THE LIFE AND TIMES OF

# HELON HENRY TRACY

MORMON POLYGAMIST

A true story of the practice of polygamy
with its divine purpose being to raise up
a righteous seed unto God.

Donald R. Hall

Those practicing polygamous relationships today have made a mockery and travesty of something far removed from the divine purpose of the practice to raise up a righteous seed unto God. "Mockery" meaning "something ridiculously or impudently unsuitable." "Travesty" meaning "a debased, distorted, or grossly inferior imitation."

Annie Clark Tanner, a polygamous wife of the late 1800's, at a time when polygamy was practiced according to its divine purpose, indicated: "Many of the finest characters in Utah and surrounding states owe their existence to this doctrine of the Mormon Church. It is often remarked that all the headaches and heartaches caused by polygamy have, in some measure, been compensated by the fine eugenic results." (Webster defines "Eugenics" as "Relating to or fitted for the production of good offspring.")

A half century and more of heated confrontation with the U.S. government had taught Latter-day Saints the practical limits of religious life in America. By the end of World War I, if not before, the Mormons were more American than most Americans. Patriotism, respect for the law, love of the Constitution, and obedience to political authority reigned as principles of the faith.
—Leonard J. Arrington and Davis Bitton, historians.

It has been said of him that seldom in the history of mankind has one person's inventions and discoveries led to more worldwide industrial growth and development than that of H. Tracy Hall, the man of man-made industrial diamonds.
—Statement made following Tracy's receiving an honorary doctorate (at age 84) from the University of Utah, May 7, 2004, fifty seven years after he had earned a PhD in Chemistry from that place in 1947.
To the above statement Tracy's posterity gratefully adds, "Grandson of revered polygamist Helon Henry Tracy."

A grandson of polygamist Lorin Fair wrote of him as follows: "A life of fullness came to a quiet and peaceful end, but his deeds and loyalty will forever live as a challenge to his posterity. That his name graces monuments, parks, school buildings, [LDS] Wards and Stakes, [Meeting houses] is a partial payment, but only the deeds of his descendants can prove their personal appreciation."

## Front Cover Flap

Helon Henry Tracy had three wives and 24 children.
Wife#l: Emma had 14 children, including Florence, the author's mother, who was the eleventh child, born while her father was in prison.

Wife #2: Mary Jane, who was Emma's sister, had seven children with one, also, born while her father was in prison.
Wife #3: Phoebe, who had three children. Judge Zane, on sentencing Henry to prison, chastised him severely while declaring him to be a poor misguided man. This verbal scolding was followed by the usual question, "Do you promise to obey the law after leaving prison?" which meant that the offender was not to have any further contact with his plural wives. Most answered that they could not make such a promise. Unfortunately records show that five polygamists were sentenced to prison for a third time while 62 served a second term because of the associations they had with their plural wives.

One unfortunate victim, William H. Tovey, was sentenced a second time because of visits to the home of his second wife. He had made his home exclusively with his first wife, but on occasions "visited the house of his plural wife, remaining probably at no time to exceed two hours. The reasons for his visits were to attend to one of his children who was sick for several weeks; to instruct his children in their lessons; to convey means for their support; to carry water, which has to be taken from a point some distance from the premises, and to saw firewood. The reason given for his attending to the last two mentioned items pertaining to the household was that the plural wife had been lame from childhood and is compelled to use a crutch, while none of the children are old enough to perform those labors for her. The defendant had not only never slept at the house of his plural wife, but had never even taken a meal there."

In Henry's case "A Strange Affair - the birth of a child," happened because of his effort to avoid further imprisonment.

The newspapers of the time told of various groups' efforts to destroy the Mormon Church with such accusations as follows:

Mormonism, as a system professing to advance civilization and education, is a failure.

Mormonism, as a system professing to bless society, is a vile delusion.

Mormonism professing to be a religion to save the people is a fraud.

Mormonism is a system that would disgrace any land, and is a foul blot upon our National escutcheon.

It was because of such accusations as the above and demands that the government do something about the "Mormon Problem" that legislation was passed that fined and sent the polygamists to prison.

Is Mormonism really a vile delusion? Doesn't every church claim to be the true church? The Church of Jesus Christ of Latter-day Saints makes that same claim to being the true church upon the earth. Is it so? Let the reader decide.

## Back Cover Flap

Donald Ray Hall was the fourth of five sons, born August 21,1924, in Ogden, Utah, to Howard and Florence Tracy Hall. Just as the family was getting established the Great Depression of the 1930's limited their economic development, as was the case with many families. Yet, they struggled through those years learning of love and compassion for those around them as they tried to elevate each other in their very difficult and trying circumstances.

Their next great challenge came with the outset of World War II when it became necessary to rise in defense of the great principles upon which our nation was established. The four older sons became involved in that war while the younger one fought in Korea. Such actions were taken in order to preserve those ideals that would preserve us as a nation while establishing those same principles in other lands that could result in more harmonious living with each other. That never-ending struggle continues to this day.

Following his 3-year service in World War II, Donald served 2-1/2 years as a missionary in Argentina for his LDS church. This happened during the dictatorial reign of Juan and Evita Peron, which was an illuminating experience for him to witness the abuse of power, which they exercised.

Upon returning home Donald married and with his wife Louise had five boys before they had their only girl. Twin boys born to them lived only one day. He graduated from Weber Jr. College with an associate degree in 1950; followed, in 1952, by a Bachelor's Degree in Social Studies from the University of Utah, with a teaching certificate in secondary education.

He greatly enjoyed his teaching years and in so-called retirement enjoys photography and historical research to keep him busy—along with the 14 grandchildren and 8 great-grandchildren that he and Louise now have.

Soldier

LDS Missionary

Teacher

84 year-old gr. grandfather

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ISBN

Booksurge Publishers

Can only polygamists raise up a righteous seed unto God?
The answer, of course, is a very emphatic "No!"
Any husband and wife, so dedicated, can accomplish that end.
That righteous seed will grow in proportion to our obedience
to the laws of God that will bring it about.
Devoted parents who teach their children to know good from evil
and truth from error while building their lives on principles of
righteous living will go a long way toward that end.

"Train up a child in the way he should go:
and when he is old, he will not depart from it."
-Proverbs 22:6.

Appropriately, then, as necessary in the timetable of God,
plurality of wives was commanded in order
to carry out his purposes upon the earth.
Those who were faithful and committed to practice polygamy
did so in order to obey a commandment of God. These
same faithful men and women gave up the practice when
God's prophets asked them to do so.
Both the practice of polygamy and the giving up of the practice
are evidence of the faithfulness of these men and women.

Thus, the story of Helon Henry Tracy,
along with the stories of others who practiced that tenet of
their religion, while later giving it up, follows:

Too much history is lost when the present isn't
recorded as it happens. -Donald R. Hall

Thanks, Grandfather, for what you had written.
In doing so we have been able to know you and love
you and thank you because of the
influence you have had on our lives.
—Your appreciative descendants.

Thanks, also, to the many newspaper writers of his time
who helped tell Helon Henry Tracy's story.

**THE LIFE AND TIMES OF**
**HELON HENRY TRACY**

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## FOREWORD

In the year 1962 my mother (Florence Tracy Hall) gave me the missionary and prison diaries of her father (Helon - Pronounced "Hee-lon" — Henry Tracy) to have them published because she felt that I was the family member who could get such work done. Those diaries were in her possession because of the fact that her mother, crippled with rheumatism, had lived most of the last fifteen years of her life in my mother's home where she could be taken care of.

My mother didn't do anything with those diaries in her lifetime, but spent considerable effort in having published her own grandmother's story—that of Nancy Naomi Alexander Tracy. It was then my turn to see that my grandfather's diaries were published.

I began with the missionary diary because that was the first of his writings. After typing the contents I set about making maps that identified his travels, along with summaries, charts and indexes that made his story better understood. Along with all my responsibilities of making a living and caring for my family it took me a year to complete the task, after which 500 copies were printed, in 1963, for sale to his descendants. This was accomplished with some financial help from my brother Tracy along his having the material re-typed with an electric typewriter to make it more readable. The book was entitled "Missionary Diary of Helon Henry Tracy in the United States and Great Britain, 1881 - 1882."

With that accomplished I set to work on my grandfather's prison diary much as I had done his missionary account. 1 typed it up along with a brief introduction that I felt was adequate to indicate that he was in prison because of his practice of polygamy. I was prepared to print up 500 copies until I went to the city library to find on micro-film an account of Grandfather's arrest and trial that he had indicated could be found in the newspaper of the time, the "Ogden Daily Herald."

Upon getting into that newspaper I became extremely embarrassed at what I had originally intended to publish. I soon found that the newspaper was full of stories telling of what was going on in the 1880s of the great effort to destroy completely the Mormon Church because of its practice of polygamy. I got what I originally went to the newspaper for and left to a future time what I could see as various chapters to better tell grandfather's story. I had already made the cover entitled, "Prison Diary of Helon Henry Tracy, Utah Penitentiary - 1886," which had to be immediately changed to "The Life and Times of Helon Henry Tracy - Mormon Polygamist," which better described the work.

I knew that I had a great task ahead of me. In my visit to get Grandfather's trial proceedings from the newspaper it took me four hours to copy what was printed there. "Copy" in those days meant to write out in longhand what was printed. It took me two visits to accomplish that strenuous task. I was asking myself how I would ever find time to hand copy the many articles that I knew would add greatly to the background of Grandfather's story. I saw those chapters before me telling of the Great Crusade, the searches, raids, arrests and jury trials of the men along with the work of the judges and Federal marshals involved in what was happening in the broken homes, women fleeing on the "underground" much as the Negroes during slavery times, etc.

When Mother died in June 1966, 1 was sorry that I didn't have her father's

prison diary printed before she passed away. She knew, however, why I hadn't finished the project. She knew that I was waiting for the opportunity when I would have sufficient time to do his story in the best way possible and to do it right. Looking to the future I was always wondering how could I ever copy the numerous articles that would better tell his story. That process of writing out in longhand could overwhelm me. When 1 finally got around to it, and that didn't happen until I retired from school teaching in 1983 and finally had sufficient time to get back to the project, a great surprise awaited me that really set my mind at ease. By that time I discovered that the newspaper reading machines had photocopiers attached that made it easy to copy the articles that I could later type at home on my old-fashioned manual typewriter. And so I began, but I still wasn't a retired person as I became involved in building projects and other things to help my children, along with occasional paying jobs needed to sustain my family, but at least I was underway.

I spent that first year averaging six hours a week at the library reading for hour after hour and day after day gleaning from the numerous articles things that I might use. During that time I identified 1094 articles that told of polygamous happenings through the years of 1881 to 1893. I photocopied 62 of them that I thought especially good and typed them for use in Grandfather's story. That was the extent of my work until 1987 when I had access to a computer for a time when 1 typed the prison diary along with the 62 newspaper items. Again there was a pause until 1994 when I got a computer of my own and did further research at the library with more things added.

Time passes as the exigencies of life kept altering my priorities. In March of 2004, 1 got back to work again expecting that I could finish the project in a couple of months. That all changed when I decided that 1 had better go back to the newspapers and re-read again the many articles I had already identified while looking for other things that I might have missed that could be important. As a result of that ten months of a few hours work almost daily, 1 found a few more new things, which I added to many of the earlier ones. That brought me to the point where I felt comfortable about what I had done, yet I still had a lot of refining to do before I was completely satisfied. That resolve to finally finish was interrupted as my attention was needed in other aspects of my family life. That delay, however, brings my book out at a time when the subject of polygamy is often in the news because of the actions of present day practitioners whose lives are in turmoil because of their secretive and often abusive lifestyles.

I hope that I have done Grandfather's story right, as I promised my mother I would do so many years ago while, also, honoring her for the wonderful mother that she was. I hope, also, that I have handled the often sensitive subject matter of polygamy, while representing the LDS Church, to which I belong, in an appropriate manner.

Donald R. Hall
Ogden, Utah Date

I would like to give a special thanks to my brother Eugene and his son Alan for some financial support needed as well as to my brother Wendell and nephew David (Tracy's son) for their helpful input. Also, to recognize my backyard neighbor Bob Clark, a great grandson of polygamist Ezra Clark and cousin to Annie Clark Tanner, who is quoted in the book, for his timely contributions.

## PREFACE

What comes to a person's mind when he/she hears the name "Mormon" uttered? What kind of impression does the word connote? Most often the name is associated with polygamy and an extremely negative connotation while other responses mention, "The Mormon Tabernacle Choir," while emitting a very positive feeling. So between those two where is the real understanding of the Mormons which is a nickname for "The Church of Jesus Christ of Latter-day Saints." This usage came about because of members' belief in the Book of Mormon which tells the story of the ancient inhabitants of the Americas written by scribes of that time to later be translated, "by the gift and power of God," and published by Joseph Smith in 1830. The word "Mormon" was written within quotation marks by all the writers of the *Ogden Herald* because of its familiar form for the name of the church.

Of course, when polygamy is mentioned, the most common name associated with that practice was Brigham Young, who is purported to have had 25 wives.[1] Whether that is the true number or not, one polygamist sympathetically asked, "Isn't One Wife Enough?" while others have jokingly implied that, "One wife is too many!" The fact remains that the practice brought great suffering and scorn among the practitioners who were demonized in caricatures such as were the Jews, Catholics, Blacks, Native Americans, Irish, Poles, Chinese, and others who were negatively characterized because of their differences.

Concerning the Mormons and polygamy a book, "The Mormon Graphic Image, 1834-1914, Cartoons, Caricatures, and Illustrations," gives examples of "the misunderstandings and misrepresentations of the Mormons that resulted in stereotyping."[2]

"Many illustrations showed quarrelsome, unhappy women and impersonal, exploitative Mormon men."[3]

Others carried the message that "Mormonism was a nefarious, stifling system that led its victims into a life of suffering and disillusionment."[4]

Samuel Clemens [Mark Twain] while visiting briefly in Salt Lake City wrote his impressions in his book, *"Roughing It"* [American Publishing Co., Hartford, Connecticut, 1872.]

I was feverish to plunge in headlong and achieve a great reform here—until I saw the Mormon women. Then I was touched. My heart was wiser than my head. It warmed toward these poor, ungainly, and pathetically "homely" creatures, and as I turned to hide the generous moisture in my eyes, I said, "No—the man that marries one of them has done an act of Christian charity which entitles him to the kindly applause of mankind, not their harsh censure—and the man that marries sixty of them has done a deed of open-handed generosity so sublime that the nations should stand uncovered in his presence and worship in silence."[5]

He further indicated: This was a fairyland to us . . . a land of enchantment, and goblins, and awful mystery. We felt a curiosity to ask every child how many mothers it had, and if it could tell them apart; and we experienced a thrill every time a dwelling house door opened and shut as we passed ... for we longed to have a good satisfying look at a Mormon family in all its comprehensive ampleness.[6]

Upon leaving the area Twain wrote: We left . . . Salt Lake City . . . not so very much wiser, as regards the Mormon question, than we were when we arrived. . . . We had a deal more "information" than we had before, of course, but we did not know what portion of it was reliable. . . . All our "information" had three sides to it, and so I gave up the idea that I could settle the "Mormon question" in two days. Still I have seen newspaper correspondents do it in one.[7] Another humorist, Bill Nye's description of "The unsightly Mormon Woman" is considered to be the harshest: I thought I had seen homely women before, but today was reserved for me a spectacle of Mormon hideousness that will haunt me always. In my opinion, polygamy carries its own punishment along with it. It is sufficient punishment for the men to stay in the house with the warty creatures they call their wives.[8]

A sampling of a few of the 165 illustrations from the book follows:

Fig. **27. The Family Bedstead.** Illustration from Mark Twain's *Roughing It* published in 1872. (p. 40)

Fig. 25 Brigham Young the Great American Family Man. *Wild Oats,* 28 March 1872. (p. 38)


Fig. 56. Up-to-Date Father Goose. Drawn by Bart for the Chicago Journal, March 1904. (p. 67)

The text reads: On 21 June 1905 *Puck's* first twentieth-century invention for Mormonism appeared—a very fat "Mormon Case watch for the Utah Jewelry Trade." (Fig. 121). In its closed position it was like other watches except for its unusual thickness. In its open position out came the portraits of several wives, the last, of course, being the youngest and most attractive. (Pages 139-140)


Fig. **17 The Veiled Prophet of Polygamutah** *Vanity Fair,* 11 February 1860. (p. 29)

The above cartoon is indicative of the times where Brigham Young, along with other Mormon men, is characterized as having a cloven foot along with horns. The blindfold is used as an illustration that he is blind as to what is going on around him concerning the practice of polygamy.

Fig. 15 **Ye Popular Idea of Brigham Young and his Followers.** *Yankee Notions,* April 1858. (p. 27)


Fig. 66. **Mormonism in Utah—The Cave of Despair.** Frank Leslie's Illustrated Newspaper, 4 February 1882. (p. 82)

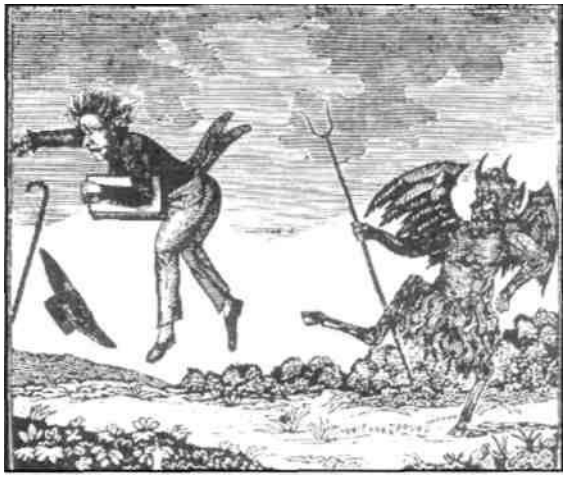


Fig. 1. Woodcut from Eber D. Howe's **Mormonism Unvailed** pulished in 1834. (p 11)

"One story asserted that a toad, hiding in the hillside repsository of the plates that contained the ancient religious record of Mormon, was transformed into a devil which proceeded to assault the young Joseph. A variant account described Joseph Smith running from Satan with the plates, finally being overtaken, and the devil's kick lifting 'him three or four feet from the ground.'" (p. 11)

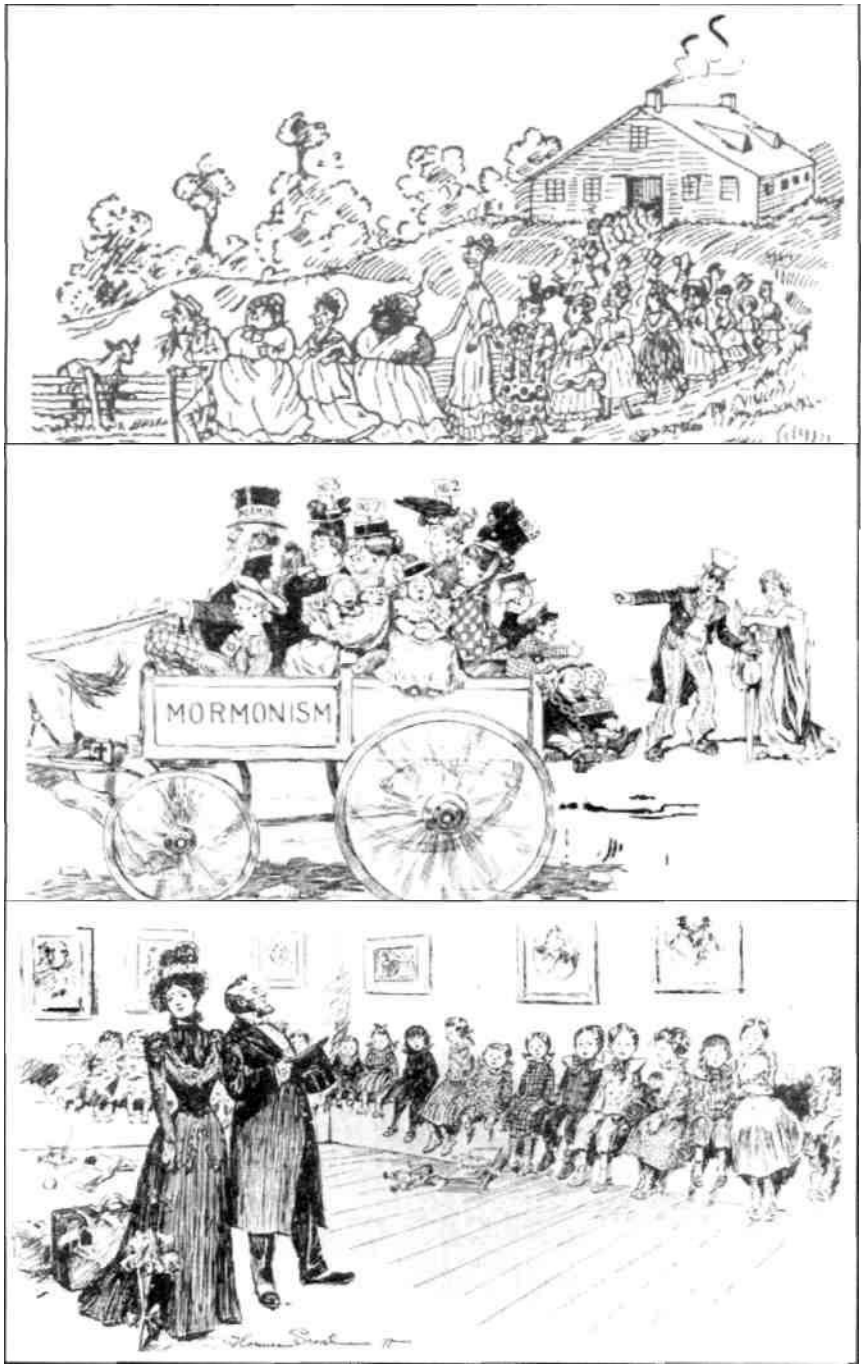



Fig. 112
**A Mormon Family out for a Walk.**
Illustration from John D. Sherwood's *The Comic History of the United States* published in 1870.
(p. 130)

Fig. **106.**
**Uncle Sam: Now There's a Merger that Will Stand Looking Into.** Pen-and-ink drawing by F. T. Richards for Philadelphia North American, 28 August 1907.
(p. 122)

**Fig.** 54.
**A pleasant Surprise for the Girl Who Marries a Utah Widower.**
*Life A May* 1899.
(P. 64)


**Jonas Ives.** *Life,* 22 November 1906. (Frontispiece.)

Fig. 57. **Portrait of a Latter Day Saint.** Drawn by Charles Dana Gibson for *Colliers Weekly,* 26 March 1904. (p. 68)

In spite of all the persecution, negativity and misunderstanding Mormon families held to the sacredness of the marriage covenant whether as to plural or monogamous relationships.

