

MEASURING OUR GLOBE

United States Geodetic Surveying Corps Finishes Its Work.

The civil engineers employed by the United States government have just completed the measurement of this globe of ours. The task has been a hard one. For over thirty years it has been in progress and it has cost the taxpayers the neat little sum of \$500,000, more or less. The coast and geodetic survey corps have had the matter in charge and they have arrived at absolute accuracy.

One result attained has been the determination of the fact that this earth is not as great a ball as has been commonly supposed. Our old mother's diameter through her great waistband, or equator, is discovered to be 7,926 miles; her height, from pole to pole, 7,899 miles. In other words, she is broader than she is tall.

Laymen will wonder how Uncle Sam's engineers could have accomplished such a seemingly impossible task as the actual measurement of the earth's dimensions. In order to determine the great sphere's girth or circumference, for instance, it would at first blush appear necessary to circumnavigate it over the equator and across the poles, making careful measurements step by step. The equator was not touched, however, during the measurements, and needless to say it is stated that the poles were not crossed. The measurement of a mountain's height does not require that its summit be climbed. If so we would as yet be in ignorance of the insurmountable altitudes of our loftiest peaks. Trigonometry, employed in mountain measurements, was utilized also in this difficult computation of the earth's dimensions.

The greatest task of the coast and geodetic survey, beside which all others paled into insignificance, was the measurement of the great arc's precise length in miles from ocean to ocean. Not until after twenty-seven years of constant field work it proved that a chalk line stretched from Cape May to Point Arena and snapped against old earth's crust would leave a white mark 2,625.6 miles long. And, by the way, it is along this very line that our center of population seems to have wended its course westward. The distance was measured, not along a straight tape, but along a narrow network of triangles, such as the surveyor traces in his measurements of great distances. It may be difficult of belief that the number of localities whose latitudes and longitudes were precisely established within this network exceeded the number of stars visible to the naked eye in the heavens above. Were all of the lines forming these triangles placed end to end they would extend 10,000 miles or more. The triangulating work was begun at the two ends and near the center of the great arc, the surveyors gradually moving toward each other. Infants in swaddling clothes had become parents and youths had grown to be gray-haired men before two parties met, some two years ago, to close the last gap of the survey which remained in Colorado.

High above the clouds were some of these important measurements made. Four stations containing the surveyors' instruments were 14,000 and twenty were 10,000 feet above the sea level. Here the expert measurers worked amid perpetual ice and snow, breathing only half the usual supply of air meted out to human beings. The water in their camp kettles boiled at 189 degrees. Yet they performed the feat of measuring over single spans with instruments from 100 to 180 miles apart. This high mountain work was done in Colorado and thence westward across the Rockies and Sierras to California.

Giant signal towers elevated the surveyors' instruments above the flat eastern country where nature had not supplied mountain peaks for aid in such feats of measurement as just described.

The highest combination of towers was erected across Ohio, Indiana and Illinois. Many of these structures were more than 100 feet in height. One at Green, Ind., held an instrument 152 feet above the earth's surface. Each of these lofty edifices appeared to be one huge windmill tower erected within another. Movements of the signaler or observer, standing upon the top of the outer structure, did

not disturb the target or telescope mounted upon the platform of the inner. In windy weather canvas screens covered the windward sides of the outer towers, and thus prevented the vibration of the instruments' supports. As further protection against exceptionally high winds, the towers were guyed on all sides with wire cables. In the Kansas cyclone belt screens of thin drilling, such as would tear in the face of a fierce wind, were substituted for those of canvas, which latter were liable to carry the entire skeleton structure of a becyoned tower to the ground before giving away. At Still Pond, Md., was erected a curious tower 120 feet tall, which supported a target to the height of 275 feet. This target was the highest above ground of all these employed. Between such towers the surveyors signaled over distances varying between ten and forty miles.

We seldom hear of an American mirage. Yet during this signaling it often occurred that one tower, absolutely invisible from another throughout the entire course of the day, would suddenly and most weirdly rise above the distant horizon just at sunset, thus effecting a much longer line of vision than could ordinarily be utilized. By actually laying bars of metal end to end the surveyors in the course of this stupendous measurement marked off the base lines essential to their triangulation work. Thus carefully measuring these base lines and later measuring the angles from either end to a common point, they, by applying a simple formula, could estimate how far away that point might be. The temperature of each bar was carefully measured by thermometers inside and its effect upon the length of the bar was taken into strict account. A single pair of these complicated bars cost Uncle Sam \$1,500. Stretched across the country they were not rested upon the ground, but upon tripods carefully leveled. One style of measuring bar utilized in this delicate work was truly a wonder. It was carried in a trough filled with melting ice and was thus kept at the zero point. Being always at the same temperature its length never varied. Can the imagination be strained to picture a degree of hair-splitting care exceeding this?

