

# Mathematics Alumni Newsletter



Winter 2011

## From Your Editor

This edition of the newsletter brings you something different. Initially, we had rather grandiose plans—hoping to publish an edition that would provide a history of events at DU, paralleled with a history of the math department, and both tied to events in the overall world of mathematics. The gargantuan scope of this endeavor quickly became apparent and a change of plans clearly became in order. We had, however, in our initial efforts, uncovered a number of unique and interesting (we thought) items in DU's history. So, we present to you a variety of moments of fame and infamy from DU history, a potpourri of interesting facts about DU, some information about former math faculty, and some milestones in mathematics over the years. As it turned out, we ran out of room before we were able to include a number of other interesting items. We hope to be able to include a few of these as part of future newsletters.

We owe a significant debt of gratitude to Professor Emeritus Bernard (Bernie) Spilka who has gathered a tremendous amount of information about DU faculty and compiled it into the volume, *The Heart of the University of Denver: A Human Approach to the Arts, Humanities, and Sciences*, 2007 (edited by Steven P. Fisher). Most of the information herein about DU math faculty was taken from that volume. We also owe many thanks to the staff of the Special Collections and Archives in the Penrose Library at DU.

**1864** On March 5, 1864 the Council and House of Representatives of Colorado Territory granted the Charter of the Colorado Seminary (the property-holding corporation of the University of Denver). Classes began that fall in a two-story, four-room building at Fourteenth and Arapahoe Streets. This is roughly where the parking garage for the Denver Performing Arts Complex is now located.

On November 26 of 1864 an English author, mathematician, logician, Anglican deacon and photographer gave a young girl a Christmas gift—a story he had written. The gentleman was the Reverend Charles Lutwidge Dodgson. The story was a handwritten manuscript called *Alice's Adventures Underground*. This was later published as *Alice's Adventures in Wonderland* under the penname Lewis Carroll.

The Colorado Seminary operated for a few years and was then closed for several years in the 1870s.

**1880** The school was reorganized with the title of The University of Denver and Colorado Seminary. In addition to a College of Liberal Arts and a Preparatory School, Schools of Music, Art and Business were established. During this time, the sports teams were known as the "Fighting Parsons" or "Ministers."

In 1880 Herbert Alonzo Howe came to the university as a professor in Mathematics and Astronomy. In his book, Prof. Spilka writes of Prof. Howe riding an unusual bicycle around Denver—a bicycle with an 18" front wheel and a 54" rear wheel.

Between 1864 and 1880 a number of interesting events had occurred in the world of mathematics. In 1872, Weierstrass presented his celebrated example of a continuous nowhere-differentiable function to the Berlin Academy. In 1873 Charles Hermite proved that  $e$  is transcendental and Muir and Thompson developed radian measure for angles. In 1874, Georg Cantor showed that the set of all real numbers is uncountably infinite and the set of all algebraic numbers is countably infinite. Cantor coined the term transfinite and his theories of transfinite numbers encountered resistance from such notable contemporaries as Kronecker and Poincaré and later from Weyl. It's interesting to speculate what the mathematicians at DU might have thought of these developments.

**1882** The Board of Trustees of the University of Denver and the Executive Committee of the Colorado Seminary met and unanimously resolved that a Medical Department be established. The first session of the medical school opened that fall in a building that was located on Sixteenth Street between California and Stout.

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## Rufus (Potato) Clark

We feel it is only fitting that Rufus (Potato) Clark receive the distinction of his very own section.

Rufus Clark came to Colorado in 1859 where he homesteaded on 160 acres. He farmed this land and began to specialize in potatoes which were apparently in high demand by the miners seeking their riches in the hills around Denver. He was able to purchase more land and hire workers to farm the land. Ultimately making a fortune raising potatoes, he became known as the "Potato King of Colorado" and acquired the nickname "Potato". Clark was apparently quite a philanthropist, very willing to share his good fortune. It's reported that he sent most of his potato crop to Chicago after the great fire in 1871.

