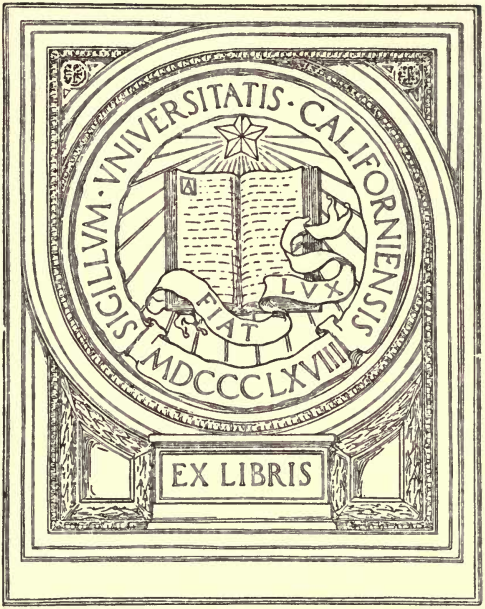
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Chas Goodyear

TRIALS OF AN INVENTOR:

Life and Discoveries of

CHARLES GOODYEAR.

"One soweth and another reapeth."

By BRADFORD K. PEIRCE, D.D.

NEW YORK:
PHILLIPS & HUNT.
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TRIALS OF AN INVENTOR.

CHAPTER I.

INTRODUCTORY.

Says Dr. Bacon, in a sermon preached in his own church, in New Haven, the Sabbath succeeding the funeral of Mr. Charles Goodyear, "the singular story of his life, and the greatness of the contribution which he has made to the wealth and welfare, not of his native city only but of his country, and to the commerce, industry, and material civilization of the world, will justify my reference to him in connection with the subject of discourse."

Probably no man who has made a discovery at once so great, and of such immediate, practical benefit to the race, ever before passed so

quietly out of his place and generation, receiving so slight an acknowledgment for the service he has performed. The long and bitter litigation conducted in his name gave a very false conception of his character to those who only knew of the man as he was represented by persons maligning his motives, and depreciating his invention, in order to deprive him of his rightful claims, and to add to the wealth they were making out of his discoveries. The false stories that were circulated in reference to the immense amounts of money received upon his patents, and of the lavish and careless manner in which he was said to squander it, in order to hinder his obtaining an extension of his patents, prejudiced many persons against one of the most unostentatious, personally economical, pure-minded, and pious men that has adorned his generation by his life and discoveries. There is scarcely a man whose labors have been so conspicuous, whose ex-

emplary, inner and spiritual life is so little known.

One cannot become acquainted with his remarkable history without being reminded of Bernard Palissy, the sturdy old Huguenot of France. Mr. Goodyear's was the more suffering and sublimer life of the two. Palissy's invention was only a beautiful enamel, which gave him the name of the "Potter," and when he had once discovered it his sufferings and sacrifices on its accounts ceased, and he became the honored and remunerated guest of crowned heads. True, he died a glorious and resolute prisoner in the Bastile, for refusing to renounce the doctrines of the Reformed religion; but he experienced no further hardships in the application of his beautiful discovery after he had once fallen upon it.

Mr. Goodyear suffered and sacrificed to the full measure of the pious "Potter" for ten years, and then for sixteen years after, to the

day of his death, lived a life of almost equal self-denial and unrequited toil, in order to develop and bestow upon his fellow-men the full benefit of his invention.

No religious inspiration sustained Palissy over his furnace, and no inward persuasion, that God had chosen him for the purpose of certainly accomplishing his appointed work, encouraged him. But Goodyear's life-work was a religious mission. With opportunities for securing an immense fortune, he laid them all aside; never devoted a day or a thought to this end simply; sought no relief from labor or addition to his personal comforts, rendered possible by an increase of income, but used all the means that came into his hand, and even anticipated the expected gains of coming years, in order to perfect the work he was persuaded God had given him to do. In all his reading, the writer recollects the record of scarcely another life, out of sacred pages, so

single in its purpose, and so pure in its motives.

The present volume is intended to present only the story of his life. The author has indulged in few reflections. The history carries its own moral with it. Our people are an inventive people. The Patent Office in Washington is crowded with models. The life of Goodyear will present a fine study, and an admirable example, for young Americans whose minds are quickened by the splendid results which have followed the inventive faculty of our countrymen, and given a bias in that direction to their own thoughts.

Said a gentleman,* whose name has become well known in connection with a valuable patent for the concentration of milk, to a son of Mr. Goodyear: "After experimenting unsuccessfully for a number of years, I should have given up in despair if I had not read a sketch

* Gail Borden.

of your father's life. This inspired me to continue my work until success was accomplished.'

This biography is published that others also may be encouraged to perseverance, even amid disappointments, in the life-work to which God commissions them.

The materials for this sketch were limited. Mr. Goodyear prepared a short account of his life while engaged upon his experiments in rubber, one copy of which was printed upon gum elastic paper, and bound in hard rubber, elegantly carved—in many respects the most remarkable volume ever published.

The legal controversies, spreading over the space of seven years, contain much material, although widely scattered, to illustrate this singular life. Mr. Parton prepared and published in the North American Review for July, 1865, a very animated sketch of Mr. Goodyear's experiments in India rubber and their results. His pastor in New Haven, Rev.

Dr. Dutton, and Rev. Dr. Bacon, of the same city, preached memorial discourses at the time of Mr. Goodyear's decease. From all these sources the present biography has drawn its connected history of the principal events in the life of the great inventor; but the author has been especially indebted to the surviving members of the family for access to valuable papers and private letters, and for incidents that have not been heretofore published. He has also been placed under great obligation to Rev. A. S. Hunt for personal reminiscences while a private secretary of Mr. Goodyear, and residing in his family.

CHAPTER II.

PARENTAGE.

NEW ENGLAND has no city more attractive than New Haven. Dating back for its origin to the early settlement of the country; its favorable location for commerce; its fine natural scenery; the establishment of Yale College within its limits, and the opportunities for education offered by this institution and other public and private schools enjoying a wide reputation, have drawn to the "Elm City" a large and intelligent population, and raised the general education of the community to a high standard.

In this city, and surrounded by such influences, the subject of this sketch passed his early childhood. CHARLES GOODYEAR was born in New Haven December 29, 1800, just a hundred years after the founding of Yale

College. He was the son of Amasa Goodyear, the eldest of six children. His father was a descendant of Stephen Goodyear, who was an associate, and afterward the successor, of Governor Eaton, who, at the head of a company of London merchants, founded the colony of New Haven in 1638. Mr. Goodyear, the father, exhibited the same enterprise, intelligence, and sincere piety that marked the principal founders of the New England colonies. He was a pioneer, as we shall see, in the manufacture of American hardware, and a leader of that great company of inventors who have dotted the banks of every stream in Connecticut with mills, and made the state to become the Lancashire of the country.

The senior Mr. Goodyear was a man of generous impulses, a devoted Christian, enjoying the confidence and respect of the community. He was noted in his religious life for his great liberality toward those differing from himself in

opinion. He could not endure to hear other professed Christians spoken of in an uncharitable manner, and felt no sympathy with the violent attacks sometimes made in public addresses on Roman Catholics. He was a noble Christian gentleman, and many of his characteristics will be noticed as reappearing in the life of his son.

Mr. Charles Goodyear was very fond of his mother, and offered her the utmost respect and affection until she was taken from him. Her name was Cynthia Bateman. She was a woman of more than ordinary talent, and well deserved the regard of her family. She was a dignified, affectionate, devout woman, conscientiously discharging all the duties of a mother and early teacher of her children.

Such was the parentage of Charles Goodyear, and the strong religious and intellectual direction given to his early life.

CHAPTER III.

EARLY LIFE.

Mr. Amasa Goodyear, while residing in New Haven, was engaged in commercial business. He owned the neck of land which is well known in the city now as "Oyster Point," and here was the pleasant homestead where Charles passed his early boyhood. Merchants of New Haven and Hartford, at this time, carried on quite an extensive trade with the West Indies, and it was in this business that Mr. Goodyear was engaged. But while Charles was still young, his father bought an interest in a patent for the manufacture of buttons, and removed to Naugatuck, a village situated upon a small river of the same name, about eighteen miles from New Haven, in order to avail himself of the water-power obtained here for carrying on

his new business. In 1807 he commenced the manufacture of the first pearl buttons made in America; and in the war of 1812 he supplied the government with metal buttons.

The senior Mr. Goodyear was a very ingenious man. He made several valuable improvements, particularly in the manufacturing of agricultural implements, for which he held patents. One proved to be very valuable. Before his day, hay and manure forks were made by blacksmiths out of wrought iron; but he constructed and obtained a patent for the beautiful strong and elastic steel fork, which long bore the name of father and son, and brought quite a fortune to them. It is a curious fact, showing the reluctance with which plain people admit of any change, that when these forks were first offered, no one would buy them, and the inventor had some difficulty in bestowing them gratuitously upon the farmers, and securing their promise to give them a fair

trial and report the result. When their excellence became known, no others in the market could be so readily sold. The business included the manufacturing of military and other kinds of metal buttons, spoons, scythes, and clocks. What a wonderful school this manufactory must have been for a thoughtful and ingenious boy!

A farm was connected with the business, and between the two a considerable portion of Charles's hours was taken up; so that, when a boy, the assistance which his father found necessary to require of him limited his schooling. But he was always a studious boy. He was quite different from children of his age. When but ten years old he was noticed for the seriousness and manliness of his behavior. He did not enjoy the usual and wholesome boyish plays; but if missed at any time was sure to be found in his bedroom, reading his Bible or some serious book. He had no particular fond-

ness for machinery, but was constantly considering what improvements could be made in the different articles of service employed in the house or upon the farm. It is a curious fact that while he was a schoolboy a circumstance occurred which pointed toward the final business of his life. He happened to take up a thin scale of India rubber, peeled from a bottle, and it was suggested to his mind that it would become a very useful fabric if it could be made uniformly so thin, and could be prepared so as to prevent its melting and sticking together in a solid mass, as it did under the simple warmth of his hand. This very thing in the providence of God he was afterward enabled to do.

When he was sixteen, Mr. William De Forest, then twenty, (whose sister afterward became the wife of Mr. Charles Goodyear, and whose generous aid, to a large amount, enabled Mr. Goodyear to bring his great discovery before the public,) became a private tutor, for a number

of months, in Mr. Amasa Goodyear's family. He remembers Charles as being a remarkably mature boy, a good scholar, eager to improve himself, and giving fine promise for the future. His father had great confidence in his judgment, and consulted him in his business.

It was about this time that he united with the Congregational Church in Naugatuck. As early as his eleventh year he had very strong religious convictions. At this early period he had a very earnest desire to become a minister of the Gospel, but the condition of his father's business rendered it impossible for him to secure the preparation he thought to be necessary to enter upon this solemn work, or even to allow him to leave his home. He was ever the dutiful son, and remarkable for the reverence which he had for his parents. There was another important work which Divine Providence intended he should perform, and, perhaps for this reason,

overruled his strong desire to benefit his fellow-men by preaching, by turning his fervent and self-denying devotion into another channel. When his way was hedged up in every other direction, and his mind was singularly turned to consider the subject which afterward employed all his powers during all the remainder of his life, he says, "a strong and abiding impression was made upon him that an object so desirable and so important, and so necessary to man's comfort, as the making of gum-elastic available to his use, was most certainly placed within his reach." This presentiment, of which he could not divest himself, under the most trying adversity stimulated him with the hope of ultimately attaining this object. He remarks, very properly, that "He who directs the operations of the mind can turn it to the development of the properties of nature in his own way, and at the time when they are specially needed. The creature imagines he

is executing some plan of his own, while he is simply an instrument in the hands of his Maker for executing the divine purposes of beneficence to the race." Just when most needed, beds of coal are discovered in the bowels of the earth, and when the progress of the race requires the art of printing or the power of steam, the right man, at the right time, led by mysterious providences, and with many painful human struggles, steps forth as the discoverer. After Mr. Goodyear entered upon his great work he never for a moment doubted that God clearly indicated to him his will that he should continue in it, and that he would ultimately be blessed with success.

In 1816 Charles, now in his seventeenth year, left his home for the city of Philadelphia, and became an apprentice with the firm of Rogers & Brothers, to learn the hardware business. He remained with this firm until his majority, and then returned to Connecticut.

CHAPTER IV.

THE HARDWARE MERCHANT.

With his valuable business experience he now entered into partnership with his father. Mr. Goodyear, senior, had made many important improvements in agricultural implements, and they were at this time coming rapidly into use and affording the manufacturer a satisfactory return. The observation of the good done by these, in lightening the burden of labor, made a powerful impression upon the son, and strongly tended to give an inventive bias to his life.

While engaged in business with his father, August 24, 1824, he was united in marriage with Clarissa Beecher, a lady every way fitted to be the companion and comforter of his life. She was a communicant of the same Church

with himself, of a peculiarly amiable temper, endowed with great fortitude, and sustained by a sincere religious faith. She was devoted to her husband, and endured without a murmur the extraordinary sacrifices occasioned by his long-continued and unsuccessful efforts, before he made his great discovery. Although yielding in temper, she had a strong hold upon the confidence of her husband, and was his constant confidant and counselor. In the heat of his fervent nature, when suddenly resolving upon some new measure, or giving way to the most sanguine expectations, she would place her hand quietly upon his shoulder and say, "Do not make up your mind too hastily; had you not better wait until to-morrow?" The touch of that wise and gentle hand was always effectual. How faithfully, through all the years of his trial, this most excellent Christian woman supported her husband, aiding with her own hands in his unremitting experiments, and sym-

pathizing with all his fluctuating fortunes, can only be known by those who were the constant observers of her beautiful life. Her life was spared long enough to see the apparent fulfillment of their long-deferred hopes, and then she was mercifully removed before other serious disappointments clouded the fortunes of her husband.

The business of the new and enterprising firm was increasing. The sales, especially of the patent forks, were large, and there was evidently a fortune in it. In 1826 he removed with his wife to Philadelphia, and opened a store for the sale of hardware. The firm still continued as before, the manufactory largely supplying the stock of the store. It was the first establishment for the sale of domestic hardware in the country. It was looked upon at first with great distrust, and thought to be a visionary undertaking; for up to this time the whole trade in hardware had been in im

ported articles. Under the enterprise and good management of Mr. Charles Goodyear the house rose rapidly in reputation, and soon came to be considered one of the best established in the country. Its credit was ample, and a handsome fortune was accumulated by the firm.

Among the letters written at this time to his wife, while absent upon business in New York, the following sentence, so characteristic of the man, appears. It proved to be no hasty or temporary resolution which he thus recorded, but it became the law of his life. "I have quit," he writes, "smoking, chewing, and drinking, all in one day. You cannot form an idea of the extent of this last evil in this city among young men. By the way of setting our faces against the world at large, I invite you to forbid in our house any thing stronger than wines and cordials, [this was long before total abstinence days,] except in cases of illness."

Among the earliest recollections of his eldest daughter, then very young, showing the spirit of this Christian family, is that of passing the afternoon of Sunday, while they were residing in Philadelphia, in the bedroom of her father and mother, her parents showing her the pictures in the family Bible and teaching her the commandments. Another very pleasant memory of her childhood is singularly prophetic of the enthusiasm with which her father entered upon the great mission of his life. When she was in her eighth year she was sent to a boarding school under the charge of ladies connected with the Society of Friends, about a mile from her home. Upon one of his visits to the school, her father brought her a pair of India rubber shoes, the first she had seen. "I well remember," she says, "with what peculiar pleasure he gave them to me, and how enthusiastic he seemed about their value. They were made

of the native gum, very clumsy, and bound round the ankle with fur."

In the winter of 1829 and the spring of 1830 the health of Charles, who was the life of the concern, entirely broke down. He had a stubborn attack of dyspepsia, a disease that pursued him to the grave, scarcely relaxing its hold upon him for a day during the remainder of his life, and often confined him to his bed; so that at times this was his only workshop, and was often covered with the implements of his experiments, continued even in his great prostration. At this time his disease was so severe as sometimes temporarily, as his friends thought, to affect his mind.

To this condition of his health, which must have had a very depressing influence upon him, were added great losses in business.

The transactions of the firm had been widely extended in different states, especially at the South, and they allowed their customers very

liberal credits. The failure of many of these, at this time, to meet their payments, so embarrassed the establishment in Philadelphia that Mr. Goodyear thought it impossible to go on with their business.

As the firm held valuable patents, and were engaged in bringing out certain inventions that could only be rendered of service to themselves and their creditors by being completed, they struggled on for a period by securing an extension of their payments. This proved to be only a temporary relief, and, after some discouraging efforts, the whole business, with the valuable improvements they had made, was given up for the benefit of their creditors. It was a great trial to Mr. Goodyear to yield up what had promised to be a certain and large fortune to him, and what afterward, to those who were so fortunate as to secure the right in these inventions, proved to be a mine of wealth; but he

submitted to what seemed to him a providential misfortune, without idle regrets, or a loss of courage, or any distrust of the goodness of God. In looking back upon this hour, after many years of such disappointments and struggles with poverty as few have experienced, with the rarest good temper and Christian philosophy, he says: "In reflecting upon the past, as relates to these branches of industry, the writer is not disposed to repine, and say that he has planted and others have gathered the fruits. The advantages of a career in life should not be estimated exclusively by the standard of dollars and cents, as it is too often done. Man has just cause for regret when he sows and no one reaps." It is a satisfaction to know, that among the numerous domestic hardware houses that have since been established in all our large cities, two of the most respectable and wealthy are the immediate successors of the original firm.

For ten years after this failure in his business, under the laws then existing, Mr. Goodyear was repeatedly imprisoned for debt, while seeking all the while so to develop unfinished inventions that his creditors might be ultimately paid. And when, in after years, he began to receive some pecuniary returns for his long, self-denying studies, the first appropriation of money, above that required for the development of his invention, was made to these creditors, although time and law had apparently released him from these obligations. His unwillingness to take any course to shelter himself from the impatient demands which he could not meet, because the failure of others had ruined him, exposed him to years of persecution and constant embarrassment.

His letters to his wife during his long and often unexpected absences from home, arising out of these perplexing arrests, are full of cheerful hope and piety.

His earliest experience of prison-life was while in Philadelphia, and soon after the failure. Although but one of the junior members, he seems to have assumed all the indebtedness of the firm, and, while the others were quietly at work in the country, to have suffered in his own person the unjustifiable prosecutions that were visited upon the unfortunate concern.

