)
necm (name) necshjn (nation) nefyu (nephew) nek (neck)
nektai (necktie) nic (knee) nicd (need) nicdjl (needle) nicr (near)
nies (niece) njmbjr (number) njn (none) njrv (nerve) njthing (nothing)
njt (nut) noc (no) noct (note) nocz (nose) noiz (noise) nok (knock)
north (north) not (not, knot) nucn (noon) nyuc (new) nyucz (news)

o

oold (old) ocn (own) ocnli (only) ocvjr (over) of (off) ofis (office)
ofjn (often) ofjr (offer) oil (oil) olsoc (also) on (on) opjzit (opposite)
or (or) ordjr (order) ocpjn (open)

P

paek (pack) paents (pants) paes (pass) paest (past) pai (pie)
part (part) paudjr (powder) paujr (power) paund (pound)
pec (pay) pecn (pain) pecnt (paint) pecpjr (paper) pecst (paste)
pen (pen) picl (peel, peal) picpjl (people) pics (piece, peace)
pictsh (peach) pig (pig) pin (pin) pjmp (pump)
pjrhaeps (perhaps) pjrps (purpose) pjrsjn (person) pjfecto (potato)
plaent (plant) plau (plow) plec (play) plecn (plain, plane)
plecs (place) plect (plate, plait) plezhur (pleasure) plicz (please)
point (point) poket (pocket) pot (pot) praud (proud) prec (pray)
precz (praise) pres (press) prezjnt (present) print (print)
prucf (proof) prucv (prove) pruti (pretty) pucr (poor) pul (pull)
push (push) put (put) pyucr (pure)

R

raebit (rabbit) raen (ran) raer (rare) raet (rat) raid (ride)
rais (rice, rise) rait (write, right) raiz (rise) rao (raw) raund (round)
rec (ray) recdioc (radio) recn (rain, reign) recndzh (range)
rect (rate) recz (raise) red (red) redi (ready) rent (rent)
rest (rest) ricd (read) rictsh (reach) riczjn (reason) ring (ring)
rip (rip) ritjn (written) ritsh (rich) rivjr (river) rjb (rub)
rjf (rough) rjmecn (remain) rjn (run) rocd (road) rocl (roll, role)
rocz (rose) rok (rock) rong (wrong) rot (rot) rotjn (rotten)
rucl (rule) ruf (roof) rum (room) rut (root) ryucl (rule)

S

saed (sad) saek (sack) saend (sand) saet (sat) said (side) sain (sign)
sait (sight, site) sao (saw) saujr (sour) saund (sound) sauth (south)
sec (say) secf (safe) secm (same) secv (save) sed (said)
sekjnd (second) sel (sell) self (self) send (send) sens (sense)
sent (cent, sent) set (set) seventicn (seventeen) sevjn (seven)
sevjnti (seventy) shaedoc (shadow) shael (shall) shain (shine)
sharp (sharp) sheck (shake) shecm (shame) shecv (shave) shel (shell)
shic (she) shicp (sheep) shicr (shear) shict (sheet) ship (ship)
shjrt (shirt) shjt (shut) shoc (show) short (short) shuc (shoe)
shucr (sure) shuct (shoot) shud (should) shugjr (sugar) sic (sea, see)