It's difficult to separate fact from folklore in reading about Clark. Born in Connecticut in 1834, some writing says he ran away to sea as a teenager and served 16 years on a whaling vessel before eventually jumping ship in California. For many years he reportedly retained many of the habits gained in his seafaring days—swearing and drinking to the point he became a confirmed drunk and was described by a contemporary as "steeped in sin and prodigious profanity and the curse of drink." Clark apparently changed his ways when he attended a revival held by the evangelist Reverend E. P. Hammond.

One thing that is certain is that the location of the current University of Denver is due to the work and generosity of Rufus Clark. Clark either individually, or as the head of a movement, donated the original land on which the University of Denver is now located. This was a welcome gift to the institution's leaders since the city of Denver was becoming too rough and tumble, with an excess of saloons and brothels, to provide a satisfactory university setting.

A hint that some of the less favorable stories of Clark's past and eventual conversion have a grain of truth is given by some of the conditions Clark attached to the gift of land. There were to be planting of trees and laying out of a street grid and no alcohol was ever to be made or sold in the area. This latter stipulation would seem to substantiate the stories describing Clark as a reformed drunk. Reportedly, some homes in south Denver still carry these old covenants against selling or producing alcohol on the premises.

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Subsequent events in mathematics included Ferdinand von Lindemann's proof that  $\pi$  is transcendental in 1882 and Felix Klein's invention of the Klein Bottle in the same year.

**1885** In April, DU and Colorado College played the first intercollegiate football game west of the Mississippi. CC won 12 to 0.

**1886** David Hilbert receive his PhD in 1885 and, in November, the mathematician Hermann Weyl was born.

**1886 to 1896** In 1886 the University secured a large tract of land that received the name University Park and a portion of it was set aside for the campus. This came about largely through the efforts of a potato farmer named Rufus Clark (see above).

After 1886 a number of events quickly ensued. In 1887, a School of Dentistry was opened and, as late as 1925, it was the only school of dentistry between the Missouri River and California. In 1888 a School of Pharmacy was started but it only lasted a few years. In 1892 University Hall, the first building on the new campus, was completed. It housed the College of Liberal Arts. The School of Law was also organized in 1892. In 1893 the building for the Iliff School of Theology was

completed on the University Park campus. In 1894 the Chamberlin Observatory, a gift of Mr. Humphrey B. Chamberlin, was completed. Dr. Herbert Howe, who had been an instructor of Mathematics and Astronomy and had now become the Dean of the College of Liberal Arts, was named to be the director of the observatory.

In 1887 George Pólya was born as well as Srinivas Ramanujan, the Indian mathematician who was subsequently brought to England by G. H. Hardy.

In 1890 Bertrand Russell began his studies at Trinity College, Cambridge, where he came under the influence of Alfred North Whitehead.

In 1895 Henri Poincaré published *Analysis Situs* and gave birth to the field of algebraic topology.

**1896** At the University of Denver, Herbert E. Russell joined the faculty as a professor of mathematics and natural science. He was called the "most popular teacher at the university" and died tragically in 1927 when his automobile stalled on railroad tracks.

The *University Bulletin* published in January of 1896 reported a number of interesting facts. The library was being

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“arranged and catalogued according to the Dewey or decimal system.” The relatively new Chamberlin Observatory was a success and had made more observations of Swift’s comet than all other American observatories put together.

The mathematics coursework for a student in the Scientific course of study in 1896 included Plane Trigonometry and Surveying, College Algebra, Higher Equations, Analytic Geometry, Calculus, Spherical Trigonometry and Determinants, Mathematical Astronomy and Logic. It appears that students in the Classical and Literary courses of study were also required to take two quarters of calculus.

For the College of Liberal Arts the matriculation fee in 1896 was \$5. An incidental fee of \$10 and a library fee of \$1 were also required. Lab fees ranged from \$3 to \$5 depending on the course. A “single study,” perhaps equivalent to the current “credit hour,” was fifty cents per week.