**The Special Sixth Day of Creation**

Each of the five periods of time described as "days" in the creation of the earth was described as "Good." while the sixth period was announced as "Very good." What made the difference between the fifth and sixth "days?" On that very special sixth period of time, "God created man in his own image, in the image of God created he him; male and female created he them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. . . . And God saw every thing that he had made, and, behold, it was very good. And the evening and the morning were the sixth day." (See Genesis Chapter 1.)

The seventh "day" was also very special, "Thus the heavens and the earth were finished, and all the host of them.

"And on the seventh day God ended his work which he had made; and he rested on the seventh day from all his work which he had made.

"And God blessed the seventh day, and sanctified it: because that in it he had rested from all his work which God created and made." (Genesis 2:1-3)

The Apostle Paul to the Corinthians indicated, "Neither is the man without the women, neither the women without the man, in the Lord." (1 Corinthians 11:11) "And they twain shall be one flesh," according to Matthew. (Mathew 19:5) "And all this that the earth might answer the end of its creation; And that it might be filled with the measure of man, according to his creation before the world was made." (D&C 49:16-17)

So it is that the man and the woman "shall be one flesh" in a partnership with God while carrying out the divine purposes of the earth's creation—to be proved and tested to see whether or not we would keep the commandments of God that would bring great blessings in this life while leading to eternal joy and happiness in the life to come.

Was the practice of polygamy, then, a part of that great plan to populate the earth *(raise up seed unto me)* as practiced by people in Biblical times—

Abraham, with two wives; Jacob, with four; and David and Solomon, with too many each; along with the Mormons for a period of time in the 1800's?

Let the reader decide!

**Brigham Young's hope that the church would become better understood.**

A certain president's visit in the Territory of Utah proved very beneficial to its citizens: In 1875 the President of the United States, Ulysses S. Grant, visited the territory. On his arrival in Salt Lake City he was driven [in a horse-drawn carriage by Brigham Young ] through the streets of the city thronged with people. He had accepted as true the falsehoods concerning the Mormons which were still circulated in the East, and while passing long lines of rosy-cheeked children who were waving and cheering, he turned to the governor who was his host and asked, "Whose children are these, Governor?"

"Those are Mormon children," the governor replied. To this the President remarked, "Governor, I have been deceived."

Brigham Young by this time was a man seventy-four years of age. He was in good health, but the trial of the years was telling on him. Life had been a constant struggle from the time he had joined the Church in 1833. In summing up the results of that struggle he wrote an article for the editor of a New York paper in response to a request for a summary of his labors:

I thank you for the privilege of presenting facts as they are. I will furnish them gladly at any time you make the request. The result of my labors for the past 26 years briefly summed up are: The peopling of this territory by the Latter-day Saints of about 100,000 souls; the founding of over 200 cities, town and villages inhabited by our people, the establishment of schools, factories, mills and other institutions calculated to improve and benefit our communities.

My whole life is devoted to the Almighty's service, and while I regret that my mission is not better understood by the world, the time will come when I will be understood, and I leave to futurity the judgment of my labors and their result as they shall become manifest.

**Monument to Brigham Young on Main Street of Salt Lake City, Utah, with the LDS Salt Lake Temple in the background.**

It is the author's hope, because of his treasured heritage as a descendant of a polygamous grandfather, that the readers of the following will have a better understanding of The Church of Jesus Christ of Latter-day Saints of those times past as well as of the present.

Much of that better understanding can be gained by accepting the invitation given in the introduction to the Book of Mormon: "We invite all men [humankind] everywhere to read the Book of Mormon, to ponder in their hearts the message it contains, and then to ask God, the Eternal Father, in the name of Christ if the book is true. Those who pursue this course and ask in faith will gain a testimony of its truth and divinity by the power of the Holy Ghost. (See Moroni 10:3-5.) "Those who gain this divine witness from the Holy Spirit will also come to know by the same power that Jesus Christ is the Savior of the world, that Joseph Smith is his revelatorand prophet in these last days, and that The Church of Jesus Christ of Latter-day Saints is the Lord's kingdom once again established on the earth, preparatory to the second coming of the Messiah."

## IDENTIFYING SOURCES

**Newspaper Sources**

The *Ogden Daily Herald,* published by the Ogden Herald Publishing Company, Ogden, Utah. References from that paper will often appear using the masthead to introduce the material. Usually, however, the reference will come at the end of the material quoted and will be identified by "ODH" followed by the date. (ODH May 7, 1881)

In 1887 the *Herald* merged with the *Semi-Weekly Standard.* References from that paper will appear using the masthead, while at most times the reference comes at the end of the material quoted, "SWS" followed by the date. (SWS Sep. 19, 1887).

That newspaper later became *The Standard,* which was the forerunner of what is known today as the *Standard-Examiner* covering the Top of Utah. In like manner references from that paper will sometimes use the masthead to introduce, but will more often come at the closing of the article and is identified as "Standard," followed by the date. (Standard, March 9, 1892).

**Scriptural References**

The usual procedure is followed when citing scriptures by placing the reference at the end of the material quoted.

The Holy Bible - King James Version, Published by The Church of Jesus Christ of Latter-day Saints, Salt Lake City, Utah, U.S.A., 1979. "And this is life eternal, that they might know thee the only true God, and Jesus Christ, whom thou has sent." (John 17:3)

The Book of Mormon - Another Testament of Jesus Christ, Published by The Church of Jesus Christ of Latter-day Saints, Salt Lake City, Utah, U.S.A. "I declare these things unto the fulfilling of the prophecies. And behold, they shall proceed forth out of the mouth of the everlasting God; and his word shall hiss forth from generation to generation. And God shall show unto you, that that which I have written is true." (Moroni 10:28-29)

The Doctrine and Covenants of The Church of Jesus Christ of Latter-day Saints - Containing revelations given to Joseph Smith, the prophet, with some additions by his successors in the presidency of the church. Published by The Church of Jesus Christ of Latter-day Saints, Salt Lake City, Utah, U.S.A.

An introductory statement tells, "In the revelations the doctrines of the gospel are set forth with explanations about such fundamental matters as the nature of the Godhead, the origin of man, the reality of Satan, the purpose of mortality, the necessity for obedience, the need for repentance, the workings of the Holy Spirit, the ordinances and performances that pertain to salvation, the destiny of the earth, the future conditions of man after the resurrection and the judgment, the eternity of the marriage relationship, and the eternal nature of the family. Likewise the gradual unfolding of the administrative structure of the Church is shown with the calling of bishops, the First Presidency, the Council of the Twelve, and the Seventy, and the

establishment of other presiding offices and quorums. Finally, the testimony that is given of Jesus Christ—his divinity, his majesty, his perfection, his love, and his redeeming power—makes this book of great value to the human family and of more worth than the riches of the whole earth." (Preface)

"Wherefore the voice of the Lord is unto the ends of the earth, that all that will hear may hear: Prepare ye, prepare ye for that which is to come, for the Lord is nigh." (D&C 1:11-12)

The Pearl of Great Price is a selection of choice materials touching many significant aspects of the faith and doctrine of The Church of Jesus Christ of Latter- day Saints. These items were produced by the Prophet Joseph Smith and were published in the Church periodicals of his day.

Following is a brief introduction to the present contents:

*The Book of Moses.* Visions of Moses, as revealed to Joseph Smith the prophet, in June 1830.

Such references would be identified, "This is my work and my glory—to bring to pass the immortality and eternal life of man." (PGP Moses 1:39)

*The Book of Abraham.* A translation from some Egyptian papyri that came into the hands of Joseph Smith in 1835, containing writings of the patriarch Abraham.

Such references would be identified, "Now the Lord had shown unto me, Abraham, the intelligences that were organized before the world was; and among all these there were many of the noble and great ones; and God saw these souls that they were good." (PGP Abraham 3:22-23)

*Joseph Smith—Matthew.* An extract from the testimony of Matthew in Joseph Smith's Translation of the Bible. See Doctrine and Covenants 45:60-61 for the divine injunction to begin the translation of the New Testament. (No references were used from this section.)

*Joseph Smith—History.* Excerpts from Joseph Smith's official testimony and history, which he prepared in 1838, and which was published serially in the Times and Seasons in Nauvoo, Illinois, beginning on March 15, 1842. See History of the Church, vol. 1, pp. 1-44, for the complete account.

Quotations from this five volume history are indicated by volume and page number, while some are identified at the end of the quotation, "In the midst of this war of words and tumult of opinions, I often said to myself: What is to be done? Who of all these parties are right; or, are they all wrong together? If any one of them be right, which is it, and how shall I know it?" (PGPJSH 1:10)

*The Articles of faith of The Church of Jesus Christ of Latter-day Saints.* A statement of beliefs by Joseph Smith published in the Times and Seasons March 1, 1842, in company with a short history of the Church that was popularly known as the "Wentworth Letter," which articles are printed in full at the end of this section.

Other References are recognized in the usual fashion by numbering sequentially in the order of their appearance from "i" to whatever the last reference quoted.

## CONCERNING POLYGAMY AS PRACTICED FOR A TIME IN THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS (MORMON) 1843-1890

According to the Lord's law of marriage, it is lawful that a man have only one wife at a time, unless by revelation the Lord commands plurality of wives in the new and everlasting covenant. (D. & C. 49:15-17)

Speaking of "the doctrine of plurality of wives," the Prophet [Joseph Smith] said: "I hold the keys of this power in the last days; for there is never but one on the earth at a time on whom the power and its keys are conferred; and I have constantly said *no man shall have but one wife at a time, unless the Lord directs otherwise. "(Teachings of the Prophet Joseph Smith, p. 324.)*

The Lord, by the mouth of his Prophet Jacob, gave similar direction to the Nephites: "For there shall not any man among you have save it be one wife; and concubines he shall have none; For I, the Lord God, delight in the chastity of women. And whoredoms are an abomination before me; thus saith the Lord of Hosts. Wherefore, this people shall keep my commandments, saith the Lord of Hosts, or cursed be the land for their sakes. *For if I will, saith the Lord of Hosts, raise up seed unto me, I will command my people; otherwise they shall hearken unto these things. "* (BM Jacob 2:27-30)

The Lord did command some of his ancient saints to practice plural marriage. Abraham, Isaac, and Jacob—among others (D. & C. 132) — conformed to this ennobling and exalting principle; the whole history of ancient Israel was one in which plurality of wives was a divinely accepted and approved order of matrimony. Those who entered this order at the Lord's command, and who kept the laws and conditions appertaining to it, have gained for themselves eternal exaltation in the highest heaven of the celestial world.

In the early days of this dispensation, as part of the promised restitution of all things, the Lord revealed the principle *of plural marriage* to the Prophet. Later the Prophet and leading bretheren were commanded to enter into the practice, which they did in all virtue and purity of heart despite the consequent animosity and prejudices of worldly people. After Brigham Young led the saints to the Salt Lake Valley, plural marriage was openly taught and practiced until the year 1890. At that time conditions were such that the Lord *by revelation* withdrew the command to continue the practice, and President Wilford Woodruff issued the Manifesto directing that it cease. *(Discourses of Wilford Woodruff* pp. 213-218)

Plural marriage is not essential to salvation or exaltation. Nephi and his people were denied the power to have more than one wife and yet they could gain every blessing in eternity that the Lord ever offered to any people. In our day, the Lord summarized by revelation the whole doctrine of exaltation and predicated it upon the marriage of one man to one woman. (D. & C. 132:1-28) Thereafter he added principles relative to plurality of wives with the express stipulation that any such marriages would be valid only if authorized by the President of the Church. (D. & C. 132:7, 29-66)

*All who pretend or assume to engage in plural marriage in this day, when the one holding the keys has withdrawn the power by which they are performed, are guilty of gross wickedness.*[9]

THE LIFE AND TIMES OF

# HELON HENRY TRACY

MORMON POLYGAMIST

A true story of the practice of polygamy
with its divine purpose being to raise up
a righteous seed unto God.

Donald R. Hall

## CONCERNING COVENANTS

In the gospel sense, a covenant is a binding and solemn compact, agreement, contract, or mutual promise between God and a single person or a group of chosen persons. (D. & C. 5:3,27-28; 54:4.) Since God is a party to every gospel covenant, it follows that his mind and will must be known with respect to the particular contractual relationship involved. Hence, covenants come only by revelation, and no person or group of persons enters into a gospel covenant except on the basis of direct revelation from God.

It follows that, as far as men now living are concerned, the only ones who have entered into covenants with the Lord are the members of The Church of Jesus Christ of Latter-day Saints. Their prophets are the only spiritual leaders receiving revelation for the Church and the world, and the saints themselves are the only ones enjoying the companionship of the Holy Ghost so that personal revelation may be received. Ancient and modern scriptures contain a record of many of the covenants of the past and the present. (1 Nephi 13:23-26; *Doctrines of Salvation,* vol. 1, pp. 152- 156.)

The *new and everlasting covenant* is the fulness of the gospel and embraces within its terms and conditions every other covenant that Deity ever has made or ever will make with men. (D. & C. 132: 5-7; 133:57.) The provisions of this covenant are that if men will believe, repent, be baptized, receive the Holy Ghost, and endure in righteousness to the end, they shall have an inheritance in the celestial world.

All of the terms and conditions of the new and everlasting covenant are accepted by individual men incident to their baptism under the hands of a legal administrator. In effect, by baptism, an individual signs his name to the *contract of salvation.* If, after the baptism, a person keeps the covenant of baptism (which is to endure in faith to the end), his salvation is assured. (2 Nephi 31; Mosiah 18:8-10.)

In the ordinance of the sacrament men renew the covenant made in the waters of baptism, receiving again the assurance that they shall have the Spirit to be with them in this life (D. & C. 20:77-79), as well as an inheritance of eternal life in the world to come. (John 6:54.) They, on their part, agree again to keep the commandments.

Ordination to office in the Melchizedek Priesthood and entering into that "order of the priesthood" named "the new and everlasting covenant of marriage" are both occasions when men make the covenant of exaltation, being promised through their faithfulness all that the Father hath. (D. & C. 131:1-4; 84:39-41; 132; Numbers 25.13.)

Tithing is a covenant by conformity to which men are assured temporal and spiritual blessings. (Malachi 3:7-12; D. & C. 119.) Sabbath observance is a covenant between God and his people through all their generations. (Exodus 31:16; D. & C. 59:9-20.) The word of wisdom is a covenant, conformity to which assures both strength of body and a special spiritual endowment. (D. & C. 89.) The United Order with its principles of consecration was and is to be entered by the saints by covenant (D. & C. 42:30; 78:11; 82: 11, 15,21; 104:4), a covenant assuring the faithful of a celestial reward. (D. & C. 105:3-5.) In the temples the faithful enter into many covenants pertaining to exaltation. And so it goes, the more faithful and devoted a person is, the more of the covenants of the Lord he is enabled to receive, until he receives them in full and his calling and election is made sure.

Special covenants have often been made for special purposes to particular persons or groups. The Lord covenanted with Noah never to destroy the earth again by flood, and he set the rainbow as a token of such covenant. (Genesis 9:12-13.) To Abraham he gave the covenant of circumcision to remain in force with the chosen lineage until it was fulfilled in Christ. (Genesis 17:11-14; Moroni 8:8.) To Lehi the covenant was vouchsafed that America should be a land of inheritance for his seed forever. (2 Nephi I.) A similar promise came to the saints in this day. (D. & G 38:20.) As part of the great Abrahamic covenant, a special land inheritance was offered

Israel. (Genesis 17.) The Book of Mormon is a new covenant binding upon the Latter-day Saints, that is, having received this ancient record as a divine book, they are bound to conform to its teachings and follow its counsels. (D. & C. 84:57.)

To remember and keep the covenants is a standing obligation resting upon the Lord's people. (D. & C. 33:14., 35:24; 42:13, 78; 97:8.) Nothing is ever appointed or required of any of the saints which is "contrary to the church covenants." (D. & C. 28:12; 68:24; 107:63.) All gospel teaching is to be "according to the covenants." (D. & C. 107:89.) Those who keep their covenants have the Lord's promise, given with "an immutable covenant," that all things shall work together for their good. (D. & C. 98:3.) Every member of the Church should subscribe, without any mental reservation whatever, to this revealed statement: *"And this shall be our covenant—that we will walk in all the ordinances of the Lord."* (D. & C. 136:2-4.) "Blessed are they who have kept the covenant and observed the commandment, for they shall obtain mercy." (D. & C. 54:6.)

## THE NEW AND EVERLASTING COVENANT

God's covenant of salvation is the fullness of the gospel. (D.& C. 39:11; 45:9; 66:2; 133:57.) When men accept the gospel, they thereby agree or covenant to keep the commandments of God, and he promises or covenants to give them salvation in his kingdom.

The gospel is the *everlasting* covenant because it is ordained by Him who is Everlasting and also because it is everlastingly the same. In all past ages salvation was gained by adherence to its terms and conditions, and that same compliance will bring the same reward in all future ages. Each time this everlasting covenant is revealed it is *new* to those of that dispensation. Hence the gospel is the *new and everlasting covenant.*

All covenants between God and man are part of the new and everlasting covenant. (D. & C. 22; 132: 6-7.) Thus celestial marriage is "a new and *an* everlasting covenant" (D. & C. 132:4) or the new and everlasting covenant of *marriage {Doctrines of Salvation,* vol. 1, pp. 152-166.) Some covenants, however, have force and validity in all dispensations; baptism is one of these. (D. & C. 22.) Other covenants are made for special purposes in particular dispensations; circumcision is this type of a covenant. (Genesis 17:9-14.)

That the everlasting covenant would be restored in the last days is amply attested in the revelations. (D. & C. 1:22.) Through Jeremiah the Lord promised to "make a new covenant with the house of Israel, and with the house of Judah," a covenant which would lead to that glorious, millennial condition in which "they shall teach no more every man his neighbour, and every man his brother, saying, Know the Lord: for they shall all know me, from the least of them unto the greatest of them, saith the Lord." (Jeremiah 31: 31-34.) Ezekiel said that this would be "an everlasting covenant with them," one that would be made in the day when the Lord set his sanctuary (temple) "in the midst of them." (Ezekiel 37:26.)

Apostasy consists in breaking the everlasting covenant. (D. & C. 1.15.) Isaiah said the universal apostasy would come because men had "transgressed the laws, changed the ordinance, broken the everlasting covenant." (Isaiah 24:5.) Those who break their covenants are condemned more severely than they would have been had they never made the initial contract with the Lord. (D. & C. 41:1; 82:2; 132.27.) In covenant-keeping there is salvation; in covenant-breaking, damnation. (D. & C. 76:101; 132:5, 15-27.)[10]

# THE ARTICLES OF FAITH
## of the Church of Jesus Christ
## of Latter-day Saints

I. We believe in God the eternal Father, and in His Son Jesus Christ, and in the Holy Ghost.

2. We believe that men will be punished for their own sins, and not for Adam's transgression.

3. We believe that through the atonement of Christ all mankind may be saved by obedience to the laws and ordinances of the Gospel.

4. We believe that the first principles and ordinances of the Gospel are: (1) Faith in the Lord Jesus Christ; (2) Repentance; (3) Baptism by immersion for the remission of sins; (4) Laying on of hands for the gift of the Holy Ghost.

5. We believe that a man must be called of God by prophecy and by the laying on of hands, by those who are in authority, to preach the Gospel and administer in the ordinances thereof.

6. We believe in the same organization that existed in the primitive Church, viz: apostles, prophets, pastors, teachers, evangelists, etc.

7. We believe in the gift of tongues, prophecy, revelation, visions, healings, interpretation of tongues, etc.

8. We believe the Bible to be the word of God, as far as it is translated correctly; we also believe the Book of Mormon to be the word of God.

9. We believe all that God has revealed, all that He does now reveal, and we believe that He will yet reveal many great and important things pertaining to the kingdom of God.

10. We believe in the literal gathering of Israel and in the restoration of the Ten Tribes; that Zion (the New Jerusalem) will be built upon the American continent; that Christ will reign personally upon the earth; and that the earth will be renewed and receive its paradisiacal glory.

II. We claim the privilege of worshiping Almighty God according to the dictates of our own conscience, and allow all men the same privilege, let them worship how, where, or what they may.

12. We believe in being subject to kings, presidents, rulers, and magistrates, in obeying, honoring, and sustaining the law.

13. We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men; indeed, we may say that we follow the admonition of Paul, "We believe all things, we hope all things, we have endured many things, and hope to be able to endure all things. If there is anything virtuous, lovely, or of good report, or praiseworthy, we seek after these things."