sicd (seed) sicm (seem) sicn (scene, seen) sict (seat) sik (sick) siks (six)
 siksti (sixty) silksticn (sixteen) sili (silly) silvjr (silver) singk (sink)
 sistjr (sister) sit (sit) siti (city) sizjr (scissors) sjdn (sudden)
 sjfjr (suffer) sjk (suck) sjm (some) (sjmjr (summer)
 sjmthng (something) sjn (sun, son) sjrv (serve) sjtsh (such)
 skai (sky) skecl (scale) skin (skin) skjrt (skirt) skocld (scold)
 skraetsh (scratch) skruc (screw) skucl (school) skwaer (square)
 skwicz (squeeze) slaotjr (slaughter) slicp (sleep) slicpi (sleepy)
 sling (sling) slip (slip) sloc (slow) small (smile) smaol (small)
 smart (smart) smel (smell) smock (smoke) smucdh (smooth)
 sneck (snake) snicz (sneeze) snoc (snow) snocr (snore) soc (so)
 socldzhjr (soldier) socp (soap) soft (soft) soc (sew, sow, so)
 socl (soul) sok (sock) solti (salty) solt (salt) song (song)
 sort (sort) spend (spend) spick (speak) spictsh (speech) spil (spill)
 spin (spin) spit (spit) split (split) spoil (spoil) spraut (sprout)
 spring (spring) staemp (stamp) staend (stand) staerz (stairs) star (star)
 start (start) stec (stay) steck (stake, steak) step (step)
 sticl (steal, steel) sticm (steam) stif (stiff) stik (stick) stiki (sticky)
 stil (still) stingk (stink) stitsh (stitch) stjdi (study) stocn (stone)
 stocr (store) stöcri (story) stocv (stove) stop (stop) storm (storm)
 straik (strike) straipd (striped) strecn (strain) strecndzh (strange)
 strect (straight, strait) stretsh (stretch) strict (street) string (string)
 strip (strip) strong (strong) stucpid (stupid) supc (soup) sun (soon)
 swel (swell) swet (sweat) swicp (sweep) swict (sweet) swim (swim)
 swoloc (swallow) swop (swap) syuct (suit)

t

taeks (tax) taer (tear) taim (time) taird (tired) tait (tight)
 taok (talk) taol (tall) taot (taught) taun (town) tecbjl (table)
 teck (take) teckjn (taken) tecl (tall, tale) tecm (tame)
 tecst (taste) tel (tell) ten (ten) thaot (thought)
 thauzjnd (thousand) thief (thief) thik (thick) thin (thin)
 thing (thing) thingk (think) thjm (thumb) thjndjr (thunder)
 thred (thread) throc (throw) thric (three) thjrst (thirst)
 thjrsti (thirsty) thjrtri (thirty) thjrtricn (thirteen) thorn (thorn)
 throc (throw) throct (throat) thruc (through) tic (tea) tictsh (teach)
 til (till) tin (tin) tip (tip) tjb (tub) tjdec (today) tjgedhjr (together)
 tjmoroc (tomorrow) tjng (tongue) tjrn (turn) tjtsh (touch) toc (toe)

toold (told) top (top) torn (torn) towjrdz (towards) trai (try)
trip (trip) `truc (true) tshaens (chance) tshaer (chair)
tshaild (child) tshecs (chase) tsheindzh (change) tshick (cheek)
tshicf (chief) tshicp (cheap) tshimni (chimney) tshin (chin)
tshicz (cheese) tshecn (chain) tshock (choke) tshuc (chew)
tshucz (choose) tuc (to, two) tucth (tooth) tuk (took) twelv (twelve)
twenti (twenty) twenti-faiv (twenty-five) twenti-wjn (twenty-one)
twist (twist)

V

vain (vine) veri (very) vesjl (vessel)

W

waid (wide) waif (wife) waild (wild) wain (wine) waind (wind)
waiz (wise) waok (walk) waol (wall) waotjr (water)
wec (way, weigh) wecst (waist) wecdzhez (wages)
weck (wake) wect (wait, weight) wecv (wave) wedhjr (weather)
wel (well) went (went) west (west) wet (wet) wic (we)
wick (weak) wicp (weep) widhin (within) widh (with)
widhaut (without) wil (will) windoc (window) wind (wind)
wing (wing) wintjr (winter) wish (wish) wjn (one) wjns (once)
wjr (were) wjrd (word) wjrk (work) wjrld (world)
wjrs (worse) wjrst (worst) wjrm (worm) wont (want) wor (war)
worm (warm) wosh (wash) watsh (watch) woz (was)
wud (would, wood) wudz (woods) wul (wool) wumen (women)
wumjn (woman)

