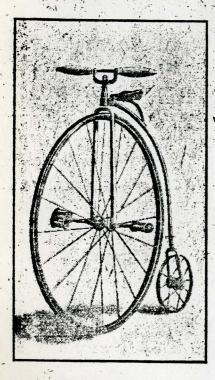
BY A. FREDERICK COLLINS.

WHO HAS WON WORLD WIDE FAME IN THE APPLICATION OF ELECTRIC POWER.

~ A NEBRASKA BOY

The man left the hour in Chicago is tering at De Soto, near what is now not a politician but an engineer! He the town of Blair, the family finally lonot a politician but an engineer! is Bion J. Arnold, the man upon whom, by the votes of the citizens of Chicago, has recently been placed the great re-sponsibility of putting into effect the raction ideas which he has for five years advocated as a solution for the problem of that city, and which not only involves the expenditure of over \$40,000,000 in the complete construction. under his direction of its transportation systems, but also the future of these properties which are valued at over \$100,000,000. It will be readily understood that this requires engineering and executive genius of the highest or-

The life of a genius is always interesting, doubly so if he is still living



## FIRST BICYCLE EVER BUILT IN NEBRASKA.

This machine created a sensation around Lincoln nearly 30 years ago Mr. Arnold occasionally rode it to his home in Ashland.

and trebly so if he is a young man. Bion Arnold conforms to the spirit of these requirements and thus stands to-day shoulder to shoulder with James watt, George Stephenson, Robert Ful-ton and other energetic, persevering and skilful men who have formed the advance guard of the world's motive power and transportation facilities. Now some men are born with exalted intellectual powers and others achieve

these qualifications, but, unlike great-ness, none can have the constructive on the Nebraska prairie, even as does faculties of invention, production and system thrust upon them, hence for our own good and the good we may As an illustration of his precoclous do by assisting our sons and the sons ness, his mother told the writer that of other men to win out, let us ascer he early developed a remarkable apti-

father of Bion Joseph Arnold, the father of Bion Joseph, the subject of this sketch. The latter's paternal grandfather, Joseph Rounds, was a soldier in the revolution, while his maternal love of mechanism when the Burling-

a continual state of suspense in antici-pation of possible attack, just as did the pilgrims who made history in the early colonial days.

In these strenuous times Mr. Arnold supplemented his meager income from the farm by teaching school, acting as a justice of the peace and serving as a member of the territorial legislature in which he sat as a minber from the Ashland district in 1860 and 1866, while the mother, a former school teacher, added to her duties as the wife of a pioneer, by thoroughly instructing her children in not only the elements of education in which she was so well grounded, but in fortitude, self-reliance and those other cardinal princi-ples which inspire ambition in the child and establish stability of character in the man.

It has been pointed out that however wonderful is the force of heredity, every child differs in some respect from its parents, but it does not require any special knowledge of these psychologi cal laws to deduce the distinguishing characteristics and traits that were inherited by Bion as his birthright, yet he possessed a mental attribute that he may or may not have inherited from them, to-wit: an abnormal love for mechanism. It is true that his father as a pioneer made and repaired many of his farming implements and many of his farming implements and that his mother possessed a marvelous-ly accurate eye for minute measure-ments, but while these accomplish-ments were undoubtedly factors in the boy's makeup, it is also well known that his father had a strong liking for jurisprudence, never having had a case reversed in a higher court, and intended his son to become a lawyer. So that, as we shall see, the wishes of the former were diametrically opposed to the desires of the latter.

## Taste for Mechanics.

Again it seems hardly possible that environment could have exerted any favorable influence in developing his taste for mechanics, but environment, like heredity, is withal a complicated process, and who shall say that it was not without its effect? However that may be, the fact remains that his me-chanical genius and the manual skill which he acquired under the greatest a cactus flourish on the Arizona des-

ness, his mother told the writer that he early developed a remarkable aptiof other men to win out, let us ascertain just how much of Arnold's success is due to heredity, to environment and to his own efforts.

The Arnold family was settled in the colony of Rhode Island before the beginning of the eighteenth century, where many of its members attained distinction. The earliest recorded ancestor of Bion Arnold was Jeremiah Arnold, who was born at Smithfield. R. I., in the year 1709, and from him the line of descent runs through Jeremiah Arnold, second, and his wife, Elizabeth Knight; their son was Ichabod Arnold, and his son Jeremiah, the parents of Joseph Arnold, the father of Bion Joseph Arnold, the father of Bion Joseph Arnold, the father, Joseph Rounds, was a soldier.

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practice of law and incidentally into

tering, at De Soto, near what is now the town of Blair, the family finally located in the spring of 1865, four miles south of an Indian trading post, then called Salt creek ford, but which is now known as Ashland, a town about midway beteen Omaha and the site upon which Lincoln's built, although the capital city of Nebraska had not been located or even thought of.

With the exception of about two years spent in Ashland, the succeeding the spent upon their prairie farm and during this trying period all the trials and vicissitudes of the ploneer settler in a new sind wild country were experienced by the entire family. The Indians far outnumbered the whites and, although considered friendly and actually proved so, in virtue of their intermittent warfare with the hosfile Sloux to the northward, the settlers lived in a continual state of suspense in antici-

things.
Probably the most difficult problem Probably the most difficult problem his father ever had to solve was what to do with the boy, who, when put id work on Saturday mornings at the wood pile, charged with the responsibility of cutting enough wood to run the kitchen stove the following week,

utilize for ath years. His amhis mother's re ine to be placed ould get into

and for some Instruction a horse pow when comwood saw supplying , but with s never coms. Relics of however, can be found in Ash.