Women could stay in the Young Ladies Home for the fee of \$215 for the academic year. This entitled them to a furnished room, light, heat, table board and washing of one dozen pieces per week. They were expected to bring two pairs of sheets, two pairs of pillow cases, six towels and four napkins—each article indelibly marked.

The School of Law had 49 students enrolled; the Conservatory and College of Music with 20 instructors reported 130 students (“exceeding the most sanguine expectation of the management”); the School of Dental Surgery had its largest enrollment ever of 28 students; and the Medical Department, while not reporting a total number of students, noted that four new students had been admitted to do special work.

**1899** In December Dr. Henry Augustus Buchtel was elected Chancellor of the University. The *University of Denver Bulletin* for 1925 reports that he served until 1920 when, due to a “stroke of apoplexy”, he was forced to resign. In 1911, Buchtel had made a promise to the entire student body that he would pay for any student’s marriage license and he agreed to perform the ceremony free of charge.

**1900** In August David Hilbert presented a set of 10 problems at a conference at the Sorbonne. Subsequently, additional problems were added resulting in his well-known list of 23 problems which were unsolved at that time. This list included, for example, the infamous eighth problem—to prove the Riemann hypothesis.

**1901 to 1949** James B. Westhaver was shown as an instructor in math and chemistry in 1901. After three years, he moved to physics and remained until his death in 1908.

Albert Recht came to the math department in 1923. In 1926, the aging Herbert Howe began to train him in operating the telescope in the Chamberlin Observatory. Recht eventually became the director of the observatory in 1928. In this capacity, he began the tradition of public nights during which the public could look through the telescope. He established some reputation as an astronomer, and a crater on the backside of the moon is named for him. Writers about Recht all mention his sense of humor. We assume it was his sense of humor at work when, in 1950, when flying saucers were a hot topic, he was interviewed by a newspaper reporter. When the conversation turned to a story that some observers had reported seeing “vegetable growth” on Mars over the weekend, Recht observed that perhaps flying saucers did come from Mars since, “If there are vegetables, why not vegetarians.”

In 1912 Josip Plemelj published a simplified proof for Fermat’s Last Theorem for the exponent  $n=5$ . In 1913, Ramanujan had sent a long list of complex theorems (without proofs) to G. H. Hardy. In 1928 John von Neumann began devising the principles of game theory. Gödel proved his incompleteness theorem in 1931.

In 1940, as the fear of war increased, a German student at DU, whose mother was American and whose father was a German government official, was asked by federal officials to leave the country.

In 1949 John von Neumann computed  $\pi$  to 2,037 decimal places using ENIAC.

**1950** March 8, 1950 was an exciting day at DU and a day that would live on until today in the annals of flying saucer lore. On that date, some 350 DU students and faculty heard an “unidentified middle-aged lecture” talk on the subject of flying saucers. The lecture had been arranged on the condition that the speaker remain anonymous and that the talk not be publicized. Word had gotten around on campus and the speaker found himself talking to a standing-room-only crowd. The speaker spoke in technical terms and seemed to clearly have a scientific background. He spoke for 50 minutes and told the crowd that flying saucers were indeed real—that, in fact, four of them had actually landed on this earth—one within 500 miles of Denver (apparently referring to a 1948 incident near Aztec, NM). He stated he was among over 1,600 scientists who were working on top secret projects and described the saucers and their passengers in detail. The first disk that landed was 99.9 feet in diameter with a cabin 72 inches high. Inside were the charred bodies of 16 men, ranging in age from 35 to 40 years old. They were approximately 40 inches tall and wore uniform-like clothing. After speaking in great detail and then fielding

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about 15 minutes of questions, a gentleman with the speaker exclaimed: "Great Scott, we have to get out of here! You have only twenty minutes to catch your plane!" and the two rushed out of the building.

It took a while but eventually this was found to be a hoax (and apparently the Chancellor issued a memo directing that people be more selective in their future choices of speakers). Nevertheless, this story lived on and was cited frequently as evidence of the existence of flying saucers by the community of flying saucer aficionados. The lecture is a significant part of a well-known book advocating the existence of flying saucers, "*Behind The Flying Saucers*", by Frank Scully.