Y

yaon (yawn) yel (yell) yeloc (yellow) yes (yes)
yestjrdec (yesterday) yet (yet) yicr (year) yjng (young)
yocr (your) yuc (you) yucs (use) yucz (use)

UNITS OF LINEAR MEASUREMENT

ENGLISH SYSTEM

$\overline{\langle \cdots \cdots \cdots 1 \text{ INCH} \cdots \cdots \rangle}$

12 inches = 1 foot

3 feet = 1 yard

5,280 feet = 1 mile

1 inch = 2.54 centimeters

METRIC SYSTEM

$\overline{\langle \cdots \cdots \cdots \rangle}$
1 CENTIMETER

1 centimeter = 10 millimeters

100 centimeters = 1 meter

1000 meters = 1 kilometer

1 centimeter = .3937 inch

1 meter is equal to 1,553,164.13 wave
lengths of red cadmium light

SEEKING METALLIC SUBSTANCES BENEATH THE GROUND

SHERWIN KELLY

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THOUGH in all probability methods more sensitive than any we have today will be employed in the future to seek for metallic bodies beneath the earth, it is possible, too, that this will become a lost art. It is therefore suggested that the Time Capsule may be discovered by detecting the secondary electromagnetic field induced in it by a strong primary electrical field created at the surface of the ground.

Construct a loop some ten feet in diameter, composed of several turns of well-insulated wire, fashioned in such a manner that it can be moved systematically over the area within which the Capsule is believed to lie. While the loop stands vertically, pass through it an alternating current of 1,000 to 5,000 cycles, using a power source of 200 watts. The primary electromagnetic field thus set up around the loop will intersect any metallic material in the vicinity, such as the Capsule, and will induce in it a secondary current. This current will produce a secondary electromagnetic field such as will distort the primary field of the "energizing" loop. This distortion, properly interpreted, will indicate the location of the Capsule.

To investigate this phenomenon, construct a second, smaller coil, approximately a foot in diameter, made up of a large number of turns of insulated wire. To the coil

should be connected an amplifier which in turn is connected to some type of current indicator, such as a galvanometer or telephone receiver. Some means should be provided for accurately measuring the strike or direction of the coil in the horizontal plane, as well as its dip or deviation from the vertical position. On level ground, where there is nothing to distort the primary field, the current generated in the small, or pickup coil will be at a minimum [that is, produce the least deflection of the galvanometer needle or the least sound in the telephone receiver] when its plane is perpendicular to that of the large coil. Conversely, the maximum current will be observed when the two coils are in the same plane. It is well to take both observations as a checkup before beginning the search for the Capsule. If the instrument is working properly, the positions of minimum and maximum current in the pickup coil should be at right angles to each other.

In exploring for the Capsule, observations may be made with the pickup coil in two ways.