His daughter remembers awaking one morning and inquiring for her father. In the gentlest manner possible, her mother told her that her father was in jail for debt. Leaving her infant with this daughter, the mother went every day to the prison to bear the great support of her presence and sympathies to her husband.

These trials prepared him for others, more severe, which were before him. "They were not wholly," he says, "without their advantage; lessons of life were learned from them. If

any one is desirous to learn more of human nature than he can learn in any other way, or wishes for a moment to look upon the darkest side of life, let him, for such a cause as debt and misfortune, be placed within the bars of a prison without a dollar in his pocket, and, in conscious innocence, look out upon the world, and reflect upon the wide contrast in his condition with that of those who are enjoying liberty without; while within he finds his fellow-sufferers all upon the same level, whether incarcerated for the sum of one hundred pence, or of one hundred thousand pounds. Then, notwithstanding the mortification attending such a trial, if he has (as every human being should have) a good purpose in life for which to live and hope on, he may add firmness to hope, and derive lasting advantage by having proved to himself that, with a clear conscience and a high purpose, a man may be as happy within prison-walls as in any other

(even the most fortunate) circumstances in life."

In this failure of his business prospects, and of his hopes of realizing a competence from his agricultural patents, is to be found the cause of his giving attention to what became the great work of his life, and of his being an instrument in God's hand of opening up for the benefit of the world one of those great discoveries, the full advantage of which, as vast as it now appears, probably cannot be adequately estimated.

If there is a providence in human affairs, and God has a plan for man's life, who can fail to see how wonderfully Mr. Goodyear was led, by a succession of singular and apparently baffling events, but steadily along all the while, to the accomplishment of the divine purpose. This certainly was the opinion of Mr. Goodyear himself, and it was this thought that sustained him in the darkest hours. "During

these years," (of unprecedented trial,) he says, "my anticipations of ultimate success never changed, nor were my hopes for a moment depressed." He further remarks: "Beyond this, I refer the *whole* to the great Creator, who directs the operations of mind to the development of the properties of matter in his own way, at the time when they are specially needed, influencing some mind for every work or calling."

The yielding up to his creditors of his agricultural inventions also naturally turned his thoughts in another direction, and prepared the way for him to enter upon an entirely different line of experiments. Besides, the loss of credit arising out of his failure, and his continued embarrassments on account of the burden of debt that constantly threatened him, prevented him from forming new business engagements. At this period he says it became a serious question what he could do

with any prospect of success. Foreseeing that he would not be likely to shake off the epithets of "inventor," "mechanical genius," or "visionary," which terms are generally considered of similar meaning, and directly opposed to money getting, he determined, all things considered, to make a profession of invention. So completely was he hemmed in by his pecuniary difficulties that he could not hope to recover himself by any ordinary business; he therefore sought some new field of enterprise, suited to his capacity and congenial to his tastes.

He did not even remain inactive while engaged in the perplexing task of closing up the affairs of the hardware firm, or even while passing many days in the confinement of the jail. While within the jail limits he perfected an invention, from the sale of which he derived the means of subsistence for himself and family.

It was just at this period, about the year 1831 or 1832, that the manufacture of gum elastic, commonly called India rubber, was commenced in the United States. Mr. Goodyear read with interest all that appeared in the public prints in reference to it, and examined carefully such articles as were made of it as they came under his notice.

CHAPTER V.

GUM ELASTIC.

BEFORE entering upon the period of greatest interest in the life of Mr. Goodyear, we shall be better able to understand the nature and importance of his discoveries by noticing a few facts connected with the substance upon which his experiments were performed. It was at first called Indian or India Rubber, because prepared by the South American Indians, or brought from the East and West Indies, and received the title of Rubber from the fact that its first practical use, suggested by a Dr. Priestly, in 1770, in a work upon drawing, was for the removal of the marks of a lead pencil from paper. Some French scholars, who had been making astronomical observations in South America in

1730, brought back with them the first specimens of the article to Europe.

What wonderful contributions to the wealth and comfort of man were hidden away in the new world, awaiting discovery by Columbus! Here, in addition to the exceedingly rich mines of precious metals, which seem almost to be inexhaustible, were found the potato, Indian corn, tobacco, cotton, immense beds of coal, and last, but not least, India Rubber. The most common name of this substance, describing its great peculiarity, is Gum Elastic; but its proper name is Caoutchouc, pronounced Koo-chook. A substance nearly similar is found in the East Indies, and bears the name of Gutta Percha. There is an almost inexhaustible supply of the different varieties of the tree producing this gum. It is to be found in nearly all the countries lying within and near the torrid zone; but the great market of the world for this material is South America.

At a very early day the Indians of Brazil became acquainted with some of its valuable qualities, and, especially in the province of Para, bordering upon the River Amazon, had been in the habit of manufacturing bottles of it. It was in the form of bottles that it was first carried to Europe and imported into the United States. The Portuguese settlers in South America were the first who turned it to other uses, converting it into shoes, boots, hats, and garments. It was found to be a peculiarly valuable defense, being water-proof, in a country so much exposed to deluging rains and overflows.

The tree from which the gum exudes grows to the height of eighty, and sometimes one hundred feet.* It generally runs up straight, forty or fifty feet, without a branch. Its top is spreading, and is ornamented with a thick and glossy foliage. The gum, which is of a yellowish

* Kidder's Brazil.

white color, and like thick cream, flows out when the slightest cut is made upon the tree. It can be obtained at all seasons, but is considered the best during the months of May, June, July, and August. A camp is established where the trees are most abundant, and early in the morning as many trees as can be attended to are tapped with a blow of a hatchet. A little clay cup resembling a swallow's nest, shaped by the hands of the workmen, is placed underneath the cut. Each tree will have five or six taps. About a gill of fluid is collected from one incision in the course of the day. When collected the fluid is taken immediately to the camp, where preparations have already been made for its use. To make shoes or bottles, or any desired article, a model is shaped out from wood or clay, and is held by a long handle. In the manufacture of shoes they have a wooden last, which is smeared with clay, to prevent the adhesion of the gum.

The creamy liquid is then poured over the last or model, a thin coating adhering to the clay, very much as farmers' wives used to make tallow candles. It is then held over a smoking fire, which gives it the dark color which it usually bears, and at the same time dries the gum. When one coating is sufficiently hardened, another is added and smoked in its turn. In this way any desirable thickness can be secured. When completed the work is exposed for some days to the sun, and remains soft enough to receive impressions upon the outside. During this time the shoes are figured, according to the fancy of the workman, by the use of a pointed iron or stick. The clay forms are then broken out, and the shoes are hung up to dry. When ready for market they are stuffed with dry grass to keep them in form, and shipped to European or American ports. From Para alone there were exported, before the great improvement in the curing of gum

elastic, three hundred thousand pairs of shoes. Great quantities of the gum in the form of bottles and toys were also exported.

It was in 1820 that a pair of these rubber shoes was seen for the first time in the United States. They were brought by a ship into Boston, and handed about as a curiosity.* They were covered with gilding, and very much resembled the shoe of a Chinaman. Soon after a ship from South America brought to the same city five hundred pairs of shoes, thick, heavy, and ill-shaped. The valuable service which they rendered, in defending the feet from dampness, made them desirable, however awkward their appearance, and they were immediately sold. The business rapidly increased, until half a million pairs were annually imported. The great price at which they at first sold excited inquiry as to their production, and Yankee skill soon discovered that the shoes

* Parton, in the North American.

could be made as well, out of the raw material, in New England as in Brazil, and at a very great profit. Immense quantities of the unmanufactured gum had been brought as ballast or freight from Brazil. This could be bought at a very small price. In this way the vast India Rubber business was commenced in this country, and at first paid to those that entered upon it a great profit.

About the same time, in France, threads were cut by machinery from the gum bottles, and were inserted into narrow webs of cloth for the manufacture of suspenders, guard chains, and garters; and in England a thin coating of liquid gum was spread between two thicknesses of thin cloth. This formed the famous waterproof Macintosh overcoats, which long enjoyed a large sale.

In the city of Roxbury, in Massachusetts, there was a large establishment for the manufacture of patent leather. The foreman of

the shop, Mr. Chaffee, in 1830, becoming interested in the improvements that were being made in the manufacture of rubber goods, conceived the idea of dissolving the rubber and spreading it upon cloth, and thus manufacturing a patent leather which should have the additional advantage of being water proof. He found that the spirits of turpentine would dissolve the gum, and that lampblack would give it the right color. He also invented a machine for spreading it upon cloth; and, having made and dried specimens of the article, he and his friends supposed that he had secured an invention of incalculable value. Immediately, a large capital was invested in the manufacture of this cloth, and the Roxbury goods became popular all over the country. Handsomely formed shoes, boots, clothing, and a great variety of goods in immense quantities, were manufactured. New companies were started in Eastern Massachusetts and in different parts of the country.

Several millions of dollars were thus invested in buildings, machinery, and stock. Large stores for the goods were opened in the principal cities, and much attention was given to the new material through the public prints. These accounts met the eye and awakened the inquiring curiosity of Mr. Goodyear.

CHAPTER VI.

OCCASION OF HIS EXPERIMENTS IN GUM ELASTIC

WHILE his mind was aroused by the accounts of the various uses to which the new substance was applied, Mr. Goodyear, in visiting the city of New York, happened to pass the store of the Roxbury India Rubber Company. He stopped to make inquiries in reference to life preservers, with the view of purchasing one for himself. On examining one of them, it occurred to him that he could improve the construction of the tube by which it was inflated. Some months after this, returning to the city, he exhibited to the agent of the company his improved tube, with the purpose of disposing of it to them. Struck with the skill displayed in overcoming the difficulties perceived in the tube, the agent entered upon a confidential talk with Mr.

Goodyear in reference to the serious troubles which were then disclosing themselves in the India Rubber business. He assured him that the whole business was on the eve of ruin, and that a very large compensation would be given to any one who would devise a way to overcome the difficulties they had met in the manufacture and preservation of their goods. The Roxbury Company had manufactured a large quantity of shoes and other goods in the fall and winter of 1833 and 1834, and had sold them at good prices; but in the succeeding summer the greater part had melted, and twenty thousand dollars' worth of goods had been returned to them decomposed, and emitting so offensive an odor as to render it necessary to have them buried in the earth.* Other companies were in the same condition. What rendered the matter more serious, was the fact that it required the test of a year or more—

* Parton.

the return of warm and cold weather—before they could know whether their goods would escape decomposition. These companies struggled on awhile against these appalling difficulties, but finally gave over the hopeless work, having fallen into irretrievable ruin. People became disgusted with an article that melted in the summer and stiffened to a stone in the winter, and would not purchase the goods. In the great speech which Daniel Webster made in the defense of Mr. Goodyear's title to the invention of the only process by which gum elastic has been made a manageable and most serviceable material, he sets forth quite humorously one of the difficulties connected with the use of uncured India rubber. "I well remember," he says, "that I had some experience in this matter myself. A friend in New York sent me a very fine cloak of India rubber, and a hat of the same material. I did not succeed very well with them. I took the cloak one

day and set it out in the cold. It stood very well by itself. I surmounted it with the hat, and many persons passing by supposed they saw standing by the porch the Farmer of Marshfield." But the worse evil was the rotting, and the melting in the heat of summer. The heat of the body would melt or decompose the threads of rubber in suspenders, and those that wore the Macintosh overcoats were obliged to keep them away from the fire. Those that had been interested in the great New England manufactories had been, many of them, ruined by their losses, and the feeling of the community had turned very strongly against the whole thing. The only reliable articles were the old-fashioned Indian made rubber-shoes from the valley of the Amazon.

It was in such a discouraging hour as this that Charles Goodyear felt himself called upon, as by a voice from heaven, to enter upon the

work of redeeming this unfortunate but invaluable substance from the contempt into which it had fallen, and of developing in it those qualities that should make it, what it has become, one of the greatest temporal blessings to the race. Up to this period Mr. Goodyear had known nothing of these difficulties; but he soon learned that this substance "had baffled all the efforts of chemists and manufacturers to divest it of these objectionable qualities. He not unfrequently met with physicians and others, who had made a long course of experiments for this purpose, but who had only met with disappointment." The attention of medical gentlemen had been particularly drawn to the subject from the fact that it promised, if these peculiarities could be obviated, to be of great service to the profession. This opinion has been fully justified by the result. Both the profession and their patients owe a large debt of obligation to Mr. Goodyear for that life of

toil and suffering by which his invaluable discovery was secured.

In all these disheartening difficulties, meeting him at the very commencement of his undertaking, himself a bankrupt, and constantly exposed to arrest for debt, suffering always from a chronic disease, a little family dependent upon him, his friends without confidence in the probable success or importance of his proposed study, he was encouraged and sustained in his efforts by the "reflection, that that which is hidden and unknown, and cannot be discovered by scientific research, will most likely be discovered by accident if at all, and by the man who applies himself most perseveringly to the subject, and is most observing of everything relating thereto." "This," he very properly adds, "is corroborated and illustrated by the circumstances attending this discovery." It was known that rubber would soften in the sun's rays at one hundred degrees

Fahrenheit, and could be melted at a heat of two hundred degrees. "No one," he adds, "who had any knowledge of the nature of the gum would be likely to apply a high degree of heat to it, from design, for the purpose of divesting it of adhesiveness, when it was known that it would melt at a low temperature." And yet the grand discovery, which was one of those marvelous accidents that seem to deserve rather to be called a divine providence, revealed the fact that a very high degree of heat, (which is so destructive to the native gum,) in connection with the use of sulphur, the necessity of which was as accidentally revealed, is the very thing that places this remarkable agent beyond all the liabilities that render it so difficult to manage. It becomes, by this singular process, pliable and indestructible in all weathers and under almost all circumstances. It certainly is not a matter of wonder, in view of all these peculiar circum-

stances, that Mr. Goodyear felt, as he looked back upon his life, that he had been led by a divine hand, or difficult to believe, in the extraordinary courage and constancy that he manifested through so many trying years, that he was inspired by a higher Presence, and felt that he was commissioned for an important service in behalf of his fellow-men.

It is an interesting fact, suggested above by Mr. Goodyear, and noticed by Mr. Parton in his sketch of Mr. Goodyear's life in the North American Review, that many of the most valuable inventions now in use were discovered not by scientific men, but by practical, and often humble minds engaged in constant and often daring experiments. It had been known for a long time, to physicians and chemists, that certain gases produced a singular effect upon the nervous system, and that, when breathed into the system, a person becomes highly excited and unconscious of his acts; but it was left to a

young dentist, (Wells, of Hartford,) who had not enjoyed a scientific training, but was observant in his habits, and felt the value in his profession of some process for relieving the nervous terror of his patients under the operation of the forceps, to notice, when a young man had recovered from the effects of exhilarating gas, that he was not conscious when he received the wounds and bruises caused by the struggles and violent exercises which he had passed through while under its influence. At once the great truth flashed upon him, that by breathing gases of this character insensibility to pain could be produced long enough to admit of surgical operations. He took the great responsibility of trying the first experiments, and soon the additional steps in this marvelous discovery were made—the choice of the safest articles for inhalation; and thus was introduced the greatest advance ever taken at one time in the healing art. Mr. Parton refers to

the invention of the steam-engine, and says of James Watt, "that while he modestly ascribes to Professor Black (of Glasgow) part of the glory of his improvements in the steam-engine, it seems plain from his own narrative that he made the great invention of the condenser without any assistance. It was simply a flash of genius that made it what we now see it, and was wholly his own. Science could give him the occasion of the defects of the old engine, but no hints as to the remedy. It was James Watt, mathematical instrument maker, earning fourteen shillings a week, who brooded over his little model until his conception of the condenser burst upon him as he was taking a stroll across Glasgow Green."

European chemists had thoroughly analyzed the gum, and developed its natural qualities. Ure, in his valuable Dictionary, had collected and presented the scientific facts which careful investigation had suggested, but no one of all

the learned chemists had intimated even the direction in which the solution of the great difficulty attending its practical use was to be discovered. Mr. Goodyear had an unknown sea to traverse, without chart or compass to direct him in his course

CHAPTER VII.

THE FIRST EXPERIMENTS.

It was significant both of the fortune and of the character of the man, that his first experiment was made in prison. He was arrested upon a suit growing out of his Philadelphia failure, soon after he returned from New York, (as he was often afterward during this memorable period of ten years,) and compelled to reside within jail limits. He did not allow this, however, which would have been enough to discourage an ordinary man, to hinder him in his new undertaking, but entered at once upon his experiments. It was a happy circumstance for him that the material upon which he was now to operate was not expensive. "Fortunately," he says "the substance is one with which, in experi-

menting, fingers are better than any other mechanical power of the same force; and these formed the only mechanical power of which I had command during the first two years of my experiments, and that by which I mixed and worked many hundred pounds of gum, afterward spreading it upon a marble slab with a rolling pin. Thus, owing very much to the plastic nature of the substance, in extreme poverty, I was able to persevere in my course against all obstacles."

Among many experiments undertaken at this time for drying and curing the gum, he was much elated with the success of one which seemed every way satisfactory at the time. By mixing half a pound of magnesia with a pound of the gum, he secured a compound of a white color which was very desirable for many purposes, as only black goods had heretofore been in the market. The surface seemed to dry thoroughly, and the unpleasant stickiness

of the gum, under the heat of the sun, appeared to be overcome. The expectation proved, however, after a period, to be unfounded; for, ultimately, the compound softened and fermented. But at the time it was supposed by himself and his friends that his success warranted him in the attempt to enter upon the manufacture of the goods.

It was necessary that he should have a home for his little family, and in this hour of need a gentleman of New Haven,* whose kindness he was in after years permitted fully to return, offered him valuable assistance. He took a cottage in New Haven, and once more collected his family around him.

The daughter, whose recollections cover the whole of the most eventful period of her father's life, recalls very vividly their mother's pleasure when permitted once more to gather her little family together around her own table.

* Ralph B. Steel, Esq.

He recommenced, upon a small scale, his work upon the peculiar material which was not again to leave his hands unemployed until his earthly labor was finished. His first manufactured goods offered to the trade were rubber shoes, as these required the least skill in their construction and found the readiest sale.

This was the beginning, also, of the family employment in the manufacture of rubber articles; father, mother, and children, as their age permitted, from this time, through years of protracted experiments and of remarkable endurance and sufferings, engaged in common labors. His oldest daughter recollects, with feelings of proper pride, that in after days she made, herself, the first pair of vulcanized rubber shoes ever constructed. Three or four young women were employed, and boarded in the family.

