

INTRODUCTION

SLIDE 1
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1994 is the quincentennial of the birth of Georgius Agricola, the German author of the classic 16th Century mining treatise, De Re Metallica. Celebrations are being held all over the mining world. They provide an opportunity for us to reflect upon and take pride in both Agricola's timeless achievement, and in the remarkable story of the highly successful effort by Herbert Hoover and his wife, Lou Henry Hoover, to translate De Re Metallica into English.

SLIDE 2
De Re
Metallica

^ Who was Agricola and why do we think so well of him, and of his book De Re Metallica? How did a German physician manage to produce the definitive treatise on medieval mining? Why did Lou and Herbert Hoover become so involved in translating De Re Metallica and how did they manage to complete such a demanding project? ~~What has happened to the Hoover reference collection of technical books?~~

SLIDE 3
G. Nash

Starting in the present, we can trace our way back in time. We begin at the Herbert Hoover Presidential Library, and George H. Nash, a biographer who is supported by the Library Association in his efforts to prepare a scholarly biography of Herbert Hoover. Dr. Nash has completed three volumes of his splendid work, including The Life of Herbert Hoover: The Engineer 1874-1914, which includes a fully detailed account of Herbert Hoover's years in mining, and a fully documented account of the translation of De Re Metallica. Dr. Nash has made use of extensive records at the Presidential Library in Iowa, and has visited places where Hoover worked, as far away as Western Australia. Every mining professional will enjoy his books.

SLIDE 4
M. West

While in London this summer, I visited with Michael West, today's publisher of Mining Journal and Mining Magazine. I had hoped he could help me with a London perspective on the Hoover story. He didn't disappoint me.

SLIDE 5
Pick & Pen

He reminded me that Arthur Wilson, who had spent many years in public relations at RTZ had written up the Hoover story in his very interesting book on the history of mining journalism, The Pick and the Pen, published by the Mining Journal. If you don't have The Pick and the Pen, or some of Wilson's other books like The Professionals and The Living Rock, you will want to get them.

SLIDE 6
D. Kuhner

As I began work on this talk, I wondered what had happened to Herbert Hoover's book collection. Dr. Nash's book pointed the way, saying that the collection was intact and housed at the Claremont Colleges, in California. A phone call brought me into contact with Mr. David Kuhner [pronounced Keener], Curator of the Hoover Collection at Norman Sprague Library, Henry Mudd College. This energetic, helpful man has prepared a comprehensive, scholarly bibliography of the Hoover collection. Wouldn't it be a pleasure to spend some time with this marvelous collection at Claremont?

SLIDE 7
Sprague
Library

One of the best places to see an original De Re Metallica and a Hoover translation is at the Colorado School of Mines Library. They have three originals: two first editions which were published in 1556 and a third edition which was published in 1620. They also have autographed copies of the Hoovers' translation of De Re Metallica.

SLIDE 8
Sorgenfrey

The Head of Special Collections there, Mr. Bob Sorgenfrey [Sor-gen-fry], is in charge of the Colorado School of Mines' old and valuable collection of books. He allowed us to borrow some of the books from the vault at CSM to photograph in preparation for this talk (including a 1556 De Re Metallica which I guarded with my life!)

SLIDE 9
L. Dunn

Another person at CSM whom I must mention is the Head of Reference, Ms. Lisa Dunn. She has always been most helpful, and this particular time, especially so. She provided the link that I needed to find the De Re Metallica illustrations.

SLIDE 10
S. Strauss

The Hoover translation is now a rare book and commands a high price when it can be obtained at all. Most of the copies signed by the Hoovers are in private hands and are a source of great pride to their owners. Here is Simon Strauss sharing his copy with Don Donahue. Herbert Hoover presented this copy to Simon's father, Oscar, when the senior Strauss was working in Chile. Michael West has a copy that was apparently given to a manager of the Sons of Gwalia Mine in Western Australia. I understand that Chuck Barber received an original of the Hoover translation from his colleagues when he retired as Chairman of ASARCO.

These, and many other, historians, archivists, and librarians have helped to preserve the wonderful works of Agricola and the Hoovers. Let's turn now to the beginning of the story -- Agricola.

AGRICOLA

SLIDE 11 Agricola

▲ Georgius Agricola was born George Bauer at Glauchau [Glówc-how], Germany, on March 24, 1494. As was the custom at that time, his name was Latinized by his teachers. He was born at the beginning of the Renaissance, a time of great discoveries and of escalation of learning and research. Soon after he graduated from the University of Leipzig, Agricola joined the surge of students moving to Italy to study medicine and the natural sciences.