Joseph Smith (PGP pp. 60-61)

**Endnotes**

[1] Brigham Young was married to sixteen women who bore him 57 children. He was, also, married to nine women with whom he did not have children. It was indicated that those were "women Brigham Young held out to be wives, in the sense that he cared for them in a temporal way as a husband would. He provided them with a home, listed them in his will and provided for their children by earlier marriages. One supposes that all or most of them were not connubial marriages." The record tells, also, that Brigham Young was married to thirty women "with no intention that he would share earthly life with them or their children, if any, by earlier marriages." (Sometimes this was done to help such families to enjoy a better place in society.) The Mormon Experience. Leonard J. Arrington and Davis Bitton, Alfred A. Knopf, New York, 1979, pp. 420-421

[2] The Mormon Graphic Image, 1834-1914 — Cartoons, Caricatures, and Illustrations, Gary L. Bunker and Davis Bitton, University of Utah Press, Salt Lake City, 1983, Inside cover piece.

[3] Ibid, p. 39.

"Ibid, p. 41.

′ Ibid, p. 40

[6] Ibid

[7] Ibid, p. 40

[8] Ibid, pp. 129-30.

[9] Truth Restored, A Short History of The Church of Jesus Christ of Latter-day Saints, Gordon B. Hinckley, Deseret News Press, Salt Lake City, Utah, 1969, pp. 135-36.

[10] Mormon Doctrine, Second Edition, Bruce R. McConkie, Bookcraft, Salt Lake City, Utah, 1966, pp. 577-579.

[11] Ibid, pp. 166-68,529-30.

CHAPTER NINETEEN

# The Results of the Mormon Practice of Polygamy, 1843-1890

With the purpose of polygamy being to raise up a righteous seed unto God, did the "Mormon" church accomplish that end in its practice? From personal experience and observation along with information gathered from reading about others in polygamous relationships, the author can make some conclusions from the Ogden, Utah area—his lifelong home. Surely, many great things have come from the descendants. They are mostly sober, industrious and well-educated people of high intellect. Their obedience to the laws of God makes them a caring and loving people who go about doing good wherever they can.

In specific instances the descendants of Lorin Farr, first mentioned in this book, are an excellent example of that "seed raised up." The descendants of Annie Clark Tanner, a polygamist wife quoted in this book indicated, "Many of the finest characters in Utah and surrounding states owe their existence to this doctrine of the Mormon Church. It is often remarked that all the headaches and heartaches caused by polygamy have, in some measure, been compensated by the fine eugenic results.'" (Webster defines "Eugenics" as "Relating to or fitted for the production of good offspring.")

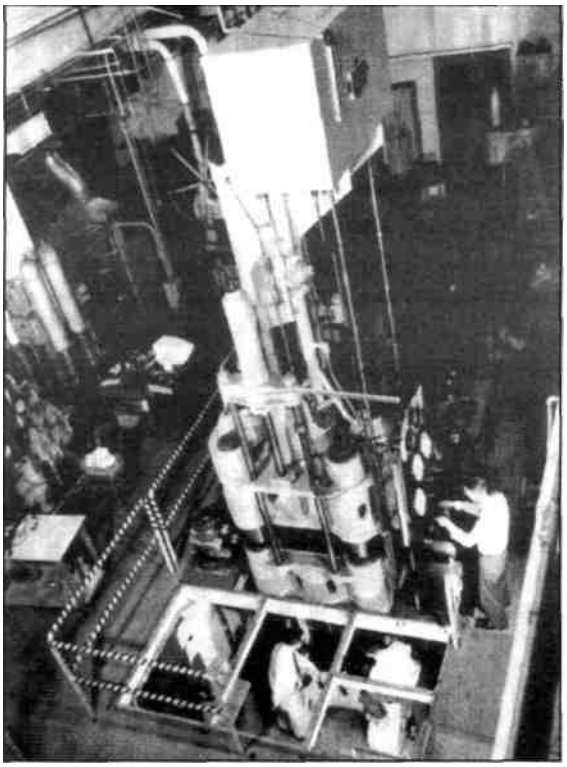
In her own case, Annie, who was the second child often of her polygamist father's second wife—his first wife had eleven children—left a legacy including eight outstanding children along with numerous descendants who have distinguished themselves in many ways. She tells, "Each mother is proud of her children, and I of mine. But the real achievements were the first ones. It is not so important to count the gains of maturity. Yet it may be a pardonable pride if I add my belief that each child in his or her own way, by the highest standards, may be called an eminent success. . . .

**Annie Clark Tanner in her earlier and later years.**

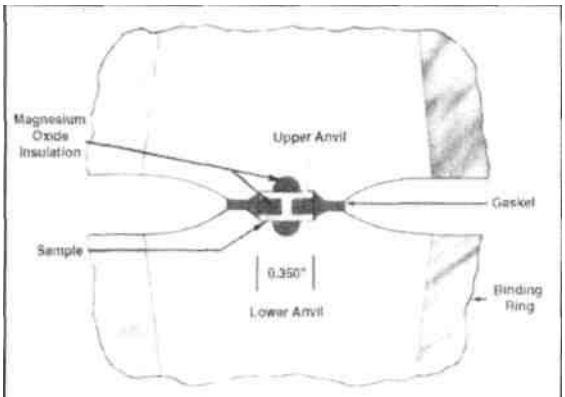
"It is but a small part that the average person contributes to improve mankind. My life has been simple, full of love, devotion, and service for my family. I might have thought mine a hard row to hoe had not the plants I cultivated responded so magnificently to the culture I gave them, made possible by our beloved America.

"The following lines were as a signpost to me when I memorized them many years ago. They certainly impressed me with a personal responsibility in shaping my life. Now that it is nearly ended and I survey the whole of it, I confess some doubt of their accuracy. However, they were influential with me and for what they are worth, I conclude my story with them.

> We shape ourselves, the joy and fear
> Of which the coming life is made; And
> fill our future atmosphere With
> sunshine or with Shade.
>
> The tissue of the life to be We weave
> with colors all our own; And in the
> field of destiny We reap as we have
> sown.[2]



The very expensive (at the time) three story high monster hydraulic press that was not needed in the synthesis of diamond. Tracy is at his workbench on the left near the small press in which he made his diamonds.




Francis Bundy's "'flying saucer" device, a modification of Percy Bridgman's opposed anvil apparatus, got its name from the distinctive shape of the sample chamber.

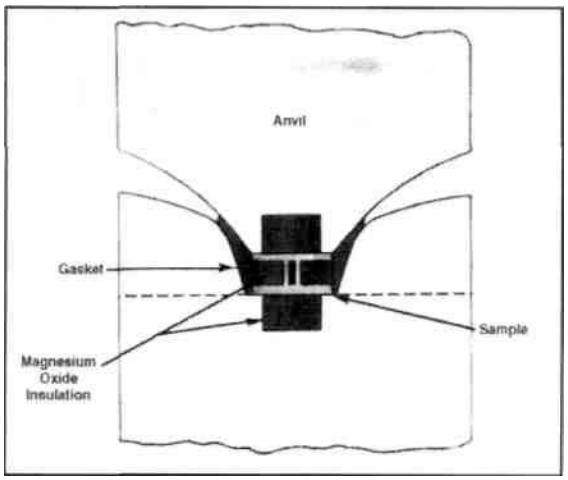
1946, "for the invention of an apparatus to produce extremely high pressures, and for the discoveries he made therewith in the field of high-pressure physics."[10]

The work seemed to divide itself into two natural categories. It was obvious that there was no high-pressure, high temperature equipment available that would reach pressures and temperatures of the magnitude that might be necessary to synthesize diamonds. Also, it was apparent that it might not be possible to transform graphite directly to diamond at the pressures and temperature that they might be able to achieve. There were numerous questions to be answered. The most logical men to work on the high-pressure equipment were the two physicists, Strong and Bundy, and they were given that assignment. Tracy and a new arrival to GE, Robert Wentorf, were to work on the chemical aspects to determine what combination of elements might work. One million dollars would be consigned to such work

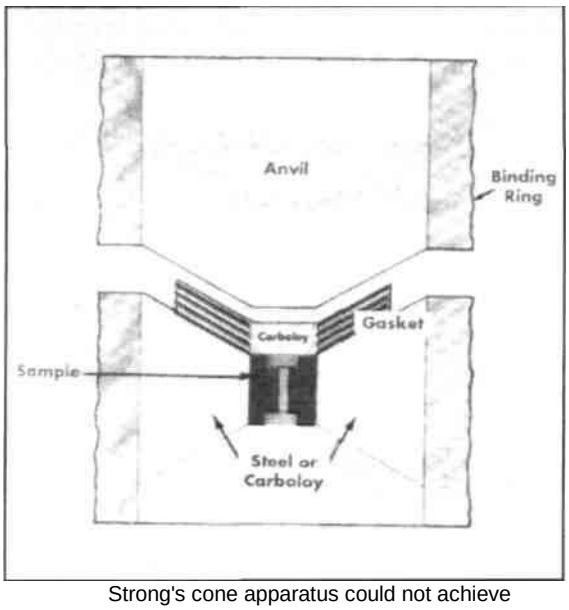
The physicists decided that a huge hydraulic double-acting press would be needed in order to achieve the pressures necessary. Such a press would cost $125,000.00 and would take from eighteen months to two years to build." It would be so huge that a special building costing another $125,000.00 would be needed to house the three-story-high monster. Along with the press the physicists would have to design a special container where the ingredients could be squeezed and heated to temperatures where the transformation from carbon to diamond might take place.

Eventually Tracy was able to solve both of those problems by building the pressure chamber necessary along with the chemistry needed to make the transformation from carbon to diamond.

Francis Bundy was the first to try his hand at diamond making. Modifying some of Dr. Bridgeman's high-pressure equipment and using an old hydraulic press that had been around GE for thirty years, he went to work. He produced a device he called a "saucer" which increased somewhat the volume that Bridgeman had achieved in his devices, yet, it could not achieve pressures beyond what Bridgeman had achieved. At that point Tracy suggested a "Sandwich gasket" composed of pyrophyllite and soft steel rings. This made a compressible "sandwich" that




Tracy's half-belt apparatus wherein he obtained pressures and temperatures heretofore never achieved.




Strong's cone apparatus could not achieve the pressure's of Tracy's half-belt because it lacked the gentle curving that gave Hall's apparatus a deeper more forceful thrust.

increased the thrust and hence the pressure that could be applied.

Although the "Sandwich gasket" was effective at increasing pressures, it was declared as "No damn good" by one of Tracy's associates. Later, such a gasket would prove to be a useful component when diamonds were finally made. Following Bundy's initial work, the two physicists did not do anything else toward making a device in which materials could be squeezed in an attempt to make diamond. They went back to work on other projects in which they had been involved just waiting for the monster press to arrive. Strong on a project to use vacuum as refrigerator insulation while Bundy went back to working on turbine bearings. In the meantime Tracy could not just sit idly around waiting for such equipment in which to test his ideas on what ingredients might transform to diamond. He, therefore, designed a device which he called the "half-belt" that he would like to use in an effort to make diamond. In a letter of February 3, 1953, to Dr. Suits, Director of the Research Laboratory, Tracy tells of the advantages over Bundy's original design. With accompanying drawings he tells that his device would have "(1) A greater compression and hence higher pressure may be achieved because a larger relative movement between the semi-piston and semi-cylinder is possible. (2) A thicker, hence larger cell may be employed because of the greater relative movement between the semi-piston and semi-cylinder."[12]

Two days later, on February 5, 1953, along with accompanying drawings Tracy illustrated to Dr. Suits how the doubling of the relative motion and compression could be had in what he described as his "full belt" device.[13]

Tracy, however, didn't have the calling to design apparatus, which was Strong and Bundy's assignment. Nevertheless, he approached Bundy with his idea. Bundy was only semi-enthused because Tracy's idea was an intrusion into his "turf." But at least he was willing to help Tracy get the "half-belt" constructed. When completed the "half-belt" was put to the test. Using the old hydraulic press that Bundy had used, Tracy applied pressure to his "half-belt" and was able to get pressures and temperatures higher than anything ever achieved before. It turned out to be a major breakthrough in high-pressure research.

Knowing that his "full belt" device would perform at even higher levels Tracy was anxious to have that device built, but his request was refused. How could that be possible he wondered! It would cost one thousand dollars to

have it made while the others were spending a quarter of a million dollars for what was proved to be an unnecessary expenditure.

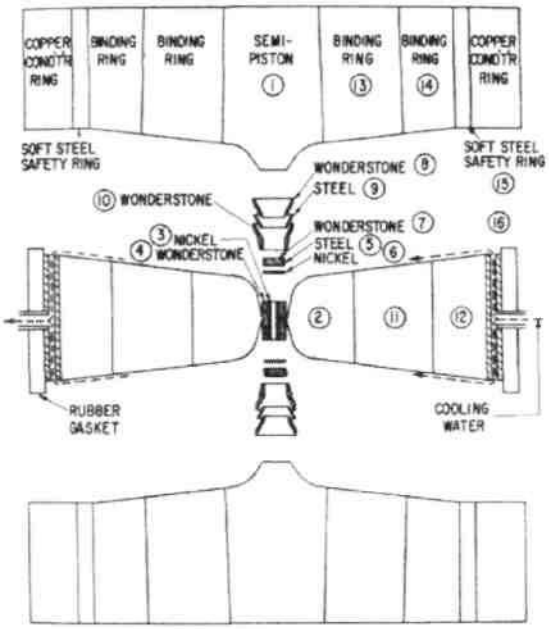
Extremely frustrated, and without a shop order that could make it possible, Tracy then talked to the shop people to see if they could build it for him when they had any slack time. They agreed to do it and finished it for him a few months later. (With the shop order it could have been done in a week's time!)

Why the opposition and lack of cooperation to Tracy's ideas? Was it still, "Hey, Tracy, you are not supposed to be doing this? You are in our territory!" Well, the others were not doing anything so why the complaints? Tracy was by far the most active person on the diamond project from the time that it was decided that the monster press with the two stage apparatus was going to be built. The project pretty much fell apart as everyone waited for the big press to be finished. It was only because of the ideas that Tracy was pursuing that wouldn't require the huge press that kept the project somewhat active. With everyone else going different directions he was the one who was carrying the bal 1 on the diamond project.

The Belt apparatus was finally ready! It was described as "a thing of beauty—sleek and shiny with curves of elegant function and form. Hall had relied on the traditional opposed piston geometry, but he tapered and curved his pistons and drove them into the rounded openings of a steel doughnut. As the two tapered anvils compress the ends of the disk-shaped sample with increasing force, the belt provides more support around the circumference of the sample. Hall also relied on clever wonderstone and soft steel gaskets—called 'flowerpots' because of their distinctive tapered form—to hold the sample in place.

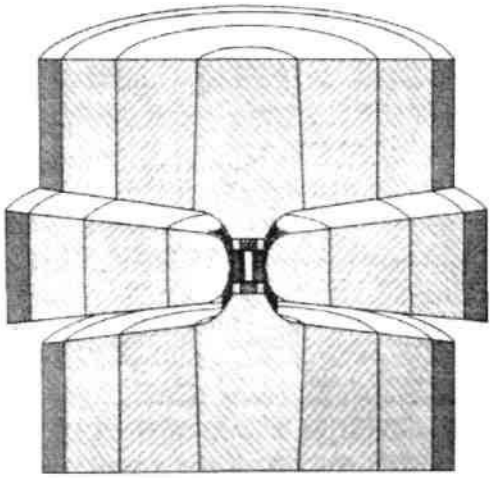
"Hall's simple, elegant Belt apparatus usually worked wonderfully well though the tapered pistons had an annoying habit of breaking after every few runs. The belt was easy to use with a graphite heater, and extreme temperatures and pressures could be maintained for long periods without difficulty."[14]

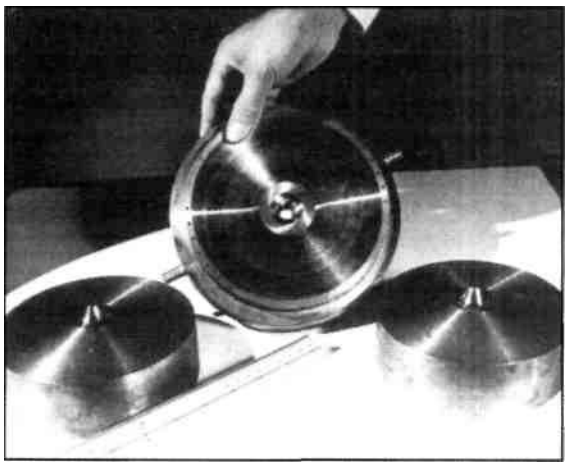
The plan forTracy's "Belt" device was submitted to GE management on February 5,1953, but its production in the necessary carboly material was delayed forthirteen months. It was finally put into service in April 1954. This is the device in which diamonds were finally made.




**This exploded view of the "Belt" device (called "Belt" because of the many rings of steel that hold it together) shows the numerous parts necessary in order to squeeze the components and heat them to the tremendous temperatures necessary to make the transformation from carbon to diamond.**

**This closed view shows the piston action pushing together on the elements with the tiny diamonds forming in a few minutes like popcorn popping in the mixture.**





The belt device for experimental purposes was quite small, while production models measured about two feet across.

That "annoying habit'" of the breaking pistons resulted in yet another delay and further frustration for Tracy. The answer to those breaking problems was to have the belt components built of carboloy steel instead of the hardened steel previously used in the components that he and Bundy and Strong had used as "it seems to have been standard policy to test the steel version fully before going to carbide."[15]

Tracy had tested the steel version and discovered its limitations. He tells, "It operated so successfully, in my view, that I desired to have the critical components constructed of Carboloy. This would allow much higher pressures to be generated. Management, however, would not approve the purchase of the carbide."[16]

Hazen noted: "Hall saw the denial as another slight, another cause for resentment to build, and once again he looked elsewhere for support. 'Having been stopped by the Superpressure people, I appealed to my former supervisor [chemist Herman Liebhafsky] and spoke at a seminar of his group concerning the Belt. He and his group were impressed and shortly thereafter permission was received to buy the carbide components."[17]

It was too bad that Tracy had to look to places outside his group in order to get support for what he needed, but at last, more than a year after he had submitted his drawing to Dr. Suits of his Belt apparatus, he finally had what he was convinced would bring success to his diamond making effort. During the next few months he experimented with hundreds of different chemical systems along with varying amounts of pressure and degrees of temperatures suffering failure after continuous failure before he finally had that momentous day of success. The pressure in the Belt was near 70,000 atmospheres (just a little over 1,000,000 pounds per square inch. The temperature was near 1600 degrees C (2912 degrees F). The mineral troilite (FeS) was used as a catalyst in the graphite heating tube. Timing sequence was about half an hour.

Tracy reported, "On the wintry morning of December 16, 1954,1 broke open a sample cell after removing it from the Belt. It cleaved near the tantalum disk. Instantly, my hands began to tremble. My heart beat wildly. My knees weakened and no longer gave support. Indescribable emotion overcame me and I had to find a place to sit down!

"My eyes had caught the sparkling light from dozens of tiny octahedral crystals growing out of the tantalum and I knew that diamond had at last been made by man!"[18]

Unfortunately following that momentous moment of discovery unanticipated problems started for Tracy. Four months before his success, the monster hydraulic press had arrived and was used in a way that brought the question of who was first to do what and how. Herb Strong using a device which he called a "Collar" which looked very much like Tracy's "half-belt" performed an experiment on December 8-9, 1954, that lasted for sixteen hours and in which he claimed two tiny diamonds were made. He announced his success on December 15, one day before Tracy's success. Strong's so-called "success" was never duplicated even though two hundred attempts and many man-hours were spent trying to do so.

There was something different about Tracy's success. It could be duplicated. The first one to duplicate the synthesis was Hugh Woodbury from Salt Lake City who worked in another

department at GE. Following Tracy's instructions, he was also able to come up with diamonds. Later on GE officials had three others duplicate the work using materials brought in from areas outside the lab to do so. They succeeded in six successive attempts.

**General Electric's News Conference**

Knowing that a reproducible method of making diamonds had been accomplished, General Electric made the official announcement of diamond synthesis on February 15, 1955.

The formal announcement told, "Of fundamental importance was the work of Dr. Hall, who extended Bundy's initial high-pressure work and developed the 'belt, a chamber enabling G-E scientists to maintain for the first time temperatures above 5000 degrees Fahrenheit at pressures in excess of 1,500,000 pounds per square inch."[19] while still declaring that Strong made the first diamond. Tracy was further insulted when it was indicated that his diamonds, which could be duplicated, were smaller than the ones produced by Strong— something that could not be duplicated.

The result of General Electric's press conference made Tracy look like a mere helper on the project. In fact, the Schenectady newspaper reporting on the discovery showed his picture with the caption underneath saying that "Hall invented part of the diamond-making apparatus."[20]

"Part of the diamond-making apparatus!" What an insult! To summarize, Tracy invented the "belt" device in which diamonds could be made. It was his idea alone. He was his own draftsman drawing out what he wanted. He was his own electrical engineer designing the system by which the belt contents could be heated. He designed what was needed in the sandwich gaskets. He designed the cell wherein the contents could be squeezed and heated. He discovered the pressures and temperature in which the synthesis could take place along with the catalyst and the timing sequence necessary. And he was only a "helper" on the project!

The General Electric Company decided that what Tracy had accomplished was too much for one person to have done by himself alone. Therefore, the credit had to be spread around as a "team" effort. It is interesting to note that in all of the steps that led to Tracy's success those "team" members dismissed his ideas and often refused to help him, making it so that he had to go around them in order to attain his final success!