"It was at this time," says his daughter,

"that I remember beginning to see and hear about India rubber. It began to appear in little patches upon the window panes and on the dinner plates. These patches were peeled off when dry. Pieces of printed muslin were covered with transparent gum. The first article made, which I recollect, was a purse, finished with a steel clasp, which I took with me to school; and the intelligent appreciation of my father's experiment, by the teacher at this time, upon its being shown to her, is gratefully remembered. Father took possession of our kitchen for a work-shop. He would sit hour after hour, working the gum with his hands."

Mr. Goodyear could not confine himself to manufacturing. This was entered upon simply to secure his daily bread. His appropriate work was inventing, and to this he went at once, before the success or failure of his manufactured goods was demonstrated. Assisted by two workmen, he began his experiments in

life-boats. He constructed several of these, made light and buoyant by tubes of tin, in one of which his daughter remembers to have been taken to sail. With his life only, he closed his studies in this direction. As we shall see, he constantly recurs to this line of experiments, seeking by a great variety of inventions to secure facilities for rescuing lives exposed to the perils of the sea.

In his India-rubber work he, at this time, dissolved the gum in spirits of turpentine, and colored it with lampblack; magnesia was added to harden it. It was spread upon flannel, and out of this substance the shoes were made. They were handsomely embossed, and were at the time, and would be now, considered beautiful. But after a season of trial the gum softened, as in previous experiments, and the beautiful overshoes proved to be a failure. This was in the winter of 1835 and 1836.

Mr. Goodyear now thought that the great difficulty was in the spirits of turpentine by which the gum was dissolved, and he considered himself very fortunate at this time in finding in the market forty or fifty barrels of India-rubber sap, among which were a number of casks in which the gum had not thickened. It was said to have been kept in that state by mixing a small quantity of alcohol with it when it was first barreled. With this Mr. Goodyear hoped to succeed in drying the gum, so that it would not decompose and become worthless, as in previous experiments.

The Irishman that he had taken into his service understood the previous difficulty, and learned the expectation of his employer in reference to the new material. He thought he would anticipate him in the experiment. On the arrival of the liquid gum, Jerry, at night, opened one of the barrels, and on meeting his employer at the shop in the morning, intimated

to him that he had stolen the honor of the first experiment, and that a Yankee was not so good at invention as an Irishman; at the same time he pointed to the trowsers he had on, which he had dipped in the barrel of sap. The work seemed to be so completely and satisfactorily performed that at first it looked as if the problem were solved, and the long-desired improvement in gum elastic secured. Soon after, Jerry sat down to his work of mixing gum before the fire, and, on attempting to rise again in a few moments, found himself fastened to the seat with his legs stuck together. On being drawn from his novel trowsers, by the assistance of others, and to their no small amusement, he expressed himself satisfied with his experience as an inventor.

This experiment showed clearly that the stickiness belonged to the gum itself, and was not a consequence of its manufacture.

The failure of these early experiments was

very disheartening; the most painful feature of the whole, however, was the effect of these disappointments upon his friends. He had previously given them sanguine assurances of his success. "They now became," he says, "entirely discouraged, and declined rendering him further assistance for such purposes, and those who had afforded his family supplies signified that they could do so no longer. At this period he was unable to meet his current expenses; he therefore sold, for the payment of those who had afforded him assistance, the little furniture he possessed."

He now found a boarding place for his family in a retired part of the country, and left, as security for the unpaid rent of the cottage he had occupied, the linen which had been spun by his wife. During his absence from home this was sold at auction for the payment of the debt, causing the family keen regret, not so much on account of its intrinsic value, as the

loss of a memento of days now forever departed, when the daughters of New England spun their own linen, and fathers and brothers were clothed in the manufactures of their own household. Trying family afflictions added to the heavy burdens that now weighed upon the heart of Mr. Goodyear. He lost a little son at this time, and another was brought down to the verge of the grave.

This discipline he bore submissively. He had implicit confidence in the wisdom and goodness of God, and calmly received, as from the hand of a Father, whatever providence it pleased him to send. In all the anxiety and disappointment attending his life during this period of peculiar trial, his faith never wavered in the conviction that God was leading him to certain results. His family devotions were regularly observed, and his piety was unblemished by any relaxation of his high standard of Christian duty.

After securing this new home for his family he left for New York, to commence afresh and alone his experiments upon rubber.

On arriving at the city a friend kindly furnished him with a room where he could continue his experiments, and a druggist, with whom he was acquainted, supplied him with the drugs required in his work. Here, as hopeful as ever, he began his labors again. Mr. William De Forest, his former tutor and brother-in-law, who had not seen him for a long period, met him one day in Gold-street. He was surprised at his appearance. He looked worn, his apparel was rusty, and he bore the unmistakable marks of poverty. His hands were covered with gum elastic. He said playfully that "he did not know how to rub India rubber off," and added that "there was only one way, by rubbing more on." He invited Mr. De Forest to his room. It was up three flights of stairs: a little room filled up

with kettles, white lead, gum shellac, and gum elastic.

"William," said the man with the seedy coat and the besmeared hands, "here is something that will pay all my debts and make us comfortable." The scene was doleful enough to the brother-in-law. "The India rubber business," said Mr. De Forest, "is below par;" "and I am the man to bring it back again," was the confident answer, as he pulled from his pocket a piece of white rubber.

Being led to suppose that the decomposition of the gum, from which he had suffered in his experiments in New Haven, was caused by the use of turpentine, he thought he had discovered a remedy by boiling the articles, compounded with magnesia, in quick lime and water. His hopes were greatly raised by his apparent success. The adhesive quality of the gum seemed to be destroyed. He manufactured some very beautiful fancy articles. The improvement

was supposed to be complete, the surface of the articles was quite dry, having much the same appearance as the present vulcanized rubber. He manufactured, for the first time, thin sheets of the gum. Heretofore it had always been spread upon cloth. Nothing could exceed the smoothness and firmness of these transparent and elastic sheets. Children's toys beautifully embossed, globes, and a great variety of useful and ornamental articles, were manufactured of this compound. He was so intent upon his work that he had articles of clothing made of the gum, and exposed them to the severe test of daily wearing. A gentleman in the city being inquired of, how he might recognize Mr. Goodyear, was answered, "If you meet a man who has on an India rubber cap, stock, coat, vest, and shoes, with an India rubber money purse *without a cent of money in it*, that is he." For this improvement he obtained a patent. It excited much favorable remark in the public

prints; and for the goods which he offered as specimens, he obtained medals at the fairs of the Mechanics' and American Institutes in the autumn of 1835.

While securing these flattering notices, the inventor observed with pain that a drop of weak acid falling upon his goods neutralized the lime, and made the beautiful surface as sticky as ever. Without depressing him, this discovery only inspired him with fresh courage to enter upon his experiments again.

His eldest daughter now joined him as a companion in New York. They took attic bedrooms in a small hotel. He obtained access to the mill of a Mr. Pike in that part of New York then called Greenwich Village. Here he prosecuted his experiments, often preparing his gallon jug at his room in Gold-street, and carrying it upon his shoulder, on foot, to the mill, a distance of three miles.

His next improvement was more substantial,

and afforded him considerable aid by the sales he was able to make. While preparing material for ornamenting some gum elastic drapery, which was made by boiling lime with bronze, the mixture not producing the desired effect, he applied nitric acid, for the purpose of eating out the bronze. This discolored the specimen and he threw it aside. Some days afterward, thinking of the circumstance, it occurred to him that he had not sufficiently examined the unusual appearance of the article. He found that a remarkable change appeared to have been made in the India rubber. The surface of it had indeed been cured, as he called it, or experienced the same change that he afterward secured, by his final experiments, in the whole substance of the rubber. The cloth which he now prepared by this new process was far superior to anything previously made, and bore a degree of heat that rendered it useful for many valuable purposes. In a few

months he was able to manufacture as elegant specimens of rubber goods and toys as have ever been made since.

When he had satisfied himself that he had met with positive success in his experiment, he came to his rooms, and meeting his daughter in the attic hall, asked her if she could keep a secret—a singular question to ask a young lady. Upon her affirmative assurance, he told her he had made the great discovery, how to cure India rubber, and had succeeded in destroying its adhesiveness.

A patent was taken out for this. Considerable attention was attracted toward it. Eminent chemists published certificates confirming his pretensions, and public institutions sent him their medals. He visited Washington, and exhibited his specimens to President Jackson, who in his own characteristic handwriting and style wrote him this note, the original of which is before the author as he copies:

"WASHINGTON, *4th March*, 1837.

"DEAR SIR: I have received, through General Upton of the Senate, your note conveying a print on gum elastic, and specimens of the pure gum designed for bandages for wounds and other useful purposes. I thank you for these samples of your skill in the new art in which you are engaged, and which I have no doubt will be found useful in a great variety of ways. I can only wish you success in the prosecution of your useful labors, and assure you that the sentiments of kindness which you express are cordially received and reciprocated by your humble servant,

"ANDREW JACKSON."

"MR. CHARLES GOODYEAR."

Henry Clay wrote the following letter, which was signed by himself and J. C. Calhoun:

"WASHINGTON, *8th March*, 1837.

"DEAR SIR: We have received and return you many thanks for the prints upon gum

elastic parchment, and your card upon a specimen of pure gum without cloth, which you have done us the favor to send us. From the limited opportunity which we have had of examining this new use of a material which has suddenly risen into great importance, it seems to be admirably adapted to the purposes to which you have applied it. The public is much indebted to you for the advantages which it will derive from this exercise of your ingenuity.

"We have doubted the propriety of Congress, or either branch of it, becoming the recipients of individual gratuities, such as you propose to offer to the acceptance of the Senate. But if you think proper to tender it, perhaps it will be best to address it to the presiding officer, who will lay it before the Senate.

"We are, sir, gratefully and respectfully, your obedient servants, etc."

He had maps beautifully printed upon sheets of this cured, transparent gum, and engravings were also successfully transferred upon the same material.

While carrying on his experiments secretly, perfecting his discovery before taking out his patent, Mr. Goodyear came very near being suffocated by the gas generated in a close room. He escaped death, but was thrown into a fever by the accident. Dr. Joseph Bradshaw, a skillful physician, attended him during this sickness. Mr. Goodyear had previously formed a pleasant acquaintance with this gentleman, and the doctor had taken great interest in the discoveries of his patient. He was particularly struck with the specimens of goods made upon the last process, which, from the new element used, the inventor termed the "acid gas" process. Doctor Bradshaw soon after made a visit to his friends in England, and kindly offered to take specimens to the manufacturers of rubber

goods, and to make arrangements with them for the benefit of Mr. Goodyear. An assortment of his latest manufactures was sent with the the doctor, and they were much admired by those that saw them, but no further result was attained. It is doubtful if any India rubber goods have since been made, in any country, equal, in beauty of design and execution, to the maps, engravings, charts, etc., sent to England at this time.

His improvement in the manufacture of elastic goods had secured to such a degree the confidence of the community, that he found no difficulty in obtaining a partner,* with sufficient capital to enter upon the manufacture of rubber goods. Success now appeared to be certain. A building, with steam power, was hired in Bank-street, and shoes, life preservers, articles of clothing, and a great variety of useful and ornamental goods, were manufac-

* Mr. William Ballard.

tured. About the same time a large factory, with its machinery, situated on Staten Island, was engaged, and a warehouse also in Broadway, for the sale of the goods.

The trials of this long-suffering and persevering man seemed to be drawing to a close, and an almost unlimited opening for a successful business appeared before him. He removed his family to Staten Island, that he might once more enjoy the comfort of his own home.

An unexpected trouble now broke upon him, and swept away all his prospects of success. The memorable and general failure in business occurring at this time—1836, 1837—rendered a new enterprise impossible, and swept away the entire fortune of the gentleman with whom he was associated. This disaster left Mr. Goodyear pennyless, and took away his only resource for providing bread for his family. The community attributed the failure, not to its true

cause—the loss of means on the part of the manufacturers, but to the want of merit in the improvement, and turned a cold shoulder to all the propositions of the still sanguine inventor, to invest money in his patents.

At the factory, having access to the machinery upon which prints had been previously manufactured, Mr. Goodyear succeeded in printing finely, in colors and in bronze, some piano and table covers and ladies' aprons, which brought them, by their sale, a little food. The intelligent, patient, devoted mother of the family at this time made, with her own hands, the first globes constructed from the pure gum. It was a constant struggle to provide for the family from day to day. Mr. Goodyear's brother Robert, who, with his family, was then living with them, with his hook and line made the adjoining sea contribute to save them from utter destitution. Mrs. Goodyear, with wonderful ingenuity, manufactured from the scraps of

pasteboard left from her husband's experiments, the bonnets which they wore to church.

We now enter upon the darkest hours in Mr. Goodyear's experience. Had he not been sustained by a confidence in the Divine Providence, amounting almost to inspiration, he would have abandoned a pursuit that yielded him only, and constantly, disappointment, and had now brought him to the verge of beggary.

CHAPTER VIII.

THE HOUR OF TRIAL.

MR. GOODYEAR had absolutely nothing to depend upon now but the few articles of furniture that remained to him, and which, one after another, were exchanged for bread. He pawned his umbrella to Mr. Vanderbilt to secure ferry tickets to the city. He relates, as an illustration of the kind providence that he never failed to notice, that one day he had put into his pocket a small article which he greatly valued, and went out for the purpose of obtaining food with it. Before reaching the pawnbroker's shop he met a man to whom he was indebted, and from whom he expected to receive bitter reproaches. But what was his astonishment to be accosted with the question, "What can I do for you?" On becoming sat-

isfied that he was not mocking his helplessness, but was sincere in his proffers, he told him that he was in search of food, and that fifteen dollars would greatly oblige him. The money was immediately forthcoming, food was obtained, and the prized article was saved for a more distressing hour. They were reduced to one set of teacups of the value of fifty cents. These were washed up after breakfast, and used by the still diligent and hopeful experimenter for the mixing of his gum elastic compounds.

About this time his brother-in-law, Mr. De Forest, met him near Holt's Hotel. He looked sad. "Give me ten dollars, brother," he said; "I have pawned my last silver spoon to pay my fare to the city." "You must not go on so; you cannot live in this way!" Mr. De Forest said to him. "I am going to do better," was his characteristic answer.

A small loan from a friend relieved him from immediate suffering, and enabled him to look

around for some new opening for the development of his inventions. The large factory which had been engaged upon the island was standing unoccupied, and he tried to induce the stockholders to take hold of it again and use his improvements in the manufacture of rubber goods. But their previous experiments in the gum had been so disastrous, that, during the six months he was upon the island, he could not persuade one of the proprietors to look at his improvements, or even to visit his own property at the factory.

About this time he met, at the store of the agents of the Roxbury Rubber Company, Mr. J. Haskins, one of the stockholders of the company, who examined with much interest the samples of the goods Mr. Goodyear had manufactured by his new process. Mr. Haskins invited him to come to Boston, and proffered him all the aid in his power; a pledge that he did not forget.

During the many painful years of trial and disappointment that followed his removal east, Mr. Goodyear found in Mr. Haskins an interested co-laborer in his work, and one ready to aid, according to the measure of his ability, even after he had met with repeated losses himself in the rubber business; loaning him money when others refused him, and encouraging him when it was thought foolishness in the extreme to have anything to do with a business which proved unvaryingly so disastrous.

Mr. Goodyear, finding that the effort to induce the India rubber men of New York to resume the business was unavailing, and having secured another small loan of money, with a package of his best specimens, started for Roxbury, Massachusetts, the fountain-head of rubber manufactures, where immense amounts of money had been invested and lost in the business.

He found friends here who had known him

in the hardware line, who generously forwarded his designs as far as they had ability.

Mr. Chaffee, whose inventive genius had given the business its first great movement, was particularly interested. He admired his specimens, and encouraged him to persevere. Mr. Chaffee, supposing, as had Mr. Goodyear, that the adhesiveness of the goods arose from the use of turpentine, had invented heavy machinery, which had been constructed at great expense, for the purpose of dissolving the gum without its use. The experiment seemed successful for a time; but, as we have seen in the experiments of Mr. Goodyear, it was ultimately discovered that the stickiness was a quality of the gum itself, and not occasioned by its solvents. The temporary revival of the trade, which followed the new method, subsided, when the old difficulties appeared again.

Messrs. Chaffee and Haskins secured assistance for Mr. Goodyear, and gave him the use

of the valuable machinery standing idle in their factory.

Again prosperity seemed to smile upon the persevering inventor. He discovered a new method of constructing rubber shoes, for which a patent was granted. This he sold to meet his immediate wants, a course he was obliged to pursue with many of his improvements, thus cutting himself off from any continued profit from them.

The Providence, Rhode Island, establishment, that bought this patent, long after successfully manufactured shoes under it. He made also pianoforte covers, tablecloths, and carriage-cloths, superior to any that had been previously produced in the United States. The demand for the goods enabled him to sell licenses for their manufacture to other companies. His profits in a single year amounted to four or five thousand dollars. He removed his family to Roxbury, and entered with all his accustomed

enthusiasm, both upon the manufacture of goods, and upon his studies for further improvements in the process.

It was a wonderful change for his little family, from the borders of absolute want to the comforts of the home which the apparently successful father had now provided for them. A very small portion, however, of the money received for his beautiful goods and licenses was used to administer to their pleasure, or even comfort. An exchange, at the little grocery near them on Staten Island, of a piece of muslin, that was not so much needed at that moment, for some patterns of print, answered the anxious question how the children were to be provided with something to wear when called to their new home in Roxbury. They were delighted, when taken into their pleasant rooms in the Norfolk House, to find the tables loaded with specimens of the beautiful fabrics which their father had already prepared for exhibition,

and the parlors constantly visited by intelligent people, who were greatly interested in examining them.

Mrs. Goodyear preserved her simple and economical habits. She waited upon the services of the sanctuary, and attended the meetings of the benevolent societies of the church where they worshiped, with her well-dressed friends, clad herself in plain calico.

Her daughter still remembers the delight she felt, occasioned by the gift to her mother of a black bombazine dress, by an old gentleman who had become interested in the family. About this time her mother made for this daughter a dress of brown silk, which had been used to emboss India rubber, and this remained her chief dependence during the years of poverty which followed, and is still treasured as a relic of those days.

These simple family recitals are preserved to show that all the means secured by this

earnest man, whose life we are recording, from the sale of his inventions, instead of being devoted to the present enjoyment of his family, or invested for their future support, were immediately given to the one great mission of his life, the development and application of this peculiar natural product.

In the summer of 1838 he became acquainted with Mr. Nathaniel Hayward, of Woburn, Massachusetts, who had been employed as foreman of a rubber company which had existed in the town, but which had failed and been disbanded. Mr. Hayward had the use of the factory, and manufactured a few articles on his own account. He had a process of hardening and drying the gum by placing a small amount of sulphur in it, or by spreading a small quantity over it, and submitting it to the heat of the sun. This process Mr. Hayward, who was an uneducated man, said was revealed to him in a dream.

