The Surveyor Who Became a Field Biologist
Alfred Russel Wallace was born the eighth of nine children in Monmouthshire, England on January 8, 1823 to Thomas Vere Wallace and Mary Ann Wallace. In 1828 when Wallace was five, he and his family moved to Hertford and it was there, at Hale’s Grammar School, that he received his only formal education. In about 1835 Wallace’s father was swindled out of his remaining assets and the family fell on very hard times. Wallace was forced to leave school in March 1837, when he was only 14 and was sent to London to lodge with his older brother John who was a carpenter.

By mid 1837 Alfred had left London to join his eldest brother, William, in Bedfordshire. William owned a land surveying business, and he was to teach the trade. Wallace and his brother would do such work for the next six and a half years, roaming all over the countryside of southern England and Wales. In the autumn of 1841 the Wallace brothers moved to the Neath area of Wales and it was there that Alfred’s interest in natural history really began. It started because he wanted to be able to identify the plants he saw in the countryside while out surveying. He bought his first books on how to identify them and also began to collect them, forming a collection of pressed specimens.

In late 1843 a slump in surveying work forced William to let his brother go. Wallace decided to apply for a position at the Collegiate School in Leicester, and was hired as a master to teach drafting, surveying, English, and arithmetic. Leicester had a good library, and there he was able to find and study several important works on natural history. He then met amateur naturalist Henry Walter Bates, who soon got Wallace passionate about collecting and studying beetles. Inspired by W. H. Edward’s book A Voyage Up the River Amazon, Wallace suggested to Bates that they travel to Brazil to collect specimens of insects, birds and other animals, both for their private collections and to sell to collectors and museums in Europe. The two young men (at the time Wallace was 25 and Bates 23) set off by ship from Liverpool to Pará (Belém) in April 1848. At first they worked together, but after a few months they split up to collect in different areas. Wallace centered his activities in the middle Amazon and Rio Negro, drafting a map of this mighty river using the skills he had learnt as a land surveyor. Some years later this was published by the Royal Geographical Society, London and it proved accurate enough to become the standard map of the region for many years.

In 1852 Wallace sailed for England, but lost his specimens when his ship sank; luckily a passing ship picked up the survivors. Wallace was not put off by this unpleasant experience for long, and in 1854 he left Britain again on a collecting expedition to the Malay Archipelago (now Singapore, Malaysia, Indonesia and East Timor). Wallace would spend nearly eight years in the region, undertaking sixty or seventy separate journeys resulting in a combined total of around 14,000 miles of travel. He visited every important island in the archipelago at least once, and several on multiple occasions, and collected almost 110,000 insects, 7500 shells, 8050 bird skins, and 410 mammal and reptile specimens, including probably more than 5000 species new to science. Wallace corresponded with George Darwin before and after the latter’s Origin of the Species was published.

During his life he wrote more than 1000 articles and 22 books, the best known being The Malay Archipelago, The Geographical Distribution of Animals, Island Life and Darwinism. Honours awarded for the many important contributions he made to biology, geography, geology and anthropology include: the Gold Medal (Société de Géographie); the Founder’s Medal (Royal Geographical Society); the Darwin-Wallace and Linnean Gold Medals (Linnean Society); the Copley, Darwin and Royal Medals (Royal Society); and the Order of Merit (the greatest honor that can be given to a civilian by the ruling British monarch). Wallace died in 1913 at age ninety-one. ■