Arbitration Must Be Compelled

The Illinois state board of arbitra-

tion reports that arbitration as a mode of settling disputes between labor and capital is gaining in favor; that the Illinois law is better than that of any other state and that it is susceptible of improvement. The reader of the report will find that in the opinion of the board the law is effective and superior to that of other states just in proportion as it is compulsory in character, and that the proposed methods of making it more effective are methods of making it more compulsory. To speak more correctly, the law is effective in proportion as it ceases to provide for voluntary arbitration and provides for compulsory adjudication. The truth is that voluntary arbitration is a failure. It has proved a failure everywhere and

always as a mode of settling disputes of this character. The attempt to make the voluntary mode work ought to have been abandoned long ago. Failure to recognize this fact and to provide for stopping the wars and insurrections against the laws of the land which are continually occurring under the name of labor disputes and strikes is not creditable to any country whose people call themselves civilized.



JOHN M. HUBBARD.

by no means a crank. Summer visitors to that section set him down as an eccentric of the extreme kind, but this idea was soon disposed of when Mr. Hubbard's fellow citizens were consulted. As a matter of fact, they had always been rather proud of him—college-bred man, poet, philosopher and war veteran as he is.

The inventor of this new sartorial cult bases his crusade on his alleged discovery that modern ideas of male attire are entirely opposed to the consistency and teaching of the scriptures.

THE TICKETS IN NEBRASKA.

The Names of Those Who Will Appear on the Ballots.

LINCOLN, Neb., Oct. 15.—Since the state conventions were held there have been quite a number of changes in the various tickets and now the following is a corrected list of the candidates:

For presidential electors: John F. Nesbit, Tekamah; Robert B. Wyndham, Plattsmouth; Edward Royse, Broken Bow; John L. Jacobsen, Omaha; John L. Kennedy, Omaha; Joseph Kanter, Wilber; Andrew C. Christensen, Minden, and Wallace R. Barton, Tecumseh, republicans; C. O. Lobeck, Omaha, John H. Felber, Hartington; William A. Garrett, Holdrege; W. C. Swan, Tecumseh; Peter Ebbeson, St. Paul; Robert Oberfelder, Sidney; L. N. Wente, Lincoln, and James Higgs, Schuyler, fusionists; Charles E. Smith, Falls City; John Hale, Omaha; Charles L. Carpenter, Creighton; Frank A. Burt, Aurora; William Timmons, Orleans; George Hornby, Valentine; Joel Warner, Creston, and D. A. Shaffer, St. Edwards, prohibition; Jerome Shamp, Lincoln; A. A. Perry, Omaha; D. W. Pierson, Auburn; G. W. Raworths, South Omaha; Dewitt Eager, Beaver Crossing; W. O. Woolman, Fairfield; James Stockham, Broken Bow, and James Brooks, Stanton, populists; Henry Huckins, Lincoln; F. H. Alexander, Omaha; C. Fredericks, Ponca; L. W. Sharp, Giltner; John Tollett, Wilcox; J. Chism, Kearney; J. Jacobsen, Plattsmouth, and T. A. Edwards, Omaha, socialists.

For governor: Charles H. Dietrich, Hastings, republican; William A. Poynter, Albion, fusion; Lucius Jones, Lincoln, prohibition; Taylor Flick, Broken Bow, populist; Theodore Kharas, Omaha, socialist.

For lieutenant governor: E. P. Savage, Sargent, republican; Edward A. Gilbert, York, fusionist; Charles R. Lawson, Santee agency, prohibition; H. G. Relfer, Prairie Center, populist; David McKibben, Giltner, socialist.

For secretary of state: George W. Marsh, St. Paul, republican; C. V. Srobonia, St. Paul, fusionist; Dewey L. Whitney, Beatrice, prohibition; W. C. Starkey, Violet, populist; Frank Neuman, Plattsmouth, socialist.

For auditor of public accounts: Charles Weston, Hay Springs; republican; Theodore Griess, Clay Center, fusion; Wilson Brodie, Brodie, prohibition; C. V. Ault, Indianola, socialist.

For treasurer: William Steuffer, West Point, republican; Samuel B. Howard, O'Neill, fusion; C. C. Crowell, Blair, prohibition; Absolom Tipton, Nebraska City, populist; F. S. Johns, Nebraska City, socialist.

For attorney general: Frank N. Prout, Beatrice, republican; Willis D. Oldham, Kearney, fusion; Dunham M. Strong, North Bend, prohibition; John Stevens, Arapahoe, populist; Michael Presler, Trumbull, socialist.

For commissioner of public lands and buildings: George D. Follmer, Oak, republican; P. J. Carey, Wahoo, fusion; Erastus Hickman, Seward, prohibition; James Salmon, South Omaha, populist; W. H. Nye, Pender, socialist.

Proceedings to Be Commenced.
LINCOLN, Neb., Oct. 15.—As a result of a conference between Auditor Cornell and Deputy Attorney General Oldham, legal proceedings will be commenced in the name of the state against the officers of the Grain Growers' Mutual Hail Insurance company of Omaha, the object being to collect penalties for transacting insurance business without a license.