'At about this Assiduous attention to his n mechanical deattention from his school work, at his parents had thus far succeed that he became in holding him, riously entangled

late Sam D. Cox, then local editor of the Hesperian Student, the college paper, and later the editor of the Lincoln Evening Call, wrote of the ma-chine, now partially preserved, as fol-

#### First Bicycle in Lincoln.

"The man with the bicycle is Bion J. Arnold of Ashland. The bicycle is entirely of his own construction, made from a shapeless mass of iron and a little wood for the rront wheel. Mr. Arnold is a natural born machinist and can't help it any more than a boarding house can help making hash. The bicycle is an innocent looking creature as it leans quietly against the fence, and is very obedient when under its owner, but when Ye Local, in response to an invitation from its accommodating owner, cautiously approached and endeavored to mount it, it showed signs of restlessness. However, by having Mr. Arnold hold it by the bits, we succeeded in mounting the bits, we succeeded in mounting and he turned it loose. It mann't gone more than ten feet when it took a notion to lie down; we expostulated, pulled it around to leeward and stuck

"not to waste money, but not to flight the machine for lack of it."
The result of the boy's labors, continuing over a period or many months, during which time in order to keep up his studies at school he worked from sixteen to eighteen hours per day, was a complete locomotive three feet long and this beautiful and brilliant long and this beautiful and brilliant testimonial of Bion Arnold's perser-vance and skill now stands in a glass case in his offices in Chicago where its bullder plans and executes gigantic traction schemes which net him over \$100,000 per annum, the city of Chicago alone possing him \$20,000 per year. for alone paying him \$30,000 per year for

alone paying nim \$30,000 per year for a portion of his time.
The university of Nebraska, at the time he attended it, had no mechanical or electrical engineering department, and as young Arnold, who had by this time been thoroughly imbued with the idea of acquiring a complete with the idea of acquiring a complete education, had entered this school to prepare for Cornell, but while there cole naval academy at An-cole naval academy at An-column cetton with less expense that at once set to work than the casion with less expense than the casion with less expense that the case to work taying the case of the c naval academy. With this ambition neither of his parents concurred, but the father severtheless assisted him, and on September 6, 1880, the boy left his western home full of that enthusiasm borner an intense desire to do things in his chosen field, but yet withous a triend, relative, or even an acquaintance in that field, or in the country where he went. He was, how-ever, thrilled at the thought of finally being amidst the great engineering work of the country and with the possibility of meeting the men who designed and built such things, thus making possible his realization of a by those who inspired or prompted by an extraordinary ambition have been raised far from the field of greatest interest to them, and who have experienced a similar transfor-

The boy's restlessness of disposition and bias toward his special field was so evident to the officers in the navy that they persuaded him he could, with the same amount of work, do better is less in less than the same are a second to the same are a second to the same are a second to the second to the same are a second to the second to better in less time outside of the navy than in it, and upon this advice, and the advice of other officers who had resigned from the service, he gave up his idea of serving Uncle Sam on the sea and set about procuring the rest of the education he needed without the assistance of the government.

#### Entered Hillsdale College,

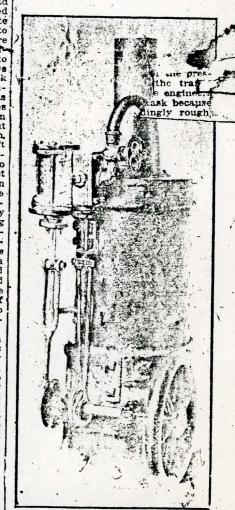
In the fall of 1880 he entered Hillsdale college, an institution especially adapted to students of moderate means, where his parents were educated in their youth, and here he refor four years, spending his summers traveling for manufacturing companies as an engine expert, in surveying work or in teaching school, and by means of which occupations he partially paid his way through college.

He graduated with the degree of

thess methods, he engaged with the Upton Manufacturing company of Port Huron, Michigan, builders of traction engines. In the capacity of general agent for this firm, he traveled throughout the United States, and in this school of experience he secured his first business training.

struction of the locomotive is worth ject at Cornell, thus, after having doing at all it is worth doing well," and graduated from a non-technical instigraduated from a non-technical insti-tution, and been in practice as an engineer for nearly five years, he realized his boyish ambition of attending Cornell, and received the only technical instruction he ever received except by

On leaving Cornell in the spring of 1889 he made application to several of the leading electrical manufacturing companies, but after investigation, he became convinced that the Thomson-Houston company was the one most likely to dominate the electrical railway field. Although offered better positions with two other companies he. in order to get connected with this company, accepted a semi-commercial position and was placed in charge of



UPRIGHT STEAM ENGINE BUILT BY ARNOLD WHEN 14 YEARS OF AGE.

He graduated with the degree of 188 Louis office, and later, in 1889. S. in 1881 and the prize for having 33, he acted as consulting engineer for matics, of any member of his class during the entire four years; M.S. in 1887, and received in 1889, from this manufacturing company in the world. This for engineering work done subsequent to graduation. its St Louis office, and later, in 1890uent to graduation uent to graduation in la Railway company, the builders on graduating from Hillsdale in of the elevated railroad at the Co-1864, being somewhat in debt and de-siring to acquire a knowledge of bus- 1893, this road being the forerunner of the present elevated electric roads.

## Independent Consulting Engineer.

So conspicuously successful was this new third rail electric road that Mr. Arnold, following his pre-conceived ideas of eventually getting on an independent engineering hosts decided to his first business training.

That he might get into a broader field of engineering work, he entered in 1886 the employ of the Edward P. Allis company of Milwaukee, Wisconsin, builders of Corliss engines, as

BION J. ARNOLD, THE ENGINEER

Now some men are born with exalted ntellectual powers and others achieve these qualifications, but, unlike greatness, none can have the constructive faculties of invention, production and system thrust upon them, hence for our own good and the good we may As an illustration of his precoclous

of other men to win out, let us ascer-

Arnold, who was born at Smithfield, R. I., in the year 1700, and from him the line of descent runs through Jerethis sketch. The latter's paternal grand-father, Joseph Rounds, was a soldier in the revolution, while his maternal grandmother, Louisa Hale, was a mem-ber of the Hale family of Massachuber of the Hale family of Massachu-Thus it will be seen that Bion came

of those excellent families who made the strength of the early colonies and which have since become the bone and sinew of our country, and who have supplied the mentality necessary to have and to hold the United States in the family dictionary.