— Excerpted from wallacelando.info

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TABLE OF CONTENTS

Vignettes: The Surveyor Who Became a Field Biologist ........................................ 2
Chips From The Board, by Rich Leu, LS ................................................................. 3
Editor’s Pen: Standard Scales, by Mary M. Root, LS ............................................. 3
Clarence King & the Great Diamond Hoax, by Mary M. Root, LS ......................... 4
Verplanck Colvin’s Journal Entries, submitted by Jim Vianna, PLS ....................... 6
Eye to Eye: Events, Notes, and News ........................................................................ 8
Bulletin Board: Buy, Sell, Trade, Etc. ..................................................................... 9
Book Reviews: Naturalists, and, a Dual Life ......................................................... 10
Egyptian Rope-Stretchers, by Mary M. Root, LS .................................................. 11
Serial Feature: An Englishman (surveyor) in Siam, 1890-93 ............................. 12
Folkways: The Knights of the Golden Horseshoe ................................................ 13
The Blunt Dividing Engine .................................................................................... 14
Board of Directors, Committees & Affiliates ....................................................... 15
Membership Application ...................................................................................... 16

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CLARENCE KING & THE GREAT DIAMOND HOAX


BACKSIGHTS V 34.2 2 FALL 2015
CHIPS FROM THE BOARD
by Richard Leu

Another Rendezvous is history and, by all accounts, it was another great success. Following a full day of lecture sessions on Thursday, the group enjoyed a ferry ride to San Juan Island on Friday where they visited the English and American camps in San Juan Island National Historical Park. In the afternoon, Rendezvous participants were guests of John and Vicky Thalacker (#306) where they viewed and discussed John’s substantial instrument collection. Saturday featured a field trip to Peace Arch State Park where the group participated in the dedication of a kiosk display explaining the history of the international boundary survey followed by the presentation “How British Columbia and Washington Got Their Shape.” Participants then traveled to the Silver Reef Hotel and Casino for the annual SHS banquet and auction. An optional field trip on Sunday took some of the participants on a two-hour voyage to Sucia Island where they participated in a treasure hunt looking for several different types of monuments and reference points. Once the monuments were found, concrete collars were placed around them to help protect and preserve them. In addition, a kiosk display titled “Surveys of Sucia Island” was installed. SHS is deeply indebted to the Rendezvous 2015 organizing committee of Denny and Delores DeMeyer (#219), Tim and Teri Kent (#222), Ron and Gail Scobbie (#248), John and Vicky Thalacker and Robert Allen.

Rendezvous 2016 will be held at Lake George in New York and will feature the work of Verplank Colvin. Details will be available soon on the SHS website, www.SurveyorsHistoricalSociety.com.

David Holland (#1242) has been appointed chair of a committee to investigate a potential SHS-sponsored Surveyor’s Tour of England for spring, 2018. Holland is the ideal person for the task since he and friend Stephen Letchford organized a Surveyor’s Tour of England in 2013. They were accompanied by Chuck Dunlap (#1281), Bart Crattie (#767) and Rich Leu (#789).

Plans are underway to consolidate the SHS instrument collection and the SHS book collection. The instruments and other artifacts have been stored for a number of years at the home of Duane Weiss (#653) and the books have been under the care of Roger Woodfill (#364). Both collections will be transported to climate-controlled storage in Chattanooga, Tennessee where they will be under the care of Bart Crattie. The collections will be evaluated and cataloged and a user-friendly process will be developed for the collections to be easily accessed by SHS members.

EDITOR’S PEN:
Standards

When Thomas Jefferson appointed Ferdinand R. Hassler to undertake a geodetic survey of the American coast, Hassler stipulated that the equipment should “be made on command and by the best mechanics.” Accordingly, he sought these “good instruments” directly from London master craftsmen Edward Troughton. When he returned to America, Hassler brought Troughton-made theodolites, transits, barometers, chronometers, and most importantly, a Troughton standard scale. This last was necessary because, as Hassler explained, “It may be easily conceived that the most minute care is required to determine the fundamental unit length of a bar or chain to be used in the measurement of a base, from the standard unit of length measure, and that the standard unit employed in it must be well authenticated.”