Found Guilty of Bigamy.
BLAIR, Neb., Oct. 15.—The jury in the case against Rev. J. Rowland Hills, charged with bigamy, after being out twenty-four hours returned a verdict of guilty. Mr. Hills, when he heard the verdict announced, did not manifest the least apparent concern. He stared into space with an indifferent expression the same as he had throughout the trial. Judge Baxter will pass sentence in a day or two, which may be from one to seven years' imprisonment.

Death Resulted.
RANDOLPH, Neb., Oct. 15.—Dr. Charles C. Crawl of this city, who was injured in a runaway accident September 25, died from the effects of injuries received. Doctor Allison of Omaha and his family physician did all they could for the sufferer, but at no time since the injury did he regain entire consciousness. He sustained a contusion of the brain.

Workman Drowns in River.
NEBRASKA CITY, Neb., Oct. 15.—Marshall C. Little, a young man of 24 years, was drowned in the river here. He was employed by the government upon the river work and in some way fell from the flatboat upon which he was working. The body was not recovered. The young man's parents reside in Hamburg, Ia.

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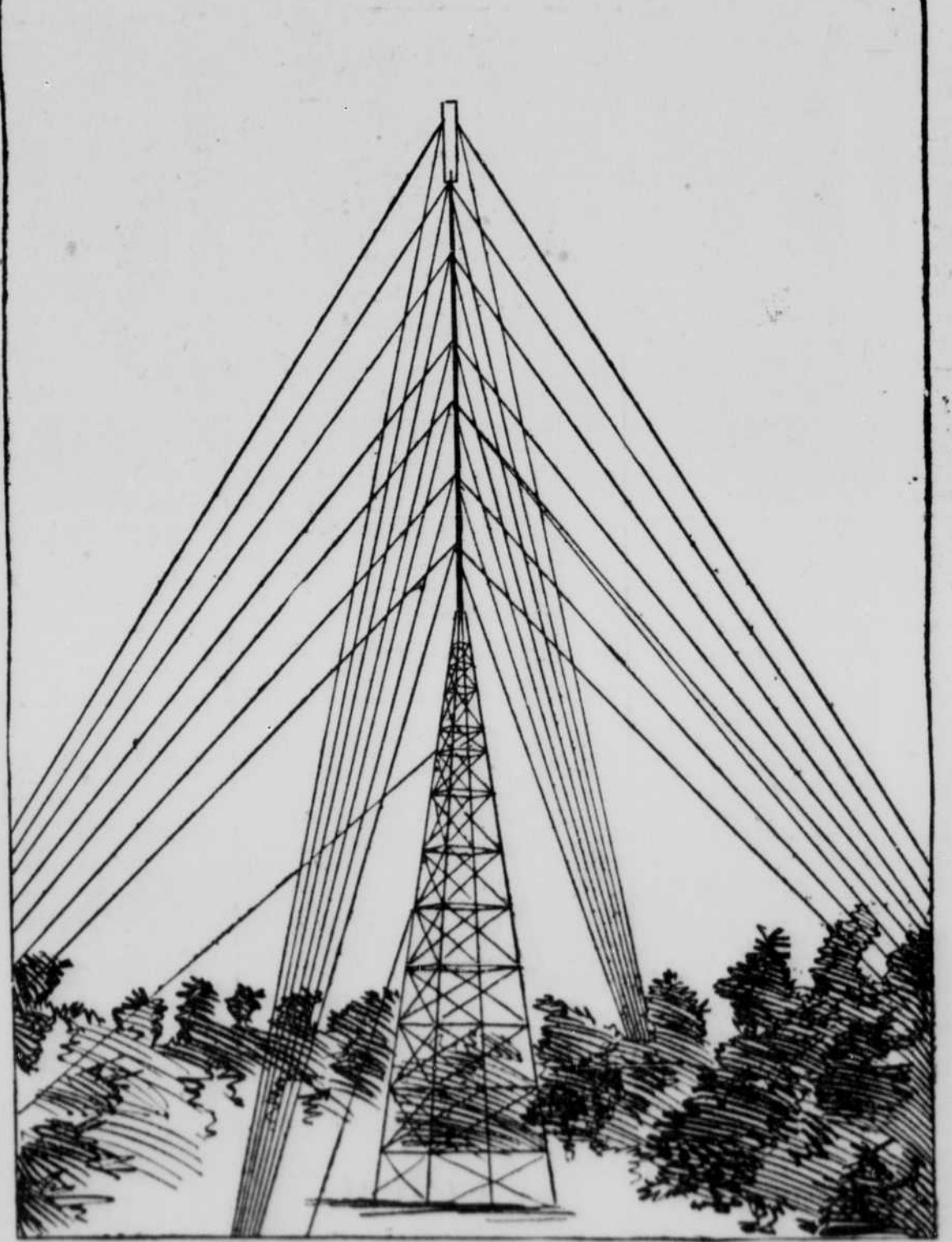
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