The same result, probably unknown to Mr. Hayward and to Mr. Goodyear, had been obtained, after long and careful experiments, by a German chemist, and was published in a treatise, prepared only for those engaged in the rubber manufacture, and entitled, "A History of India Rubber." In this volume the scientific author, Dr. F. Leudersdorff, points out the various difficulties, arising from the decomposition of the gum, which had been experienced by American manufacturers, and attributes them to the resinous properties of the oil of turpentine; and this, he thinks, he has succeeded in correcting by the use of sulphur in small quantities. As was practiced by Mr. Hayward, without any clear comprehension of the chemical cause for the result, this German chemist directed that where the surface, by exposure, had begun to decompose, finely powdered sulphur should be strewn upon it and rubbed in, and asserted, that in this way the fabric

would be rendered dry and serviceable. Dr. Leudersdorff had not discovered the still fatal objection to this process, that, while it cured the surface, the interior of the substance preserved its original quality, and was constantly exposed to decomposition.

The process of Mr. Hayward, however, had not attracted the attention of the rubber manufacturers in this country, or even of the company that had employed him, and it had the serious objection of causing a very disagreeable smell whenever it was used. Mr. Goodyear noticed that its effect upon the surface of the gum was much the same as that produced by his "acid gas" process, and for the reason, (although it did not strike him at the time,) that nearly the same chemical elements were used in both processes, in different combinations; the sulphuric acid, and the sulphur and the sun, both producing common results. For a small consideration, Mr. Good-

year purchased the patent which Mr. Hayward had taken out for his sulphur drying invention. He also occupied the Woburn factory, and employed Mr. Hayward in the manufacture of life-preservers and other articles by the two modes they had discovered.

The sulphur drying had awakened the curi osity of Mr, Goodyear, and, with the fine machinery of his Roxbury factory, he entered upon a series of new experiments with the use of this substance.

It is not a matter of surprise that he began now to feel that he was about to realize the fulfillment of his highest expectations. The public, although often, heretofore, deceived and disappointed, sympathized with him in his confidence that his improvements had overcome the final and chief obstacle to the universal use of rubber, wherever its peculiar qualities were required. He made at this period many novel and useful applications of the

prepared gum. He had newspapers printed upon thin sheets of it, and many fancy articles.

With the prospect of a considerable and an increasing income, Mr. Goodyear hastened to gather his family around him, to share with him the prosperity with which Providence seemed about to crown him. His aged parents and his two younger brothers, who had suffered with him in his failure in business, now joined him.

But God had further trials in store for him. Continued success in his present undertaking would have delayed, if it had not forbidden, the final and great discovery by which this substance has been made so invaluable and of such extensive use. It is hard necessity that, with God's blessing, becomes the mother of invention.

While the public had become satisfied with the result of his experiments, and the inventor himself imagined that he had done all he

could to improve the material, he was led to discover, by a very serious and painful test, that he had not accomplished as much as he hoped. He and others had supposed that the whole body of the gum was cured by the process which had secured such a smooth, dry, and beautiful surface. He was soon to find that while the surface was indeed changed, just below this the gum retained all its natural and peculiar qualities. This fact was now to be revealed.

His beautiful goods had attracted so much attention, that the government gave him an order for a hundred and fifty India rubber mail bags. This fact was generally known. Mr Goodyear was confident of success, and took no pains to conceal his contract. It was an invaluable public advertisement of his manufac tures, and if his work proved satisfactory, his invention would be admitted to be a complete success. The mail bags were completed in the

summer season, and were exposed for inspection about the factory. They were beautiful in form and color, and excited great admiration among the numerous visitors that came to inspect them. He was called away by his business for a few weeks from home, and when he returned what was his consternation to discover that his admired mail bags were decomposing and dropping from their handles. He had been in the habit of using, in his later experiments, white lead, vermilion, and other coloring substances; and in order to give his bags an appropriate leather hue, he had introduced them freely into their composition. These proved deleterious as the gum was then cured; after his final invention he was enabled to use them again freely and safely. He very properly remarks, "that had it not been for this misfortune from the use of these articles, in all human probability the vulcanizing process would never have been discovered."

This well-known and unqualified failure was the deathblow to his opening prospects. The public, so often made the victims by unsuccessful experimenters in this article, seemed to become utterly disgusted with the business and the material. Mr. Goodyear had manufactured and sold throughout the country several thousand life preservers, colored by the use of the same substances which he had employed in his mail bags, and these after a short time began to decompose. "And that," as he says with affecting simplicity, "which he had represented as a useful discovery, and which was so in fact, was pronounced by the public to be a complete failure. Instead of realizing the large fortune which, by all acquainted with his prospects, was considered certain, his whole invention would not bring him a week's living." From a condition of comparative ease and comfort, he was once again reduced to absolute want. Everything

he possessed of a salable character was sold at auction for the payment of his debts. Once more he had the pain of seeing his aged parents and family, through his misfortunes, stripped of their means of support. It is not a matter of astonishment that they should now think his unsuccessful experiments had been carried far enough. He had spent four years in fruitless attempts to make improvements in a substance that had baffled, thus far, all the ingenuity of inquiring minds, and ruined everybody that had meddled with it. An immense amount of capital had been sunk by it; and the community had become so exasperated by their losses that they could hardly endure the mention of it. Mr. Goodyear had yielded his undivided attention to it, doing nothing besides. "It was generally agreed," he says, "that the man who could proceed further in a course of this sort was fairly deserving of all the distress brought upon himself, besides being

justly debarred the sympathy of others." His friends advised his return to his old business in hardware, in which he was an accomplished merchant, and which promised him some positive return for his labor. He must choose at once either to enter upon another line of business, or continue in this suffering and weary course of experimenting; not merely exposing himself to discomforts, but bringing down upon the innocent heads of his family untold miseries. What a dilemma was this! How could he hesitate what to do? A stronger than a human hand guided him in the path he took, and a voice, that others could not hear, penetrated his soul: "This is the way, walk ye in it." So he turned aside from the respectable business to the depressing, but important, experiments of the "visionary" inventor.

With the assistance of his family, he manufactured a few articles by the old process, and by this means, with his familiar resort to the

pawnbrokers, he managed to eke out a humble living.

If his experiments had required any capital, beyond a small sum required to purchase his raw gum and simple chemicals, or any machinery, or any assistance, outside of his own family, he would, from necessity, have been compelled to yield to the entreaties of his friends or to the absolute impossibility of obtaining the required facilities. No companies nor individuals were willing longer to throw away their money upon such an apparently hopeless undertaking.

So far from despairing under this fearful pressure of poverty and responsibility, he says of himself at this time, "the inventor now applied himself alone, with unabated ardor and diligence, to detect the cause of his misfortune, and, if possible, to retrieve the lost reputation of his invention; and, as had happened on former occasions, he had hardly time enough to

realize the extent of his embarrassments, before he became intently engaged with another experiment, and his mind buoyant with new hopes and expectations; which, as it afterward proved, were to be, for this time at least, more than realized."

The effect of the sulphur upon the surface of the gum had greatly excited his interest, and he pressed his experiments in this direction.

He had removed his family to Woburn, and was closing up the business of the factory. As he permitted no time to be lost, he was still carrying on his experiments in his own house. He made a workshop of his parlor, and here with his family he manufactured rubber shoes. Two feeble men were employed in the business, who could only perform light work, and by medical advice were using a bread and milk diet, so that they were content with the limited fare of their employer. In all their extremities this family was always a happy one. The

hopeful and devout mother never murmured for the lack of anything that might add to their comfort, but was ever reminding them to be grateful for what they had and trustful for the future. They needed the discipline they were suffering, she said, because they might have been themselves, heretofore, uncharitable in their judgment of the poor.

Mr. Goodyear, amid all the pressure of his cares and the constant struggle of his mind to solve the difficult problem upon which he was studying, was always genial in his family. He had a keen sense of the ridiculous, and enjoyed a hearty laugh even at the expense of their poverty. His little Willie, then two years of age, once tried to put on his shoe by crowding his little fat foot through the big hole in the toe of it. This trifling incident greatly amused the father, and he often told of it in brighter days.

Mr. Goodyear was now trying to discover the effect of heat upon the same compounds

out of which his mail-bags were made. His brother, and a number of individuals who were acquainted with the nature of the gum and its manufacture, were sitting in his kitchen with him one winter evening about this time. While engaged in his usual discussion about his experiments, and making a rapid gesture in his earnestness, a piece of gum, which he held in his hand, accidentally came in contact with the hot stove. As the gum in its natural state melts at a low degree of heat, what was his astonishment to notice that it charred like leather without dissolving. No portion of it was sticky.

His daughter says: "As I was passing in and out of the room, I casually observed the little piece of gum, which he was holding near the fire, and I noticed also that he was unusually animated by some discovery which he had made. He nailed the piece of gum outside the kitchen door in the

intense cold. In the morning he brought it in, holding it up exultingly. He had found it perfectly flexible, as it was when he put it out. This was proof enough of the value of his discovery."

Of this great hour of discovery, the turning point in his life, although terrible years of patient endurance of suffering and want were before him, Mr. Parton remarks: "To say that he was astonished at this would but faintly express his ecstacy of amazement. The result was absolutely new to all experience. India rubber not melting in contact with red-hot iron! A man must have been five years absorbed in the pursuit of an object, to comprehend his emotions. He felt as Columbus felt when he saw the land bird alighting upon his ship, and the driftwood floating by. But, like Columbus, he was surrounded with an unbelieving crew. Eagerly he showed his charred India rubber to his brother, and to the other

bystanders, and dwelt upon the novelty and marvelousness of his fact. They regarded it with complete indifference. The good man had worn them all out. Fifty times before he had run to them, exulting in some new discovery, and they supposed of course that this was another of his chimeras." This was in the early months of 1839. When, by a series of experiments, he had satisfied himself that he had discovered a process of curing the rubber entirely through, and that the new substance resisted heat and cold and the strongest acids, before he had convinced another person, or received the slightest return for all his toil, he says, "I felt myself amply repaid for the past, and quite indifferent as to the trials of the future." It was well for him that he did, for it was only after two full years, passed in the most distressing circumstances, that he was able to convince *one* person, out of his immediate family circle, that he had made a valuable discovery.

This charred rubber was not in a serviceable condition, and, on this account, failed to attract the attention of any one but the enthusiastic inventor; but he inferred, very prophetically, that if the process of charring could be stopped at the right point it would divest the gum of all its native adhesiveness. Upon further trial he was convinced of this, by noticing that the rubber could not be melted in boiling sulphur at any heat, but always charred. He also noticed, in trying the experiment before an open fire, that around the border of the charred substance there was an edge of the fabric not charred but perfectly cured. The question now was, what degree of heat should be used? The difficulty of reaching this discovery will be seen when it is stated that, "at the present time it takes an intelligent man a year to learn how to conduct the process with certainty, though he is provided from the start with the best implements and appli-

ances which twenty years' experience has suggested." *

The first successful experiment was tried in his own house, assisted by his family. He made up a large fire in his bedroom, and before it he cured a square yard of rubber cloth. As it was his custom to test his experiment by wearing, he had it made up into a vest and cap.

Thus the two greatest improvements in rubber seem to be the results of pure accident. They occurred indirectly, and would have attracted no attention save from the mind of one who allowed nothing connected with his experiments to escape his notice.

The circumstance suggesting it, as he properly remarks, was like the falling of the apple to Newton. "It was suggestive of an important fact to one whose mind was previously prepared to draw an inference from any occur-

* Parton.

rence which might favor the object of his research." With Christian humility he properly adds, "It may, therefore, be considered as one of those cases where the leading of the Creator providentially aids his creatures, by what are termed accidents, to attain those things which are not attainable by the powers of reasoning he has conferred upon them."

To avail himself of the steam-power of Mr. Haskins' rubber establishment in Lynn, in trying the experiment of curing the gum by steam, he removed his family to this town; and after a short period returned to Woburn, all the while prosecuting alone the inquiry as to the best form of applying heat, and the exact degree of it, to secure the highest results.

But now the greatest of all the difficulties he had to surmount stood directly across his path in the hour of his positive success. His means were utterly exhausted: his friends had become impatient at what seemed to them his reckless

obstinacy, and could not bear to hear the word India rubber named in their presence. "It was certain," he says, "that nothing could be done to restore the confidence of the public in the vicinity of Boston, or to induce them to establish the business for a long time to come, and it would have been useless to visit any other part of the country for this purpose, even if he had the means, without specimens large enough to be used, so as to prove the utility of the invention." But here occurred another difficulty. "His experiments could no longer be carried on with a few pounds of India rubber, a quart of turpentine, a phial of aqua fortis, and a little lamp black. He wanted the means of producing a high, uniform, and controllable degree of heat, a matter of much greater difficulty than he anticipated. We catch brief glimpses of him at this time in the volumes of testimony [collected during the repeated trials in defence of his patent.] We see

him waiting for his wife to draw the loaves from her oven, that he might put into it a batch of India rubber to bake, and watching it all the evening, far into the night, to see what effect was produced by one hour's, two hours', three hours', six hours' baking. We see him boiling it in his wife's saucepans, suspending it before the nose of her tea-kettle, and hanging it from the handle of that vessel to within an inch of the boiling water. We see him roasting it in the ashes and in hot sand, toasting it before a slow fire and before a quick fire, cooking it for one hour and for twenty-four hours, changing the proportions of his compound and mixing them in different ways. . . . Then we see him resorting to the shops and factories in the neighborhood of Woburn, asking the privilege of using an oven after working hours, or of hanging a piece of India rubber in the 'man-hole' of the boiler. The foremen testify that he was a great plague to them, and smeared

their works with his sticky compound; but though they regarded him as little better than a troublesome lunatic, they all appear to have helped him willingly." *

The reason why so long a period elapsed before he could satisfy others, by the small specimens he was able to produce, was that there had been no change wrought in the appearance of the goods. Heretofore the outside of the rubber had been cured, and it had only been after the trial of a year or more, and in different conditions of heat and cold, that the material had decomposed and proved to be valueless. The inventor himself had been heretofore as confident in his assurances when the experiment had resulted only in disappointment. But he was prepared for anything, even to beg the bread for his family and himself, if necessary, in order to bring his invention before the community. Indeed, for several years, he

* Parton.

had scarcely any support save that which came from the generous gifts of his friends and neighbors. The fortune that would probably come to him if his hopes were realized, seemed hardly to operate as a motive upon his mind to inspire his perseverance. His great inspiring and urgent occasion for hastening the work in which he was engaged, was the reasonable fear, on account of his feeble health, that he might die and his discovery be lost to the world. In the event of his death, it could hardly be expected that his theory, which he found it so difficult to establish, could survive him. This fear almost overwhelmed him, and threatened to produce the very result he dreaded. He says nothing sustained him but the excitement caused by his efforts to surmount the obstacles in his way. "How he subsisted at this period," he remarks, "charity alone can tell, for it is as well to call things by their right names, and it is little else than charity, when the lender looks

upon what he parts with as a gift. The pawning or selling some relic of better days, or some article of necessity, was a frequent expedient. His library had long since disappeared, but shortly after the discovery of this process he collected and sold at auction the school-books of his children, which brought him the trifling sum of five dollars; small as the amount was, it enabled him to proceed. At this step he did not hesitate. The occasion and the certainty of success warranted the measure which, in other circumstances, would have been sacrilege." His furniture was too limited to afford him a long support by pawning it, and charity, although enduring, among his neighbors, could not always be cognizant of the necessities of this self-denying family.

A witness in one of the trials that took place in defense of his patents, testified that in the year 1839 he found them "extremely destitute. They had sickness in the family. I was

often in, and found them very poor, very destitute both for food and fuel. I knew they had to go into the fields and woods to glean fuel. They had none. They had nothing to buy any with. This was before they boarded with us, and while they were keeping house. They told me they had no money to buy their bread with from one day to another. They did not know how they should get it. The children said they did not know what they should do for food. They dug their potatoes before they were half grown, for the sake of having something to eat. Their son Charles, eight years old, used to say they ought to be thankful that they had the potatoes, for they did not know what they should do without them. We used to furnish them with milk, and they wished us to take furniture and bed-clothes in payment rather than not pay for it. At one time they had nothing to eat, and a barrel of flour was unexpectedly sent them."

It was in the winter when his discovery was made, and he found that his goods did not stiffen with the cold. Professor Silliman, of Yale College, who had always manifested a deep interest in his experiments, and in Mr. Goodyear himself, in October, 1839, wrote this certificate: "Having seen experiments made, and also performed them myself, with the India rubber prepared by Mr. Charles Goodyear, I can state that it does not melt, but rather chars by heat, and that it does not stiffen by cold, but retains its flexibility in the cold, even when laid between cakes of ice." When the summer returned his specimens remained uninjured by the heat; for how could they melt, as they were prepared in a heat of 270 degrees?

Of Mr. Goodyear's right to the sole honor of this great discovery, Judge Grier of the United States Circuit Court, sitting in Trenton, New Jersey, in September, 1852, at the close of the memorable trial in which Daniel Webster and

Rufus Choate were engaged as opposing counsel, in his decision says, "It is due to Mr. Goodyear to say, that upon examining the certificate of Professor Silliman, and other evidence in the case, I am entirely satisfied that he is the original inventor of the process of vulcanizing rubber, and that he is not only entitled to the relief which he asks, but to all the merits and benefits of that discovery. Many persons had made experiments—they had used sulphur, lead, and heat, before Goodyear's patents, and, probably, before his discovery. But to what purpose? Their experiments ended in discovering nothing, except, perhaps, that they had ruined themselves. The great difference between them and Goodyear is, that he persisted in his experiments, and finally succeeded in perfecting a valuable discovery, and they failed. . . . It is when speculation has been reduced to practice, when experiment has resulted in discovery, and when that discovery

has been perfected by patient and continued experiments—when some new compound, art, manufacture, or machine, has been thus produced, which is useful to the public, that the party making it becomes a public benefactor, and entitled to a patent."

The great object of Mr. Goodyear now was to prepare specimens of a larger and thicker character. The first were made of thin fabrics, and these he had cured before an open fire with brushwood, which the kindness of his neighbors permitted his children to gather in their fields, as he had not the means to purchase more substantial fuel.