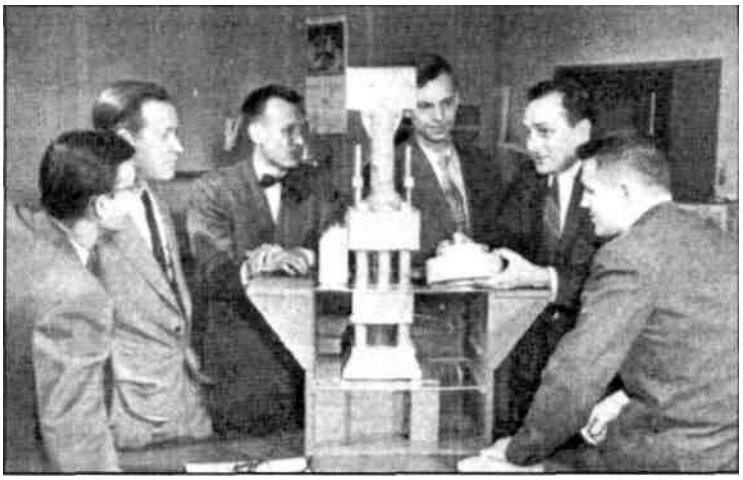
A "team" effort suggests working together. Tracy was not a "team" member. He had to go his own way in defiance of his superiors in order to be successful. Of course, he built on many things done before him by Dr. Percy Bridgeman and Francis Bundy, but he had to develop new means to achieve his ends.

After Tracy had announced his success, Dr. Suits paid him a visit. He arrived grim-faced and tight-lipped asking, "Tracy, did you make your diamonds in the big press?"

When Tracy had to tell him "No," while pointing to the small press— the relic of many years past, as the source of his success with his "belt" device~Dr. Suits disappointment was very visible. Instead of expressions of delight and pleasure at Tracy's resourcefulness, ingenuity and meager expense that led to his success, Suits countenance was truly dour. That meeting should have been a dramatically happy occasion filled with joyful exuberance, backslapping, handshaking excitement amid exclamations of, "Tracy, you did it! You did it!"

Totally dishearted and chagrined at Tracys response. Suits walked away without saying one word of congratulations or comment about the fact that Tracy had finally been successful. In fact, no one at General Electric ever offered any congratulations or word of thanks for what he had accomplished that was to earn the company billions of dollars.

Tracy attributed that meeting with Dr. Suits to the fact that certain people wanted the diamonds made in the monster press as proof that the press was a necessary expenditure and that there had not been any wasted money. Oh, the sorrow, the misty eyes, the forlorn look, the



The General Electric diamond team poses with a model of the monster hydraulic press. From left to right: Francis Bundy, Herbert Strong, Tracy Hall, Robert Wentorf, Anthony Nerad, project manager, and James Cheney, a technical assistant.

Each team member was given a $25.00 savings bond for his effort on the project. Wentorf went on to make "Borazon" which is harder and more heat resistant than diamond and is used extensively in the machining of space-craft parts.

mental anguish and the tragedy of it all that Tracy hadn't made his diamonds in the big press! It was enough to make a person weep. Sob!

Tracy later explained: I had come to "understand" the politics of the expensive double-ram press. After committing itself to this approach, management could not face a cheap alternative.[20]

Indeed, how extremely disappointing it was for Dr. Suits to learn that Tracy performed his magic of changing common graphite material to diamond, for less than a $1000.00 expenditure. What a truly unbelieveable act!

Hazen reported of Tracy, "I loved GE, and they didn't love me back." Hall speaks passionately about his role: "I hit the home runs, but they took the credit. It was worth a Nobel." Tracy Hall has found many reasons to be resentful."[21]

General Electric's deceit in not giving proper recognition where recognition was due also cost the company a Nobel Prize. The prize can only be given if a minimum of three people were involved in the success of an enterprise. Extending dubious credit to others under the "team" concept of success robbed the rightful person of the prize along with the notoriety that GE could have enjoyed for being the company where the success was accomplished.

Concerning the "Team" approach, Hazen wrote: Hall dismisses the importance of collaborative research at GE, and promotes his own central role. Although hampered by a bureaucratic management and unsympathetic coworkers, his story goes, Hall solved the key problems of device design and chemistry almost entirely by himself. Many in the scientific community, impressed with Hall's brilliant subsequent innovations in high pressure, have tended to accept this version as closer to the truth. Tracy Hall is unequivocally cited as the first to make diamonds in several authoritative histories, and it was he alone who received the American Chemical Society's gold medal for creative invention in 1972.[22]

Robert Hazen tells: Tracy Hall, perhaps by virtue of being the lone wolf of the team, played a unique and pivotal role. His belt apparatus — virtually unchanged in basic features to this day — was a brilliant advance and a key to GE's success. By ignoring the critical nature of Tracy Halls contributions, General Electric and its spokesmen have polarized and distorted the historical record __ If GE had highlighted Tracy Hall's special role, and promoted his nomination for the Prize, General Electric could have heaped glory on top of their extraordinary commercial success. With such a magnificent discovery there was plenty of credit to go around.[23]

From the time the monster press had arrived there seemed to be an atmosphere reminiscent of the California gold rush of 1849. There was the rush to be first to get to the "mother lode"

and extract what was there. Now it was the rush to be first to make diamond. At various times and places in the 125 year effort to make diamond there had been intrigue, secrecy, and fraud as others had proclaimed success. But where was the evidence? No one else could duplicate such claims. The quest for precious metals and minerals such as gold, silver, rubies, diamonds, etc., seems to have a dark and suspicious side

Once Tracy had been successful, Bob Wentorf made a few runs in his "belt" device and found other transition metals that would synthesize diamonds. Metals that Tracy himself had planned on trying as time availed itself. Tracy was pushed to the background and hardly made visible during the press conference. He was really not one to assert himself. Social wise he did not take part with staffmembers in picnics and parties they had. "Where was Tracy?"

"Oh, he spends all of his spare time working for his church."

Tracy began to wonder if he was being discriminated against because he was a Mormon. Nobody wanted to give credit where credit was due!

Because of what transpired during the next few weeks, Tracy explained: The lack of recognition I received for this extraordinary dual achievement, the invention of the Belt (U.S. Patent 2,941,248 issued June 1, 1960) and synthesis of the first diamond (U.S. Patent 2,947,608 issued August 2, 1960) was, simply stated, demeaning.

Saddened and hurt, I left General Electric, a company I had admired and aspired to work for since the age of nine.

In August of 1955, I began a new career as director of research and professor of Chemistry at Brigham Young University.

I had anticipated building a Belt to continue high pressure research at my new location. But G.E. officials warned that I could not build a Belt under any circumstances. So, I had to invent another device. I called this invention the Tetrahedral Press. It was the first of a series of 'multi-anvil presses' that I was to invent. I

Strong's diamond, which has none of the characterstics of a man-made diamond, compared to the size of a phonograph needle.

succeeded in obtaining a patent on the Tetrahedral Press (U.S. Patent 2,918,699) issued December 29, 1959) before G.E. obtained a patent on my Belt.

Having thus extricated myself from dependence on the Belt, I was free to pursue a 25-year career in high pressure research at Brigham Young University.[24]

**The full story of that "first" diamond**

The official record indicates: Strong removed the specimen on the morning of December 9th and examined the products. The two seed crystals tumbled free; they had not changed at all. No sign of diamond growth was found, and he chalked it up as just another failed experiment. Strong did notice that a portion of the iron had melted into a blob at one end of his sample chamber. One of the principal motivations for the run was to determine how much carbon could be dissolved in the molten iron. He wanted to know if any reaction had taken place among the starting materials, so he sent the sample to the metallurgy division to be polished (and prepared for light microscopy) whenever they had a few free moments.

Strong was totally unprepared for the message from metallurgy a week later on December 15th.

"I'm terribly sorry but I can't polish your sample. It's gouging my polishing wheel," the technician Bob Smith complained. Strong rushed to the metallurgy labs to have a look. A

distinctive octahedral point protruded from the hard, metal mass of his sample.

Strong wrote his own account of the subsequent dramatic events.

"The entire group gathered around to inspect that hard point. Initially there was a moment of stunned silence. Could it possibly be diamond?" (The verdict was that it was diamond, but nobody said it was man-made at the time.)

Eventually, two shard-like diamonds, one-sixteenth of an inch in the longest dimension, were separated from the sample. X-ray analysis proved beyond doubt the identity of Strong's historic crystals.[25]

Unfortunately there were some problems associated with that claim of diamond synthesis. First of all, Strong's device was not capable of maintaining the pressure necessary and secondly, in the process of making diamond, they form by the thousands in the mix and it happens within a very few minutes time. The final proof was that two others spent weeks trying to duplicate that claim without success, whereas Hugh Woodbury, a GE employee from an entirely different department, immediately duplicated Tracy's claim. Other scientists also did the duplication several times, which proved beyond doubt that there was a reproducible method of making diamonds.

The entire situation following Strong's sixteen-hour press run was extremely unusual. First of all, after every press run the material squeezed under extreme pressure and temperature ends up in one solid mass, so how could "two seed crystals tumble free?" Next, why wait around for so long to examine all the contents? Whenever Tracy completed a press run, he would open the pressure chamber and remove the sample squeezed. Then he would make a visual inspection, often with a magnifying glass. If nothing were visible, he would then place the sample on a hard surface and smash it to pieces with a mallet in order to view every particle squeezed. He would never set aside a press run for a few days before checking it out. He wanted to know the answer immediately. Had diamond formed or not?

It is interesting to note that Strong left to others the opportunity to discover that "diamonds" had been made in his press run. It would appear that he wanted to remove any suspicion of himself as being the perpetrator of a fraud, he knowing exactly what was inside and it would be better for others to find it than he, himself. Had the "fever" of the gold-rush days taken over in his quest to make diamond?

Concerning the "first" man-made diamonds, one was lost and the remaining one, according to Hazen: It has become a piece of GE history lovingly protected on a special wooden plaque with a built-in magnifier and engraved plate proclaiming it to be the "First Diamond Made in GE Research Laboratory." The plaque was presented in 1955 to General Electric's CEO, Ralph J. Cordiner, to display in his office, and there was talk of transferring the display to the Smithsonian Institution. The souvenir lost some of its appeal, however, when Tracy Hall wrote a sharp letter to Cordiner and the Smithsonian Institution discrediting the crystal and claiming priority for his own synthesis. Cordiner, not wishing to become involved in the controversy, returned the display to Herb Strong, who for a time kept it in his office. Eventually, the crystal was placed in General Electric's historical display in Schenectady, where it can still be seen.

Ironically, that sole surviving crystal, enshrined as a piece of history, now provides compelling proof that no diamonds were made on that December night four decades ago. General Electric experts now acknowledge that Herb Strong's crystal could not possibly be a synthetic diamond. GE insiders cite a litany of anomalies. The crystal is unusually large - perhaps ten times the size of any other crystal produced during those first weeks. The elongated shape is odd, too, for most of the early crystals were more or less round. Strong's diamond is water clear, while typical synthetic diamonds are yellowish; it displays atypical surface etching; its x-ray pattern lacks distinctive "satellite" spots characteristic of most man-made diamond. And, most damning, it's infrared spectra, first measured in the spring of

This monument memorializes the moment when Tracy opened the cell from his Belt device to examine it in the morning light when his eyes were met by the flashing of many triangular faces that told him his quest had ended.

1992, show distinctive features found only in natural diamond. In fact, Strong's diamond looks for all the world like the natural diamond points that Tracy Hall brought back by the hundreds from New York City.[26]

Note: In May of 1952, Tracy was sent to New York City to purchase some diamonds for Project "Superpressure." The intent of the purchase being to use such as "seed" diamonds in the hope that the seeding would foster the growth of diamond crystals. Tracy often used such seeds, himself, but without any success. His "Short Report of a Diamond-Buying Trip" indicated the following items: 19 carats of diamond points; 2 Ballas; 1 Crystal octahedral, rather perfect; 2 large imperfect octahedras; 11 Natural Fragments of "Carbon"; 106 Small Boart. All at a cost of $994.72.[27]

Long before that scientific determination mentioned above; in fact, on the very day of GE's announcement, the diamond dealers of New York, London, Antwerp and Johannesburg knew exactly what Strong's first and only diamond was. It was such a laughable story in the eyes of those experts. They were perplexed wondering why General Electric would perpetrate such a fraudulent claim of diamond making at the expense of the real "hero" who made it all possible. GE sullied its reputation while making the company look rather foolish for not giving credit where credit was due.

In common parlance GE shot themselves in the foot, so to speak, in too many instances concerning the making of diamonds. They could have made of it one of the best stories ever to come out of the company as another example of its many beneficial accomplishments.

That twenty-five dollar savings bond that Tracy received would not be worth that amount until five years after its issue. In fact, he cashed it in for the $18.75 that it cost GE, because he needed the money for his relocation back to Utah. Thanks, GE, for your generosity, considering the fortunes that the company would eventually earn from his discoveries. Your treatment of H. Tracy Hall, after having accomplished one of the greatest scientific feats of all time, was, indeed, very demeaning!

**The results of Tracy's diamond making**

The ability to make diamond from carbon was a critical invention needed in order to achieve most of the technical marvels of the modern age. Tracy's son David tells: Over two billion dollars of man made diamond products are used as a raw material in over $100 billion dollars of tooling that is used to produce trillions of dollars of manufactured products each year.

1) Diamond grit for grinding tungsten carbide tool inserts, which made possible automation in manufacturing operations.

2) Grinding of glass and other hard substances which made possible the "Glass building age."

3) Cutting, grinding, and polishing of silicon, which enabled microchip technology and from that computers, flat screen TV's, cell phones.

4) Polishing of metals to high polish - enabled hard disk drive technology for storage - iPods, etc.

5) Creating of Polycrystalline diamond and CBN compacts which enabled the machining of abrasive strengthened composites that enabling

which enabled microchip technology and from that computers, flat screen TV's, cell phones.

4) Polishing of metals to high polish - enabled hard disk drive technology for storage - iPods, etc.

5) Creating of Polycrystalline diamond and CBN compacts which enabled the machining of abrasive strengthened composites that enabling turbine engines, the modern low pollution car engine, light weight plastic parts, composite materials for the new generation of airplanes, carbon fiber materials for high strength super performance bicycles, etc.

6) PCD products that enabled deep and horizontal drilling for oil and gas without which our fuel costs would be much higher.

7) Large diamond Grit products for cutting and grinding rock and concrete enabled the granite counter tops that we are starting to have in our kitchens, the cement roads, and etc.

8) Heat sinks for high powered solid state electronics

9) Super sharp cutting edges used for microsurgery

10) Cutting and polishing the ends of glass fibers that enabled fiber optics and thus the modern high bandwidth telecommunication age.

11) PCD cutting edges for machining wood and composite materials enabling mass production and the lowering of cost for furniture, etc.

Any item that a person picks up or uses in the modern age has benefited from the ability to manufacture diamond from carbon.[28]

Some of Tracy's Awards

Olympic athletes aren't the only ones to earn gold medals.
The front of this medal awarded Tracy in 1972 by The American Chemical Society reads:

PUBLIC WELFARE THROUGH CHEMISTRY

The obverse reads:
The American Chemical Society
IN
RECOGNITION OF
OUTSTANDING CREATIVITY
AND OF INVENTION
FOR THE BENEFIT OF MAN
H.TRACY HALL

AWARD FOR CREATIVE INVENTION

**The American Chemical Society**
Commemorates by this certificate - the 1972 presentation of the American Chemical Society Award for Creative Invention to

H. Tracy **Hall**

For being the first to discover a reproducible reaction system for making synthetic diamonds from graphite, and for the concept and design of a super high pressure apparatus which not only made the synthesis possible, but brought about a whole new era of high pressure research.

Presented at the meeting of the American Chemical Society held in Boston, Massachusetts. April 10, 1972.

F. T Wall Executive Director

In the Ogden area, four others associated with polygamy, other than Lorion Farr, first mentioned have had phenomenal successes that have been of great benefit to others.


The foreword to this book by Bill's lifelong friend Mark Evans Austad tells, "Bill's unswerving devotion to his faith has dominated his life. He has worshipped more in deed, however, than in word, without inflicting his views on others. His true love of God. Allie, his family, his fellow man, and his country has been the rudder of his life."

J. Willard Marriott, grandson of John Marriott (who "Astounded the Court," during his trial proceedings), has honored the family name worldwide because of the Marriott hotels and other enterprises. "Bill" as he was known, was born on September 17, 1900, into a family of four girls and four boys, the children of Hyrum Willard and Ellen Morris Marriott. He early became involved in his father's many fanning and ranching business that gave him some great learning experiences.

By the time he was fourteen years old he was helping to herd the cattle and sheep. His biggest adventure began at that age when his father asked him to take charge of a trainload of sheep to San Francisco where an exposition was going on in celebration of the opening of the Panama Canal. That trip served to be very profitable for the family. The next summer, being one year older and more experienced, Bill took another herd of sheep to Omaha, Nebraska. The next two summers he did the same, but that time his father came along which caused young Bill to indicate that they had experienced some of the best times of their lives together.

Bill's next big adventure took him, at age nineteen, away from the family farm to Vermont and Connecticut as a missionary for The Church of Jesus-Christ of Latter-day Saints. Bill's first companion was remembered by Robert O'Brien as follows:

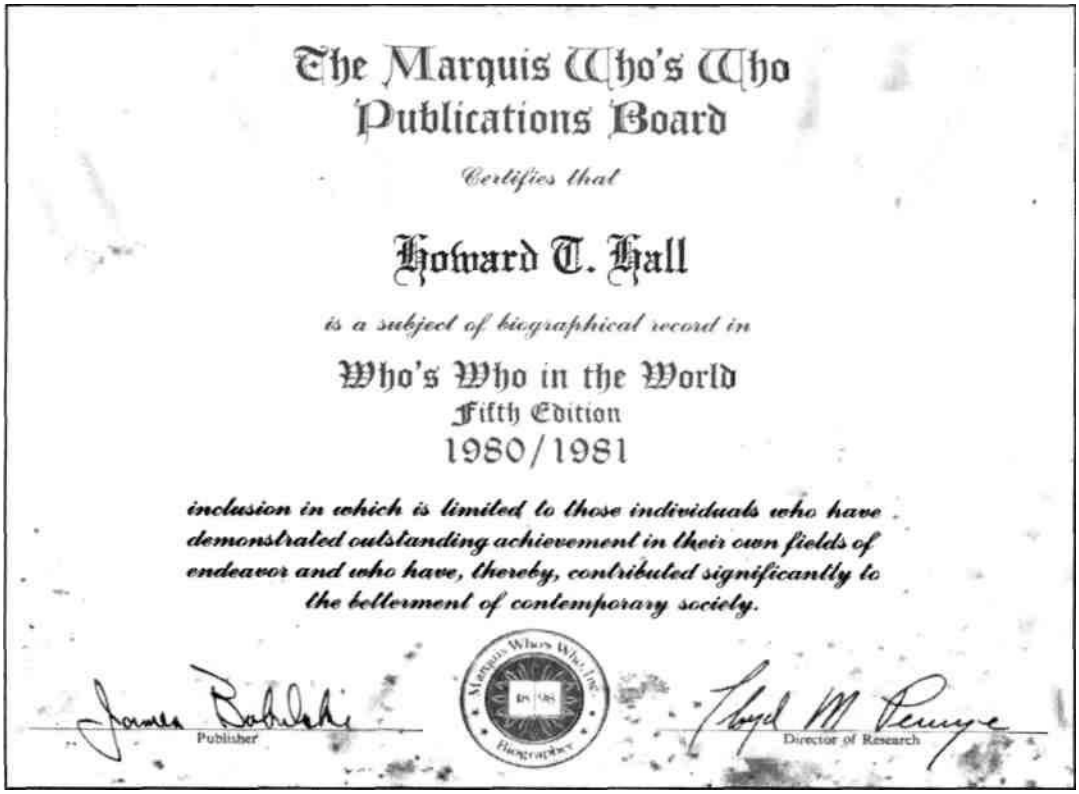
T. W. Tanner, ex-cow puncher, ex-sheriff from Snowflake, Arizona, a tiny Mormon out post south of the Painted Desert. Sun-leathered face, permanently parched lips, calloused, flipperlike hands that could bulldog a steer faster than you could say "Longhorn." Tough? Sure—on the outside. Inside his heart was like lamb's wool.

They made a curious pair: the lanky, tow-headed nineteen-year-old and the old sheriff and cowhand (at least, in his forties, he seemed old to Bill), walking with a cowpoke slouch, talking with a cowpoke twang, uncomfortable in his somber preacher's clothes. But they were earnest, eager to toil for the Lord in this back country vineyard where Joseph Smith and Brigham Young had been born more than a century before. . . .

In the summer they walked the dusty roads with their suitcases, their Bibles, and their tracts, chopped wood for their meals, slept in bat-haunted barns and starlit haymows. Winter snows forced them indoors, into the cheapest of boarding houses; occasionally a Mormon farmer and his family would put them up for a day of two.[3]

It was hard for Bill to understand Vermont and Vermonters. He and T. W. often discussed it, as they walked the country roads. "With all the change and uncertainties everywhere in the world today, you'd think people would be interested in listening to almost any religious meeting, wouldn't you?" Bill would say.

"Both he and T. W. were convinced that they had a religion that could cure every ill in the world, if people would only listen and believe and live by it. What Bill loved to talk about more than anything else was The Church of Jesus Christ of Latter-day Saints as the "restored



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Who's Who in the World
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1980/1981

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Publisher

Director of Research

Chemical Pioneer Award
to
Dr. H. Tracy Hall

For his role in the synthesis of diamonds which resulted in the creation of a new industry.