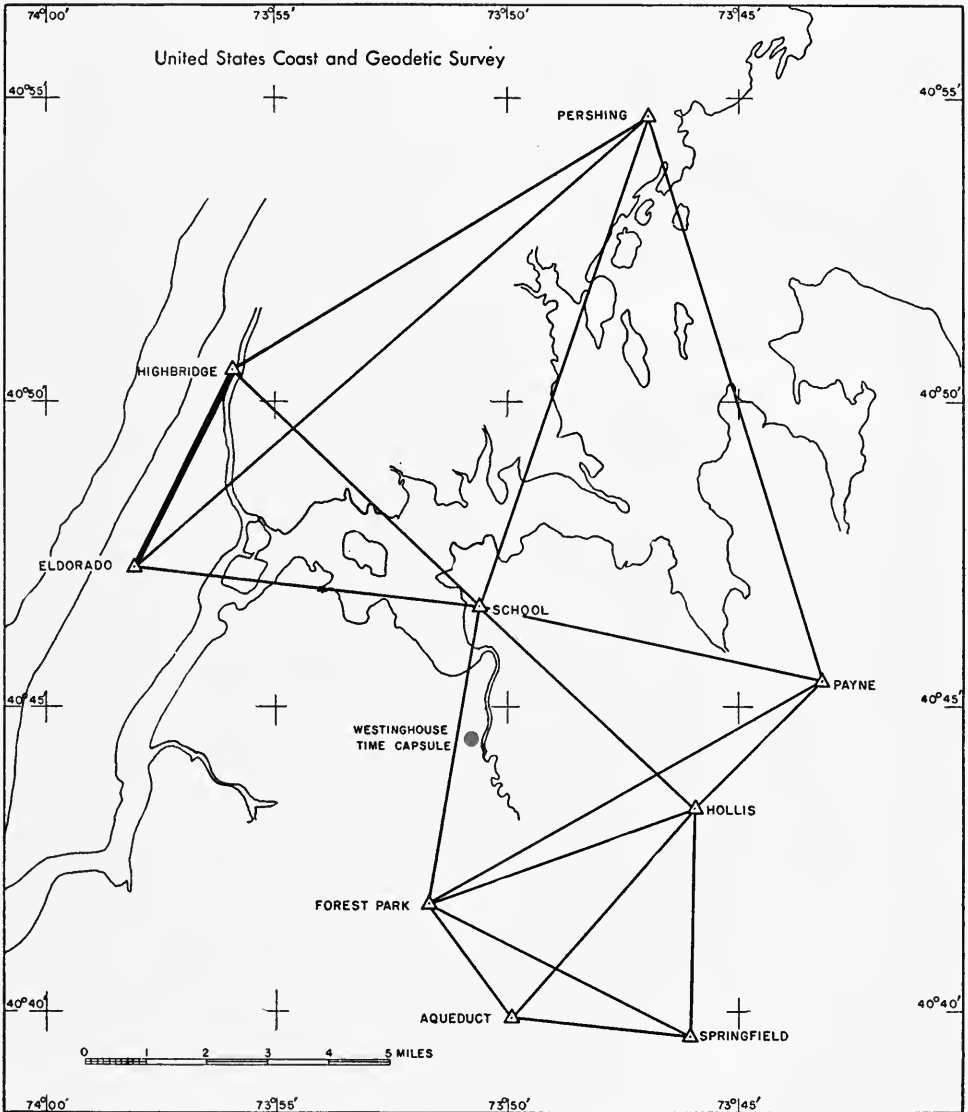
First: Take measurements in the plane of the energizing loop, moving farther and farther away from it in short stages of five or ten feet. Do not work too close to the energizing loop. If during this survey the pickup coil passes over buried metallic material it will be noted that the positions of the coil do not correspond to those described for an undistorted field. The divergence from the normal dip will be at a maximum over the hidden body, whereas the deviation from the normal strike will increase as the metallic substance is approached, reverse to a maximum in the opposite direction as the spot is passed

over, and then decrease as the coil moves farther away.

Second: Take readings along lines at right angles to the measurements suggested in the first method above. These readings should be taken approximately five to ten feet apart, extending fifty to one hundred feet each side of the plane of the energizing coil. The lines of observation should cross the first line every five feet. Observe the position of maximum current in the pickup coil. In an undisturbed field the coil should stand vertically. As the metallic body is approached the position of maximum current in the pickup will stand at an angle from the vertical, and its plane will point roughly to the buried metallic mass. When it passes over the Capsule, the plane of maximum current of the pickup coil will again become vertical. As the coil passes beyond, it will reverse & point in the opposite direction. The strike will undergo a maximum deviation from its normal position as the Capsule is passed.

By a combination of these two methods it should be possible to locate the position of the Time Capsule within a few feet. However, if any other metallic objects lie within the area, they may also give indications. In our day we know of no way to distinguish by geophysical prospecting between different types of metallic substances when they are concealed beneath the ground.