The Troughton standard scale is a ½ inch by 2-1/2 inch by 82 inch brass bar inlaid in its center with a silver strip graduated to one tenth of an inch throughout its length. It was said to be identical with the English standard yard at Westminster, although it had never been directly compared. Back in his laboratory, Hassler compared the Troughton standard to a variety of metal standards both borrowed and purchased. After many trials, he determined the interval between the 27-inch and the 63-inch graduations on the 82-inch Troughton standard would define the yard standard measured at 62 degrees Fahrenheit. It was adopted in 1832 and would remain the United States’ primary reference yard standard until 1857.

Meanwhile, in London a disastrous 1834 fire destroyed Westminster House of Commons, and severely damaged the British imperial standards. The British immediately set to replacing the yard standard using two previously existing standards which had been compared to the one lost. The firm Troughton & Simms constructed forty precise yard standards between 1845 and 1855. All used [British astronomer] Baily’s metal No. 4 consisting of 16 parts copper, 2-1/2 parts tin, and 1 part zinc. One was selected as the new Imperial standard and four others known as “Parliamentary Copies” were distributed to The Royal Mint, The Royal Society of London, The Royal Observatory at Greenwich, and the New Palace at Westminster, commonly called the Houses of Parliament. The other standards were given to British cities and Commonwealth countries, as well as other countries throughout the world. The imperial standard received by the United States in 1855 was known as “Bronze Yard No. 11.”

When directly compared, it was revealed that “the accepted 36 inches of the Troughton scale was 0.00087 inch longer than the British imperial yard. Since the new yard was far superior as a standard of length, the Office of Standard Weights and Measure adopted it as the U.S. standard.”

Today, both beautifully crafted Troughton Yard and Troughton & Simms Bronze Yard No. 11 standards reside in the National Institute of Standards & Technology Museum, in Gaithersburg, Maryland.
During the summer of 1872, rumors began circulating around San Francisco about the next big thing—the purported discovery of a diamond field. Amid the West’s mineral abundance a diamond deposit seemed plausible, as did the story of two prospectors stumbling upon the find. Although the story eventually proved too good to be true, many people were taken in by the carefully crafted hoax, including bankers, financiers, generals, a United States Senator, and a reputable jewelry firm. The damage to fortunes and reputations would have been far worse if not for the hoax’s discovery and exposure by geologist and surveyor Clarence King.

The grifters were two cousins from Kentucky, Philip Arnold and John Slack. Arnold had worked around various mining operations for years and had served as an assistant bookkeeper for the Diamond Drill Company, and knew the industry. With that knowledge and a sack of uncut gems purchased abroad, Arnold and Slack began their scheme. Arriving at the Bank of California’s San Francisco branch, the two men asked for their valuables to be placed in the vault. “Before he locked up the sack, the cashier found that it contained several hundred uncut diamonds and many raw rubies, sapphires and emeralds. Someone had discovered a fabulous gem mine,” wrote Harry Crosby in American Heritage Magazine.

Soon, bank director William C. Ralston became involved. Arnold and Slack agreed to Ralston’s request to send a mining expert to their discovery, but stipulated that the expert be led blindfolded to the site in order to preserve secrecy. Several weeks later, the expert returned with more uncut jewels and his report that diamonds were “jutting out of the ground and gleaming in crevices.” Still cautious, Ralston asked that samples be submitted to Tiffany & Company of New York, the nation’s leading experts in precious stones. Again, Arnold and Slack agreed.

Excitement grew in San Francisco when Ralston filed incorporation papers for the new firm “San Francisco and New York Mining and Commercial Company.” The firm’s Board of Directors were big names in the fields of finance, mining, law, and government. Senator Benjamin F. Butler was enlisted to help expedite the proposed mining claim on federal land through Congress. New York lawyer Samuel Barlow arranged the appraisal with Tiffany.

William Ralston arrived in New York with a sample of Arnold and Slack’s gems. Witnesses to the appraisal included editor of the New York Times Horace Greeley, George B. McClellan, Benjamin Butler, and other potential investors. Charles Tiffany examined the gems before declaring, “There are beyond question precious stones of enormous value,” and then asked for two days examination time from his lapidary department. When they reassembled at the appointed time, “Tiffany stated firmly that, when cut, the gems would be worth $150,000.”