Witness our hand and seal this 16th day of May, 1970.

s/ Erna L. Gramse
Secretary

s/
President

MODERN PIONEERS IN CREATIVE INDUSTRY

1965 AWARD

H. Tracy Hall

In recognition of his outstanding contribution to the wellbeing of mankind through scientific research and development

NATIONAL ASSOCIATION OF MANUFACTURERS

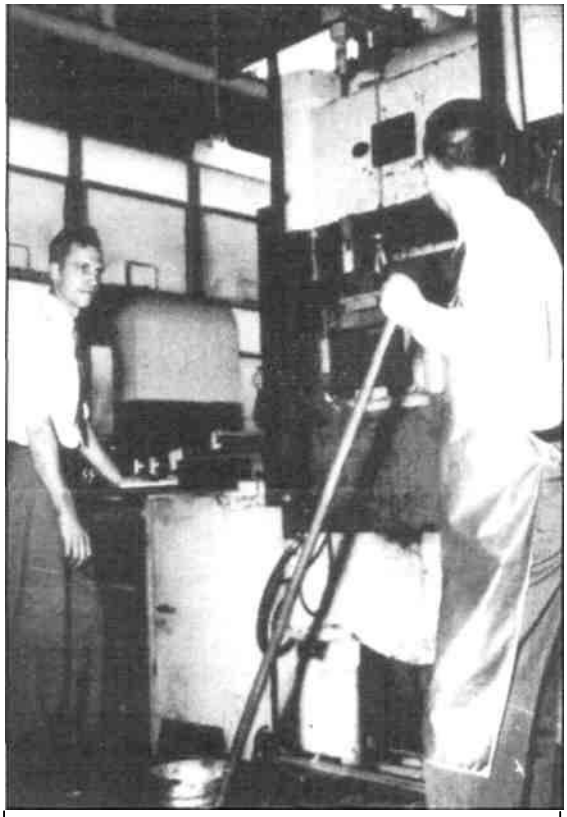
The American Physical Society
INTERNATIONAL PRIZE
FOR NEW MATERIALS
sponsored by the
INTERNATIONAL BUSINESS
MACHINES CORPORATION
This Diploma certifies
That the 1977 prize has been awarded to

H. Tracy Hall

For his outstanding research contributions and inventions which include the first reproducible process for making diamond; the synthesis of cubic boron nitride; and the development of the high pressure processes that are required to produce these materials.

G..E. Pake
President

W.W. Havers, Jr. Executive Secretary Date: March 22. 1977



This Watson-Stillmen hydraulic press was originally used to do experiments on tungsten filaments. Eventually it was in use during project "Super-pressure" and was the one in which Tracy was finally successful in making diamonds. Tracy was upset that GE threw out the press. It had historical value both because the first diamonds had been made in it and because of what it had done before

Those in the picture illustrate some problems with the press as the hoses leaked water everywhere. Thus the rubber apron worn by one of the workers, with a needed mop and bucket shown to clean up the mess. The press should have been preserved with a plaque mounted on it telling: "At 11:02 A.M Eastern Time Zone, H. Tracy Hall, on Dec. 16, 1954, finally accomplished the 150 year effort to make diamonds from common carbon substances."


On the 50th anniversary celebration of his discoveries, the deBeers company presented this hour-glass timepiece to Tracy. In the place of the usual sand or salt used in such instruments, granular sized man-made diamond grit was used. It has been tradition for many years that retirees of various companies have been presented a watch in appreciation for their "time" of service to the company. In Tracy's case the granular diamond containing hourglass is absolutely the ultimate time-piece that anyone could receive.

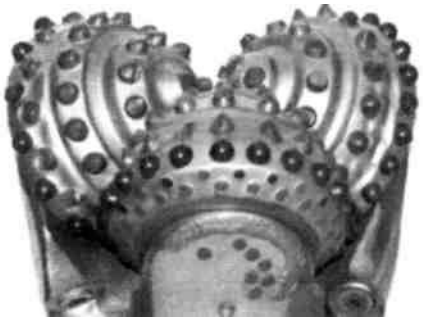
Other than the timepiece presented to their own company executives, deBeers gave one such hourglass to the president of South Africa from which deBeers operates.

The award to Tracy indicated the high esteem in which deBeers, the world renowned diamond dealer, recognized him for what he accomplished. ("Element Six," or "E6" identifies the deBeers Industrial Group.)

On December 16, 2004, the 50th anniversary of Tracy's diamond-making, several representatives of diamond makers or those associated with sale and distribution of diamonds, met in Provo, Utah, to celebrate with Tracy the results of his accomplishment. Throughout the day, fourteen such representatives gave many examples of what the man-made diamonds have done in order to create what some have called a "second industrial revolution," of our times.

For one example, it takes months to mount the natural diamonds on the drill bits. This, because though hard, diamonds are also very brittle and if not mounted at the correct angle of the force that will be applied against them in the drilling process, such diamonds will shatter. In contrast the man-made mega diamonds can be installed in a few minutes and will endure for great lengths of time.

One speaker told of how some of those oil wells drilled in the North Sea off of England took 17 changes of natural diamond drill bits in order to reach the desired depth of over two miles. Such an operation takes a lot of time to pull up the hundreds of pipe segments in order to install a new drill bit on the end. On the other hand, using the mega-diamond to drill to the same depth, only one change of the drill bit was needed to accomplish the task.



A typical bit used in subterranean drilling.
The man-made mega-diamonds are of a darkish color.
The lighter protruberances are of hard metal.

General Electric made over a billion dollars on Tracy's discovery. Diamonds are made world wide with China being one of the leading producers. GE sold their diamond division and it is now part of SandVik, a very large hard metals company based out of Sweden.

Once the process for making diamonds was known there is now some diamond-making equipment no bigger than the average clothes washing machine. So much for the saga of the very expensive and useless monster press!

In fairness to GE it should be mentioned that giving details of Tracy's accomplishment would have given greater opportunity for the competition to start making diamonds themselves.

**Tracy - A special note**

Add this note concerning the overwhelming feeling that Tracy had when his eyes caught that fiery sparkle of light that sent his heart beating so wildly. That signal of his success at making diamonds caused him to fall back in his chair shaking with excitement from which it took several minutes to recover. That falling back in his chair was later followed at the first opportunity for quiet solitude that came to him when he went down on his knees in prayerful thanksgiving to God for the many inspirational moments that had come to him that had helped him in his efforts.

That occasion was soon followed by a telephone call home when Tracy told of his success at making diamonds. In a voice choking with emotion and while tears flowed he poured out his soul in gratitude for what his parents had done for him.

His father and mother, similarly affected emotionally at hearing of Tracy's success, went down on their knees, also, because of the results of their humble efforts to "Train up a child in the way he should go," (Proverbs 22:6) which had brought great blessings to them.

Tracy's response was a common experience of many, who, after starting families of their own often call back home to thank their parents for the training they received, which leaves both parents and children alike teary-eyed and grateful.

"Train up a child in the way he/she should go" and many good things will follow.

That way to go is found in the gospel of Jesus Christ, which tells us who we are, why we are here and the rewards that come by keeping those commandments that will bring great blessings to us not only in this life but, also, in the life to come.

"Jesus saith unto him [Thomas], I am the way, the truth, and the life: no man cometh unto the Father, but by me." (John 14:6)

"I have no greater joy than to hear that my children walk in truth." (3 John, verse 4.)

Photo by Erich U. Petersen of the University of Utah geology department

A magnified view of some granular sized man-made industrial diamonds compared to the thickness of the "lead" in what is called a "lead" pencil. The material is actually graphite, the same that under the proper pressure and temperature can be changed to diamond. So, students, if you had such a powerful squeeze, yourself, while generating great heat at the same time, you could make diamonds in the process of writing your lessons!

Because of their many pointed triangular faces man-made diamond crystals are 35% more efficient than what was used before when diamonds were crushed to the size to cut and grind and polish materials which made them less able to do the work than the man-made kind can do.

In one of his writings Tracy indicated the problems associated with the lack of credit given his diamond making success at the time it happened.

**Effects of Pressure on the Elements**

In some respects, the simplest type of chemical reaction is that in which only one kind of atom is involved, as for example, is the case in allotropic transformation. The classic reaction of this type is the transformation of graphite to diamond. High pressure research and diamond synthesis attempts have been intimately connected for at least eighty years. Diamonds themselves have been the object of synthesis ever since Antoine Lavoisier in 1792 discovered (by burning diamonds in oxygen and identifying the resultant carbon dioxide) that, chemically, diamond is nothing but carbon.

Attempts to make diamond have always been cloaked in secrecy, surrounded with mystery and steeped in alchemy. Through the years, chicanery, suspicion, jealousy, pretension, and dishonesty have lined the elusive trail to the synthesis of the most precious of diadems. When synthesis was finally accomplished, "official releases" artfully framed in corporate image, disclosed no scientific details and obscured the human aspects of the achievement. With the passing of time and the lifting of secrecy, however, it became possible to partially penetrate the obscuring screen.

From "High Pressure Inorganic Chemistry" by H. Tracy Hall. Reprinted from "Progress in Inorganic Chemistry, Edited by F. Alert Cotton as published in INTERSCIENCE PUBLISHERS, a division of John Wiley & Sons, Inc. New York. London. Sydney. 

John M. Browning The world's greatest gunmaker.

The gun the inventor is demonstrating is the infantry model of Brownings Model 1917.30 Caliber Water Cooled Machine Gun.

John M. Browning, son of a polygamous father, is considered to be the greatest gun inventor that the world has ever known. Every fighting soldier of World War II is acquainted with the famous BAR, "Browning Automatic Rifle," that helped bring that war to an end. Another summation indicates, "His [John's] accomplishments are remarkable whether they are measured by their innovations, their number, their duration, or their popularity. During those forty-seven inventive years, John M. Browning was issued 128 different patents, to cover a total of some eighty complete and distinct firearm models. They include practically every caliber from the .22 short cartridge through the 37-mm projectile; embracing automatic actions, semi-automatic actions, lever actions, and pump actions; including guns that operate by gas pressure, by both the long recoil principle, and by the blowback principle; including models utilizing sliding locks, rotating locks, and vertical locks. He stood alone, and there never was in his time or before, one whose genius in gun making could remotely compare with his." "Browning guns have equipped the huntsman of four generations and armed the forces of the United States during two world wars, Korea, and Viet Nam. Out of his crude


gun shop on the frontier of western America "for nearly a half century came gun designs that revolutionized the fields of sporting and military arms."[29]

The Honorable Dwight F. Davis, Secretary of war, gave the following eulogy after Browning's death in 1926.

"It is a fact to be recorded that no design of Mr. Browning's has ever proved a failure, nor has any model been discontinued. The War Department, through its agency, the Ordnance Department, will be greatly handicapped in its future development work on automatic firearms as a result of the loss of Mr. Browning's services. It is not thought that any other individual has contributed so much to the national security of this country as Mr. Browning in the development of our machine guns and our automatic weapons to a state of military efficiency surpassing that of all nations."[30]

John Moses Browning was born January 23, 1855, at Ogden, Utah, soon after the arrival of the Mormon pioneers in that part of the country. He would soon learn about guns from his father Jonathan, who was "sire of twenty-two children, the last born when he was seventy one years old. He was married first at twenty-one and twice thereafter, and a wifely scolding had long since lost its edge,"[31] according to his biographer.

Jonathan, himself, was born October 22, 1805, at Bushy Fork of Bledsoe Creek in Sumner County, Tennessee. In those times every home needed a gun in order to provide something to eat, which led Jonathan to tinker at making guns

for his own use. Having exceptional mechanical talents he soon became successful at making and repairing guns. Having married at age 21 and after hearing enticing, siren songs of the West, he moved to Quincy, Illinois, 400 miles distant, in 1834. There his work at improving, repairing and inventing guns brought his family a period of comfortable prosperity. During that time he invented one of the earliest American repeating rifles.

On one occasion he had the company of a young lawyer traveling through the area by the name of Abraham Lincoln. The two spent the evening in a lot of animated discussion before they retired for the night. "Jonathan would say, some thirty years later in Utah. 'Two frontiersmen yarning. Only I'm just beginning to realize that I was listening to prophecy'"[32]

During the middle 1830s Jonathan became interested in religion and in a short time joined the "Mormon" church. In 1842, he moved his family to Nauvoo, the main church settlement at the time, and again prospered in his business operations. Persecution followed the "Mormons" wherever they went and after Joseph Smith and his brother Hyrum were assassinated the city of Nauoo was taken over by their persecutors in 1846. Earlier that year, however, many had abandoned their homes and fled to the west side of the Mississippi River to prepare for their westward journey to the Rocky Mountains that began in 1847. Jonathan didn't leave for the Utah Territory with the main body of pioneers because Brigham Young depended on his "specialized knowledge and skill" to help others prepare for that journey. As a result he and his family arrived in Ogden in the fall of 1852. The small town had a population of 1200 people by that time.

Finally settled, Jonathan again set up his business. As his children were born they also became involved during their growing years. By the time he was thirteen "John already thought of himself as a gunsmith, with more justification than his father accorded him. He had picked up the knacks of the shop so easily and smoothly that Jonathan was unloading more and more responsibility on him without realizing how much the boy was helping. . . .He could braze and weld. He could drill out a tattered and rust-tight nipple, retap the hole, and from his collection find a nipple to fit, or one that could be rethreaded to fit, or, if necessary, make a new nipple, using the foot lathe. As a gunsmith he was emerging from the embryonic stage. He no longer thought of himself as a boy. But he did not suspect, even in his most manly moods, the full extent of his accumulated knowledge until the freighter's gun, [which had been left for repair] laid on the bench for study, challenged him with its battered, bent, and broken arts. He accepted the challenge with the one attribute of genius he would ever acknowledge: an unyielding tenacity."[33]

That tenacity proved itself just after John turned twenty-three when it was reported: He was repairing a single-shot rifle, the parts spread out before him on the bench. Many of the guns he repaired were remarkably well built, but this one was a freak. He wondered how a man could figure out parts so complicated. ... He shook his head in disgust.

"I could make a better gun than that myself," John said. He did not mean it literally; it was just his way of saying the gun was no good.

Jonathan looked up and as matter-of-factly answered, "I know you could, John Mose. And I wish you'd get at it. I'd like to live to see you do it."[34]

With his inventive background and that challenge he was on his way to becoming the world's greatest gun maker. Along with his brothers and his half-brothers, by 1882 he had "The Largest Arms Factory Between Omaha and the Pacific" the Browning Brothers Factory, Ogden, Utah Territory.[35]

John's father died on June 21, 1879, in his seventy-fourth year. "Died of weariness," John said. "He had worked so hard that, finally tired out, he went to sleep and didn't wake up." He had turned the shop over to John a year before his death, saying, "You've earned it ten times over, John Mose, and anyhow, it's not much of a gift. Maybe if you run it your way, you can make something of it."[36]

So, John Mose did exactly that! On April 10, 1879, John Moses Browning married Rachel Teresa Child. The record tells: Rachel's father, Warren C. Child, merchant and landowner, had passed the Browning shop too many times to be entirely pleased with his daughter's choice. Still, he had to admit that John was a good-looking young man, a practicing Mormon who did not smoke or drink. He gave the couple his blessing, together with a cook stove, bedroom set, cottage organ, and a cow. Delivery on all these items had to be delayed until their new house was finished; the Browning adobe [brick house] was already crowded, and the cow, which would not "come in fresh" for some months, was comfortable on a farm that Mr. Child owned. Rachel had to wait about a year for her house, as nearly as we can estimate.

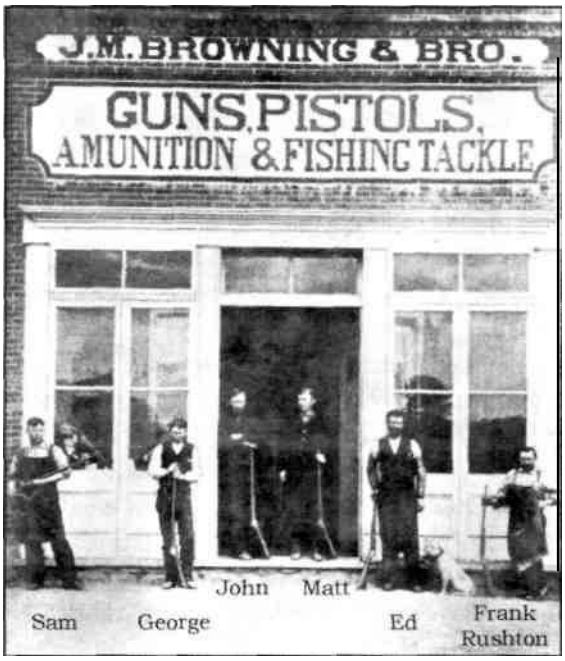
By the time the house was finished, John was building his new shop downtown and was so pressed for money that he could add to father Child's contributions only a few essentials: kitchen table and chairs, a few dishes and utensils, and two indispensables, a rocking chair and a cradle. It has become a Browning family legend that after Rachel had arranged and rearranged, making as brave a showing as possible. With the little she had to work with, John looked through the house, frowned thoughtfully and said, "It seems a little crowded, Rachel, but I believe there is still room for the cow."[37]

There was a lot of local interest in what the Browning brothers were doing, especially from John's former schoolteacher, who dropped in for a visit where the following interesting exhange unfolded:

"John," he called down the long bench, "you never were worth a damn in spelling, but there are two words I'd expect you to know how to spell by this time—gun and *ammunition. " Then,* as an afterthought he added, "I suppose you can spell gun?"

"What's that?" John asked, looking up from his work, irritated at the interruption, "What's a spelling gun?"

The man led him outside, and production




This 1882 photo by William Beal shows the Browning brothers in front of their factory with the misspelled word highly visible.

halted as the brothers followed. "There you are," the man pointed. "Only one *m* in ammunition." "Looks all right to me," John protested. "Any of you boys ever notice anything wrong with that word?" They admitted they hadn't. Matt ran back into the store and brought back a box of cartridges. Marking the word with his finger, he showed the box to John. "He's right, two m's."

"Boys," John said, "this is bad. I'm so ashamed I don't know what to do. Why, everbody'll think we're ignorant."

"Oh, don't worry about that," the teacher laughed. "That news got out years ago—back when you were going to school."

"Hold on!" John said, "When I finished the sixth reader, didn't you tell me that I needn't come back—that I knew as much as you?"

"But since then I've learned how to spell ammunition," the teacher parried.

"So have I," John grinned, "and that makes us even. As for the missing *m,* just keep mum about it, and nobody will ever notice."[38]

In the early years it was a difficult struggle on his frontier community to get what he needed

in order to work out his ideas. Yet John's most common expression was, "The Lord will provide."[39]

One such incident was when the brothers had bought lathers, milling machines, and other equipment needed to produce their guns in quantity, and unsure where to begin there arrived a sturdy little gunsmith from England, Frank. Rushton, who looked over the equipment and soon had everything in place and operating.

Eventually the day arrived when "Mr. T. G. Bennett, Winchester vice-president and general manager, was on his way to Ogden, authorized by his board of directors to buy the rifle.

The record tells: Bennett was a puzzled man, he admitted to John in later years. He had heard the name Ogden and associated it vaguely with the railroad on which he was riding westward. But the name Browning Bros had no meaning for him. And yet there it was, stamped on the barrel of the best single-shot rifle he had ever seen. Moreover, the rifle bore the serial number 463, not a large number, to be sure, but a good many guns, and the threat of competition from a new quarter. He had enough of that in the East.

It grew increasingly clear to Bennett as he pondered his problem that he had to have the Browning.[40]

His arrival in Ogden and meeting the Browning's is recorded as follows:

It is not difficult to imagine the state of mind of the large, heavily bearded man who entered the Browning store that day in the early spring of 1883. He stopped by the breast-high partition, stared down the shop, taking in the miller, lathe, emery wheel, and the little upright engine in the far end of the room. So this was an factory! (Had he been told that it was, at the time, the largest such between Omaha and the Pacific, he would have been no more non-plussed.) The seven men he counted, intent on their work, looked for the most part to be boys. Had he found the right place? He soon found out, for one of the youngsters, Matt, as it happened, came toward him, his hands on his pants.

"Am I in the Browning Factory, where the Single Shot rifle is being made?"

"Yes, sir," Matt replied, remembering his manners in the presence of a man of such dignity.

"I'd like to speak with the Browning Brothers, if I may," said Mr. Bennett.

"I'm one of them," said Matt.

Something was wrong. This youngster had only fuzz on his chin. As a matter of fact, Mart's beard was late sprouting and gave him considerable concern in that bearded age. John now sported both a mustache and a short beard. Matt didn't look over eighteen, although he was twenty-three.

"Do you have an older brother?" Bennett asked.

"That's him," Matt pointed. "Third vise."

"I wonder if you could both spare me a few minutes?"

"Sure-oh, John, there's a man up here wants to see you."

Thus began an alliance that was to last nineteen years and change the course of firearms development. New Haven had come to Ogden. Within a few years Winchester would become the largest producer of sporting arms in the United States, and almost all of the Winchester arms would be Browning inventions.

The negotiations in the Browning store were concluded in short order. Bennett wanted to buy, and John wanted to sell, and neither wanted an argument. John could not fail to see the advantage of his position; nevertheless he showed token reluctance, explaining that he and his brothers and two other men were making a good living and that they all liked the work. Still, he admitted, he would rather be inventing than manufacturing. Just now, for example, be had a rifle pretty well worked out in his mind, a repeater that would handle the big cartridges, something no other repeater could do. It was the fattest worm in John's bait can. Bennett asked a few tactful questions, such as John could answer without divulging secrets respecting the mechanism, and quite frankly admitted that he would be interested in a rifle of that type.