Agricola received his degree in medicine and in 1526,

SLIDE 12 Map

▲ was appointed physician to the town of Joachimsthal [Yäk'-eem-shtal] - - - now Jachymov [Yäk'-y-mof], in the Czech Republic - - - which was located in the middle of the most productive metal-producing area of Europe. This thriving mining town kept Agricola busy with his practice, but also sparked his interest in the lives and occupations of his patients.

He spent nearly all of his free time visiting the mines and smelters in the surrounding areas, asking questions, and reading all references to the industry which he could find.

Soon after publishing two other technical books, Agricola began work on De Re Metallica. Realizing the great extent of the project, he quit his practice at Joachimsthal [Yäk'-eem-shtal] and devoted the next three years to travel and study at the mines. He eventually accepted a position as city physician at Chemnitz [Kem-nitz]. In 1546, prior to the completion of his main work, Agricola began publishing a series of books on mining, metallurgy, geology, and animals in mining. Agricola was elected to Burgher of Chemnitz, and was soon appointed Burgomaster by Duke Maurice of Saxony.

SLIDE 13
Title Page

Agricola spent more than 20 years on De Re Metallica. A true scientist, he based his work primarily on direct observations and secondly on inductive reasoning. Although his manuscript was completed in 1550, he delayed its publication for another 5 years, mainly because of his insistence that the work be illustrated.

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Inside
Pages

↗ Agricola hired illustrators to delineate various practices, ~~partly to avoid confusion carried by translation of technical terms from German to Latin.~~ He considered these artistic woodcuts to be of prime importance, ~~"lest descriptions which are conveyed by words should either be not understood by men of our times, or should cause difficulty to posterity".~~

Because of his determination on this issue, he never lived to see his masterpiece in print. However, these illustrations have added greatly to the value of the book and may be more widely recognized than the text itself.

Agricola died in 1555, and is buried at Chemnitz [Kem-nitz]. ↗

THE IMPORTANCE OF THE BOOK

SLIDE 15
Inside
Pages

De Re Metallica was the first book ever printed which treated mining comprehensively, and which actually described in both words and pictures how to undertake various mining practices. De Re Metallica provided miners technical information that was formerly passed along only by word of mouth.

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The scope of Agricola's work is remarkable. It is presented in 12 separate books bound into one huge volume. Interestingly, the first book deals with anti-mining complaints, including charges that investors lose money in mining schemes, that mining is too perilous an occupation, "that the fields are devastated by mining operations". He argues at length against these anti-mining attitudes and makes a good case for reclamation.

Agricola concludes Book I with what must be the most widely quoted text of the entire work: 

SLIDE 17, 18
Quote

...inasmuch as the chief callings are those of the moneylender, the soldier, the merchant, the farmer, and the miner, I say, inasmuch as usury is odious, while the spoil cruelly captured from the possessions of the people innocent of wrong is wicked in the sight of God and man, and inasmuch as the calling of the miner excels in honour and dignity that of the merchant trading for lucre, while it is not less noble though far more profitable than agriculture, who can fail to realize that mining is a calling of peculiar dignity?

^ The next books go into the geology of veins, discuss mining law, and describe mining methods. Thereafter, they describe mining machines, tell how to assay ore, and describe concentration and smelting techniques. The coverage is remarkable. Virtually every issue confronted by modern miners is discussed in a useful way somewhere in De Re Metallica.

The usefulness and wide acceptance of Agricola's work are shown by the fact that it was not superseded for 180 years, and was translated into three languages and published in 10 editions during that period.

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Potosi

The book was carried all over the world. Legend has it that in some Spanish outposts, such as Potosi in South America, it was chained to the church altar and translated by priests to the miners between religious services.

The information provided in the book is practical and detailed as shown in this selection of the woodcut illustrations that Coopers & Lybrand in New York kindly allowed me to copy.

SLIDE 21
Devining

The first slide illustrates the method of devining as an exploration tool. Agricola was skeptical, but the practice is not unknown today.

SLIDE 22
Shafts

This next slide explains types of shafts and tunnels.

SLIDE 23
Rock Fract.,
Safety

Next, we see how a hard rock surface could be broken by the use of fire. Agricola also cautions that the resulting fumes could injure the health of miners or even kill them.

SLIDE 24
Ore
Removal

The next slide illustrates the various ways of removing ore from a mine...

SLIDE 25
Processing

...and this next one shows the different types of equipment used in processing.

Translations of De Re Metallica were often less than fully satisfactory because the original was written in Latin and Agricola had invented Latin words and phrases for many of the mining practices he observed firsthand. Translators, most of whom had little mining background and no opportunity to revisit the mining operations observed by Agricola, were stumped by Agricola's technical terms. This remained a problem with all of Agricola's progeny until Lou Henry Hoover and Herbert Hoover tackled these puzzles.