The construction of this road and the construction of th the front rank in the commercial and industrial world.

#### Emigrated to Nebraska.

So much for his ancestral inheritance or normal inheritance. His father, Jo day, emigrated from Michigan to Ne-obviously could not be realized at that brasks in order to take advantage of particular time, but which, neverthepioneers as a "prairie schooner."

chanical genius and the manual skill which he acquired under the greatest difficulties combined with it, thrived on the Nebraska prairie, even as does a cactus fiourish on the Arizona des

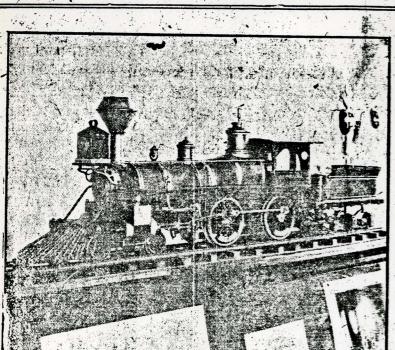
do by assisting our sons and the sons i ness, his mother told the writer that he early developed a remarkable aptitain just how much of Arnold's success tude for mechanics, and during the is due to heredity, to environment and period spent upon the farm, made to his own efforts.

The Arnold family was settled in the trade models of farm imperions, have colony of Rhode Island before the beginning of the eighteenth century, where many of the members attained distinction. The earliest recorded ancestor of Bion Arnold was Jeremiah Arnold, who was born at Smithfield, omaha and Denver before the days of railroads. "In fact," Mrs. arnold says, "he was trequently in truble due to his unconquerable desire to make things, and his too enthushestic use of the visible supply of his father's nails, limited. mish Arnold, second, and his wife, Elizabeth Knight; their son was Ichabod Arnold, and his son Jeremiah, third, and his wife, Percy Rounds, were the parents of Joseph Arnold, the father of Bion Joseph, the subject of this sketch. The latter's paternal grand.

and which entered the state at Platts-mouth in 1870, passed through Ashland and ended at Fort Kearney, 180 miles further west. Up to this time he had never seen a real locomotive, at least

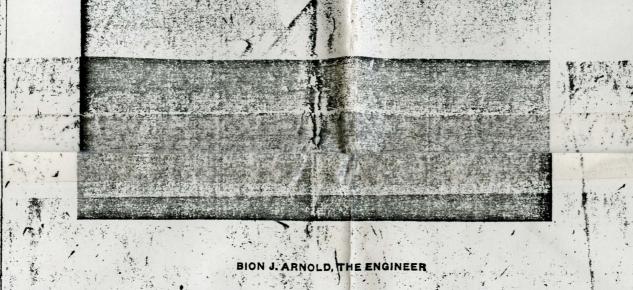
The construction of this road and the passing of its trains gave the youthful mechanician his first opportunity to actually see at close range a real locq-motive. He was fired with enthusiasm at the glorious sight of a self-propelled and now something of his continuous steam engine traveling on wheels over or normal inheritance. His father, Joseph Arnold, following the spirit of the there to build one, an ambition that braska in order to take advantage of the homestead laws and to secure a western ranch. Mrs. Arnold took Bion and his younger brother as far as Chicago by railroad and from this point the family journeyed to the far west, driving the entire distance in a large covered wagon familiarly known to the prioneers as a "prairie schooner." pioneers as a "prairie schooner."

This memorable trip consumed a part venture, the family moved to Ashland, of the summer of 1864, and, after win
where Mr. Arnold, sr., entered into the



### MODEL LOCOMOTIVE BUILT BY ARNOLD WHEN 18 YEARS OF AGE

Described as follows in the Nebraska State Journal in August, 1880: Described as follows in the Nebraska State Journal in August, 1880:
"In the show window of Day's jewelry establishment may be seen a
miniature foc-motive, constructed by Master Bion J. Arnold, of Ashland, a
university student, eighteen years of age, which is attracting general attention.
The young man leaves for Annapolis, Md., where he will undergo an examination for cadet engineer in the U. S. navy, and he takes with him his little locomotive to show those in authority what he is capable of doing in mechanics.
The locomotive is just thirty-six inches in length from the front of the pilot to the locomotive is just thirty-six inches in length from the front of the puet to the back end of the tank. It is built on a scale of three-fourths of an inch to the foot, after dimensions of locomotive No. 31, of the B. & M. Every part and parcel of the locomotive, from the cow-catcher to the tank bumper, is perfect, and not a screw, bolt, or any part of the engine but was made by the year man. Yesterday he got up a few pounds of steam and set his machine in motion, to the great amusement of a number of B. & M. and U. P. engineers. who pronounced it perfect in every respect. Mr. Arnold is possessed of vemarkable genius, and it's a pity to spoil so fine a mechanic to make a ea-faring man."



would usually be found, after an hour or so, in this shop, busy with some lever, wheel or other "blamed thing of no earthly use to anybody," while his brother, Wayland, faithfully sawed the wood or did the chores allotted to Bion. Often, when the supply of wood was short, and the father's patience exhausted, he would come into the shop from his office, nearby, take the boy by the ear or arm, lead him to the door. and tell him to "mosey home and saw word." His father's attitude, however, can be readily understood, when it is remembered that he was ambitious for his son to become a lawyer, and felt and said that the boy's "tinkerings not