An interesting twist on the story comes from individuals who believe that the CIA is behind the whole flying saucer issue. Their belief is that, in the past, the CIA encouraged belief in UFO incidents and even took steps to make the incidents seem more credible—the intention being to make our enemies during the cold war believe that we had captured saucers and exploited the technology to develop super weapons. The incident at DU is considered by them to have been a psychological test to see if college-level people would believe a well-presented story. Although this might seem far-fetched, it's interesting to observe that Scully's book notes that immediately after the lecture, 80 percent of the audience said they were impressed. By a show of hands, 60 percent said they believed the lecturer. (A later poll reduced that to 50 percent.) One does wonder, however, why these polls were taken.

**1970** There are many other interesting incidents from DU's history but, in the remaining space, it's important to note a very significant one—Woodstock West. Woodstock West is the name given to the protest village that was constructed on campus in 1970 and also to the entire series of events surrounding that protest. At that time, activists throughout the country were protesting the nation's actions in Vietnam and DU was no exception. The shooting of students at Kent State on May 4 served to set off what would become Woodstock West. A statewide college and university strike to protest had been proposed and DU students acted to implement that strike. Picket lines were formed and students were urged to boycott classes. A strike rally ended in a march on the chancellor's office and that led to a convocation that did little to calm things down. After the convocation, students marched to the area that is now the Penrose Library where there was talk of escalation and burning buildings. Instead it was suggested that students build rather than burn and that led to the erection of a "shanty-town" on the lawn.

Woodstock West was torn down by police, rebuilt by students, and ultimately razed by National Guard troops. An interesting sidelight to the story, for those of us who have frequented John Greene Hall, is that a homemade bomb was thrown through a window of John Greene Hall. Fortunately, this caused no more damage than the burning of some lecture notes.



## Math Puzzler

**Solution to the last puzzler:** The previous puzzler asked the question—"Which two whole numbers, neither containing any zeros, when multiplied together equal exactly 1,000,000,000?"

The answer is 512 and 1,953,125 which corresponds to 2 to the ninth power and 5 to the ninth power, respectively.

Solutions to this puzzler were provided by: David Martin (BA, 1966), Timothy Bartos (6th grade son of Radim Bartos, Phd, 1997), Jan Riggs (BA, 1972), Mary Krimmel (MA, 1970), David Frantom (MS, 2008), Sada Narayanappa (PhD, 2006), Lee DeRaud (MS, 1974), David Gwinn (BA, 1973), Glenn Ballard (MA, 1967), Gail Kahler (BA, 1971), Tena (Listopad) Murphy (BA, 1983), Paul Williams (BA, 1952), Andrea Avanzino Blum (MA, 1972), Clark Bond (BA, 1960), Tory Toupin (BS, 1994) and Frank Richards.

**For the next puzzler consider the following:** On a sunny morning, a greengrocer places 200 kilograms of cucumbers in cases in front of his shop. At that moment, the cucumbers are 99% water. In the afternoon, it turns out that it is the hottest day of the year, and as a result, the cucumbers dry out a little bit. At the end of the day, the greengrocer has not sold a single cucumber, and the cucumbers are only 98% water.

**The Question:** How many kilograms of cucumbers has the greengrocer left at the end of the day?

Send your solutions to Sharon Bütz - sbutz@du.edu

## Were You At Woodstock West?

If you were at DU during Woodstock West, there are people who would like to hear from you—whether you were an active participant or not. A documentary film, *Woodstock West: Build Not Burn*, is in the works and filmmaker Sheila E. Schroeder would like to hear your memories of that time on campus. You can contact her through the [Share Your 1970 Story](#) link on the Web page [www.woodstockwestthemovie.com](http://www.woodstockwestthemovie.com), through the Facebook page [www.facebook.com/WoodstockWest](http://www.facebook.com/WoodstockWest) or directly by e-mail at [sschroed@du.edu](mailto:sschroed@du.edu).