SLIDE 26
Young
Hoover

This remarkable couple met when they were geology students at Stanford in the early 1890's, and they were married in 1899. Herbert made a connection early in his career with the London-based mining consultants and merchant bankers, Bewick, Moreing and Company, and, at a very early age, became a highly successful mine manager and consulting engineer. After what Herbert Hoover described in his autobiography as "years of

SLIDE 27
Herbert, Lou
Venice

adventure," involving travel and extended stays in places like Australia, China, Burma and Russia,

SLIDE 28
H. Hoover

Herbert had done well enough professionally and financially to leave the firm and set up an independent consultancy in mining and mining finance, and the Hoovers settled down in London.

Herbert was active in mining until the time of the First World War. Thereafter, Herbert embarked upon a career of public service which involved relief to victims of war, and eventually to his return to the

SLIDE 29
Time Magaz.

United States where he became Secretary of Commerce, and ultimately, President of the United States.

SLIDE 30
President -
Des Moines
Register

Lou Hoover was also a high achiever. She once remarked that her life "was much more exciting than anything that she could find in fiction." She was an

SLIDE 31
L. on Horse

avid outdoorswoman, a devoted mother, and the first woman to earn a geology degree from Stanford

SLIDE 32
Lou, Baby

University. She was proficient in Latin, loved to travel (going around the world five times), and was equally at home in a mine as at a Presidential function.

She was the first President's wife to invite a black woman to the traditional White House tea for congressional wives, a gesture for which she was both praised and violently criticized at the time.

Her keen sense of duty led her to participate in several philanthropic and community organizations throughout her life. She scavenged food and

SLIDE 33
Armaments
China

worked in a hospital during the Boxer Rebellion in China, was a leader of the Girl Scouts from 1917 to

SLIDE 34
L. Hoover

1944, was involved with the Red Cross and Friends of the Poor, the American Women's War Relief Fund, organized food drives during both World Wars and the Great Depression, and performed scores of private acts of charity.

Lou Hoover was a woman ahead of her time in many ways. She repeatedly stressed that a woman could have a career and a family. She held a strong sense of values which included the importance of education, family, community, frugality, loyalty, hard work and independence.

SLIDE 35
Lou, Sons

SLIDE 36
Hoover
Family

London was the center of the world of mining finance during the early years of this century, and was a wonderful base for the professional and family life of the Hoovers. The Hoover's leased what biographer Nash describes as "a rambling, old, eight room, two-story house, surrounded by high walls and graced with a garden," in the Kensington section of London: the "Red House" it was called, on Horton Street. They moved in late in 1907. Herbert and Lou were 33. Their young family included five year old Herbert Charles and the infant, Allan Henry Hoover. Herbert maintained an office at Salisbury House in the city. Most of the mining consultants of the day had offices there, and Salisbury House was also the location of offices of the Institute of Mining and Metallurgy and the club rooms of the Mining Club.

SLIDE 37,38
Red House

SLIDE 39
Hoover
Family

SLIDE 40
Salisbury H.

Lou, with the help of a substantial crew of downstairs servants, looked after the children, managed a very active schedule of entertaining, and pursued a wide variety of writing and other intellectual projects.

SLIDE 41
Red House

▲ It was here at the Red House that work went forward on the translation of Agricola. Lou Henry Hoover is given the credit for originating the project in 1906. She is thought to have had the better language skills, and she and Herbert agreed to work together on the project in 1907. What started as a light-hearted proposal to translate De Re Metallica in "a year," turned into a major project requiring a lot of time from both Lou and Herbert, and eventually the help of outside assistants.

SLIDE 42
Book Collec

By the end of 1908, they were beginning to run into trouble and they started using collateral sources from Herbert's extensive collection of ancient and medieval mining and other scientific books, and the German translation of De Re Metallica. They

SLIDE 43
Biblio - Title
Page

eventually employed several assistants to compile bibliographies of primary and secondary works that would help shed light on the meaning of Agricola's technical descriptions, and to translate these sources. Herbert prepared extensive footnotes on various subjects such as mining law, geology and surveying practices that place Agricola's work in context. In my judgement, no finer history of Mining Law exists than Herbert Hoover's extended note on page eighty-two of the translation.

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Herbert also engaged in what he called "scientific detective work." As he explained, - - "material A might start as an unknown substance, but in different parts of the book, Agricola would state its varying reactions when treated as combined with known substances B or C. Thus, I could often have the meaning of his terms worked out in our laboratories." Although they hired a number of assistants, it seems clear that the Hoovers put in an enormous effort and that they truly deserve the credit for the translation. Herbert writes in his autobiography that "we grappled with it sentence by sentence, during our spare time, month after month, for over five years. We lugged the manuscript all over the world for odd moments that would be available for work on it."