At thirteen years of age he had made small horizontal stationary steam engine, about seven inches in length, casting its main parts out of lead and putting them together with such tools as the local gunshop afforded. Of this attempt a friend recently wrote him, after learning of his selection for the Chicago work, "I recall our early experience at trapping muskrats on Salt creek, and when you developed your mechanical ingenuity. I pumped the interfere. bellows on that hot afternon in the old gun shop while you made the castings for your first attempt at a steam engine in minature and how we were both nearly overcome with gas from the forge as we had closed up everything tight for fear someone would see us. All this, and many other things of our experience, comes back vividly to

## His First Steam Engine

At fourteen he constructed a vertical steam engine, about fifteen inches high, now in existence, using for a boiler an old piece of iron pipe which had been thrown away by the railroad company, an old lynch-pin wagon-hub band for a fire-box and an abandoned valve wheel for a fly wheel, while a gas cock, which he had picked up at Lincoln, served for a throttle valve. At fifteen he had sent to a model

naker's supply house in Boston, advertised in the Youth's Companion, for four iron rods, each one foot long and threaded their entire length. With these as uprights, and a supply of nuts threaded to fit and with castings he made out of Babbits' metal, he constructed a vertical steam engine of about one-eight horse power and supplied it with steam from a crudely constructed sheet iron boiler with wooden heads. This boiler he supplied with water from an old kerosene barrel elevated a sufficient distance above the boiler to force the water into it when the steam pressure was low. In the construction of this engine he devised and used the piston valve now in common use on locomotives and other engines, believing himself to be its inventor, only to soon find, after a visit to the railway shops at Plattsmouth, that it had been invented long before was born and was then in use or the steam engine driving the railroad

Two foot-power scroll saws by

subject of no earthly value, and decided, thinking himself old enough to satisfy his ambition, to learn to run an engine, he ran away from home, found the only portable engine he knew of, and probably the only one in the state at that time. Having secured employment, he let his parents know where he was, and started in to learn the art of running an engine which was engaged, according to the season, threshing in the country districts, or in driving a machine for shelling corn stored in cribs in the various towns along the railroad. His duties in this only interfered with his schooling, but would probably result in making a gine from sunrise to sunset, were to. traveling tinker of nim." supply the engine with water, which necessitated his dipping up and pour-ing into a portable wagon tank over one hundred tobacco pail fulls of water twice a day, and hauling it by means of a yoke of oxen to the engine, his pay for his entire services being fifty cents per day and board. The father. thinking probably the work would not injure the boy and that it might be the means of teaching him the necessity of securing an education, did not

## Comes to the University.

In this experience, as in many others before and since, he had to oppose the wishes of his family and act against their judgm nt and in accord ance with his own. He having acquired during the two seasons he was absent, the skill he had sought in the handling of steam, and having met a boy who told him of a school called Cornell university, where they taught mechanical engineering, he resolved to get an education at Cornell if he could, and finally he returned to his father, who, upon being told by the boy that he desired to go to school exclaimed:

"Well, my boy, I am glad you have come to your senses." Bion again entered the school he had left two years before, after more or less difficulty with his teacher on account of his lack of attention to his studies, and from that time on to graduation from college did industrious and eminently satisfactory work.

During these eventful school years Ashland, in addition to acquiring experience in operating an engine, as just described, the boy turned out in rapid succession numerous boats. scroll saws, models of steam engines mentioned above, and, as a climax, built in his seventeenth year, without ever having seen one, the first bicycle made in the state, having as a guide nothing but an advertising cut about coln, who imparted information conthree-fourths of an inch high, which cerning it to the editor of the Linwas being run by the Pope company in the Youths'-Companion. He, howmanufacturers of bicycles, and built moment, to his father when at Platts-his wheels accordingly. Not only did mouth on legal business, entrely he design and build the machine, but changed his attitude towards his son's further, he accomplished what his

with cube root, believing it to be a our feet through the wheel and praided them together, and punched the steering apparatus into our stomach. We had an idea that would hold her up; that's what we did it for, but it was no go, it would lie down, and did; we choose a soft spot where the dust was think because we let it lie down, so we escaped without much injury. When it had gotten rested we took it up to the top of the hill and two men assisted us to get on. It didn't seem to want it lie down again—itwas in playful mood; and this time it ran down hill and over a basket of eggs-with a small boy, then jumped the university fence and ran through the hedge; we expostulated again and stuck our feet through the front wheel, the front wheel stopped, but the rear one got its back up and tried to get upon the seat. The seat isn't very big so we got off and tried to smell some violets—some of those that that will get above the ground next spring but that blamed thing kept following us up and stepping on us until we got to the fence and its owner came and drove it away. As we said before, its owner is an accommodating young man and would not hurt your feelings by refusing to let you ride it if you asked him."

Prior to leaving Ashland Bion had acted as messenger boy at the railroad station where he started to learn telegraphy, but the attraction of the locotives was greater than that of the Morse alphabet, and in consequence he made the acquaintance of many of the trainmen running on the road. He had ridden repeatedly with the en-gineers while the firemen allowed nim to fire and clean the engine and other-wise assist them until he was quite familiar with their construction and operation and he still cherished the desire to build one in order to demon-strate that he had sufficient knowl edge to do so.

## Made a Complete Locomotive.

Feeling that his father's consent could not be secured to so ambitious an undertaking, he remained silent about it while at home, but when well located at Lincoln he made frequent trips to the local round house to secure measursements of locomotives and set secretly at work afternoons making the boiler in the tinshop of a hardware store whose owner was kindly disposed toward him.