United States Coast and Geodetic Survey



DETERMINATION OF LATITUDE AND LONGITUDE

COMMANDER C. L. GARNER

CHIEF, DIVISION OF GEODESY

UNITED STATES COAST AND GEODETIC SURVEY

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THE geodetic latitude and longitude of the Time Capsule has been determined by the United States Coast and Geodetic Survey by means of precise triangulation measurements from nearby stations of an extensive rigid Federal net comprising more than fifty thousand stations distributed over the United States. The net extends from the Atlantic to the Pacific Ocean, across the entire North American continent, and is included between latitudes 25° and 49° north of the Equator, and longitudes 68° and 125° west from Greenwich, England. The net has been extended into Canada and Mexico by the two countries involved & the datum on which it is based is called the North American Datum of 1927.

The accompanying sketch shows the first-order stations of the national net in the general vicinity of the Time Capsule. It should be noted that the latitude and longitude furnished for the Capsule are geodetic & may differ by as much as five seconds or more from the latitude and longitude determined by astronomical observations alone. This is due to deflections of the plumb line from the vertical, which are caused by the attraction of mountain masses or other topographic features & by the

unequal distribution of mass in the crust of the earth. These deflections can be determined only by comparison of geodetic and astronomic latitudes and longitudes at identical or nearly identical stations. No astronomic observations have been made at the point above the Capsule. However, at station Forest Park, shown on the sketch, observations for astronomical longitude, latitude, and azimuth have been made and furnish the following comparison :

Geodetic latitude	$40^{\circ} 41' 49'' .518$
Astronomic latitude	$40^{\circ} 41' 42'' .38$
Geodetic longitude	$73^{\circ} 51' 43'' .966$
Astronomic longitude	$73^{\circ} 51' 42'' .30$
Geodetic azimuth to station School	$190^{\circ} 07' 54'' .20$
Astronomic azimuth to station School	$190^{\circ} 07' 55'' .28$

Any operations for locating the Capsule by astronomical means should be started as nearly as possible at station Forest Park. After this point has been located the measurement of a base line for the determination of distances and the extension of triangulation to the position of the Time Capsule can be done without difficulty.

A study of conditions in and around New York City would indicate that there will be no chance five thousand years from now of recovering any of the triangulation stations shown on the sketch except possibly Forest Park. This station is located in Forest Park, Borough of Queens, New York City, six meters north of Park Lane and 70 meters east of the easterly line of Forest Parkway [extended]. It is marked by a cross in a granite post 0.15 meter square and 0.6 meter long embedded in a mass of concrete 0.9 meter square and 1.2 meters deep.

It should be noted that according to the present system in use in this country, the distance from the Equator to either pole is divided into 90 degrees [°] and each degree is equal to 60 minutes ['] or 3600 seconds ["]. The unit of length is the meter [3.28083 feet]. At station Forest Park one second of latitude equals 30.846 meters, and one minute equals 1850.77 meters.

A more detailed description of the triangulation net of the United States and of the North American Datum of 1927 will be found in the Capsule.



MESSAGES FOR THE FUTURE FROM NOTED MEN OF OUR TIME

IN ORDER that peoples who live long after us may see our world somewhat as we see it, and understand at least some of the viewpoints of our contemporary world, three men, chosen for their high reputation among us, have summed up in their own words the strengths and weaknesses of our age, pointed out the discernible trends of human history, & envisioned something of the future. The messages follow.

THE MESSAGE OF DR. ROBERT A. MILLIKAN

AT this moment, August 22, 1938, the principles of representative ballot government, such as are represented by the governments of the Anglo-Saxon, French, and Scandinavian countries, are in deadly conflict with the principles of despotism, which up to two centuries ago had controlled the destiny of man throughout practically the whole of recorded history. If the rational, scientific, progressive principles win out in this struggle there is a possibility of a warless, golden age ahead for mankind. If the reactionary principles of despotism triumph now and in the future, the future history of mankind will repeat the sad story of war and oppression as in the past.