Coming back to the Single Shot, John, as Matt told the tale, got a faraway look in his eyes

and began to speculate on how he could handle things. He thought that by enlarging the store, places could be made for three of his brothers. Ed could help with the model making and lend a hand with the repairs when Ed Ensign and Frank Rushton got behind. There would be the expense of remodeling the store. The boys could do most of the work, but they would have to be paid, and nothing much would be coming in for a while. Then there would be the big outlay for merchandise. He was thinking aloud. Abruptly he arrived at his total and turned to Bennett. "Ten thousand," he said.

Bennett would probably have gone to twenty thousand. His experience and acumen told him that he was in the presence of an unusual young man, one who should be tied to the Winchester Company. John's mention of a high-power repeater was the best trading bait he could have dangled, and be knew it, for he was aware that the time was exactly right for the appearance of such a rifle. That awareness had started his search for a way to make one. But John had not been a hundred miles from his shop, and ten thousand was about as high as he could think in terms of money.

Bennett was compelled by habit to dicker. He proposed the sum of eight thousand dollars, in addition to which he would place the Brownings on the Winchester jobbing list, provided the business was expanded. That would compel other manufacturers to do the same. These jobbing grants, he pointed out, would be worth many times the two thousand he was deducting from John's price. He made the offer contingent upon the assurance that the forthcoming repeater be shown to him first. He would give the Brownings a check for one thousand dollars now, the balance to be paid in thirty days, if investigation showed the patent gave adequate protection. In any event, the Brownings would keep the one thousand.

"How about it, Matt?" John asked, turning to his brother, who had remained a silent listener. "Think you and Sam and George can run a big store?"

"We've been running a pretty good little store right here," Matt replied, with a sweeping gesture that took in the well-stocked shelves.

"It won't be the same thing," John said prophetically, "but I guess you can all make a living out of it." And then to Bennett, "Shall we fix up some kind of agreement?"

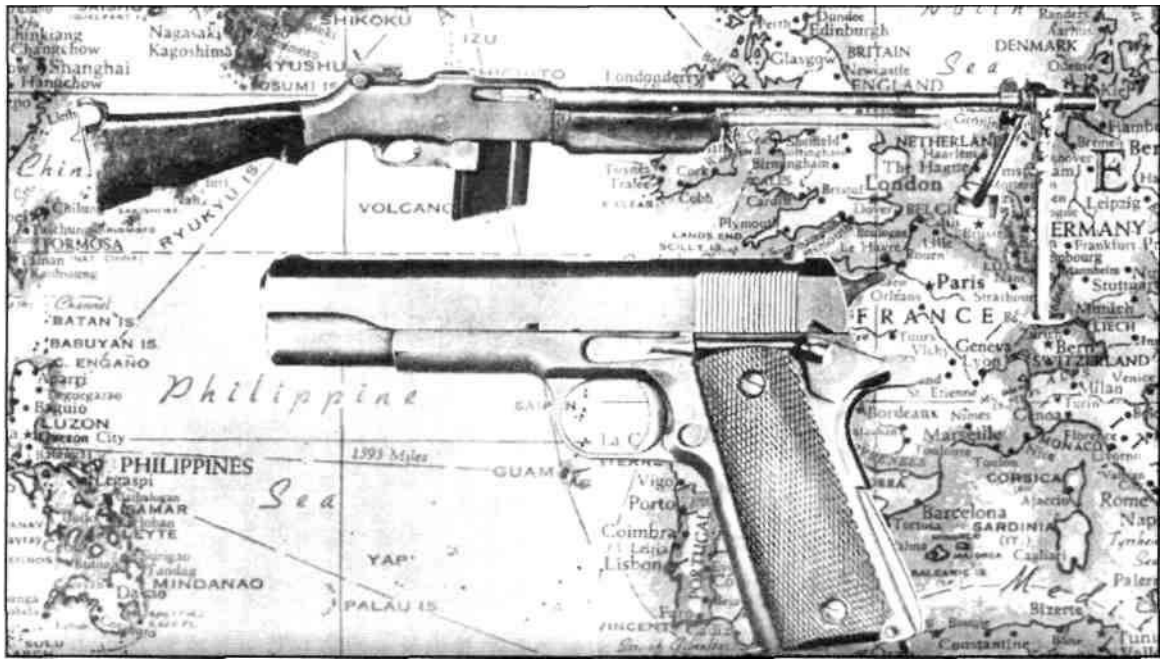
"I'll write you a letter, now, stating the terms, if you'll give me pen, ink, and paper, and you can write one, accepting those terms. Is that satisfactory?"

The two short notes, scratched off on the counter, concluded the business and set an example that was followed in all subsequent negotiations between Winchester and the Browning's. No contract was ever drawn for them by a lawyer. The matter of the Single Shot was settled in a few hours; Mr. Bennett entered the store early in the afternoon and was able to take a train out of Ogden the same day.

All concerned were happy. Bennett bad come West, determined to buy the Single Shot, and he had bought it, at a figure probably less than he was prepared to pay. John, once he saw an opening, was just as determined to sell and get out from under the burden of the factory. Matt, Sam, and George were enthusiastic about giving full time to the sporting-goods business, and Ed Ensign and Frank Rushton were content with the repair work. Ed Browning was getting into stride in the work he did so well and so long—model maker extraordinary.

As for John, he was on his way.[41] Four years after signing the contract with Winchester, and more involved than ever in his work, "On March 28, 1887, two months after his thirty-second birthday, John Moses Browning was 'set apart' as a Mormon missionary to the southern states."[42]

It was common at the time for not only single men but married ones also to devote two years to preaching the restored gospel of Jesus Christ. So John accepted that "call" as it is referred to to give two years of his life in that endeavor. Like so many others he left his wife at home with a seven-year-old son and two year old daughter to care for. Two other sons born to them died shortly after birth.[43]




Two of the world's best known military arms: the B.A.R. (Browning Automatic Rifle), officially adopted by the United States in 1917; and the Government .45 Caliber Automatic Pistol, the official U.S .military side arm since 1911. World War II production models. The Browning Automatic Rife was one of the first guns to bear its inventor's name. Even today many are unaware that not only the Colt .45 shown but all the automatic pistols produced by Colt's Patent Fire Arms Manufacturing Company have been of basic Browning design.

GUNS: John M. Browning Armory. Maps: Rand McNally & Company

Concerning his field of labor, the record tells: The Mormon Church has succeeded in establishing stakes or wards in almost every part of the world; it has had the least success, and some of its most violent resistance, in the southern portion of the United States. It was little consolation to John that his ancestors had been one of the first families of Virginia. Often, John recalled, he and his companion had to sing for their supper. Singing contests were one of the best ways to draw an audience. But at times even this was not effective. The people of Georgia were, on the whole, unreceptive to new doctrine. On one occasion John and his companion were driven from a town by a mob. John was fortunate in that his long legs made him a fast runner; his companion, less fleet of foot later joined him covered with tar and feathers. [The mission was a very difficult one because one missionary, John Standing, had been shot and killed by a mob nine years earlier on July 21,1878.][44]

John's favorite incident, however, told in later years, always brought forth gales of laughter. After several days on the road the two missionaries entered a southern town. They had been unshaven for days, their hair was hanging long, and their clothes were worn and covered with dust. As they walked down the town's principal street John suddenly stopped and pointed toward the window of a sporting-goods shop. There, on display, was the Winchester Model 1887, the lever-action repeating gun. The finished gun had been released in June of that year; John hadn't seen it, having left on his mission in March.

Despite their appearances, John felt compelled to have a look at the gun. They seem to have overwhelmed the storekeeper, and before he had time to refuse, John had the shotgun in his hands. He opened and closed it several times, scrutinizing the movement of the parts. Then suddenly, as though a covey had flushed, he

church"—restored, that is, to the true Christian church as it was in the days of Christ's apostles, restored by direct action of the Lord, in His revelations and those of many angels who appeared to Joseph Smith and his associates in the 1820s and 1830s.[4]

Upon returning home and reporting on his mission, Bill indicated: You sure learn a lot in the mission field. I learned a lot about self-reliance. I learned to meet people, to talk with them, to get along with them. I learned how to explain the gospel, and to tell the story of Joseph Smith and Mormonism.

And another wonderful thing. We were living right every day, clean moral lives, almost as perfect a life as you can live on earth. We were trying to help people, trying to get them to accept a system that would help them lead better lives. The growth, the change in all of us, was unbelievable. Most of us had never made a speech, never been off the ranch, but prayer and hard work led to miracles in our personal development.

And I could see the difference—the difference between people who lived clean like us and those who didn't. They were unkind and mean and unhappy. They knew very little about God and His relation to man. They couldn't understand that He's a real person, and Individual, a resurrected Being. They couldn't believe what we know is the truth—that God is a power, or a source of power, that could appear right here in this room, right now.

But that's the greatest thrill of missionary work—to tell people about life and the spirit, to bring them the gospel truth and inspire them to leave their bad habits behind and walk hand in hand with the Lord.[5]

Upon returning home, Bill was anxious for more schooling and enrolled at Weber Jr. College. Even though he had completed only seven years of formal schooling, he was accepted and was able to pay his tuition by working in the college bookstore. His activities there and in editing the college newspaper and yearbook helped elect him president of the student body the following year.

For three summers he sold woolen goods throughout the Pacific Northwest and after graduating from Weber in 1923, he was able to continue his education at the University of Utah with enough money to complete his education in that place where he graduated with a Bachelor of Arts Degree in 1926. During his stay at the "U" Bill had met Alice Sheets, who would later become his wife on June 19, 1927. While she was finishing her last year at the university, Bill went back to Weber where he became secretary and treasurer of the institution while also teaching theology and English. He, also, ran the bookstore as he had done three years earlier. Prior to that, however, Bill became interested in the A & W root beer stands that were being franchised throughout the country and through acquaintances decided that Washington D.C. would be a good place to get started. Not having quite enough money to pay for the franchise and other things needed to get started, he had to borrow some money himself, while his mother-in-law gave money planned to be used for the wedding reception that sent them on their way.

Bill and his new bride left, on their wedding day, in the famous Model T Ford of the time, overloaded with baggage that got them to their destination. They opened their first stand on the same day that Charles Lindbergh made his famous flight from New York to Paris, which they considered to be a good omen of things to come for themselves.

The selling of root beer was a summer activity and in order to stay in business Bill and Alice decided on serving something hot for the winter times, so, thus evolved the "Hot Shoppe's" with menus suitable for all year round. With airline travel coming into vogue the idea of providing lunches for such travelers proved to be another profitable enterprise. Thus, one thing after another evolved into the many Marriott enterprises that are now operating worldwide.

Bill began his Washington D.C. enterprises with Hugh Colton as a partner. Each had put in $3000.00 to get started. While very busy running the operations together, Hugh kept up his studies

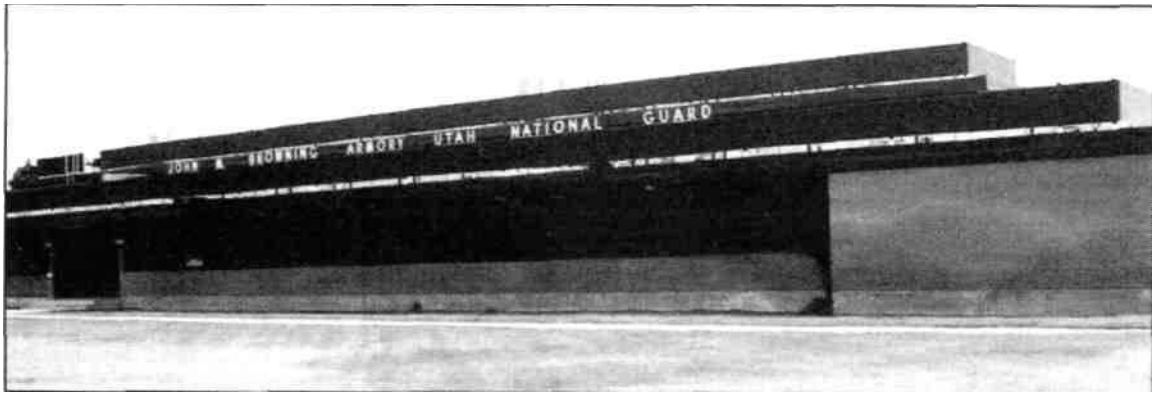
threw the gun to his shoulder and operated it so rapidly that hand and lever were a blur. The exhibition and John's appearance were too dissimilar to be readily reconciled, although for a moment the storekeeper seemed swayed in the direction of admiration.

"Well," he said wonderingly, "you seem to know how to handle that gun."

"He ought to," John's companion remarked. "He invented it."

The remark relieved the storekeeper of any doubt and indecision. Without a word he reached over and took the gun from John's hand, and, with ostentatious care, set it safely back in the window.[45]

The above gives just a small glimpse of the man who gained great fame and wealth because of his inventive genius and good works




The John M. Browning Armory Utah National Guard building is located in Ogden, Utah. It was named in honor of the gun-maker because of his renown at providing the weapons that helped the United States armed forces become victorious in both World Wars I and II.

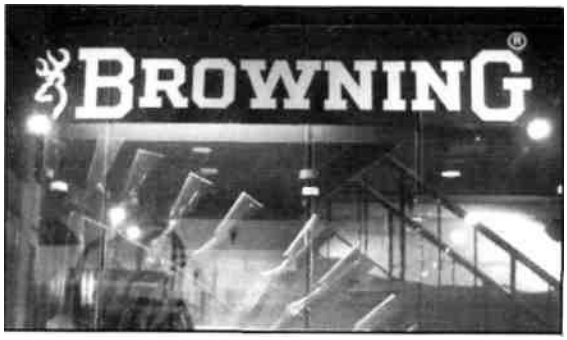
Its purpose is too keep various National Guard units in training for any conflict in which their action might be needed.

In front of the armory is the sign which identifies the facility as a training unit. It exemplifies the "Minute Man" of Revolutionary times as being ready to fight for our countries freedom at any time and place necessary.

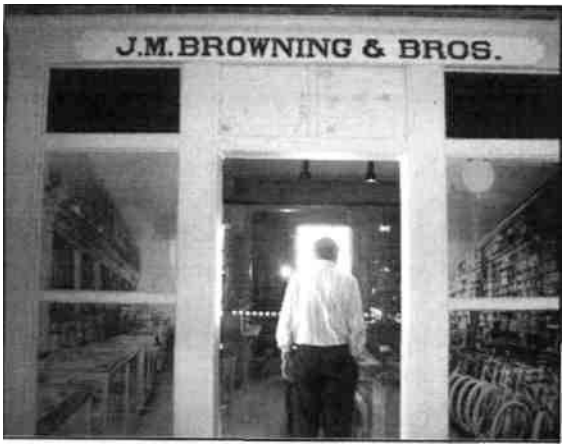
Val A., a son of John M., made several contributions of his own in invention and gun development.

The Val A. Browning Center for the Performing Arts, on the campus of Weber State University, represents yet another gift from the Browning's. Agift that keeps ongiving and giving for the benefit of others.

Every week there is a performance of some kind, while during the year there are specials such as the Utah Symphony and Ballet West along with others of similar stature. "The Nutcracker" ballet series continues to thrill large audiences of both young and old alike at Christmas time.

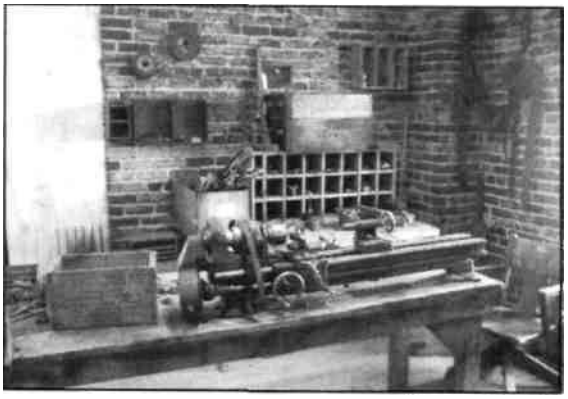



The entrance to the John M. Browning Firearms Museum, located in the Union Station at Ogden, Utah, is only a ten minutewalk from where John established his first factory. The museum contains the originals of many of the guns that Mr. Browning invented of all sizes, kinds, and calibers.




Part of the facade of the original shop is preserved in the museum along with many tools and machinery used in the production of the various guns of the time.

Part of the interior of the shop showing a working bench along with cubby holes for the many items needed to keep the business running.



**David Eccles**

Great Western Pioneer Industrialist

David Eccles was born May 12, 1849. in Paislely, Scotland. His father William was almost totally blind as a result of double cataracts to his eyes. He was a woodturner by trade and was able to make spools for the city's spinners and weavers. Because there was not always a market for the spools or kitchen tools and other items the lathe could produce William was forced to move to Glasgow. There he started making sticks tipped with resin that could be used to ignite a coal fire.

His biographer tells: Young David soon became the family merchant, peddling the resin sticks, along with the kitchen utensils which his father made at his lathe, through the streets of Glasgow. He quickly acquired a frugality and a cleverness beyond his years, and by the time he was eleven he and his small burro were distributing their wares in neighboring towns gone from home for days at a time.

There was little thought of school for David or any of the other children of William and Sarah Eccles. Like the children in the factories, they were more needed to bring food to the family than to 'be of use to Church and Commonwealth' by going to school, even the half time that the education act prescribed. By the time he was fourteen, David had had only six months of formal education, probably acquired in two winter sessions of three months each. In succeeding years he would speak with regret of his lack of schooling.

With no school, and no respite from the arduous responsibility of caring for the needs of a blind father and a continually growing family, David learned early to hunt out ways of earning money. There were the peddling trips, but there were also things to do right in Glasgow: one could always carry luggage for the travelers who came and went at the railroad stations and hotels in the city. David was so scrawny and undernourished, though, that sometimes sympathetic tourists would hand him a penny and carry the bags themselves! Wherever there was a bit to he earned, David would be on hand.

And there were the peddling trips. With each venture David would wander farther and farther from home, one time causing his parents extreme worry when he stayed away three weeks. He had been in Edinburgh, forty-five miles distant. With his wider travels came bigger ideas: rather than just returning home with the cash intake from the resin sticks or kitchen utensils he was hawking, he would barter with his customers, or with his cash receipts buy other goods. These he would add to his stock, and then sell further on for a profit. Every penny was needed, and clever merchandising often multiplied the income. Clever as one might be, there was still not enough; a hungry family waited at home. The poverty around David in his journeys reminded him of the circumstances of his family in Glasgow; even the price of a bed was too much to pay from his earnings, so he slept in doorways or the hallways of buildings. There seemed not much improvement, though, for all his diligence and enterprise. Day to day the family barely managed to stay together and stay alive. It was a life without a hope. Except one.[46]

That hope came because of their membership in The Church of Jesus Christ of Latter-day Saints. William Eccles, age 17, and his mother Margaret had joined the LDS church and were baptized members on Feb. 5, 1842. Later, William was to teach the gospel to his bride, Sarah Hutchinson, and baptized her himself the same year they were married. There was a longing among all converts to join with the main body of the church in America. William's mother


The Salt Lake Valley, Ogden Valley and Cache Valley region where the William Eccles and David Eccles families lived.

was able to travel to Nauvoo in 1843, but she died in the same place in 1845. William and his growing family were always living in poverty hoping to realize that same dream. How could they ever save enough money to make the journey across the ocean and also most of the American continent?

Their hope was answered as follows:

Eight years they had struggled in Glasgow, and still there was far from enough money to buy passage. Then the first real ray of light for the blind woodturner: in April 1863 the Perpetual Emigration Fund confirmed the advance to him of 75 Pounds ($375). Enough, with what they had saved from their meager earnings, to take them to Utah. They would arrive with nothing but themselves and their hopes, but what matter—it would be Zion, America, the Kingdom of God on earth!"[47]

The Perpetual Emigration Fund was a fund set up by the church that would pay the travel expenses of those involved in that plan and after the participants arrived in the Salt Lake Valley, they would be able to find employment to repay the costs. This revolving plan helped thousands to arrive who otherwise may not have ever come.

"On October 5, 1863, four months after

## Eccles Utah's First Tycoon'


Ogden Standard, March 21,1945. David Eccles had widespread mining, railroad, banking, cattle and beet sugar interests. When he died in 1912 he was rated the wealthiest man in Utah.

leaving Scotland, William and Sarah Eccles and their young family stood on the east bench over Great Salt Lake City. They had endured sickness, hunger, and weariness to reach their promised land. There it lay, spread out before them. How David expressed to his father the wide sweep of flat valley floor, the settlements spotted along the few streams, the business center forming to the north of the canyon mouth would have revealed the youth's feeling—excitement? disappointment? eagerness" challenge? Probably not fear or anxiety, for David seldom approached new experiences otherwise than confidently. More likely high hope and impatient anticipation. Taking his young sister by the hand, David Eccles began the last section of the trek."[48] The first few years in the Ogden area were very difficult for the family. There was not a large enough population to buy the wares that William Eccles could produce on his woodturning lathe. But then came some interesting news from two different sources. David Stuart, who had met the Eccleses in England and had been the leader on the ship that brought the family to Utah, had been sent by the church on a preaching mission in 1857 to Oregon. Some years later he met the Eccleses and gave them some enthusiastic reports on what he saw.

Then there was Joseph Tracy (great uncle of the author), who had arrived in the Ogden area in 1851, but to the disappointment of two other brothers, who had also arrived with their families, went on to the greener fields of Oregon. He returned in 1867 on a visit to those families, but, most of all, the Eccleses learned from him the interesting news of a woolen mill being constructed in Oregon City. What great news that was! There would be a market for William's spools. There would also be jobs for the Moyes cousins, who were weavers by trade, for their skills. They thought they would stay for two years while earning enough money that they could return to Ogden better able to advance their lives financially.