Bion, who was then just past seven-teen years of age, soon produced a complete locomotive boiler one-sixteenth full size, and this attracted the attention of a Union Pacific locomo tive engineer then running into Lin coln Globe, and who in turn wrote a glowing account of the young student's ever, originated, in so far as he was ability. This article, and what nad concerned, the suspension type of been said by some railroad men, enwheel now so common in bicycle contirely incidental a few days before struction, and in fact then used by but nevertheless at the psychological but nevertheless at the psychological endeavors, and from that time forward father and friends thought impossible, he did everything possible to assist namely: he learned to ritle. This chef- him in his chosen field. The next Two foot-power scroll saws, by means of which all the walls of his home were filled with brackets, a crude turning lathe and a treadmill for his department in the fall of 1879. The mail brought a letter from the father enclosing a check with a request "not to neglect your studies," and a statement to the effect "that if the con-

facturing companies as an engine expert, in surveying work or in teaching school, and by means of which occupations he partially paid his through oillege

iness methods, he engaged with the Upton Manufacturing company of Port Huron, Michigan, builders traction engines. In the capacity of general agent for this firm, he traveled throughout the United States, and in this school of experience he secured

his first business training.

That he might get into a broader field of engineering work, he entered in 1886 the employ of the Edward P. Allis company of Milwaukee, Wisconsin, builders of Corliss engines, as draftsman, and continued with them for some months, when he was offered, unsolicited and unexpectedly, a position as chief designing engineer of the Iowa Iron Works at Dubuque. At the latter place he remained a little over a year, and while there he designed and built numerous steam engines, not miniature models, but large units, some developing as high as 1,500 horse power, and all of which are still

in operation.
In order to get experience in a different line and furthermore to into outside engineering work which, account of his close confinement to needed, he resigned in the fall of 1887 and engaged with the Chicago & Great Western rallway in the civil en-gmeering department and afterwards when the road was turned over to the operating department, acted as its mechanical engineer, where he de-signed some of the company's locomotives and prepared the drawings for new equipments.

#### Adopted Electrical Engineering.

After graduation and prior to this time his policy had been to acquire as much experience in various branches of engineering work as possible be-fore taking up a special line of work. Electric railroading was then in its extreme infancy, but having that keen foresight which has ever characterized foresight which has ever characterized his many epoch-making achievements he decided that it had a great future and he consequently took up electrical engineerings is his particular profession. The emight prepare himself for the sum of the resigned and spent the winter of 1888-89 as a postgraduate student in studying the sub-

DI AKNOLD WHEN 14 YEARS OF AGE.

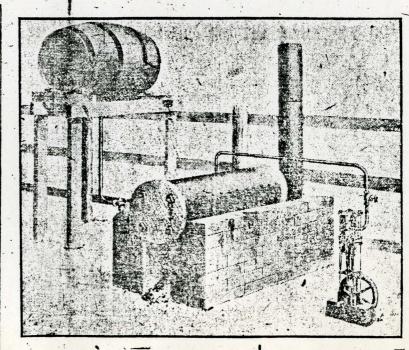
graduated with the degree of its St Louis office, and later, in 1890-B. S. in \$34 and the prize for having 183, he acted as consulting engineer for obtained the highest rank in mathethis company after it had been conmatted, of any member of his class solidated with the Edison General during the entire four years; M. S. in company, now the greatest electrical manufacturing company in the world institution, so honotary degree of M. While with this concern be also acted. during the entire four years; M. S. in company, now the greatest electrical manufacturing company in the world. The for engineering work done subsequent to graduation. und Railway company, the builders of the elevated railroad at the Co-On graduation Hillsdale in of the elevated railroad at the Co-string to acquire a knowledge of pusof the present elevated electric roads,

#### Independent Consulting Engineer.

So conspicuously successful was this new third rail electric road that Mr. Arnold, following his pre-conceived ideas of eventually getting on an independent engineering basis, decided to open an office in Chicago, which he did in October, 1893. His marked ability as an electrical engineer combined ity as an electrical engineer combined with that extraordinary talent for me-chanical construction which we have previously observed, soen placed him at the head of his profession, where he has not only remained but is also recognized today by his contemporaries as the greatest advocate and most successful pieneer of new ideas which mark the progress of electric traction. Immediately after the Intramural railway he built the property of the St. Charles street railway of New Orleans and has since devoted his attention largely to the construction of electric railway work in which he has accom-complished numerous distinct ad-

Mr. Arnold with his characteristic

foresight was early impressed with the value of storage batteries in connection with electric plants, and with his usual dynamic energy set out perfecting plans for their use, and that he might better accomplish the results he deemed necessary to fulfill his standard of success he conducted many experiments in a laboratory which he fitted up in the basement of his home, and finally invested his entire means and finally invested his entire means in their production, and even entered into the manufacture of batteries himself. This business, after a long and desperate struggle, so common to the storage business at that time during storage business at that time, during which the company pulled through the panic of 1893, and afterwards lost its factory by fire, finally grew so rapidly and to such proportions that in about two and one-half years from the time it was founded by him it became sufficiently important to attract the attention of the so-called of negotiation, during which time he



COMPLETE STEAM PLANT BUILT BY ARNOLD WHEN 15 YEARS OF AGE.

# The Canterbary Pilgrims

The following modernized extracts heart our monk would ride, and hunt, and play, hor stinted he in dress—I saw his hand been compiled from the Springfield Republican by Thomas Bailey:

Meanwhile our monk would ride, and hunt, and play, Nor stinted he in dress—I saw his hand both was fastened underneath his hood was fastened underneath his from the "Canterbury Pilgrims" have been compiled from the Springfield Republican by Thomas Bailey:

The father of English poetry," Geof.
frey Chaucer, was born in London in
1328, died in that city in 1400, and was buried in the south transept of Westminister abbey, where eminent poets and men of letters have ever since been buried, from which circumstances the transept is called "Poets' Corner."
Chaucer, after studying at Cambridge,
and perhaps at Oxford also, was sent
to the court of Edward III and was employed in the public service. He married the sister-in-law of John of Gaunt, King Edward's son, thus being probably the only poet ever remotely connected with a reigning family, which fact undoubtedly had something to do with his being retained at court. In the latter part of his life he retired to Woodstock, where he wrote "The Canterbury Tales," one of the famous poems of the English language. As it was written in an early stage of the mother tongue, it is difficult to read at merchant next among the throng appeared. mother tongue, it is difficult to read at the present day, on account both of the present day account the present ized, the following portions of the pro-log give an account of some of the twenty-nine pilgrims whom Chaucer Southwark, preparatory to starting on the host of the Tabard proposed that each pilgrim should tell a tale on the way, and that on the return of the party he who had told the best story should be entertained by the same and trade;

And used his eyes and ears in foreign trade;

And none could ever his secrets get.