Robert A. Millikan.

ROBERT A. MILLIKAN [1868-], physicist, isolated and measured the ultimate electric unit, the electron; contributed greatly to other fields of research, especially photoelectric phenomena and cosmic rays; awarded Nobel Prize in physics, 1923; chairman, Executive Council, California Institute of Technology, Pasadena, California.

THE MESSAGE OF DR. THOMAS MANN

WE know now that the idea of the future as a "better world" was a fallacy of the doctrine of progress. The hopes we center on you, citizens of the future, are in no way exaggerated. In broad outline, you will actually resemble us very much as we resemble those who lived a thousand, or five thousand, years ago. Among you too the spirit will fare badly—it should never fare too well on this earth, otherwise men would need it no longer. That optimistic conception of the future is a projection into time of an endeavor which does not belong to the temporal world, the endeavor on the part of man to approximate to his idea of himself, the humanization of man. What we, in this year of Our Lord 1938, understand by the term "culture"—a notion held in small esteem today by certain nations of the western world—is simply this endeavor. What we call the spirit is identical with it, too. Brothers of the future, united with us in the spirit and in this endeavor, we send our greetings.

A handwritten signature in cursive script, reading "Thomas Mann". The signature is written in dark ink and is positioned above a long, thin horizontal line that spans most of the width of the page.

THOMAS MANN [1875-], German novelist & essayist; awarded Nobel Prize in literature, 1929. Now living in the United States.

THE MESSAGE OF DR. ALBERT EINSTEIN

In unserer Zeit gibt es viele erfindungsreiche Köpfe, deren Erfindungen unser Leben in hohem Maße erleichtern könnten. Wir durchqueren die Meere mit Maschinenkraft und benutzen die letztere auch, um die Menschen von aller anstrengenden Muskelarbeit zu befreien. Wir haben fliegen gelernt und senden uns bequem alle Nachrichten über die ganze Erde durch elektrische Wellen.

Aber die Produktion und Verteilung der Güter ist völlig unorganisiert, so daß jeder in der Angst leben muß, aus dem Kreislauf der Wirtschaft ausgeschaltet zu werden und an allem Mangel zu leiden. Außerdem töten einander die Menschen, die in verschiedenen Ländern wohnen, in unregelmäßigen Zeitabschnitten, so daß auch aus diesem Grunde alle in Furcht und Schrecken leben, welche sich irgendwie über die Zukunft Gedanken machen. Alles hängt damit zusammen, daß die Intelligenz und Charakter-Bildung der Massen unvergleichlich tiefer steht als die entsprechenden Eigenschaften der wenigen, die für die Gesamtheit Wertvolles hervorbringen.

Hoffentlich liest das spätere Geschlecht diese Konstatierungen mit dem Gefühl stolzer und berechtigter Überlegenheit.

A. Einstein.

ALBERT EINSTEIN [1879-], theoretical physicist; discoverer and exponent of the theory of relativity; life member of the Institute for Advanced Study, Princeton, New Jersey.

AUTHORIZED ENGLISH TRANSLATION

Herewith follows Dr. Einstein's message in authorized English translation :

OUR time is rich in inventive minds, the inventions of which could facilitate our lives considerably. We are crossing the seas by power and utilize power also in order to relieve humanity from all tiring muscular work. We have learned to fly and we are able to send messages and news without any difficulty over the entire world through electric waves.

However, the production and distribution of commodities is entirely unorganized so that everybody must live in fear of being eliminated from the economic cycle, in this way suffering for the want of everything. Furthermore, people living in different countries kill each other at irregular time intervals, so that also for this reason any one who thinks about the future must live in fear and terror. This is due to the fact that the intelligence & character of the masses are incomparably lower than the intelligence and character of the few who produce something valuable for the community.

I trust that posterity will read these statements with a feeling of proud and justified superiority.

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*The Vocabulary of High-frequency English, Monotype set, is in Gill sans-serif.

RAC