The success of these experiments, and his earnest and persevering entreaties, induced a few individuals, whom he rewarded with India rubber aprons, to assist him in building a brick oven about six feet square; but his battle with disappointment was not yet won. Before his goods were finished and prepared for the heat-

ing process, it being summer, the material fermented three times in succession, and could not be cured. He was unable at this time to discover the cause of the trouble. "He was puzzled and distressed beyond description; and no single voice consoled or encouraged him."

It was at this hour of positive suffering, when a considerable sum of money would not only give positive relief from want, but enable him to develope and bring out his great discovery, that Mr. Goodyear had occasion to show the real nobleness and Christian honesty of his character. An extensive manufacturing house in Paris made highly advantageous proposals to him for the introduction of his previous improvement—the acid gas process—into France. Instead of accepting the offer, in the spirit of the golden rule, he informed his correspondents that he was then engaged in developing a discovery that would render the other valueless, and that when he had finished his

experiments he would confer with them in reference to it.

It was not long after declining the French proposal that he endured his worst extremity of want and humiliation. It is thus graphically described by Mr. Parton: "It was in the winter of 1839–1840. One of those long and terrible snow storms, for which New England is noted, had been raging for many hours, and he awoke one morning to find his little cottage half buried in snow, the storm still continuing, and in his house not an atom of fuel nor a morsel of food. His children were very young, and he himself sick and feeble. The charity of his neighbors was exhausted, and he had not the courage to face their reproaches. As he looked out of the window upon the dreary and tumultuous scene, 'fit emblem of his condition,' he remarks, he called to mind that, a few days before, an acquaintance, a mere acquaintance, who lived some miles off, had given him

upon the road a more friendly greeting than he was then accustomed to receive. It had cheered his heart as he trudged sadly by, and it now returned vividly to his mind. To this gentleman he determined to apply for relief, if he could reach his house. Terrible was his struggle with the wind and deep drifts. Often he was ready to faint with fatigue, sickness, and hunger, and would be obliged to sit down upon a bank of snow to rest. He reached the house and told his story, not omitting the oft-told tale of his new discovery, that mine of wealth, if only he could procure the means of working it! The eager eloquence of the inventor was seconded by the gaunt and yellow face of the man. His generous acquaintance entertained him cordially, and lent him a sum which not only carried his family through the worst of winter, but enabled him to continue his experiments on a small scale. O. B. Coolidge, of Woburn, was the name of this benefactor."

He had not yet lost his experience of prison life. Daniel Webster, in his great argument in behalf of Mr. Goodyear, quotes the following letter written by him, and dated "Debtors' Prison, (in Boston,) April 21, 1840." It is addressed to two gentlemen connected with the rubber trade, and reads as follows:

"GENTLEMEN: I have the pleasure to invite you to call and see me at my lodgings on matters of business, and to communicate with my family, and possibly to establish an India rubber factory for myself on the spot. Do not fail to call on the receipt of this, as I feel some anxiety on the account of my family. My father will probably arrange my affairs in relation to *this hotel*, which, after all, is perhaps as good a resting-place *as any this side of the grave*."

Upon this Mr. Webster remarks: "He had but two objects, his family and his discovery. In all his distress, and in all his trials, his wife

was willing to participate in his sufferings, and endure everything, and hope everything; she was willing to be poor; she was willing to go to prison; she was willing to share with him everything, and that was his solace. There is nothing upon the earth that can compare with the faithful attachment of a wife."

Finding it impossible, with such means as he could command, to prepare large specimens of his vulcanized rubber, as he called it, and satisfied that nothing could be done in the vicinity of Boston, he now endeavored, with such specimens as he had, to reach New York; but where could he find money to meet his expenses? He received some assurance from a party that had formerly been in his employ, that on his coming to Boston he would lend him fifty dollars, with which he could support his family in his absence and pay his own expenses to New York.

He reached the city only to be disappointed in his expectations of a loan, and remained a

week at a hotel, hoping to secure the small sum required from some other quarter. But his efforts were fruitless. At last he applied, where he had reason to expect it, for the sum of five dollars, with which he might return to his family. This was refused. In the evening his bill at the hotel was presented to him, which he had not the means of discharging. Overwhelmed with mortification, he went out into the street and walked until long into the night, meditating upon his condition. He wandered over the bridge into East Cambridge, and stopped at the house of a friend, who received him kindly, and made him comfortable for the night. Early the next morning he walked ten miles to his home. At the door he was met by one of the family, who informed him that his youngest son, two years of age, who was in perfect health when he left home, was then dying. And he also learned, that, in addition to the deep affliction into which they had fallen, the person

who had promised, when he left, to supply the necessities of his family had failed to do so. His wife was confined to her bed with an infant. In all his sorrow he devoutly thanked God that he had been so providentially, although painfully, turned back from his journey.

He was tenderly attached to his children. The loss of the little boy was a heavy blow to him. At the funeral, the witness, a part of whose touching testimony has been already given, says, "they walked to the grave. The child was carried in a wagon. They were very destitute at that time, and said that they could not afford to hire carriages."

Immediately after this sad and simple funeral he called his older children to their work, saying to them, that although sorrowful, they must earn their daily bread.

Mr. Goodyear, by a letter, now represented the situation of his family to a gentleman in Boston, a sincere friend, from whom he was con

fident that he should not receive a refusal. In this he was not disappointed. He sent him seven dollars, saying that he did it out of regard for his family, and administering a severe reprimand to himself for not finding some occupation by which he could support them. A stranger who happened to be at his friend's office when the letter came, was so moved by its contents as to forward him a barrel of flour. This was relief in a timely hour, and was most gratefully accepted.

There was one relative who had often befriended him, and whose name afterward became indissolubly associated with his discovery, as providing the means of bringing it fully to the knowledge of the public, Mr. William De Forest, his brother-in-law, to whom in his extremity he now wrote. As here ended his most bitter struggle with poverty and want we will close the chapter, and open the next with his brightening prospects.

CHAPTER IX.

THE NEW ELASTIC METAL.

Mr. Goodyear's letter to Mr. De Forest brought him fifty dollars, and enabled him to to reach New York. He submitted his invention to the examination of Mr. William Rider, an enterprising merchant, who was so well satisfied with the evidences of the value of Mr. Goodyear's improvement in rubber, that he agreed to furnish sufficient capital to carry on the manufacture for their mutual benefit. His brother Emory, a skillful manufacturer himself, gave the valuable aid of his practical judgment in overcoming the serious obstacles that were met with in the earliest attempts to prepare suitable machinery for vulcanizing the rubber, and making the various articles to be offered for sale.

His family was now placed beyond want, and, although through all of Mr. Goodyear's varied life they were subjected to much anxiety and many inconveniences, they were never brought again to the verge of absolute suffering. Before he had fairly overcome the difficulties in the way of preparing the rubber, the singular fortune that had attended Mr. Goodyear in his whole career, was illustrated again in the failure of Mr. Rider and the loss of his capital.

Before this occurred he had commenced manufacturing operations in Springfield, Mass., and had succeeded in securing a simple cast-iron machine, by the use of which he prepared sheets of the vulcanized rubber, and also the shirred goods, out of which suspenders and elastics are made, which immediately attracted the favorable attention of the public, and secured a large sale. These goods were manufactured in the following manner: two pieces of cloth, ribbons, or any suitable fabric,

are covered with cement, small cords of rubber, drawn out as far as they will permit, are laid between these pieces, and they are pressed permanently together by being drawn between the rollers of a machine. When the goods come from the rollers the cords of rubber contract, and thus draw or ruffle the cloth.

Having prepared some elegant ribbons in this way, they awakened the interest of his brother-in-law, Mr. De Forest, then an extensive woolen manufacturer. He was convinced of the value of the invention, and took the place of Mr. Rider in supplying capital for its development. It affords an idea of the difficulties that still remained to be overcome, and of the wearisome labors of the inventor, (for it was not until three years after this, in 1844, that he was able to conduct his business with sufficient certainty to feel safe in taking out his patent,) to know that Mr. De Forest was called upon to advance between forty and fifty thousand dollars; a sum

which Mr. Goodyear, on account of the expenses incident to the development of his discovery, was never in a condition to repay him.

It was at this time, in Springfield, that he had his last experience of a debtor's prison in this country. Up to this time he had never availed himself of the bankrupt law to cover himself from his creditors, being opposed to it from principle; but he was now induced to avail himself of it simply to relieve himself from malicious prosecutions, and that he might have his time for the benefit of his creditors and others. He availed himself of none of its legal benefits, but immediately upon the turn in his fortunes commenced repaying his old indebtedness, and in the course of a few years had discharged his obligations to the amount of thirty-five thousand dollars.

More than ten years after he commenced his experiments, and five after he had come in sight of his great discovery—years of endurance

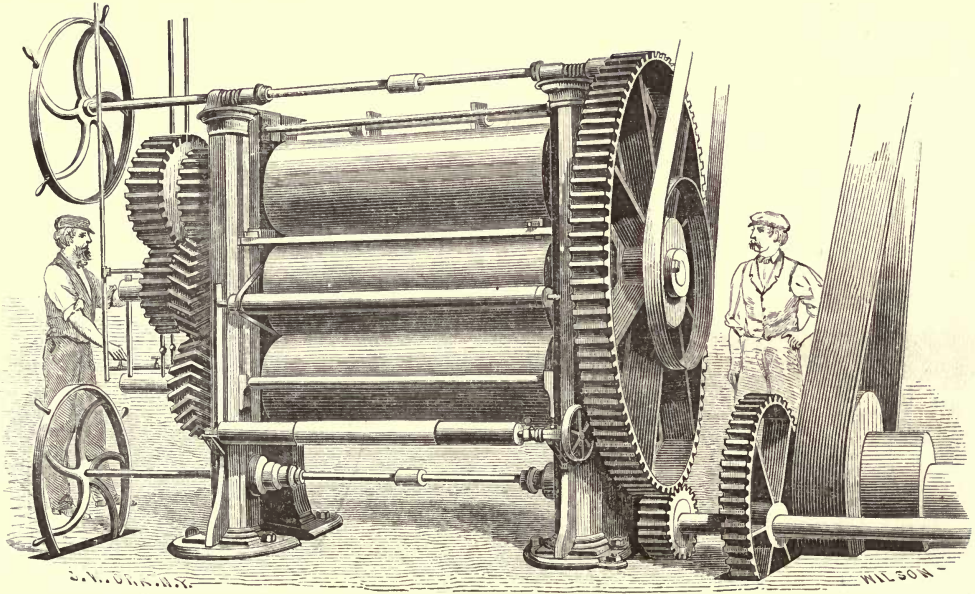
such as few have experienced—never yielding to discouragement, always confident that the result, although delayed, was certain, Mr. Goodyear took out his letters patent for the new and wonderful material which God had enabled him to bestow upon the race.

"He had added to the arts," says Parton, "not a new material merely, but a new class of materials, applicable to a thousand diverse uses.... It was still India rubber, but its surface would not adhere, nor would it harden at any degree of cold, nor soften at any degree of heat. It was a cloth impervious to water. It was a paper that would not tear. It was parchment that would not crease. It was leather which neither rain nor sun would injure. It was ebony that could be run into a mould. It was ivory that could be worked like wax. It was wood that never cracked, shrunk, nor decayed. It was metal, 'elastic metal,' as Daniel Webster termed it, that could be wound round

the finger or tied into a knot, and which preserved its elasticity almost like steel. Trifling variations in the ingredients, in the proportions, and in the heating, made it either as pliable as kid, tougher than ox-hide, as elastic as whalebone, or as rigid as flint. All this is stated in a moment; but each of these variations in the material, as well as every article made from them, cost this indefatigable man days, weeks, months, or years of experiment. It cost him, for example, several years of most expensive trial to obviate the objections to India rubber fabrics, caused by the liability of the gum to peel from the cloth. He tried every known textile fabric, and every conceivable process, before arriving at the simple expedient of mixing fiber with the gum, by which at length the perfect India-rubber cloth was produced. This invention he only considered second in value to the discovery of vulcanization. The India-rubber shoe, as we now have it, is an admirable

article, light, strong, elegant in shape, with a fibrous sole that does not readily wear, cut, or slip. As the shoe is made and joined before vulcanization, a girl can make twenty-five pairs in a day. They are cut from the soft sheets of gum, and joined by a slight pressure of the hand. But almost every step of this process, now so simple and easy, was patiently elaborated by Charles Goodyear. A million and a half pairs per annum is now the average number made in the United States by this process. The gum, which, when Goodyear began his experiments was a drug at five cents a pound, has recently been sold (1865) at one dollar and twenty cents a pound, with all its impurities."

The factory in Springfield was under the charge of his brothers, Nelson and Henry, and the work undertaken was general experiments in shirred goods, clothing, hose, etc. In the autumn of 1843 Henry started a factory in Naugatuck, and in the summer of 1844 intro-



Calenders heated internally by Steam, for spreading India Rubber into Sheets or upon Cloth, called the "Chaffee Machine."

duced the steam process, dissolving the gum without the use of solvents. It was not until the gum came to be ground and worked with steam heat, instead of being dissolved with turpentine, that doubts as to the success of the manufacture were removed. The blistering and fermenting of the compounds, under the old process, were so liable to occur, and thus a great loss in the material occasioned, that many manufacturers with ample means became discourged, and doubted whether the invention could be made so practicable as to become useful. When, however, these serious difficulties were overcome, the public eager for the goods, and the manufacture had come to be a matter of certainty and profit, then there came up to Mr. Goodyear's mind the question, What should be his own course in the future? His debts, which always hung like a cloud over him, made it necessary for him to sell licenses to manufacture under his patents, at an early

period, before the great value of his improvements could be realized. He was not a shrewd business man in the common acceptation of the word, and was too intent upon the great work of developing his discovery, to secure for himself and his family all the benefits that might come from a prudent management of his patents.

"As soon as he had brought his rubber shoe making process to the point where other men could make it profitable, he withdrew from the manufacturing, and sold rights to manufacture for the consideration of half a cent per pair. Five cents had been reasonable enough, and would have given him ample means to continue his labors. Half a cent kept him subject to necessity, which seemed to compel him to dispose of other rights at rates equally low. Thus it happens that, when the whole India rubber trade of the country paid him tribute, or ought to have paid it, he remained an em barrassed man."

In order that the work of opening and adapting the invention to every possible variety of use might go on, he stipulated with the Naugatuck Company, which was the first licensed under his patents, that they should manufacture such articles as he suggested from time to time. But they had observed the embarrassments which he had brought upon himself by his experiments, the great cost originally of introducing a new modification, while the simpler branches of the trade, such as suspenders, shoes, elastics, and clothing, commanded a ready sale, and so strenuously resisted his efforts that he was virtually compelled to relinquish his claim upon them "With kind intentions, no doubt," he says, "they, together with other friends, earnestly deprecated his devoting more time or money to experiments, and constantly urged him to turn his attention to obtaining a pecuniary compensation from the branches already estab-

lished." Their advice was wholesome, but Mr. Goodyear could not receive it. We may call it a weakness in his character. We may even say he ought to have first secured enough to have relieved his creditors, and to have provided a competence for his dependent family in the event of his death, which was to be expected at any time through the many infirmities that constantly wore upon his strength. But this was simply impossible for Mr. Goodyear. This very delicacy of health made him all the more earnest to prosecute the work for which he seemed to himself commissioned, before the curtain of that night fell down upon him, when he could no longer serve his race. He seemed to be oblivious to everything besides this great appointed work which was set before him to do. When suffering such excruciating pains from the gout, while in England, that he could not bear to have a person approach the bed, Mr. Hope, the banker, once remarked to

him with astonishment that he could not understand how he should be so susceptible to even the approach of a friend, and yet have his bed weighed down with India rubber substances upon which he was experimenting. "His friends," remarks Mr. Parton, "smiled at his zeal, or reproached him for it. It has been only since the mighty growth of the business that they have acknowledged that he was right, and that they were wrong. They remember him, sick, meager, and yellow, now coming to them with a walking-stick of India rubber, exulting in the new application of his material, and predicting its general use, while they objected that his stick had cost him fifty dollars; now running about among the comb factories, trying to get reluctant men to try their tools upon hard rubber, and producing at length a set of combs that cost twenty times the price of ivory ones; now shutting himself up for months, endeavoring to make a

sail of India rubber fabric, impervious to water, that should never freeze, and to which no sleet or ice should ever cling; now exhibiting a set of cutlery with India rubber handles, or a picture set in an India rubber frame, or a book with India rubber covers, or a watch with an India rubber case; now experimenting with India-rubber tiles for floors, which he hoped to make as brilliant in color as those of mineral, as agreeable to the tread as carpet, and as durable as an ancient floor of oak. There is nothing in the history of invention more remarkable than the devotion of this man to his object. . . . The door-plate of his office was made of it, his autobiography was written upon it, and his mind by day and by night was surcharged with it. He never went to sleep without having within reach writing materials and the means of making a light, so that if he should have an idea in the night he might be able to secure it."

In 1845 he removed his family to New Haven, and as he was now selling licenses under his patent quite freely, he was in comparatively easy circumstances; but all his time and means were devoted to his one great business of fulfilling the work God had given him to do. "I never saw a man," said his private secretary at this time,* "so entirely consecrated to his work. His business was his religion, and he was as conscientious in the faithful devotion of his hours to it, and as apparently obeying a direct inspiration from above in it, as a minister or a missionary in his appointed service." It was not the unintelligent labor of an ordinary mind, obeying a blind instinct and pushing on without plan, trnsting in happy accidents for his success, but the impression that this small, thin, sallow, nervous man made upon the thoughtful observer, quoted above, was that of an extraor-

* Rev. A. S. Hunt.

dinary genius, whose highest powers were sacredly devoted to what he considered a divine work. It was astonishing, his secretary remarks, to notice how slightly serious difficulties affected him. It was a constant expression of his, in response to the suggestion of the obstacles that stood in the way of accomplishing some purpose, "Don't be seeing all the difficulties that may possibly occur. If it is to be done it must be done, and it will be done." This extraordinary devotion kept him from being disturbed by the malicious efforts of others to deprive him of the benefits of his valuable patents, or by the ungenerous criticisms of friends or enemies upon the course he was taking. He lived in a higher atmosphere, and was too much taken up by his sublime work to give heed to the unjust or ungenerous deeds or words of his fellow-men. He was willing to wait for the proper estimation of himself and his labor, that he knew

would ultimately come. He would often say, while engaged in his unappreciated work, "Somebody will yet thank me for it."

His mind was constantly running in the direction of human suffering, partly perhaps because his own life was so constantly tortured by pain; and he sought to make his great invention the solace of physical distress. An interesting and beloved young lady in the vicinity of his house, suffering from disease and from the weariness of confinement to the bed, turned his mind to the invention of the water-bed, an application of his discovery that has brought comfort to tens of thousands in and out of the army hospitals.