Whether he rich had got, or were in debt. a Becket at Canterbury, in order to

When gentle April with his showers sweet (The winter past), the cold dry earth does

century, and opens thus:

should be entertained by the rest at a supper, and this was agreed to. The poem contains one of the best ac-counts which exist of the manners and

customs of England in the fourteenth

and bathes in genial moisture every root. That in its season may bring forth fruit; When southern gales fan with their lov-

Pasture and field, and forest-grove and Bringing back life-the while the spring-

In joyous strength, his giant course doth

run;
When woods re-echo birds' sweet melody,
As day and night they carol happily;
And all rejoice, light youth and hoary
age,
Then is the time men go on pilgrimage.
Palmers go forth, to seek on distant
strands

The ehrines of holy saints in foreign lands.

But specially, from Berwick to Land's

End.
The English folk to Canterbury wend.
The holy martyr, Thomas, for to seek,
Because he helped them when that they
were sick.

Then, as introductory to the "Tales," Chaucer says: "But first I must ten you something about these pilgrims. . will describe them to you one by

A knight there was, and that a worthy Who from the period when he first be-

To ride on horseback, loved chivalry,

Honor and truth, freedom and courtesy.
Full well approved had he been in war
Fierce battles had he fought in, no man

In Christendon as well as Heathenness, And still was honored for his worthiness. In peaceful times he gained rich meed of

Harmless as dove, and yet as serpent

Brave as a lion, gentle as a maid. He never evil word to any said; Never to said dur always surang-right,

As the knight had only just landed

from foreign wars he were his armor, and a fustian frock under it, all solied, with rust. His son was with him, acting as his squire, and is next de-

His tooks were curied as though they had

of twenty years of age he was, I guess, In stature somewhat more than common

In France and Flanders, Italy and Spain; and borne him bravely for so little space, spent, in hope to gain his young lady's grace. And far surpass'd those of Ypres and

bright; so did his face, as if it were anointed. A well-conditioned man, and well-appointed.

His eyes deep sunk, and relling in his head.

Which, stem'd and smoked like pot of melted lead.

The frier is described next, and i The frier is described next, and is drawn in very dark colors. He is represented as thoroughly venal and corrupt; a smooth-tongued, ering hypocrite, who will talk of the most pocrite, who will talk of the most sacred things with his tongue in his cheek, to wheedle money from the simple-hearted, but who specially prides himself on robbing the poor and widows, and who is also profligate in

hat;
And as he solemnly on horseback sat,
He spoke of trade and gains, and thought

From Middeburgh to Orwell wall'd should To guard from foes. Right well he bar

A Clerk was next, come from Oxford town,
Who had in logic gotten great repown.
His horse as lean and thin as any rake,
Himself no fatter, I my oath will take.
His cheeks were hollow, and his coat
threadbare.
He had no living yet you might be ware.

He had no living yet, you might be ware; Nor cared he for such things, or wordly

Yet there were things which he desired amain.

To have a score of books at his bed's

This was his pleasure, and he truly said

greet. He had but little gold, but sometimes Would make him presents, which he

straightway spends
In buying books, and as he does so,
prays
That God will bless the givers all their

days.

And as he gave to study earnest heed.

need: And this he spoke with formal reverence Quitely, calmly, but with all good sense; Sounding in moral virtue was his speech, And gladly would he learn and gladly

A Franklin was there in the company, With snow-white beard, right comely for

to see, And broad red cheeks, which plainly told And broad red cheeks, which plainly told
the tale
That in the morn he loved a cup of ale.
Own son of Epicurus was he.
And held good living felicity;
In his large household, everyone could

His patron saint, Saint Julian, served he well.

His bread, his ale, were always of the

stew, Woe to the cook unless the sauces were Polgnant and sharp, and ready all the board, which stood fixed in the hall His

alway. Was ready cover'd all the livelong day. At quarter sessions he was ford and And many times was chosen knight o' th' shire.

wing the service seem.

A wife came next, of acient fash's fair city, wonderful activity and strength etc.

But she was somewhat deaf, which was a pity.

France and Flanders, Italy and Spain; Is making cloth much labor had she A wife came next, of acient Bath's fair city. But she was somewhat deaf, which was

part.

And neighbor as himself; and therefore he, For Christ's dear sake, would give his To help his brethren in necessity.

Never, I ween, was seen more stalwart frame.
Nor did his looks deceive in any wise,
At wrestling bouts he always won the

Mighty in brawn and bones a Miller

erty.

Coarse jests and oaths too often from it Of corn entrusted to him some he stole, for to'l.

And yet this Miller, if the truth be told,
Among the millers had a thumb of gold.

In jerkin white, and hood of blue, was

Blowing a bagpipe loud and lustily.

Passing over the Manciple (a stew ard) who was such a rare hand at making bargains, that whether he paid money or received it he always got the best of it; the Reeve (farm balin). and the Sompnour (ecclesiastical sumlast of Chaucer's portraits of the pil-

grims is that of the seller of pardons.