**SLIDE 45
Title Page**

Edgar Rickard, friend of the Hoovers and business manager of the London-based Mining Magazine, helped them with the physical production of the book. ↗ Printed and bound to closely replicate the original 1556 edition, the book was hand-printed on paper manufactured in a sixteenth century manner by a Scottish paper mill and bound in white vellum like the original. The 239 original woodcut illustrations were faithfully reproduced.

**SLIDE 46
Autograph**

Three thousand copies were printed. ↗ The Hoovers gave away 1,500, retained 500, and permitted the remaining 1,000 to be sold. Very much a labor of love, the Hoovers subsidized the printing, reportedly to the extent of \$20,000 -- a sizeable amount in the dollars of the day.

The Hoover translation is a seminal work for mining historians. It is of the highest quality, well deserving of the first gold medal for distinguished service ever awarded by the Mining and Metallurgical Society of America. It received wide-spread acclaim in contemporary, scholarly circles, and is still recognized as an important contribution to science.

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L. Hoover -
Hall of Fame

Students of the Hoover story wonder why this highly successful couple put so much effort into the Agricola project. Most have concluded that Herbert was sensitive about the place of mining engineers in society, and was anxious to upgrade the profession in the eyes of the public.

SLIDE 48
H. Hoover -
Hall of Fame

Hoover remembered an incident that had occurred during one of his voyages across the Atlantic. He had shared a table with an English lady "of great cultivation and happy mind," who had been quite pleasant to converse with during the days at sea. At their final breakfast together, upon entering New York harbor, she had asked Hoover, "I hope you will forgive me, but I should like to know, what is your profession?" After Hoover told her, she appeared quite astonished. "Why," she said, "I thought you were a gentleman.."

As biographer George Nash writes: "In his address to the Mining and Metallurgical Society of America, Hoover gave his answer: he and his wife undertook to stimulate a sense of 'dignity,' 'pride,' and 'professional ideals' among the members of their profession." "I am sure that you will agree with me that they achieved their goal, and that all of us are proud of their accomplishments on behalf of our calling. 

SLIDE 49
Pres., Mrs.

▲ So far, the story of the Hoover translation is one of great accomplishment by a couple of gifted people who, in their early years, had gone from one success to the next, and who only later in life would know defeat of any kind. But there is a warm, human interest side to this story as well, and if you will allow both President Hoover and I to indulge in a little sentimentality, I will quote from his autobiography a note he wrote to Mrs. Hoover in 1938, when he revisited England after an absence of nearly twenty years: ▲

SLIDE 50
H. Hoover

While in London I sneaked away on a visit of unalloyed sentiment. I stole out of the hotel alone, found a cab, told the driver the old formula - "Kensington, High Street, Horton Street to the Red House."

On the way, my mind traveled over the thousands of times we had driven along Pall Mall, Knightsbridge and High Street, nearly every house of which was still unchanged...

SLIDE 51
Red House

▲ I came to the door of the Red House, flooded with memories of the months we had lived there, alternatively with our New York and California homes for nearly twenty years. How we had first come, as a couple, from stays in Australia or China or Russia or Burma, or New York or the Continent; then when we had brought the babies; then when I would return from long journeys to meet you all again.

At the door, even after twenty years, I automatically fumbled in my pocket for the key. I rang the bell, gave the very stiff butler my card, and asked if I might see the lady of the house, explaining that I was an American who had lived in this house many years ago, was in London only for a few days, and would like to walk through the rooms and the garden again.

SLIDE 52
L. Hoover

The butler seemed nonplussed, but came back after some minutes, and through the partially opened door, announced, "Her ladyship is not in." I was prepared for this British event with a ten-shilling note, sufficiently exposed, and suggested that perhaps he would let me see any part of the house that was not in use at the moment. To the left was the oak-panelled library with its fine fireplace and its leaded glass bookcases -- the same as ever. I imagined again, sitting on the opposite side of the desk from you, with the manuscripts and reference books of Agricola, piled between us, as we worked over the translation of De Re Metallica. Again I saw "Pete" at the little table in the corner, making marks and announcing that he was writing a book too; and "Bub" clambering into his mother's lap and demanding to know what the book said. The dining room was the same walnut-panelled room and evoked all kinds of memories of the multitude of happy gatherings which had filled it...

SLIDE 53
Herbert, Lou
in Garden

✎ Altogether my mind was a maze of revived emotional pictures and some disappointments. But by now the butler was standing on one foot and filled with anxieties -- and to finish him, I shook his hand, which I suppose no "gentleman" had ever done before.

In closing, I must say that I have enjoyed the preparation for this presentation as much as any that I have given. Miners and others associated with the mining industry are special people -- with a unique understanding of the earth and with a distinct spirit and enjoyment of life. Agricola and both of the Hoovers typify this personality. ✎ I feel privileged to be able to share their stories with you, and hope that you, as I do, feel as if you have met them.

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Thank you.