At a later period, hearing in the evening that the daughter of a friend was sick, and believing that a water-bed would administer to her relief, without waiting for the coming day, he sent a messenger at once, at his own expense, to the manufactory at Naugatuck, eighteen miles distant, for one of these most comfortable articles; with

orders, if there were none on hand, to call up the workmen and make one at once. There being none finished, this course was taken, and in a few hours a bed was in New Haven, and the grateful patient was enjoying its refreshment.

He seemed to conceive of the whole sublime idea, that these merciful or useful applications were not for a few persons, or a lifetime, but for millions, and for all time. It was this that made him so forgetful of the mere pecuniary results of his labor; he had a compensation that ordinary figures could not estimate.

He was naturally a very generous man. He could not look upon want or suffering unmoved, but acted instantly. His gifts were constant, and scattered in the quietest and most unostentatious manner, and often without thought. He was one day riding with his secretary to the cars; his horse was urged at the top of his speed, for he only allowed himself the shortest

possible time after leaving his house to reach the station. On their way they met a lame man, hobbling along upon his crutches. He drew his reins so suddenly as almost to throw them from the carriage. "Take them," said he, placing them in the hands of his secretary, and bending down, he asked kindly, "What is the trouble with you, my poor fellow?" Hardly stopping for an answer, he took a five dollar bill from his pocket, and handing it to him, caught up the reins and drove on.

"There was," says Dr. Dutton, "in Mr. Goodyear an admirable combination of gratitude and generosity, and also a beautiful regard for his kindred and relatives. When the days of his prosperity at length came, he remembered those who had aided him in his adversity and extremity, and he was not satisfied with a full payment of their dues. Bnt when any of them were in pecuniary misfortune he aided them with a princely gener-

osity. Indeed, some of them with their families were really supported by him for years. He also, as soon as he was able, afforded modes of remunerative employment and ways of advancement for many of those who were allied to him or his by kindred. In his manifold experiments, and through his influence in connection with the extensive manufactory under his patents, a large number of them have been employed, and have found avenues to lucrative and independent business for themselves. And for all the objects of benevolence he had an open heart and hand, giving to them cheerfully and unsparingly whenever he had money at his disposal." It may be said of him, as was tauntingly said to his Master, "He saved others, himself he could not save."

The great nourishing fountain of his kindness, nobleness, and perseverance was his sincere piety. His secretary remarks that there were few men that said less about a personal religious

experience. He had a great shrinking from anything that looked like pretense or cant, but his piety was as manifest as it was unpretending. His family devotions, which he usually conducted himself, were occasions of peculiar interest. His prayers were offered in a low tone of voice, but little above a whisper, but they were peculiarly impressive, tender, reverent, and spiritual; more so, says Mr. Hunt, than those of any other person in whose devotions he had united.

He was very rigid in his religious principles. On the Sabbath, wherever he happened to be, all forms of labor, and conversation upon secular topics, were strictly excluded. The Bible, religious services, books, or, what he particularly enjoyed, religious poetry, employed his time. Mr. Hunt says he was often with him at the hotel in New York when he was overwhelmed with business, callers pouring in upon him every day; but nothing could induce him, how-

ever pressing the importunity, to listen to any suggestion of a worldly character on the Sabbath. His course became so well understood in this respect, that business visitors rarely intruded upon him on this day.

From such a source as this, Mr. Goodyear secured that strength of purpose which enabled him, at the expense of much bodily suffering, with great inconvenience and self-denying often on the part of his family, exposing himself to very uncharitable opinions and severe denunciations, to devote himself still to the one object of opening every possible avenue of usefulness for the remarkable material it had pleased God to permit him to give to mankind. He had a compensation that others could not understand. He says of himself, "Independent of all pecuniary considerations, I have taken great satisfaction in trying to invent and inprove articles oi necessity and convenience for the use of man;" and he

adds, "Whatever of misfortune may hereafter befall the inventor, he will have the satisfaction of knowing that his efforts have been successful, and of witnessing on every side, and in every civilized country, the growing importance of the numerous branches of manufacture already established, and which may in his lifetime be established, under these inventions and improvements."

When quite large amounts of money began to come in from his various licences, whatever was not devoted to the repayment of former indebtedness and his small personal expenses, for his habits were very simple, was freely used in his constant experiments, continued until nearly the last day of his life. So that while the community esteemed him to be worth millions, his estate, when the hard-working inventor fell at his post, was indebted for two hundred thousand dollars. His life was an illustration of what he had himself written: "It is often

reported that 'necessity is the mother of invention.' It may with equal truth be said, that inventors are the children of misfortune and want. Probably no class of the community receive a smaller compensation for their labors than do inventors. Their hard fortune often calls forth the expression of pity and compassion from the public; while, at the same time, there are too many ever ready to encroach upon their inventions without their knowledge or consent. However valuable and important an improvement may be, it seldom happens that the rightful owners are benefited by it. There is, however, in such cases, an alleviating and controlling reflection to well-disciplined minds, which is this: success has crowned their efforts to do that which they attempted, and they can leave the world better off for their having lived in it."

These calm and noble sentiments were written while shrewd and unprincipled men were

attempting to snatch from him both the honor of his invention and the comparatively small pecuniary compensation that he was deriving from it. The demand for the goods was so great, that it was but a short time before the value of his licenses began to be decreased by the illegal manufacture of India rubber goods after his process. In the sketch of his own life and inventions, which Mr. Goodyear issued in 1855, he makes but slight allusion to this. Probably a more generous, noble-hearted, and charitable man never lived. "In his whole narrative," says his pastor in New Haven, Dr. Dutton, "there is not one severe or unkind word, even toward the man who so greatly defrauded him, and who compelled him to the trouble, anxiety, and enormous expense of constant litigation." And yet, speaking of the injury done him during a period of ten years, Hon. J. Holt, United States Commissioner of Patents, in granting him an extension of his

patent for seven years, says: "The public stipulated with him that he should peacefully enjoy for fourteen years the monopoly created by his patent, and, had he been permitted to do so, he would no doubt long since have realized an ample remuneration; but so far from this having been the case, no inventor probably has ever been so harassed, so trampled upon, so plundered by that sordid and licentious class of infringers known in the parlance of the world, with no exaggeration of phrase, as 'pirates.' The spoliations of their incessant guerrilla warfare upon his defenseless rights have unquestionably amounted to millions. In the very front rank of this predatory band stands one who sustains in this case the double and most convenient character of contestant and witness; and it is but a subdued expression of my estimate of the deposition he has lodged, to say, that this Parthian shaft—the last that he could hurl at an invention which he has so long and

so remorselessly pursued—is a fitting finale to that career which the public justice of the country has so signally rebuked."

Several of the parties whose personal influence and testimony were used during the protracted suits brought to contest his rights were those who were making immense fortunes out of his inventions, or had been generously aided from his liberal hand in the hour of their necessities. He did not permit their ingratitude, however, either to disturb his equanimity or to hinder his repetition of acts of kindness whenever opportunities for them occurred. His nature was of the noblest order, and was sanctified by Christianity. Upon one occasion, when his son remonstrated with him upon his doing what he considered too much for a young man who had proved himself to be dishonest in his transactions with him, remarking that "he did not care how much his father gave away to those

who honestly deserved it," he replied, with the utmost gentleness, "Where should we all be, my son, if God were to act upon these principles."

Some idea of the immense value of the business which Mr. Goodyear had opened up for others, may be formed from the fact, that in six years from the time he discovered the process of curing the rubber, the companies that held the right of manufacturing shoes under his patent, in defending themselves against the efforts of Mr. Day to deprive Mr. Goodyear of the honor and emoluments of his invention, paid Daniel Webster a fee of twenty-five thousand dollars for his triumphant argument; a sum which, Mr. Parton remarks, "it is questionable whether Mr. Goodyear ever realized from his discovery, after deducting the money expended in developing it."

Mr. Goodyear had thus settled it in his

mind, through good report and evil report, with or without a fortune, enjoying, or suffering the loss of, the sympathy of his friends, to use the remnant of his life in expanding his discovery, which he now believed perfect in itself. The material could not be improved, but its application to the arts and manufactures might be almost infinitely extended.

He had also a patriotic desire to make his invention a national benefit, and a wholesome pride of being able to offer to other countries applications of his discovery that would deserve public notice. It was this purpose that induced him to give his attention to ships' sails, entering upon experiments involving great outlays of money, to mail-bags, ships' letter-bags, life-boats, army-tents and blankets, gun covers, pontoons, wagon covers, and for all the purposes for which leather is used. But he felt a more absorbing interest in the manufac-

ture of articles relating to the preservation of property and life. Singularly enough, his first and last experiments were upon life-preservers. To this work, he says in 1855, "I should be glad to devote myself in the evening of my life." He adds, that there is no real necessity for such constant loss of life and property on the sea as annually occurs. "What!" he says, "must men continue to be drowned because their fathers were? Must treasures continue to go to the bottom of the deep because there are offices where they are insured? The loss to the world on that account is none the less, and such a state of things in the present age need not and ought not to exist."

Upon these national, useful, and humane experiments he lavished the means that came to his hand or were supplied by his friends. He certainly expected ultimately an adequate return when the community became awake to

their value; but if he had not expected this, his earnest enthusiasm and humanity would have inspired him to the same sacrifices. A letter, written from England in 1853 to his brother-in-law, whose debtor he was to a large amount, exhibits the actual pecuniary condition of Mr. Goodyear during what may be esteemed the most successful portion of his life, his great purpose, and his lively sense of his obligations to his friends. It was rumored at the time that he was receiving large sums of money, which he was lavishing upon his family expenses. "My dear brother," he writes, "I left, on my way to Paris, last night, and rather than travel on the Sabbath I have stopped here (Folkstone) for a day of rest. A remark in your letter, in which you quote an expression of mine, conveys to me the impression that you deem me unmindful of your embarrassed condition. It reminds me that justice to myself demands a little explanation.

I am touched like some old Puritan, who makes it a point of Christian duty to confess before God and man that he has the hardest heart of all God's creatures; but so much as intimate to him yourself, that he is not the most perfect specimen of humanity, and no man will knock you down quicker than he. To remind you that you are not alone in embarrassment, that I am not rioting in independence, let me say that, three months before I left home, I borrowed one thousand dollars of a friend in Boston, and during the illness of my wife received the sharpest rebuke, and from him; yet notwithstanding this claim had hung like a millstone round my neck to weigh me down, it was not till yesterday that I have seen the time when, in justice to myself and all others who have claims upon me, I could pay the debt. Mr. B., too, accepted for my accommodation three thousand five hundred dollars, and had to take up the note.

This remains unpaid, but I hope to discharge this debt the coming week. There are yet more of these that weigh upon me. As relates to your case, my feeling has been this: that after having shown the good people of New Haven my disposition to pay, so many times, by paying them, they would indulge you and me in the liberty I have taken with them and you; and I had hoped with this indulgence you would be comfortable. I feel that I have done all that mortal man could do, under the same circumstances, to recover from that pecuniary indebtedness to my fellow-creatures into which I fell in early life; and in striving to do this, (which I know myself has been the chief object of my apparently 'towering ambition,') I have at the same time aimed at the accomplishment of a great work for the good of mankind. In this last aim I need not tell *you* that I have been successful, as I hope to be in the other. Vast numbers of mankind

already bear witness also to this. I only wish they could know you and others who have aided me. Whether I shall live to see 'the end' I know not. The toil of the struggle thus far onward I have seen, and yet I have ever had a feeling which seemed to me very much like faith, that I should live to see the end of that embarrassment and those trials of life which arise from the want of money enough. We have both had a full share of trials of this sort, the want of means to execute our plans, but many others we have not known; and God only knows what other trials he has in store for us, when this one may no longer be the burden of our complaint. I call to mind Kimberton, Washington Hill, Woburn Plains, the cells of gloomy prisons, and two visits to most of these; and yet, for the most part, my heart was light. Seldom a dark cloud, except from ill health, darkened my sky of hope. And why should

there? The scene shifts, we may realize our hopes and worldly independence, and yet sigh for the former state, in which our cup overflowed with blessing. We murmured that God did not bestow all his blessings upon us at once."

Mr. Goodyear was not insensible to the value of economy; he constantly inculcated it in his family, and appreciated, to the fullest extent, habits of frugality and thrift. "But," says his son, "in his efforts to arrive at some desired result in his experiments he felt that halfway measures were inefficient, and that time was more than money. He often found that an experiment tried on a very limited scale, though attended with apparent success, would be impracticable when attempted on a large scale; while the reverse might be equally true; and he was thus led to the conclusion that true economy for him was to develope his invention to the utmost of his ability; and to this end he

applied himself with all his resources, employing, at great expense, many persons in various localities wherever he could best attain the desired results." That some of his experiments, as, for instance, the sails of ships, have not resulted in equal success with others, by no means stamps the attempt as visionary or unwise. Large sums of money were necessarily expended on this experiment. He felt a national pride in such a work. He reasoned that their imperviousness to air would enable smaller surfaces to be spread in propelling a vessel; that the toughness of material, and its non-liability to mildew, would render its renewal less frequent; and its defense from freezing would take away much from the sufferings of the sailor upon our northern coasts in winter. Captain Popham, upon whose ships these sails were used, gave them the most unqualified praise. Other branches of the trade requiring less capital, and already command-

ing large markets, manufacturers have hesitated to undertake this and other experiments of this indefatigable man. But the experiments have been tried at his expense, although not for his benefit, for the good of the race and for all time.

CHAPTER X.

MR. GOODYEAR IN EUROPE.

For several years Mr. Goodyear had a visit to Europe in contemplation. He could not leave until the perplexing lawsuits in reference to his patents, which spread over the space of seven years, were settled. He desired also to secure as wide an application of his discovery as possible to the useful arts, and to prepare as many samples of the manufactures as was in his power, to take with him.

He knew that his effort to secure an English patent had been forestalled by Thomas Hancock, of the house of M'Intosh & Co., through peculiar provisions in the English patent laws. He relied, however, upon his ability to prove, by his superior skill and knowledge of his own invention, that he was indeed the father of it—

COUNCIL MEDAL OF THE EXHIBITION.

C. GOODYEAR. CLASS XXVIII.

1851.

BRONZE. REDUCED ONE THIRD.

an important recognition, which he did afterward secure in an English court of justice, Mr. Hancock admitting that the first specimen of vulcanized India rubber that he ever saw was shown to him by a gentleman sent from America by Mr. Goodyear himself. But his chief object was to induce manufacturers abroad to unite with him in the production of the many improvements and applications which he had introduced in the India rubber business, specimens of which he was to carry with him.

The prospect of large success in such an undertaking seemed favorable.

In 1851, the great International Exhibition held in the Crystal Palace, at Hyde Park, London, afforded him a peculiarly favorable opportunity of introducing, both to the scientific and practical men of Europe, the improvements that had been made in the United States, through his instrumentality, in India rubber manufactures.

His beautiful specimens, prepared at great expense, the exhibition costing him the sum of thirty thousand dollars, occupied more space in the exhibition building than all other American goods combined. For the first time in Europe, he exhibited articles of household furniture made of hard rubber, musical instruments, and India rubber globes of great beauty, inflated with air or gas, from twelve inches to three, and even six, feet in diameter, floating in the air, besides several other useful or ornamental applications of the same material. For his goods in this exhibition he received the "Grand Council Medal," the highest testimonial given at the fair, only three of which were bestowed upon American manufactures.

These rubber goods were placed in an elegantly constructed suite of open rooms, made of hard rubber, ornamented with handsome carvings, carpeted and furnished with articles of the same material. When the Crys-

Charles Goodyear's Exhibition of Hard India Rubber Goods at the Crystal Palace, Sydenham, England.

tal Palace was removed from London to Sydenham, his rubber court was also transferred, and, for several years, was kept open for the display and sale of India rubber articles of use and ornament.

In the following year Mr. Goodyear, accompanied by his family, sailed for Liverpool. His health was at this time very poor, and he was obliged to avail himself of the aid of his crutches. Often he was utterly prostrated, and obliged to keep, for weeks, his bed; but his courage was unbroken; and in a strange land, with all his depressing physical troubles and his disappointments, he continued, with his accustomed zeal, his experiments.

For many months he had expectations of effecting favorable negotiations with the individuals who had superseded him with the English patent; but at last he became wearied, and was convinced that the parties did not intend to deal fairly with him. He therefore

closed his negotiations in this direction. As the English law was now so amended as to admit of patents for new applications of known substances, Mr. Goodyear endeavored to secure, if possible, some compensation in this way for the loss of the original patent, by taking out a large number of patents of application. Few, however, of the important articles were patentable, as the most valuable had been already anticipated and brought into public use by English manufacturers. Efforts were made by the friends of Mr. Goodyear to establish a company in London for the manufacture of India rubber goods under these patents; but the company never went into organization.

A keener sorrow than these multiplied disappointments in his business was now to fall upon him. His beloved wife, who had been the constant and patient participant for thirty years of all the sacrifices and sufferings of his remarkable career, and had lived to share in

the early honors and comforts of his great success, now drooped in health, and in spite of every effort that affection and skill could suggest, sank into the grave in March, 1853.

Rev. Mr. Hunt, for two or three years private secretary of Mr. Goodyear, and residing in his family, speaks of Mrs. Goodyear as one of the most remarkable women he ever knew. She was endowed with a very strong intellect; but her crowning grace was the perfect harmony and repose of her life. Without any effort, or appearance of desire to secure it, she had entire control over her husband and family. He loved to repose upon her judgment. She was particularly faithful with her children, and was one of those rare saints on earth whose religion shines out as a constant benediction upon her face, and made her to be the sunlight of the family.