With the ending of the prolog the "Tales" hegin. The knight takes precedence by right of rank, and tells the beautiful story of "Palamon and Arcic." Though Chaucer calls this a story of ancient times. It. was undoubtedly intended as a picture of the court of Edward III. The Equire's tale recorded his regret that it was left un-The nun prioress tells ho Hugh of Lincoln, a Christian child. into a sewer, because he learned an absurd legend, but was believed to he true in the middle ages. Wordsworth moderinized the story. The Merchant tells the sprightly and pleasing story of "January and May," which has peen made familiar to many by the paraphrases of Pope. Dryden also has moderinized the story of "The Cock and the Fox," and the tale of the Wife of Bath. There are two or three tales. that of the Miller's among them, that are coarse and vulgar. It is an insufficient excuse for them to say that they are characteristic of the age in which they were written. The con-clusion of the great work is as fol-

Now I pray to you all that hear this little treatise or read it, that if there be anything in it that liketh (pleaseth) them, they thank our Lord Jesus Christ, from whom proceedeth all wit and goodness and there be anything that displeaset. them. I pray them that they put it to the fault of my uncunning, and not to my will, that would fain have said better if I had cunning. Wherefore I beseech you meekly, for the mercy of God, that you pray for me that God may have mer-His bread, his ale, were always of the best.

A better filled cellar few possest;
Fish, flesh and fowl, in larder, one might think:
It snowed in his house of meat and drink.

And as the quarters of the year came 'round'
Sure was each dish in season to abound.
Full many a partridge fat had he in mew.

And many a bream and many a pike in stew,

Woe to the cook unless the saucer were sound unto sin, of the which Christ for his great mercy forgive me; and I pray him that from henceforth to my life's end he send me grace to bewall my sins, and to study the salvation of my soul; and grant me grace and space of very repentance, penitence, confession and satisfaction, to do in this present life, through the benign grace of him that is king of all kings and priest of all priests, that bought us with the precious blood of his heart, so that I might be saved. Amen.

togineer togineer

h Page, Part Two.)

rty, alizing toon the transaction in net boilt of \$86,000.

With the funds has secured he was further emabled enforce his own Never, I ween, was seen more stalwart frame.

Nor did his looks deceive in any wise, At wrestling bouts he always won the prize.

He was short shouldered, broad, with mighty fist.

And from its hinge he any door could twist.

Or rush and break it been with his head, His great broad beard as any fox was red;

A wart upon his nose was decked with halrs.

He had fierce eyes, and nostrils black and wide.

A word and buckler were he by his side.

A word and buckler were he by his side.

To shame!

With the funds has secured he was further simbled enforce his own tradical and progrative ideas in electric fraction and the rimopriant matters. He has a de valuable contributions in the devancement of company installed by the New York. New tributions in the devancement of company being carried on under a large buildings, which briefly stated in conjunction with storage batteries for equalizing the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open a large work of the lacting the load and to open at a large work of the lacting the load and to open at a large work of the lacting the load and to open a large work of the lacting the load and to open a large work of the lacting the load and to

equipped the Chicago & Milwaukee Electric railway with high tension alternating current for power transmis-sion in combination retary converter

his plan that he was forced to take the contract for the completion of the road and he had, a consequence, to assume the financial risk under a successful operation in order to demonstrate the feasibility of this new type of traction of which he was the father. This plan has proven a tremendous succession despite the early opposition it encauntered from men who ought to have known better it at once became the standard type of construction for ighierurban electric roads that has since been universally followed and finds is highest development in the magnificent equipment of the New York Central railroad later the Trans-Mississippi exposition of Omaha, the Pan-American exposition at Buffalo and the Universal exposition ly put in operation.

The New York Work.

The latter road commissioned Mr. Arnold in 1901 to study and report upon the feasibility of electrically opapon the reasibility of electrically op-erating its trains in and out of New York city, and as a member of the electric traction commission of that road he has for the past five years been engaged, in connection with his other work, in carrying out the plans which, with the terminal thus being created, involves an expenditure of over \$60,000,000, by means of which improvement all trains on the road with-in thirty miles of New York will be propelled by electricity, many of them being in operation at the present time. In 1902 Mr. Arnold was commissioned

by the city of Chicago to make an ex-haustive study and jo report upon the domains, which work involved the valassurance of these franchises being re-newed; the obsolete cable systems were still in operation and divisional owner-ship and operation whereby the business district was filled with innumera-ble loops existed, and there was no ble loops existed, and there was no provision for transferring passengers between the cars of the different companies without the payment of an ex-

tra fare.

The traction question had been a poand the companies coked askance at each other and municipal compensions of the international electrical congress at St. Louis. In 1905-7 he was president of the was not, although veryone joined in the universal cry it a solution that which he acted as trustee from 1900 to the universal cry it as a country. Mr. Armond frescoes of the palace of West minister, which are for the purpose the to be disinterred from beneath the wall paper long since drawn over them as a means for decently burying the remains of what had been the young hope of a nation's enthusiasm, once more draws attention to this highly the latter an element of no more draws attention to this highly the latter an element of no municipal compensation for the coll of the was president of the was not, although veryone joined in the universal cry it as outling and is now to acting. In 1905 he was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was elected a trustee of Hillsdale colling, and has served as president of the was not, although the enters were cally sure that it couls. In 1905 he was not, although the enters were cally sure that it couls. In 1905 he was elected a trustee of Hillsdale colling, and has served as president of the western society of enters were cally sure that it international electrical congress at St. Louis. In 1905 he was not, although the enters were cally sure that it internatio

progress, and the efforts of others since, a successful single phase railway system has been evolved and is now being applied to a number of steam railroads, one of the most important installations being that of the St. Clair tunnel of the Grand Trunk Huron, Michigan, and Sarnia, Ontario,

tion at St. Louis. neering subjects before many of the 000, it is safe to estimate that in this leading universities and colleges of country alone nearly if not quite 10, the country, and in 1897 delivered at 100,000 miles of telephone wire are in the university of Nebraska a course of ten lectures upon engineering sub-jects. In recognition of his work that ceived from Hillsdale college an en-grossed testimonial diploma in recognition of his "Distinguished learning and achievement in invention and in mechanical and electrical engineer ing." a form of honor of much more

Received Many Honors.