When David Eccles arrived in Oregon he found something better to his liking than the woolen mill. There were great forests everywhere. He was soon to open lumber mills in Oregon as well as in Utah. From operating lumber mills, he started constructing railroad lines in order to get his lumber to market. One thing led to another as he became involved in numerous other enterprises, which eventually made him the Great Pioneer Western Industrialist.

David Eccles married Bertha Marie Jensen by whom he had twelve children. He next married Ellen Stoddard by whom he had nine children. Dates of marriage were kept secret in order to avoid prosecution for polygamous marriage. Ogden became the home for one family, while Logan was home to the other. From the two families came many good and noble people.

Involved with David in his various businesses were children of both of his wives, who have excelled in many ways themselves. To mention one such, his son Marriner S. Eccles became

chairman of the Federal Reserve Board having been appointed by President Franklin D. Roosevelt in 1934 and continuing until 1951.[49]

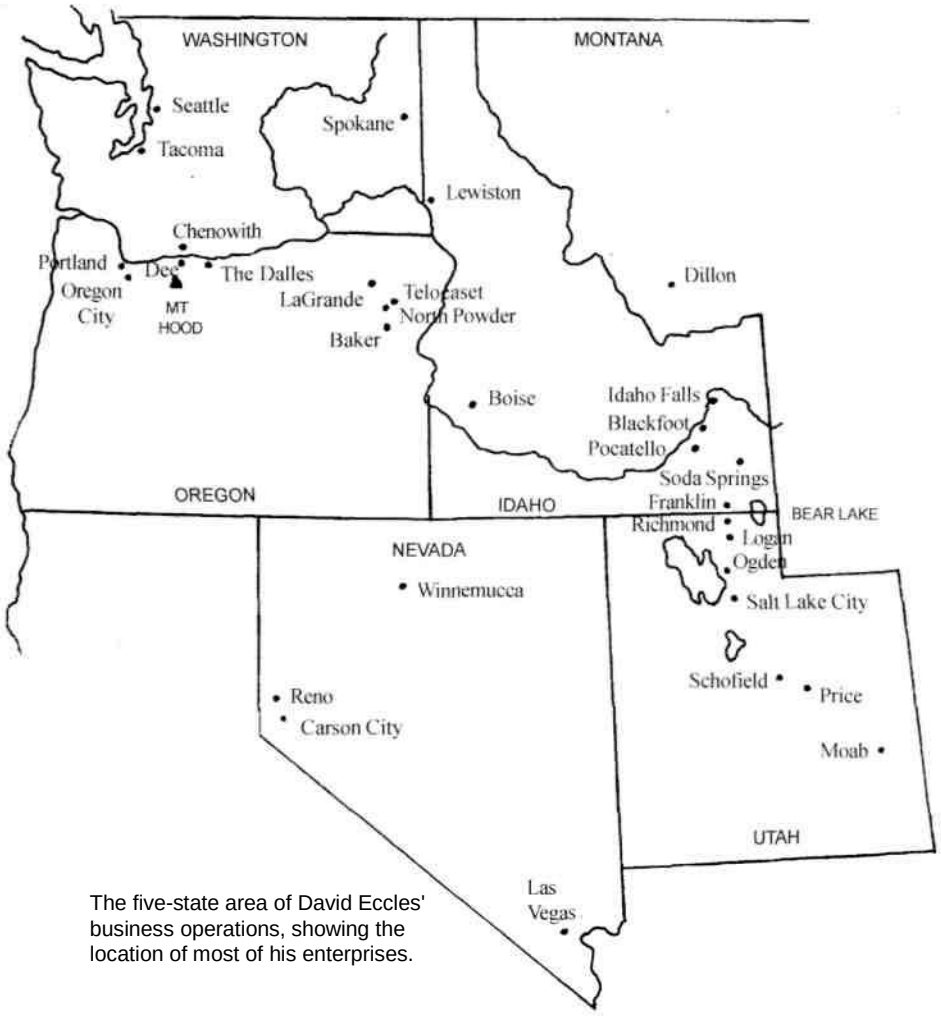
The Browning's, Eccleses, and Marriott's are prominent in Utah because of their many generous gifts to organizations that greatly benefit and dignify the community. The story was once told of a prominent wealthy person who indicated that the only reason to have money was so that he could tell anybody he wanted to to go to hell! This expression infers that the teller doesn't need anybody else, that he is supreme in his own right and the rest of the people be damned.

We do need each other and should be looking out for others! "Love one another as I have loved you," Jesus admonished us in John 13:24.

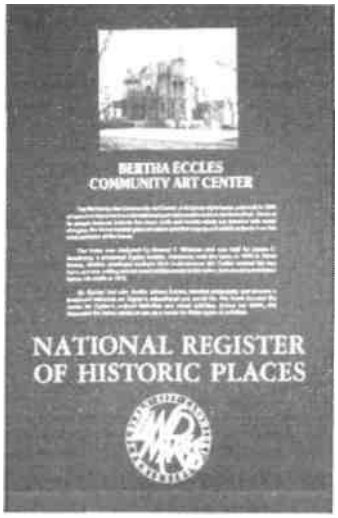
The power of money should be used for doing good deeds. It is often a fact that those who have a certain degree of wealth feel an obligation to do what they can to improve the quality of life of those around them. That is their main concern as they very generously contribute to things that edify the human soul.

In the spirit of giving, let's never forget the story of the Widow's Mite," (Mark 12:41-44) and the blessings that come for both giver and receiver alike!

The stories of those mentioned above are but a few examples of the type of people descended from those early polygamists when it was practiced in all sincerity of heart from 1843-1890, in the "Mormon" church at a time when it was sanctioned by God to do so.

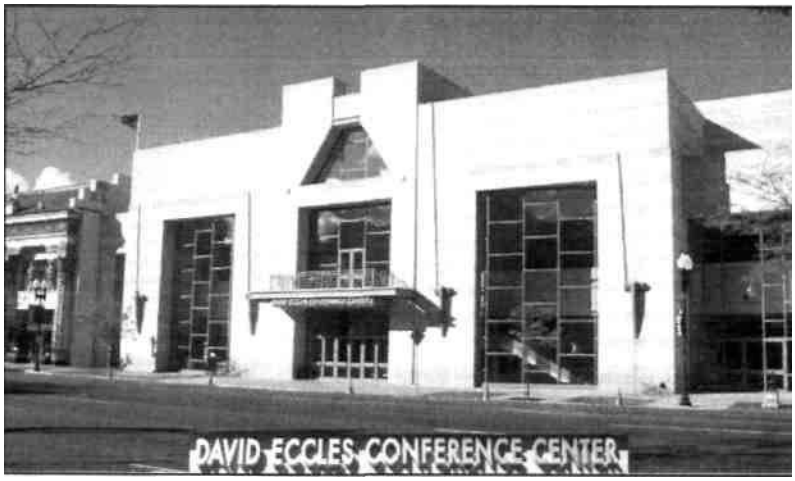



The five-state area of David Eccles' business operations, showing the location of most of his enterprises.



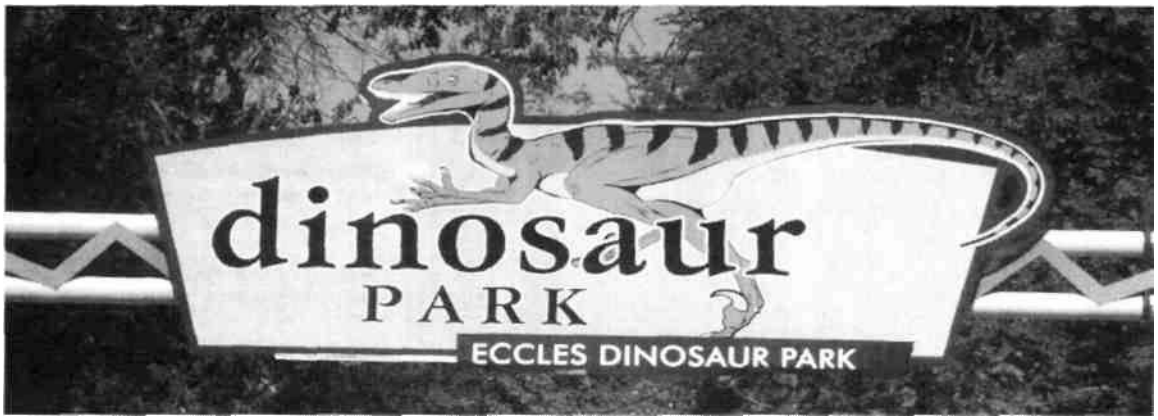

The purpose of the community art center is to promote the arts, in all forms, and to enhance the quality of life within the community. Classes in visual arts and dance are offered at the Art Center throughout the year.

The "Bertha Eccles Community Art Center," is named after David Eccles' first wife, and is located in the Ogden home that was the family dwelling for many years. Because the building is of such an historic nature, due to David's many contributions to the West, it was placed on the National Register of Historic Places.


The David Eccles Conference Center had its beginning with an original donation by George S. and Dore Eccles of $2,000,000. This donation has been followed with several others from community people that have made the facilities an excellent place for many civic functions as well as for private weddings, banquets, business meetings, and other occasions.

An official brochure for the center tells, "The David Eccles Conference Center, opened in 1997, offers two levels of spacious and flexible gathering space that is perfect for meetings and social gatherings of any size. Located in the heart of historic downtown Ogden, the conference center provides its guests with convenient access to hotels and local points of interest. Its magnificent windowed walls create bright daylight-filled hallways while revealing breathtaking mountain views. Combined with the warm tans and gray-blue accents that appear throughout the building, these interior features create the impression of walking through Utah's grand desert landscape."



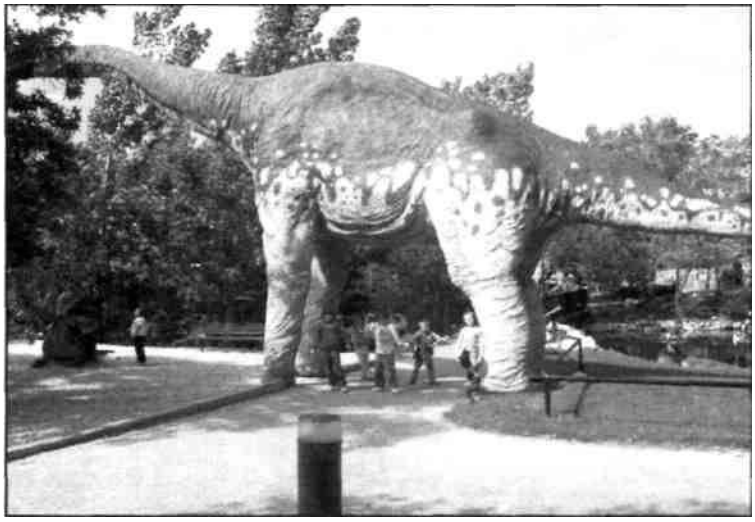

This sign welcomes the visitors to Ogden's George S. Eccles Dinosaur Park. The park features, "Eight acres of life-size Dinosaurs, Museum and Paleontology lab, Dinosaur skeletons and fossils, Picnic and playground areas, Life-like Robotic Dinosaurs, Cretaceous Corner Cafe, and Zane's Adventure Shop." All of those exciting features are open year round.

In Springtime andAutumn of every year, students from the surrounding schools get to explore the wonders of the park. Those great creatures from the past are very exciting to everyone.

This gigantic dionosaur, called Brachiosaurus, straddles over the pathway entrance to the park, making for an interesting introduction to the pleasures that await these students.

A plaque near each dinosaur tells something about it along with its scientific name and where it roamed in ages past.

The Brachiosaurus weighs seventy to eighty tons, is 52 ft. high and 75 ft. long. It roamed the area of the state of Colorado.



Though mostly financed by the Eccles family, donations have been made by others who have paid the expense of duplicating the various dinosaurs. In the case of the Brachiosaurus, it was donated by Robert and Annette Marquart

These students, along with their teacher, pause for a rest after learning all they could about the dinosaur behind them, known as the Utahraptor.

It roamed the area of Arches National Parkin Utah. It was 20 ft. long and weighed in at one ton.

It has been described as a real life Hollywood monster.

As the students leave the grounds, they thank all of the attendants for their help; but, mostly they are grateful for what the Eccles family has done in order to provide the great experience for them.

One of the most stunning artistic features of the Salt Lake 2002 Olympic Winter Games is the Olympic Cauldron, provided through the generosity of George S. and Dolores Dore Eccles Foundation. A beacon to athletes during the Games, the sight of the Cauldron endures as a symbol of the Fire Within.

"Light the Fire Within," was the theme of the Olympics.

In the background is the Rice - Eccles Stadium, home of the University of Utah football team. Having been upgraded over the years by the Robert Rice and Eccles families, it was especially enlarged for the opening and closing ceremonies of the 2002 Olympic Winter Games.

As the years go on, the good works of the Eccles descendents multiply greatly from the original good deeds of David, their forefather, thus expanding the gratitude of others who are the recipients of such generosity, while inciting in themselves the desire to immitate such generous actions. Goodness begets goodness. Love engenders love for each other, etc., which works for our benefit and well-being as we make our journeys through lfe

Such is the same for the few other local people mentioned with their connection to polygamy and the good works that they have done: Lorin Fair, J. Willard Marriott, H. Tracy Hall, and John M. Browning. Other communities throughout the state can make the same claim for their own polygamous forebears.

While extolling the exceptionally good works of the foregoing persons it is important to acknowledge that the strength of the LDS church lies in its typical membership of a people dedicated to keeping the commandments of God —most of whom will never be known beyond their own neighborhoods. They are those who display the quiet heroism of daily going about their various tasks of making a living, while facing life's many challenges with faith that their good works will be a blessing to themselves and those around them in ways that will make them eligible for the greatest rewards that our Father-in-Heaven has for all of his children. This is done while they humbly pay their tithes and offerings along with giving of their time and talents in helping to build up the restored gospel of Jesus Christ upon the earth. They will be known for the qualities that dignify and ennoble a person. They will be remembered for the nobility of their souls.

**Measuring the successes and failures of polygamous marriages**

The problems the Mormon practitioners of polygamy encountered along with their successes were previously mentioned in chapter two as follows: The measurement of "success" in this, or any other form of marriage is nebulous, but at least one sociologist has tried. Kimball Young, in his important though somewhat impressionistic study curiously entitled *Isn 't One Wife Enough?* concluded that 53 percent of the plural marriages were highly or reasonably successful, 25 percent were in the moderate to doubtful category, and 23 percent were clearly

unsuccessful. ... Such problems, nevertheless, had negligible impact on the Mormons commitment to a system they believed divinely inspired, and the small number of people who practiced polygamy in Salt Lake City were significant beyond their numbers."[50]

In his book, *In Sacred Loneliness,* Todd Compton summarizes the major problems associated with polygamous marriages in the LDS Church when the principle was practiced in all virtue and holiness as a divine command at the time. He explains: Anti-Mormon polemicists saw polygamy as pure evil. Mormon men were viewed as insidious enslavers of woman; polygamous women were seen as helpless, mindless victims. A representative period novel was entitled, *Elder Northfield's Home; or, Sacrificed on the Mormon Altar: A Story of the Blighting Curse of Polygamy.* After sweeping aside such melodramatic propaganda, one finds that in actuality Mormon polygamists, both female and male, were generally sincere, intensely religious, often intelligent and able, and men and women of good will. "Nevertheless, my central thesis is that Mormon polygamy was characterized by tragic ambiguity. On the one hand, it was more than secular, monogamous marriage—it was the new and everlasting covenant, having eternal significance, a restoration from the prophetic, patriarchal milieu of Abraham, which gave the participants infinite dominion in the next life. On the other hand, day-to-day practical polygamous living, for many women, was less than monogamous marriage—it was a social system that simply did not work in nineteenth-century America. Polygamous wives often experienced what was essentially acute neglect. Despite the husband's sincere efforts, he could only give a specific wife a fraction of his time and means. Plural wife Annie Clark Tanner described herself as raising her ten children "alone." When one of her boys caused trouble, her 'frank admission' to a neighbor was: "Well I am alone." The ambiguous nature of Mormon polygamy, for women, is summed up in a paragraph from Tanner's moving autobiography: "As a girl I had been proud that my father and mother had obeyed the highest principle in the Church ... I was aware now that my mother's early married life must have been humiliating and joyless on many occasions because of her position as a second wife."

Some feminist scholars have suggested that there were positive sides to the man's frequent absence in a polygamous wife's life; she became more independent, self-supporting, and closely tied to sister-wives, developing as Annie Clark Tanner noted, "an independence that women in monogamy never know." Ironically, Tanner's husband resented her independence and self-reliance. These advantages of polygamy, while real, are clearly consequences of the less-than-ideal absence of a marriage partner. Annie Tanner, in her discussion of the independence of women, also emphasized their isolation and insecurity. She often envied monogamous neighbors.

This is not to deny that there are examples of polygamous families that approached the supposed ideal. But special conditions (especially limited plurality) probably accounted for these successes. The more women a man married, the greater the danger for serious problems in the family, for the husband's time and resources became more and more divided. By an almost cruel irony, the greater the number of women married, the greater the man's exaltation, according to nineteenth-century Mormon theology.

Not surprisingly, therefore, polygamous wives, even those married to prominent, well-to-do men, were often not supported adequately financially. Annie Clark Tanner wrote: "We returned from Provo after a single school year there. All of us were conscious now that we would have to make our own way, if possible, independent of help from Mr. Tanner." In 1893 Annie's husband told her that she should "look to [her] stalwart sons for support." Clearly, monogamous men also struggled financially at times, but polygamy exacerbated financial problems.

As the polygamous husbands were generally church leaders, demands on their time further

reduced their ability to be with their families. Polygamous husbands generally had favorite wives, which limited even more their time with other wives. As a result, some women left their polygamous husbands, but if they remained in the family, they compensated by developing especially close ties with sister wives, siblings, and children. Annie Clark Tanner wrote, "A woman in polygamy is compelled by her lone position to make a confidant of her children." Plural wife Olive Andelin Porter wrote, "I have worshiped my children all my life, as I have had no husband to love so all my love has been for them."

Polygamous marriage, by modern monogamous standards, often does not seem like marriage at all. Sometimes polygamous wives consciously steeled themselves to limit affection for their husbands, as a strategy for emotional survival during absences. Vilate Kimball advised a plural wife that "she must lay aside wholly all interest or thought in what her husband was doing while he was away from her" and be "pleased to see him when he came in as she was pleased to see any friend." Annie Clark Tanner wrote, of her husband, "When he came to my house, he was more like a guest." Thus the title of this book, *In Sacred Loneliness.*

Often plural wives who experienced loneliness also reported feelings of depression, despair, anxiety, helplessness, abandonment, anger, psychosomatic symptoms, and low self-esteem. Certainly polygamous marriage was accepted by nineteenth-century Mormons as thoroughly sacred—it almost defined what was most holy to them—but its practical result, for the woman, was solitude.[51]

The last paragraph of the above describes an understandable condition that existed among wives at that time. Yet they were not hindered in so far as rearing their children, who were truly wanted, loved and cared for with the most ardent feelings a mother can have for the well being of her offspring. Those wives and children did not suffer the crushing abuses that we read about among non-LDS polygamist groups of today.

The legacy of polygamous marriages in the Church of Jesus Christ of Latter-day Saints

In spite of the problems associated with the practice, what was the legacy of polygamous marriages in the LDS Church? Were such unions worth the sacrifices necessary? Was a polygamous marriage with all its problems better than no marriage at all when it was performed by legal authority as authorized at the time? Did any of the negative factors in those situations balance out the other in the joys that come from rearing children under the divine command to "multiply and replenish the earth?" (Genesis 1:28)

What could be said of Helon Henry Tracy and others like him who entered into polygamous relationships? Henry's first two wives fared better than the third who hardly had any sustained relationship with him. Indeed, she became a vagabond and wanderer never knowing of life's comforts and the serenity of a stable and happy home with its comforting and loving relationships. Again, we ask the question, "Was it worth it?"

The posterity of Henry's three wives and children would answer with a resounding "Yes," while rejoicing in the heritage that is theirs—a noble heritage that has brought unnumbered blessings. Most have truly become the righteous seed of good parents dedicated to serving God while looking forward to the glorious day of the consummation of all things when evil will be banished from the earth and He whose right it is to reign will return triumphant on the earth as "King of King and Lord of Lords," when all will be judged and merit a reward, whether for good or evil, depending upon our works here in the flesh.

The posterity of Helon Henry Tracy and his wives.

Number yet to be determined.

First wife Emma .....

Second wife Mary Jane .....

Third wife Phoebe .....

Grand Total .....

at George Washington law school, and with that training was subsequently voted into office as city attorney at Vernal, Utah. Bill tried to get Hugh to stay, but he was anxiously looking forward to his new career. They both agreed that $5000 would be a fair price for half of the business. Bill didn't yet have that much money, but borrowed what he needed to send Hugh on his way. "For better or for worse, the Marriotts were sole owners of The Hot Shoppes of Washington,D.C."[6]

Bill received many honors from many people and places during his lifetime. At the age of 76, he reminisced about a lot of things important to his life and successes. He concluded by saying, "A man should keep on being constructive, and do constructive things, until it's time to die. He should take part in the things that go on in this wonderful world. He should be someone to be reckoned with. He should live life and make every day count, to the very end. It takes push and discipline. Sometimes it's tough. But that's what I'm going to do."[7]

Marriott Library on the campus of the University of Utah at Salt Lake City, Utah.