Dr. Dutton well remarks that the scriptural word "helpmeet" best describes the relation of

this excellent woman to her husband; and to her enduring faith, in no small measure, is to be attributed the perseverance and final triumph of Mr. Goodyear. "He could confide in her discretion," says her pastor, "as well as her affection. To her intelligence and wisdom, and her eminent faith and piety, he could entirely intrust, amid his absorbing occupation and frequent absence from home, the care and culture of his children. And in all the alternations of his fortune, and especially in its deepest depressions, he experienced in her the gentleness, the patience, the equanimity of an angel, and *more* than the *sympathy* of an angel, even the sympathy of a true Christian *woman and wife.*"

The loss of his wife was a crushing blow to Mr. Goodyear. His absorption in his studies kept him from cultivating his social qualities, and limited his intimate companions to his own little family circle. His health at this time,

and even until the close of his life, was so poor —he was so liable to sudden and most painful attacks of gout—that the brief intervals of rest from his incessant toil were spent either in driving out alone with his wife, or on the sofa, soothed by her reading; or when too much exhausted even for this, by her sitting near him in perfect silence. Hour after hour would he sometimes recline in this manner, too feeble even for speech, making his wants or his feelings known by some sign of the lips or eyes. Frequently he was so unnerved as to be unable to bear even the entrance of a child into his room. His wife fully understood his case, when a stranger would have been alarmed, and supposed him to be near his end. Calmed by her presence, by words of holy faith, by strains of inspiring poetry or soothing words of Scripture, he would rally his exhausted energies, and rise up full of some new purpose, and go forth to labors such as few hale

men could endure. To such a man the loss of a tried and sympathizing partner, who alone possessed the magic power of soothing at all times his weariness, pain, and sickness, was indeed a burden too heavy, without divine support, to be borne. The lady who afterward became his wife remarks: "I shall never forget the impression made on my mind by the deep melancholy in the first tones of his voice that ever fell upon my ear, as, leaning upon his crutches, he was first presented to me."

Mr. Goodyear was again peculiarly favored in his domestic relations by forming the acquaintance of Miss Wardell, of London, the estimable lady who still survives him, and whose strength of character and affection sustained her in the severe trials that followed Mr. Goodyear almost to his grave, and enabled her to give to him such sympathy and support as only a loving wife can offer. He was married in the summer of 1854.

The remaining portion of this year was one of the few sunny spots in his life. His marriage opened to him a pleasant social circle, the relatives of his wife, whose respect, although they had heretofore been strangers, and ignorant of his claims to public notice as a man of genius and a discoverer, he soon won by his genial temper, profound courtesy, and true modesty of character. His health and spirits improved, and his business seemed to be opening with great promise.

He now began to occupy himself with preparations for the approaching French exhibition. To facilitate his business in connection with this enterprise, he removed his family to Paris in November of 1854.

CHAPTER XI.

MR. GOODYEAR IN FRANCE.

DURING the winter of 1852–3 the manufacture of India rubber boots and shoes was commenced in France by an American company under a license from Mr. Goodyear, and the business rapidly grew into importance. The French patent, which Mr. Goodyear had taken out, was the first publication in Europe of the invention of vulcanized rubber. At this time (1854) an American gentleman, full of enterprize, but at times rash in his speculations, Mr. Charles Morey, undertook to negotiate the sale of some branches of the India rubber manufacture, particularly those relating to the hard compound, with the French manufacturers, and Mr. Goodyear was induced to place the management of his remaining French interests

GRANDE MEDAILLE D'HONNEUR.

EXPOSITION UNIVERSELLE DE 1855.

Donne pour la Decouverte de la Vulcanisation et Durcissement du Caoutchouc.

FAC-SIMILE. GOLD.

almost wholly in his hands. For about two years the prospect of large returns from this quarter were very flattering; so much so, that Mr. Goodyear was led to make extraordinary preparations for the opening of the "Exposition Universelle," in Paris, in 1855. He fitted up, at an expense of fifty thousand dollars, two elegant courts in the most central part of the exhibition palace, which were filled with beautiful inlaid India rubber furniture and ornamental articles, finely carved, caskets, and rich jewelry. The walls were hung with valuable portraits painted upon panels of India rubber.

The immense trade that has since arisen in India rubber jewelry shows the prophetic wisdom of the inventor, and forms his justification for what might seem to be the extravagant outlay of this occasion. For himself and family the great expense, coupled with the mismanagement of his agent, proved to be very

unfortunate; but for the expansion of the business in hard rubber it was only a wise investment. But a small space having been at first allotted to American exhibitors, it was increased on the representation of a committee of Americans in Paris. Afterward it became evident that comparatively few articles would be sent from the United States, and urgent requests were made by these gentlemen to Mr. Goodyear to fill up, as far as possible, the vacant space. He was urged, therefore, by this additional patriotic motive, to sustain, as far as he was able, the honor of his beloved country in the exhibition.

For his wonderfully successful exposition of his improvements in rubber, he had conferred upon him by the French emperor the "Grand Medal of Honor" and the "Cross of the Legion of Honor," the highest expression of appreciation of genius in the gift of the French Court. But how strange the vicissitudes through

which this man passed: the announcement that the decoration of the "Cross of the Legion of Honor" had been accorded to him was conveyed to him by his son while he was imprisoned in "Clichy," the debtor's prison of Paris!

Mr. Morey, his agent, speaking French fluently, endowed with remarkable tact for business, had awakened an extraordinary interest in the rubber trade, and developed it in a few months into proportions that could only have been reached by a healthy growth in five or six years. Three large companies were formed, and commenced the manufacture of various articles under Mr. Goodyear's licenses.

A lawsuit, involving Mr. Goodyear's right to his French patent for vulcanization, was terminated at first in his favor. This fact, together with the great success attending the first manufactures, especially of shoes, increased the enthusiasm of the companies.

Patents were taken out in most of the kingdoms of Europe. His son and daughter, at the request of one of the largest rubber companies on the Continent, established in Vienna, visited the capital of the Austrian empire, to give their workmen instructions in the process of manufacturing rubber shoes after the patent of their father.

But now came serious difficulties which had been overloooked in the brilliant prospects that attended the opening of the undertaking. The companies lacked experienced workmen in the new modes of combining the rubber compounds, and also the suitable heavy machinery for preparing the gum. The declaration of the courts in favor of Mr. Goodyear was reversed upon a technicality in the French law; and, just at this time, occurred disastrous failures in business in the United States which affected the standing of European houses, and altogether served to destroy the apparently

well-founded promise of rapid fortunes which were at first confidently expected, and to discourage the stockholders from continuing the business. In this way the rubber manufacture suffered a check from which it did not recover for years.

Mr. Goodyear had received large amounts of notes from these companies in payment for his patent rights. Having indorsed these notes, he turned them over to parties who had made articles for the Exhibition, and to the makers of a new machine of immense proportions for the mixing of his compounds by a new process, to which he attached great importance. These notes were not paid when they became due; and, although the machine was not yet completed, the parties interested, with others that had received the notes, commenced to take the severest legal measures with Mr. Goodyear. The great expenses of the Exhibition rendered it impossible for him at once

to meet these large demands, so unexpectedly arising out of the failure of these companies.

On the evening of the 5th of December, 1855, he returned to his hotel, as he had done many nights previously, completely worn out by the efforts he had made to obtain an extension of the time of payment upon certain notes which had fallen due a few days before. He had already been arrested three times for small bills, but had been able to save himself from imprisonment by the interposition of friends. On this evening he came home quite dispirited, because the parties holding the notes, who were the manufacturers of the unfinished machine, refused to grant him any indulgence, saying that such was the pressure of the times they must have their money. Weary, and suffering from an attack of the gout, he laid down to rest. He had just fallen into a peaceful slumber, when the

startled wife was aroused by a knock at the door. An indescribable chill, she says, ran through her frame, the presentiment of evil. She arose, and opened the door. A face, which she had seen before, showed itself, and the eyes at once peered round the room, taking in all its contents. Perceiving the sleeping sufferer, the intruder exclaimed, "I have you at last! Here he is!" At these words another rough-looking officer entered, and giving a whistle, the windows of the bed-rooms, which opened out upon a balcony, were pushed up, and two other men made their appearance.

Mr. Goodyear at once comprehended the situation, and raising himself in the bed, asked the men politely what warrant they had for taking a sick man out of bed after sundown. They replied by showing a special permit, which they had obtained to arrest him even on Sunday, or after sunset and before sunrise,

on the plea that he was a foreigner, and intending to escape to the United States. He requested to be left alone to dress, but this was refused. The earnest request of Mrs. Goodyear, to be permitted to accompany him to the prison to act as his interpreter, as he did not readily speak French, was granted. They walked through the long halls of the large hotel, Mr. Goodyear upon his crutches, attended by the four guards, and took a cab in the street to proceed to the Clichy prison. The judge, whose office it is to admit prisoners, had retired, but he was soon dressed and present in the office. The process of commitment was at once finished. The wife earnestly sought the privilege of passing the night with her husband on account of his illness. This, of course, could not be permitted. She accompanied him to the massive iron doors that shut off the court-room and offices from the interior of the prison; the jailer and her husband passed inside, and

the door closed. Conducted back to the office, she obtained from the judge the information required to secure permission to visit her husband, and then rose to return to the hotel. The judge considerately asked if she had kept the cab. The bailiffs answered that they had dismissed it. He then asked: "Gentlemen, which of you will see Madame home?" The men hesitated. The judge rose angrily, saying, "Then, gentlemen, I will go home and dress, and see Madame home myself; a lady ought not to go through these streets after midnight alone." One of the men upon this consented to take Mrs. Goodyear under his charge. They walked down the dark Rue de Clichy, and the sad wife before she was seated in a cab had reason to be grateful for even the ungracious attentions of her protector.

In the morning Mrs. Goodyear took measures to secure at the proper office a ticket admitting her to visit her husband in his cell. She was closely questioned by the clerks

whether this "was the Goodyear of *Caoutchouc*, about whom there had been so much in the papers," etc. She visited also the gentlemen in the city with whom her husband had heretofore transacted business, and laid before them his situation, seeking their aid to procure his release. She was received coldly by all, with the exception of one generous-minded man, who promised to see Mr. Goodyear, and confer with him as to what steps could be taken to aid him.

Somewhat relieved of the great burden which she had been bearing upon her heart, she hastened to the prison. Having been carefully examined, and her person searched, she was admitted. The prisoners stared at her from their grated windows as she passed along the corridors, as if a woman's presence was an unusual sight within those walls. She found her husband's cell closed and he absent from it. A good-natured Italian, just then passing and

noticing her dilemma, at once offered to go in search of Mr. Goodyear. Opening the door of his cell, he left her there, and soon returned, saying that Mr. Goodyear was coming as quickly as possible, being compelled to use his crutches from the attack of the gout under which he was suffering. He met his wife cheerfully, was perfectly calm, and even hopeful. To her inquiry "how he had passed the night," he answered, taking both of her hands in his and looking steadily in her face, "I have been through nearly every form of trial that human flesh is heir to, and I find that there is *nothing in life to fear but sin!*" a golden sentence, that it is worth a lifetime of severe discipline to be able to utter.

After prayer together, and the business messages she had brought had been delivered, Mr. Goodyear took his wife with him in search of two fellow-countrymen whom he had found; for so far from yielding himself to repinings

at his lot, to the contemplation of his troubles, or to the simple endurance of the acute bodily pain that he was then suffering, he commenced at once to look about him for some opportunity to do a kind service to any one subjected to the same discomforts as himself without his resoures for relief. These two Americans he had been attempting to cheer, and to study how he might practically aid them.

This was characteristic of his whole life. He had no sooner obtained his own freedom, than, returning to his hotel, he went to his bureau, took out his flannel clothing, and went back immediately to the prison, to proffer to these suffering countrymen the additional comfort which these garments would afford in the chill and dampness of their cells. His Bible, a book of prayers, and the writing to which he was compelled by his extended business, occupied his waking hours in the prison. He remarked that the being locked in at night was the only

thing he noticed. The brick floor, the straw bed, the grated window, the bitter cold, the loneliness of the cell, were all borne without a murmur.

Of this incident a writer in the "Hours at Home," for September, 1865, remarks: It is "but one out of many similar trials borne with equal heroism by this remarkable man. Few persons appreciated him. All who knew his history marveled at his indomitable perseverance amid such aggravated and protracted trials and opposition, with so little seeming chance of success, and still less of reward; but we have the clue to it in his own simple answer to the question, what sustained him through those long years of disappointment and failure? 'It was faith—if I know what faith is.' This faith, not in himself nor his own genius, of which he seemed scarcely conscious, but in God, to whom, from his earliest years, he had dedicated himself, and whose love and providing and pro-

tecting care for him he never doubted, was the main-spring of his whole life: inspiring his energies; making him strong for the battle of life; prompting to generosity and true beneficence, even when on the verge of want; filling him with hope and undoubting confidence of success in the work God had given him to do; and keeping him from despair when crushed by poverty, sickness, failure, or disappointment, and from a murmur or an unforgiving word when persecuted, forsaken, neglected, or injured."

The sudden fall from the height of prosperity and success to such a depth of worldly depression, to the loss, apparently, of everything, and to imprisonment in a foreign land —such a transition from the applause of the public, the adulations of the press as a man of high genius and of great prospective wealth, to the contempt which falls upon an unfortunate alien, supposed to be fleeing from his creditors

—was, without doubt, keenly felt by one of so honorable and sensitive a nature, but it did not for a moment shake his confidence in the good providence of God.

The book of Job, as might be naturally supposed, was a great favorite with him, and he studied it with peculiar interest. There were portions of it that he could not read aloud on account of the deep emotion it stirred within him; its illustrations of the mysteries of Providence were full of instruction and comfort to him in such hours of disappointment and suffering as those through which he was now passing.

In after days he regarded the painful events of this period as a providential interposition to prevent his settling down with his family in Paris, and bringing up his children amid the temptations and worldliness of the French capital.

CHAPTER XI.

RETURN TO ENGLAND.

IMMEDIATELY upon his release from Clichy prison, December 21, 1855, he was compelled by his business to return to England. The result of his French reverses followed him, and caused him much annoyance. After the return of the family to London in February, 1856, he was again arrested upon these French demands, and detained for a few days in a sheriff's office, as he would not accept the bail offered by his English friends, preferring to remain under arrest until he could prove, as he soon did, that his detention was secured by fraud. He was then honorably discharged. His daily letters, written to comfort his wife, then prevented by illness from visiting him, breathe the most cheerful, generous, and Christian temper.

In a letter to Mrs. Goodyear, written just after he had been set free from prison, he says: "Sickness and sorrow, like health and joy, are brief at the longest. God hath set the one over against the other. I write you from the snug little parlor at the 'Pavilion,' where hangs the engraving of the convalescent soldier from Waterloo, his wife and baby by his side, and on the other side of the room the prisoner chiseling the image of Christ on the prison wall with a nail. How one would like to know that man! There was good for others, and we may hope for him from this suffering. This brings my mind to reflect upon the occurrences of the past month. I cannot but believe they were ordered for some special purpose for my good, or for that of my family, *even in this life*, and that it will be explained here. Satan was once let loose in this way upon poor Job; not that I presume to compare myself with that good man. Yet, scrutinizing my conduct as

closely as I can, I cannot censure myself for, or really regret, after what has happened, any thing which I have done, which others might, in ignorance of the circumstances, suppose to be the cause of such persecutions, which often are occasioned by a man's own folly or imprudence. Committing you and all dear to us to God's kind care, trusting that he will deliver us in every day of trial until we are safely brought to a happy death and immortal life through our Saviour, I am, etc."

This constant and severe strain upon a constitution always weak from chronic infirmities, as might have been expected, proved too much for him, and he was attacked with the most serious and alarming of all his many seasons of illness excepting the last. His life was despaired of; he took leave of his family and sent farewell messages to his friends. It was not until the eighth of April, 1856, that he was able to be removed by easy stages in a private

carriage to Bath. For nine weeks he was unable to move hand or foot, and seemed to be in constant peril of death. He made the city of Bath his residence until he sailed for America in May, 1858.

These two years proved to be a period of great embarrassment to him, his ill-health preventing him from giving that attention to his business which it required. His office was his sick chamber, and his desk the bed upon which he was prostrated. There appeared to be no way to escape the grasp of money-lenders but to renew his notes, at a very high rate for interest and commissions. His affairs in America were suffering from his absence. Some of his licensees, indeed, fulfilled their obligations, but others required legal measures to compel the fulfillment of their contracts; while one, whose duty it was, as attorney, to attend to his interests in that regard, used his position to serve his own private ends, and to amass wealth for him-

self; so that it is questionable whether Mr. Goodyear suffered more detriment from the piracies of open enemies, than from the schemes of his own agent.

Mr. Goodyear continued his studies in the application of rubber to the arts during all these hours of feebleness. Often he would arouse his wife in the night, and ask her if she was too fatigued to write for him, remarking, as the reason for the untimely request, "I have not closed my eyes yet, for I believe I have thought of the true way of overcoming a difficulty;" sometimes adding, "I have been studying that for *so* many years," mentioning the time. He would then dictate, more rapidly than his wife could write, the precise directions to some workman who was making experiments for him, and perhaps a number of letters and papers of importance. Having thus relieved his mind, he would fall asleep.

His labors during his last summer in England

were principally spent upon the perfecting of a series of inventions for saving life in water, and a severe illness was the consequence of undue efforts to which he was prompted by the reading of some statement relative to the number of persons, in the whole world, who were drowning every day. The figures were alarming, and for many nights Mr. Goodyear could not sleep. When, one night, his wife asked him what was the cause of his continued sleeplessness, he remarked, "How can I sleep, when so many of my fellow-creatures are passing into eternity every day, and I feel that I am the man that can prevent it."

"It was long his endeavor to invent some garment which every man, woman, and child would necessarily wear, and which would make it impossible for them to sink. He experimented with various articles of clothing; and, though he left his principal object incomplete, he invented many ingenious contrivances for saving

life. He had the idea that every article on board a vessel, seizable in a moment of danger, every chair, table, sofa, and stool, should be a life-preserver." *

Even at this day, so embarrassed was he for means, and yet so earnest in the pursuit of his investigations, that his own watch chain, his wife's gold chain and diamond ring, a wedding present from himself, and other jewelry, were pawned for ready money to carry on these experiments.

The winter which preceded Mr. Goodyear's return to his native land, says his wife, was "one of deep trial, constant sickness, acute bodily and mental distress, and great pecuniary inconvenience and anxiety. The history of that period can never be told."

* Parton.

CHAPTER XIII.

CLOSING LABORS AND DEATH.

As the period for the expiration of Mr. Goodyear's first patent drew near, it became necessary to take measures to secure its extension by an application to the commissioner. Thus far he had expended, in developing and bringing into general use the results of his great discovery, more than he had received from it. He had introduced an immense and profitable trade into the country. Thousands of laborers were supplied with remunerating employment; many persons were building up large fortunes; while he, exhausted in health by his unremitted labors and anxieties, with a dependent family, had no resources save those he might and ought to draw from the great invention which he had given to his countrymen. The small royalty,

which no purchaser would feel, and which would be an inconsiderable portion of the great profits pouring into the hands of the manufacturers, would form but a small compensation for his services.