In 1903-04 Mr. Arnold received the upon an electrical engineer when he was elected the president of the American institute of electrical engiamounting to approximately \$100,000, neers, a consideration all the more door. At that time the sailway properties distinguished since he was the first the companies did not feel warranted in properly maintaining them, on account of the early opiration of their most important franchises and with no United Engineering society which was organized for the purpose of acting as trustee for the expenditure of \$1,-500,000, given by Andrew Carnegie for the erection of the engineering soci-ety's building in the city of New ety's building in the city of New York, which was dedicated on April

One of this emisser engineer's successes as an electric railway pioneer Transportation Problem" (1902), and was in 1897-98, when he designed and which, as previously stated, has since become a text book on traction mat-ters. He is also the author of numerters. He is also the author of hinds, along highways and byways, and ous reports for the city of Chicago, along highways and byways, and for which he has acted as consulting notes, swinging from poles that are not overloaded and not of excessive not ungraceful storage battery sub-stations, by means engineer for several years, and he is of which the initial cost as well as the now acting in a similar capacity for expense of operating electric railways, the Wisconsin state railroad commiswhile the construction of this line was in progress the company owing it changed hands and so great was the opposition of the new interests to has plan that he was forced to take ernment commission controlling the

figures of the total amount of wire of the many societies of which he phone countries a member, the American society of astounding civil engineers, and the American astronomy the advancement of sciphonic communications have become not less than \$007,722 miles of wire Franklin institute of Philadelphia, The exact number of miles operated Trans-Mississippi exposition of by independent systems cannot be

States in the neighborhood of 2,000,-000,000 miles of telephone wire are in daily use, or smough to reach from the luminary that is enormously distant from this planet. Yet the telephone wire mileage for the United States would already cover about one-ninth

probable, and our population continues to grow rapidly. That means a very and it may never be possible. Even for local systems the subterranean construction is expensive, so that only in larger cities and towns will the conditions of traffic permit in its in-York to converse with the business man in Chicago or St. Louis almost as readily as if he were in the next room. If the wires between Gotham

The traction question had been a volictical congress, in Paris, and in 1804 hardly an intelligible sound could get
litical football for pars, the citizens acted as chalman of the executive through for the current in a cable
and the companies coked askance at committee and vice president of the
circuit "decays" rapidly. In the more
international electrical congress at St. thickly settled portions of our country

BOSTON, May 18, 1907.—About all engineers are already declaring that that keeps the sky from being darkened in the more thickly populated ble, be kept overhead and of open portions of this country by the ever wire construction through their entire expanding network of telephone wires length, for where one of them is expanding network of telephone wires length, for where one of them is is; the custom that has grown up among the engineers of concentrating their circuits in aerial cables. Similarly about all that prevents the available supply of tall straight sticks of timber, of the varieties capable of resisting the effect of the moisture of the ground, from being exhausted by the demand for telephone noise is this.

Cable Avenues for

Telephone Talks

the demand for telephone poles is this same improved method of hanging head cable involves a radical departthe wires that carry the long distance communications of the nation. So early days naturally followed the custhat the average man, as he travels tom of the telegraph companies in along highways and byways, and stringing single pairs of wires on stringing single pairs of wires on poles. Whenever the business grew poles. Whenever the business rapidly it became necessary to ering above the trees of the street or were attached in order that the pole for telephone service. A single cable possible. Even thus a pole would be will carry wires which spread out on come overloaded. The exposure of a many wires offered a great This development of the cable idea ter time and led now and then to one is one of the most important in the of those annoying breakdowns of the recent thistory of telephony. The service which, with the best of man-

A remedy for the overloaded condition of the poles was fortunately demeet the needs of vised about the beginning of the pres-0,000 Beil subscribers ent marked expansion of the traffic according to the In the city of Pittsburg the engines, a bort of the American had an especially difficult task because ence are worthy of especial mention, lates, en port of the American had an especially difficult task because and he has received medals for invenwith winding streets and almost an enployment in such a community oper wire lines were particularly impracticable, and about 1897 the system was worked out and decided upon that has all-cable system. This has now become very familiar throughout the United States. Its general adoption led President Frederick P. Fish, of the American Telephone and Telegraph company, to say in his report of progress during 1906:

"The improvement in cables, made within the past few years, has revolutionized the art of telephone line con-struction. Not only is it now possible of the distance, and at the present rate of increase this country within a few decades is likely to have wire enough, if such a thing were possible to loop a complete telephonic circuit to place in underground ducts cables containing four hundred or even six hundred circuits, but a pole line the through the central energy plant of carrying capacity of which would have the solar system. An average of at least one telephone to five persons is been exhausted by forty pairs of open wires in the form of cables. The oldfashioned exchange pole line rarely wires. When an open wire aerial line all telephone wire underground, event there is a great waste as com-pared with a type of construction in A good overhead circuit of open pole line may have a capacity times as great. Sound economy has many times in the past year required the scrapping of all the wires on a pole as the only way of securing the enquired, and not infrequently it has whole line as the cheapest way of s curing the opportunity for growth that was required."

and the Windy City were buried, even though the most improved form of

conduit construction should be used,

length, the fat but not ungraceful cables, has reason for thankfulness

that their invention came in time to

present era of unprecedented demand

crossarms would darken the roadway

used in this country for carrying tele-

times. We thing of the sun as a

large wire mileage half a century

But it is not possible at present to

enables the business man in New

troduction.

the Data and Compile Reports.

New York Evening Post: The publication of the May crop report gives interest to the method of tabulating and collecting the statistics that are gathered by 162,000 agents throughout the crop area. Much has been accomplished within the last few years in

judgment among observers of the same facts are of slight importance in 'ar-