The Marriott Special Events Center on the campus of Brigham Young University at Provo, Utah. Besides basketball games the building is also used for weekly religious devotionals, graduation ceremonies and other special events.

The Marriott Hotel in Ogden makes a good reminder of Bill Marriott and his humble beginnings in the area.

J. Willard Marriott Allied Health Sciences Building on the campus of the Weber State University at Ogden, Utah.

**H.Tracy Hall**

Another grandson, this one of Helon Henry Tracy, and the author's brother, H. Tracy Hall, who grew up on the same country road as did J. Willard Marriott, Jr., achieved international renown, at age thirty-five, as a result of his scientific achievements. His award from "Who's Who in the World," 1980-81, tells of his contribution "to the betterment of contemporary society." His gold medal from the American Chemical Society, in 1972, reads, "In recognition of outstanding creativity and of invention for the benefit of man." His 1965 Award from "Modern Pioneers in Creative Industry" tells, "In recognition of his outstanding contribution to the well-being of mankind through scientific research and development."

Endnotes

[1] A Mormon Mother, An Autobiography by Annie Clark Tanner, Published by Tanner Trust Fund, University of Utah Library, Salt Lake City, Utah, 1991, p. 23 Copyright 1983 by Obert C. Tanner.
[2] Ibid, pp, 330, 335-336.
[3] Marriott - The J. Willard Marriott Story, Robert O'Brien, Deseret Book Company, Salt Lake City, Utah, 1977. pp. 78-79.
[4] Ibid, p. 80.
[5] Ibid, pp. 92-93.
[6] Ibid, p. 133..
[7] Ibid, p. 326.
[8] InFocus-A GIA Alumni and Associates professional development publication, Winter/ Spring 2000, Vol 19, No. 1, p. 31.
[9] Copy of tribute in possession of the author
[10] The New Alchemists - Breaking Through The Barriers of High Pressure, Robert M. Hazen, Times Books, a division of Random House, New York, N.Y, 1993, p. 62.
[1] Tracy Hall's personal records in possession of the author
[12] Collected papers of H. Tracy Hall, Letter to Dr. C.G. Suits, Director of Research, Feb. 3, 1953.
[13] Ibid, Feb. 5, 1953.
[14] The New Alchemists, p. 117.
[15] Ibid, p. 118.
[16] Ibid, pp. 117-118.
[17] Ibid, p. 118.
[18] American Association for Crystal Growth, March 1986, Vol. 16, No. l,p. 3.
[19] Man-made Diamonds, General Electric Research Laboratory, Published by Research Information Services, March 1955, p. 2.
[20] Personal Experience in High Pressure, American Institute of Chemists, Pittsburgh, Pa. May 16, 1970. Reprinted from THE CHEMIST, Vol. 17, July, p, 277.
[21] The New Alchemists, 113
[22] Ibid, pp. 111-112
[23] Ibid, pp. 125-126.
[24] American Association for Crystal Growth, March 1986, Vol. 16, No. 1,p. 4.
[25] The New Alchemists, p. 124-125.
[26] Ibid, pp. 126-128.
[27] Memo Report C-90, Chemistry Research Department, Research Laboratory, May, 1952, A Short Report of a Diamond-Buying Trip, H. Tracy Hall, Mechanical Investigations Section. Abstract: This is a short report of a trip to Acme Diamond Tool Company of New York City to purchase some diamonds for Project "Superpressure."
[28] Summary by David R. Hall, son of H. Tracy Hall, and President of "Novatek" a company involved in many activities associated with diamond use activities.
[29] John M. Browning - American Gunmaker, John Browning and Curt Gentry, p. viii
[30] Ibid
[31] Ibid, p. 28
[32] Ibid, p. 14
[33] Ibid, p. 41
[34] Ibid, pp. 58-59
[35] Ibid, p. 87
[36] Ibid, p. 63
[37] Ibid, p. 62.
[38] Ibid, p. 95
[39] Ibid, p. 85.
[40] Ibid, p. 97
[41] Ibid, pp. 99-101
[42] Ibid, p. 111
[43] Ibid, p. 110
[44] Essentials in Church History, Joseph Fielding Smith, Deseret News Press, Salt Lake City, Utah, 1953, pp. 585-86.
[45] Ibid, pp 111-112
[46] David Eccles - Pioneer Western Industrialist, Leonard J. Arrington, Utah State University, Logan, Uah, 1975, pp. 7-9.
[47] Ibid, pp. 15-16.
[48] Ibid, p. 26.
[49] Marriner S. Eccles - Private Entrepreneur and Public Servant, Sidney Hyman - With a Foreword By G. L. Bach, Graduate School of Business, Stanford University, Stanford, California, Introductory page.
[50] Mormons and Gentiles, A History of Salt Lake City, Thomas G. Alexander, James B. Allen, Pruett Publishing Co., Boulder, Colorado, 1984, pp. 78-79.
[51] In Sacred Loneliness—The Plural Wives of Joseph Smith, Todd Compton, Signature Books, Salt Lake City, Utah, 1997, pp. xiii-xv.

These awards tell of the results of his work without indicating what he really did.

The "Chemical Pioneer Award" to Dr. H. Tracy Hall of May 16, 1970, tells "For his role in the synthesis of diamonds which resulted in the creation of a new industry." Tracy is the man of man-made industrial diamonds, which have kept the wheels of industry turning. This he accomplished as a research scientist of the General Electric Company, on December 16, 1954, at 11:02 A.M., Eastern Time zone, after numerous failures to find the right combination of pressure, temperature, timing sequence, and catalyst to change common carbon to diamond in his pressure chamber device. Without diamonds to cut, grind and polish harder materials, industry would come to a standstill. These granular sized diamonds, (that form by the thousands like pop-corn popping in the mix) along with larger polycrystalline diamonds that Tracy learned how to make meet every industrial need. Just about every purchase we make has his imprint upon it because diamonds were used somewhere along the line in its production.

It has been said of him that seldom in the history of mankind has one person's inventions and discoveries led to more worldwide industrial growth and development than that of H. Tracy Hall. (To which his posterity gratefully adds, "Grandson of a revered polygamist.")


SCHENECTADY UNION-STAR

GE BARES DIAMOND PROCESS

Nature Duplicated In Lab

The newspaper from Schenectady, New York, headquarters of the General Electric Company.announces the making of man-made diamonds, February 15,1955.

This General Electric photo shows Tracy examining under a microscope some of his granular-sized diamonds.

The bottom photo is a microphotograph of the first man-made octahedral diamond crystals whose fiery sparkle sent Tracy's heart beating wildly along with indescribable emotion. Not all of the starting graphite material changes to diamond. Placing the contents in acid disolves everything but the diamonds

The Ogden Standard Examiner announces Tracy's discoveries.


The Weather

Ogden Stand

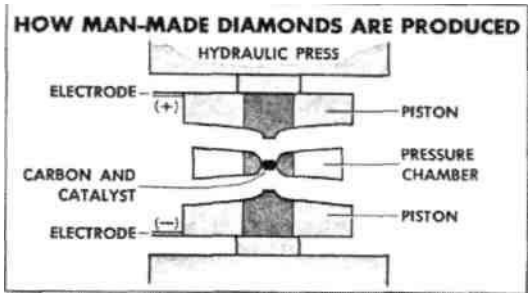
Britain W Overhaul

Pineau Forms Cabinet but 3 Withdraw

Utah House Gi OK to Divorce

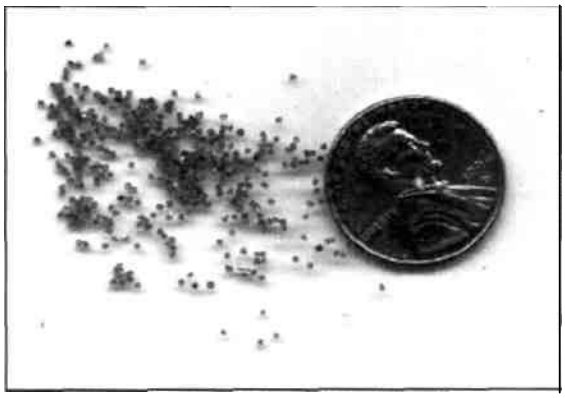
He Liked to Invent

Diamond Maker Is Ogdenite



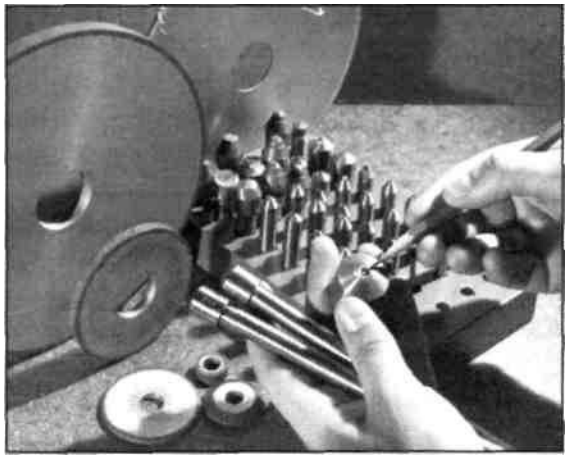

**A pellet of pure graphite** and o metal catalyst are placed inside a doughnut-shaped pressure chamber within a powerful hydraulic press. Conical pistons, pushing into the top and bottom of the chamber, apply continuous pressure — os much as I ,500,000 pounds per square inch — against the pellet, and an electrical current heats it to as high as 4,400 ' F. This super pressure and temperature, combined with the action of the catalyst, results in the growth of diamond crystals within minutes.

This General Electric drawing indicates how man-made diamonds are produced.

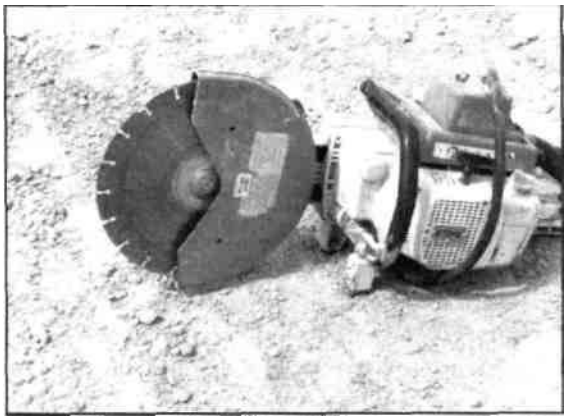


These tiny diamonds alongside a penny give a better perspective of theirsize.

This 1957 advertisement from GE announces that industrial diamonds are being made by the pound. Today's yearly production is measured in the tons.

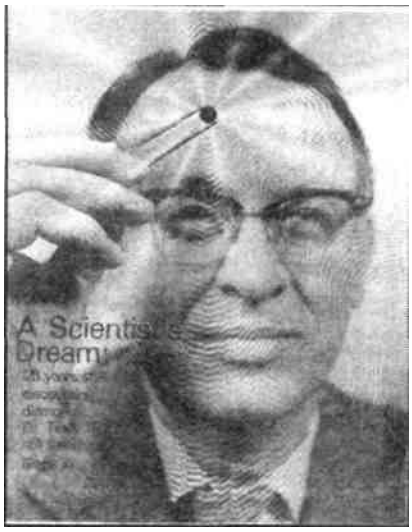


A few examples of industrial diamond tools are shown here.

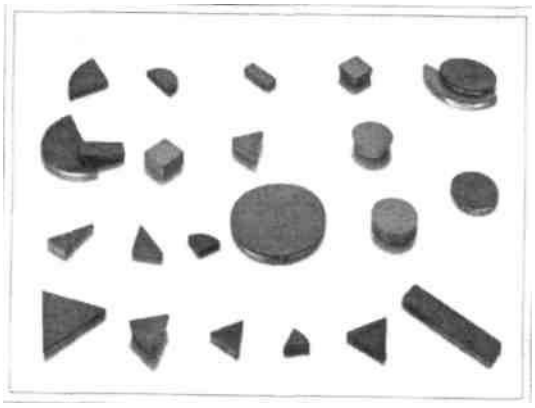


This circular saw blade is embedded with man-made diamonds. It is notched in order to dissipate the heat generated while cutting.

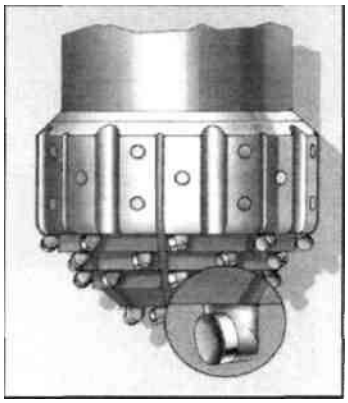
The saw is shown cutting through a two-foot diameter water culvert pipe.



In 1968 Tracy made another scientist's dream come true by finding a method of taking diamond powder and squeezing it to such temperatures and pressures as to form it in any desirable shape. By this discovery he thereby was able to fill every need for industrial diamonds in both the larger ones as well as the granular sized diamonds. (Above photo by Glen Killian.)

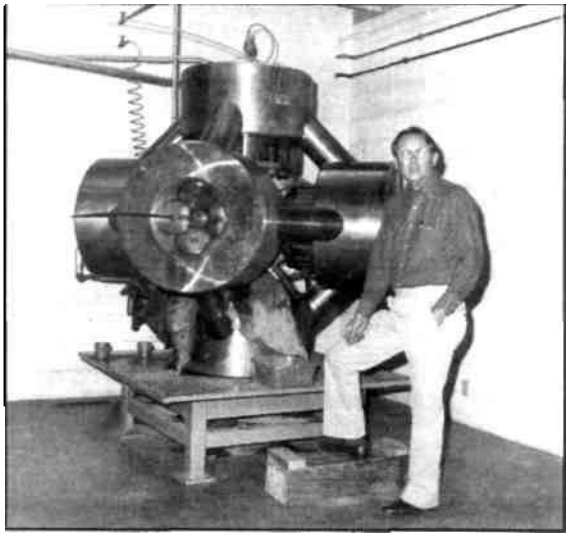


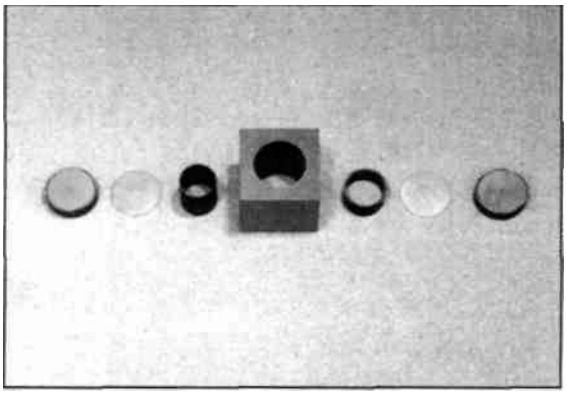
Here are samples of the various made-to-order shapes of larger sized diamonds that industry needs.These polycrystaline diamonds can be formed directly in virtually any desired shape - wedges, points, flat plates, pierced parts, rollers, spirals, etc. Some of the uses for these diamonds are in drills, chisels, thred guides, saws, blades, wire-drawing dies, specialized machine tools, grinding wheels and grinding wheel dressers.



Here is an example of such diamonds mounted on an oil-drilling bit. They are put in place in a few minutes time as compared to the natural cdiamonds that have to be studied for hours at a time to discover the precise angle at which they must be mounted. Though diamonds are very hard they are also very brittle, and if not mounted at the precise angle at which force is applied against them they will shatter to pieces. This indicates again the advantage of man-made diamonds over the natural ones

Tracy stands besides his hydraulic cubic press that he developed after he left General Electric and could no longer use his "belt" apparatus for futher research in the area of high-pressure and high-temperature. It has six rams that working together squeeze a cube-shaped vessel that contains the diamond making ingredients.





An exploded view of the two-inch cube in which ingredients to make diamond grit or the larger polycrystaline diamonds are placed. Add some tremendous pressure and temperature and the magic takes place.

One article telling of Tracy's work, noted, "Manufactured diamonds are used in aerospace, manufacturing, mining, and automotive industries and are found in masonry saws, mining drill bits, polishing machinery and cutting tools. " . . it would be difficult to find an industry where industrial diamonds are not used. Countless jobs and billions of dollars of American production are the direct result of Hall's work. ... in 1954, [just before Hall was able to make diamond] U.S. industrial diamond consumption was 14 million carats-all from natural sources. By 1996, U.S. industrial diamond consumption had reached **505** million carats, 90% of which was manufactured diamond. . . .

"Hall's inventions have made enormous social contributions. They reduced the cost of drilling oil wells, dental work is quicker, cheaper and more painless because of industrial diamond instruments; eye glasses that once took weeks to order are now available in an hour; and road repairs that once required noisy, dirty, and bone-jarring jackhammers can now be prepared with precision using diamond saw blades.

"According to Hall, creating diamond is very similar to what happens when diamond is produced in nature.

"'See, you're just doing what nature did by generating the same high pressure and temperature the same as what you would find in the bowels of the earth where they exist naturally,'Hall said. 'We're doing the same things that nature does, but we have more control-it's hit and miss in nature. But by creating high pressure and high temperature, we have control of the heat and pressure to make these changes occur.'"[8]

And it can all be done with such control as to have industrial diamonds made to order for what is best in drilling, cutting, and polishing the variety of metals and other hard substances that need to be fashioned.

**Gene's tribute to his brother Tracy**

Sometime after Tracy's accomplishment his brother Gene wrote of the Ramblin' Wreck of a car that he helped Tracy buy that took him and his family to Schenectady and to his work there with the General Electric Company.

"Many years ago on an October day of 1948, a truly odd vehicle could be seen speeding along the highway from the residential section of Schenectady, New York, to the Research Division of the giant General Electric Company. Some might be heard exclaiming at the sight of the strange object, "It's a bird, It's a plane, a train!" etc., while wondering at the same time if it could move faster than a speeding bullet or if its occupant driver, like Superman, could jump small buildings in a single bound? On the other hand, some might reasonably say that the object was none of the above, but it had to be a refugee from the Dust Bowl of the 1930's.

"Indeed, it was a vintage 1938 Plymouth sedan. Obviously it had been rolled, perhaps by a drunk driver. The top had been caved in, and someone certainly not adept at the art of bodywork had torn out the upholstery and hammered the metal upward to permit headroom. Unfortunately, also, this rambling wreck gave the vehicle the appearance of leaning a little to one side. An astute politician might say, "1 believe the fellow is a little left of center!"

"Truly, the accident had left the hood pointing off toward the left, so that drivers coming toward it had the fearful feeling for a moment that the car was headed directly toward

them, and some even veered away in an effort to avoid a collision. Although the car was headed straight down the street, the impression it gave was otherwise— a rather fearful otherwise to oncoming motorists!

"In spite of its appearance this vehicle had a good engine and plenty of tread on the tires. It was quite capable of conveying a father, mother and 3 children across country from Salt Lake City, and, hopefully, continues to take its owner safely to work for another year. Undoubtedly, it compared favorably to the Spaniards valiant steed, Rocinante that carried Don Quixote to dream the impossible dream to fame and glory in reaching the unreachable stars.

"The driver of this completely out of character vehicle was none other than Dr. H. Tracy Hall, Ph.D. in Chemistry and Physics, prototype of the great Dr. Henry Eyring, whose many scientific contributions were later to help Tracy in what he would someday do. Many people involved in the 125-year quest to achieve the "Impossible Dream" of making diamonds from carbon gave up, but Tracy did not. During all working and waking hours he was totally consumed in scientific thought; and in the night, also, while sleeping, dreaming and pondering solutions, he continued on, seeking the catalyst that would cause carbon black to gleam like the unreachable stars.

"One bright day as the sunbeams danced through the lab window, he prepared to open the chamber of his previously invented "Belt" apparatus that had subjected the carbon and catalyst to unearthly pressure and temperature. His hand trembled a little with the excitement of a scientist with an impossible dream. His brainchild had been scorned by his fellow workers "as no damn good" and perhaps his stature as a scientist questioned; but, as the chamber opened, full rays of sunshine caught the unmistakable gleam of the first man-made industrial diamonds!"[9]

It was a "gleam" that would revolutionize the world's industrial abrasives industry that would bring great benefits to much of the world's population.

It was a "gleam" that in the wording of many of Tracy's awards, resulted "in the creation of a new industry," . . ."contributed significantly to the betterment of contemporary society," as well as to "the well-being of mankind" in many areas of life.

**Tracy's involvement in what came to be known as "Project Superpressure."**

Tracy joined the Research Department of the General Electric Company in Oct. 1948, shortly after graduating from the University of Utah with a PhD in Chemistry. In 1951, after he had been working for three years in the polymer plastics area, GE decided to start the diamond synthesis project again. About thirty chemists were called into a meeting where the secret project was announced. Two chemists were needed to work on the project. Tracy was the only volunteer so he got the job. He had been thinking about the subject for many years and during the time he worked on his master's degree at the University of Utah he thought about making diamonds or about making boron—a solid crystalline boron he thought might be as hard as diamond.

Others at GE were not interested because of the continuous failures at what most deemed to be an impossible achievement - an impossible dream! In fact, most scientists considered working on diamonds to be a "crack-pot" venture in view of the long history of what was pictured as some cackling "mad-scientists" turning knobs and watching gauges while sparks flew amid thunderous sounds as they worked their magic.

The project had begun a year earlier where two physicists, Herbert M. Strong and Francis P. Bundy, were asked to survey the literature to see what others had done prior to that time. At that point they issued a report to the company management of what had been done and outlined some procedures that might be followed in some new attempts based on the use of some of Bridgeman's high-pressure equipment.

Percy W. Bridgeman, of Harvard University, had been the leader in developing such equipment during forty years of research for which he earned the Nobel Prize in physics in