Every effort, however, which money and political influence could command was put into requisition to deprive him of this. The application rested upon its merits, and we have seen on a previous page of this biography how strongly these were presented in the official report of Mr. Commissioner Holt. It was characteristic of the man, significant of the real greatness and true nobility of his nature, and of his confident and cheerful repose upon the wisdom and goodness of the Divine Providence, that, in a letter written to his wife the day before that which was to decide whether he should be penniless, an invalid without physical strength to turn to any other form of labor to support himself and his dependent family,

he exhibits the same calm reliance upon God. "Indeed," says his wife, "the letter is almost a psalm of thanksgiving, without one word of anxiety or suspense, recounting the mercies and deliverances of his past life." He had used all the honest means in his power, and having devoutly committed the matter into the hands of God, he calmly awaited the result.

The objection to the renewal of his patent, after the statement in reference to the immense sums he was said to have already received was proved to be unfounded, was based upon the charge made by parties interested in destroying his claim, that he was wasteful and reckless about his money affairs. Upon such an accusation, again urged, when a second and unsuccessful application was made by his family, for a renewal by Congress, after his death, Hon. James T. Brady, before the Committee of the House of Representatives, remarked: "That he expended

thousands upon thousands in prosecuting his experiments in India rubber is quite true, but it is just as true that he expended little on himself. There is one great fact to demonstrate that he sunk his means in experiments, namely, that he died in debt, which his assets cannot pay. Now what became of his money? Did he spend it in pleasure? Had he any costly vices or habits? On the contrary, he was a small, attenuated, sickly man, with a complexion intensely sallow, pale, a weak stomach, faltering limbs, and feeble almost as a puny child. Aside from love of family and friends he had but one worldly idea, that was India rubber. It was the sole object of his study and occupation. Money could purchase little or nothing for the gratification of such a man."

"Those who would censure Mr. Goodyear for permitting his estate to become so much involved," says Mr. Parton, "should consider that his discovery was not profitable to himself

for more than ten years, that he was deeply in debt when he began his experiments, that his investigations could be carried on only by increasing his indebtedness, that all his bargains were those of a man in need, that the guilelessness of his nature made him the easy prey of greedy, dishonorable men, and that his neglect of his private interests was due to his zeal for the public good."

The favorable termination of the present application enabled him to enter afresh upon the study of his life. The idea of ceasing his experiments in order to devote himself to the accumulation of property was as foreign as ever from his purpose.

In the winter of 1859 he purchased a house in Washington, and, for the first time, gathered the unmarried portion of his family together under his own roof. He often remarked during the short period that he remained in it, that he "had never had such a quiet home be-

fore;" and although still busy daily with his experiments, he would add "that he had never had so much rest, or taken life so easily." "It was the foretaste," says Mrs. Goodyear, "of that eternal rest which he was so soon to enter." He had one room in his house fitted up as a workship, with a large bath for the trial of his life-preserving apparatus. He remarked to his wife, only a few days before he left his home, never to return to it again, "that he had never made his experiments with so much ease and success before." By a singlar coincidence, as has been heretofore remarked, his last labors in India rubber were, like his first, devoted to life-saving boats and apparatus.

Here, as we approach the close of this active and fruitful life, we may for a moment consider the great additions made to human comfort and progress by the discovery of Mr. Goodyear. The business of manufacturing rubber articles has constantly increased since his

death, but he anticipated nearly all its applications to the arts. What he said has proved true, "that no one but himself would take the trouble to apply his material to the thousand uses of which it was capable, because each new application demanded a course of experiments that would discourage any one who entered upon it only with a view to profit." "He lived," says Parton, "to see his material applied to nearly five hundred uses, to give employment in England, France, Germany, and the United States to sixty thousand persons; annually producing in this country alone merchandise of the value of eight millions of dollars. But we should greatly undervalue the labors of Charles Goodyear if we regarded them only as opening a new source of wealth; for there have been found many uses of India rubber, as prepared by him, which have an importance far superior to their commercial value. Art, science, and humanity are indebted to

him for a material which serves the purposes of them all, and serves them as no other known material could.

"Some of our readers have been out on the picket line during the war. They know what it is to stand motionless in a wet and miry rifle-pit, in the chilling rain of a southern winter's night. Protected by India rubber boots, blanket, and cap, the picket man performs in comparative comfort a duty which, without that protection, would make him a cowering and shivering wretch, and plant in his bones a latent rheumatism to be the torment of his old age. Goodyear's India rubber enables him to come in from his pit as dry as when he went into it, and he comes in to lie down with an India rubber blanket between him and the damp earth. If he is wounded, it is an India rubber stretcher, or an ambulance provided with India rubber springs, that gives him least pain on his way to the hospital, where, if his

wound is serious, a water-bed of India rubber gives ease to his mangled frame, and enables him to endure the wearing tedium of an unchanged posture. Bandages and supporters of India rubber avail him much when first he begins to hobble about his ward. A piece of India rubber at the end of his crutch lessens the jar and the noise of his motions, and a cushion of India rubber is comfortable to his arm-pit. The springs which close the hospital door, the bands which exclude the drafts from doors and windows, his pocket-comb and cup and thimble, are of the same material. From jars hermetically closed with India rubber he receives the fresh fruit that is so exquisitely delicious to a fevered mouth. The instrument case of his surgeon, and the store-room of his matron, contain many articles whose utility is increased by the use of it, and some that could be made of nothing else. In a small rubber case the physician carries with him and preserves his

lunar caustic, which would corrode any metallic surface. His shirts and sheets pass through an India-rubber clothes-wringer, which saves the strength of the washerwoman and the fiber of the fabric. When the government presents him with an artificial leg, a thick heel and elastic sole of India rubber give him comfort every time he puts it to the ground. In the field, this material is not less strikingly useful. During the late war armies have marched through ten days of rain, and slept through as many rainy nights, and come out dry into the returning sunshine, with their artillery untarnished and their ammunition uninjured, because men and munitions were all under India rubber. When Goodyear's ideas are carried out, it will be by pontoons of inflated India rubber that rivers will be crossed. A pontoon train will then consist of one wagon drawn by two mules; and if the march is through a country that furnishes the wooden part of the

bridge, a man may carry a pontoon on his back, in addition to his knapsack and blanket.

"In the naval service we meet this material in a form that attracts little attention, though it serves a purpose of perhaps unequaled utility. Mechanics are aware that, from the time of James Watt to the year of 1850, the great necessity of the engine-builder was a perfect joint—a joint that would not admit the escape of steam. A steam-engine is all over joints and valves, from most of which some steam, sooner or later, would escape, since an engine in motion produces a continual jar that finally impairs the best joint that art could make. The old joint process was exceedingly expensive. The two surfaces of iron had to be most carefully ground and polished, then screwed together, and the edges closed with white lead. By the use of a thin sheet of vulcanized India rubber, placed between the iron surfaces, not only is all this expense saved, but

a joint is produced that is absolutely and permanently perfect. It is not even necessary to rub off the roughness of the casting, for the rougher the surface the better the joint. At present all engines are provided with these joints and valves, which save steam, diminish jar, and facilitate the separation of the parts. It is difficult to compute in money the value of this improvement. We are informed, however, by competent authority, that a steamer of two thousand tons saves ten thousand dollars a year by its use.* Such is the demand for the engine packing, as it is termed, that the owners of the factory where it is chiefly made, after constructing the largest water-wheel in the world, found it insufficient for their growing business, and were obliged to add to it a steam-

* This is the statement of Mr. Parton. Without having an opportunity to verify or correct it, we can only express the opinion that the amount seems very large, and would be more probable if stated simply in reference to the original outlay in the construction of the steamer.

engine of two hundred horse-power. The New York agent of this company sells about a million dollars' worth of packing per annum. Belting for engines is another article for which Goodyear's Compound is superior to any other, inasmuch as the surface of India rubber clings to the iron wheel better than leather or fabric. It is no small advantage to save leather for other uses, since leather is an article of which the supply is strictly limited. It is not uncommon for India rubber belts to be furnished, which, if made of leather, would require more than a hundred hides."*

An immense business has grown up out of the manufacture of the India rubber car springs, which have made the railroad coaches so easy and pleasant in their rapid motions. Of late very successful experiments have been made in the substitution of India rubber for gold and other minerals in the manufacture of sets of

* North American Review, p. 94, July, 1865.

artificial teeth. This material is lighter, more durable, and can be kept cleaner, as no acids corrode it. There is no limit to its use by the physician and surgeon in the manufacture of their instruments and appliances; and handles of the finest cutlery, the most beautifully carved jewelry, and a great variety of stationery, are made of this material. It can only be compared, as Mr. Parton remarks, in its usefulness, with such indispensable articles as glass, brass, steel, paper, and porcelain. It was the great privilege of Mr. Goodyear, after a life of extraordinary endurance, to present to his countrymen and to the race this wonderful addition to the useful and beautiful materials that enter so largely into the civilization of the times.

His appointed work was now completed, although in no degree had the fire of his enthusiasm gone down. His mind pursued its wonted channels of study with unabated inter-

est until the last. But his health and strength were evidently declining. The attacks of illness, from which he had been a constant sufferer, now returned at shorter periods, and were more severe.

Of his religious life his wife remarks: "During his last winter with us there was a marked ripening for glory; a growing gentleness and forbearance; an increased spirituality of mind, and a superiority to earthly care and anxiety, which made me often feel how near he was walking to his God." His great life-work had been truly a religious one, and a means of grace to himself. He had said, years before, to his niece and her husband, who went, says Dr. Dutton, "with his approbation and sympathy as missionaries of the Gospel to Asia, that he was God's missionary as truly as they were." He had finished the work God had given him to do. The harvest takes upon itself the color of the sun when it is ready to bow before the

sickle, and Mr. Goodyear, to the eyes of those who knew him best, was beginning to wear the golden coloring of the skies. The hour had come for the faithful servant to receive from the Master his "Well done," and to enter into the joy and rest of his Lord.

On the 30th of May, 1860, he heard of the dangerous sickness of his daughter, in New Haven, and, in the hope of seeing her once more alive, with a part of his family, accompanied by his physician, Dr. Bacon, although himself very feeble, he left Washington for Connecticut. As he was too weak to bear a railroad journey of such length, he was advised to take the steamer to New York.

He suffered severely from sea-sickness, which was very unusual to him. In writing to his wife, who was detained at home by illness, in reference to his sickness, he adds characteristically, "But Providence always smiles in the storm as well as in the sunshine." It was also

a characteristic trait of the man, that in this letter he alludes to the attentions of the steward and servants. He had a remarkable power, by his thoughtful kindness and gentleness, of attaching strongly to himself those that served near his person, or labored in his employment. The steward of the steamer Montebello, on which he came from Washington to New York, who had never known him except during this voyage, when he heard of his sickness, came three times to his hotel to hear how he was, and if possible to see him. When, a year after the death of Mr. Goodyear, his wife visited England, she received many touching proofs of the respect and affection in which his memory was held, from those that had been in his employment.

Upon reaching the dock in New York he was met by his son-in-law, who informed him of the death of his daughter. He was too ill to continue his journey to New Haven to attend

the funeral, but remained at the Fifth Avenue Hotel. He seemed from the first to have a presentiment of his approaching end. He sent for his brother-in-law, Mr. De Forest, and arranged, as far as he could, his business affairs. That night his faithful and intelligent physician said to Mr. De Forest, "This is the last!"

It was thought expedient to inform his wife of his sickness, although her health seemed to forbid her coming to New York. On the 7th of June, however, Mrs. Goodyear reached his bedside, expecting to find him very sick, but quite unprepared for the announcement that he was hopelessly ill. He recognized his wife, although unable to pursue any connected conversation from that time to the day of his death. Twice during his sickness he gathered all the members of the family, that were present with him, by his bed-side, for prayer and his parting blessing, referring to each person by name. Even when his mind was partially obscured by

disease, his confident trust in the Divine Providence which had been the inspiration and solace of his life, afforded him manifest comfort. In the midst of his perplexities and wanderings he would frequently say, "God knows." Sometimes, looking at his wife with intense earnestness, he would add, "God knows all." His sufferings during all his last sickness were severe in the extreme, yet he preserved the same gentleness, gratitude, and love to all to the very last. The marked characteristic of his life—his truly Christian spirit of forgiveness—received an affecting illustration in his dying hours. His last audible expression to his wife, when he was dying, was a charge to forgive a person from whom he had suffered much. His humility was as conspicuous as his gentleness. "One who knew him thoroughly," says his pastor in his funeral discourse, says that "the most marked features of his religious character were deep consciousness of the evil of

sin, and of his nothingness before God. Self-reliant as he appeared as a business man, his soul was most humble before God, and he seemed more deeply conscious of his dependence upon him, and need of forgiveness as well as of forbearance, than any other person with whose religious experience I have any intimate acquaintance." In his last hours, when reference was made to his useful works, he humbly and devoutly responded, "What am I? To God be all the glory."

On Sunday morning, July 1, 1860, without a sigh or a struggle, his released spirit left its wasted body, and rose to its heavenly rest and reward in the presence of its Redeemer. Just as the bells were ringing for divine service, half raising himself from the pillow, as if he saw some one, he sank back again, and was at once a worshiper in the upper sanctuary.

APPENDIX.

It would be impossible to exhibit more clearly the distinct conception which Mr. Goodyear had of the nature and availability of his great discovery, than to present the following circular, which was prepared, and sent out, at the time he obtained his patent in 1844:

The subscriber has invented, or discovered, a Metallic Gum Elastic Composition.

He is prepared to demonstrate, by ocular and irresistible evidence, that this Gum Elastic Composition possesses extraordinary and valuable qualities; namely, that,

1. No degree of heat, without blaze, can melt it. It remains unaltered in the torrid zone. Heat without blaze, more intense than 280 degrees Fahrenheit, chars it like wood.

2. It continues flexible in any degree of cold. The contact of ice itself does not stiffen it.

3. In durability it surpasses any other material applicable to similar uses.

4. Its elastic power is superior to that of common India rubber, and is retained unaffected by heat, cold, or continued stretching.

5. Of itself, or in combination with fabrics of cotton, or other material, it can be made of any desirable strength, with or without elasticity.

6. It resists the most powerful chemical reagents. Aquafortis, sulphuric acid, essential and common oils, turpentine, and other solvents, which destroy the native gum, wood, leather, and metals, produce no effect upon this composition, except that long-continued immersion in pure aquafortis, or sulphuric acid, chars it.

7. It possesses valuable medical qualities, being a substitute for oiled silk, furnishing hydrostatic beds, and a great variety of articles used in surgery.

8. It, as well as the fabrics with which it is used in combination, can be washed in boiling water, with lime or lye, without injury.

9. Like other Gum Elastic Composition, it is water-and-air-proof.

10. It is not liable to be injured by rats, moths, or other vermin.

11. It can be moulded or embossed like wax, and can be prepared in sheets of any thickness or thinness.

12. It will take any color.

13. It will take Japan varnish, and equals in beauty patent leather, as it surpasses it in many other qualities.

14. It takes impressions more delicately than the finest paper.

15. It can be woven or braided.

16. It can be napped, like broadcloth or plush.

17. It can be rendered perfectly tasteless, and inoffensive in point of odor.

18. Its contraction, after having been stretched in threads between two adhering thicknesses of cotton, silk, or other flexible materials, shirs or corrugates the fabric in a new and beautiful manner, and renders it applicable to a variety of uses.

He is also prepared to demonstrate, by means of samples and other evidence, that this composition can and will be advantageously employed in a great number of useful ways.

1. It is, for many purposes, a cheaper and better substitute for leather.

2. It is, for many purposes, a cheaper and better substitute for cloth and hair-cloth.

3. It is, for many purposes, a cheaper and better substitute for oiled cloth.

4. It is, for many purposes, a cheaper and better substitute for oiled silk.

5. It is, for many purposes, a cheaper and better substitute for paper and parchment.

6. The shirred or corrugated goods are peculiar, and for many purposes are unrivaled.

This composition can be economically and usefully employed,

1. In almost every article of external clothing, particularly where protection from cold and rain, or durability, are desired.

2. In trimming carriages.

3. For harness of all kinds.

4. In building, particularly for roofs and cisterns.

5. In furniture, (land and sea,) particularly for carpets.

6. For firemen's dresses, for fire and water hose.

7. For the binding of books.

8. As a substitute for paper and parchment, and for maps and charts.

9. For the canvas and rigging of ships, supplying them also with compact boats, life preservers, letter-bags, perhaps with sheathing and caulking materials.

10. For belts and banding of machinery, and for smiths' bellows.

11. For bags, bagging, compact casks, rope and tarpaulins, used in securing and transporting merchandise, dry or liquid.

It is especially applicable to the wants of government.

I. To the post-office it supplies the cheapest and best mail-bag, and ships' letter-bag. A bag, water-proof, more durable than riveted leather, incapable of sinking when filled with papers, unalterable by climate.

II. To the Indian department it furnishes an artificial buffalo robe cheaper and better than any blanket.

III. To the Army it will supply,

1. Tents.
2. Tent carpets.
3. Tarpaulins.
4. Gun covers.
5. Knapsacks.

6. Blankets.
7. Cartridge cylinders.
8. Pontoons.
9. Magazines.
10. Soldiers' Dresses and Equipments.
11. Baggage Wagon Covers and appurtenances, securing to the camp much of the safety and comfort of barracks.

IV. To the Navy, it will furnish

1. Canvas, for sails.
2. Rigging.
3. Boats.
4. Life-preservers.
5. Buoys.
6. Fenders.
7. Gun Covers.
8. Gun Breechings.
9. Spring Cables.
10. Perhaps, Sheathing Materials.
11. Perhaps, Caulking Materials.
12. Carpets.
13. Awnings.
14. Tarpaulins.
15. Cartridge Cylinders.
16. Fire Screens.
17. Tanks, holding fresh water for ballast.
18. Hose.
19. Buckets.
20. Magazines.
21. Water Bags.

22. Provision Bags.
23. Sailors' and Mariners' dress and equipments.
24. Hammock Cloths, Hammocks, and Hammock Bags.

The above mentioned are some of the qualities and uses of this composition. It is not pretended that all the fabrics of this composition possess, alike, all the qualities, or are applicable to all the uses, before enumerated; each kind of fabric possesses those qualities which are desirable for the uses to which it should be applied. A cloth intended to sustain friction would be different from a cloth designed to resist pulling or straining; and light, semi-transparent fabrics, suitable for printing upon, being finished by a peculiar process, do not possess, as they do not require, some of the qualities which are desirable in heavier goods.

This composition has been already subjected to chemical analysis, to thorough and practical tests by men of science and by the Government of the United States.

In now presenting it to the public, the subscriber invites the most searching investigation, and the most severe trial. CHARLES GOODYEAR.

NEW YORK, *October*, 1844.

THE END.