Knowing that the appraised gem sample represented just ten percent of the find, Ralston was elated. Returning to California, he organized an initial stock offering, and paid Arnold and Slack a reported total of $600,000. Ralston also hired a respected mining expert, Henry Janin, who was to verify the gem field. Poor Janin! He, too, was dispatched to the site blindfolded by Arnold and Slack, after a long train trip followed by a trail ride of two days. Once at the diamond field, the fraudsters never let Janin out of their sight, and whenever any questions arose, managed to divert Janin’s attention or quickly salt a spot Janin was about to explore. Janin’s subsequent report concluded, “I would say that I consider this a wonderful discovery; and one that will prove extremely profitable; that while I did not have time enough to make the investigations which would have answered very important questions, I do not doubt that further prospecting will result in finding diamonds over a greater area than is yet proved to be diamondiferous; and finally, that I consider any investment at the rate of forty dollars per share or at the rate of four million dollars for the whole property, a safe and attractive one.”

Meanwhile, the most prominent field geologist of the day was studying the ancient glacier system of the High Sierra, directing survey teams in Nevada and Wyoming, and working with a draftsman to develop a shading method for his topographic maps. Clarence King was nearing completion of the 40th Parallel geological atlas and his summary volume Systematic Geology. He would later write “I had been so absorbed with the legitimate work of the Exploration during the summer, that it was quite impossible for me to devote any attention whatever to the consideration of the reported diamond discovery.” But by October 1872, with Janin’s report being quoted in the newspapers, King finally realized his geological reputation might be at stake. “If the story was true, the prospectors had come across something King and Gardiner had missed in five years of exploration.”

Clarence King reached the geological survey’s San Francisco office on October 18th, meeting Samuel Emmons, George Gardiner, and Allen Wilson. First, the location of the secret diamond field must be discovered.

William C. Ralston

Charles L. Tiffany
King went to Henry Janin and gleaned two clues: that the sun had been in his face during his blindfolded two-day ride, and that the gem field lay upon a mesa near pine timber. Next, the four geologists spent time in the gossip corridors of San Francisco, subtly rounding up any fact that might lead to the location. Gardiner even managed to chat with Ralston's civil engineer. King and Gardiner felt that the field might be in the Tertiary beds of Vermillion Basin. From the other incidental clues "as to water supply for washing, timber, lay of the land, and various other things that would mean nothing to the ordinary individual," along with their extensive knowledge of the land itself, the team was able to "place the field within a fifteen-mile radius." Now it was late October and mountain travel would be difficult, but King "determined to go there."

Wishing to disguise their mission, Wilson and Emmons set off by train to Fort Bridger with King following one day later. Gardiner stayed in San Francisco to work on the atlas. In freezing cold, King, Emmons and Wilson rode 150 miles from Ft. Bridger to the suspected diamond field 7,000 feet above sea level. They advanced, King wrote, "with terrible marches to Green River Canyon, making a ford at Browns Park, and then headed up the fordom cleft which Fremont had called Vermillion Canyon." Elation took the place of cold once they found a water notice nailed to a tree, claiming the water right of the stream, and signed by Henry Janin. They rode on, and came to "a shelf of coarse limestone which jutted out from the imposing mesa. It was bare and swept by wind and stained with iron, but here all the tracks converged." Samuel Emmons wrote, "We began examining the rock on our hands and knees, and in another instant I had found a ruby. This was indeed the spot."

Darkness soon fell, and the three went to sleep that night believing the find was real. The next day, however, the geologists gradually became suspicious. There was a disturbing regularity in the ration of diamonds to rubies. Then, doubts were increased when a diamond appeared in an unlikely place, perched on a rock, as King wrote, "directly on top, in a position from which one heavy wind or the storm of a heavy winter must inevitably have dislodged it." The next day they began a systematic investigation. They sieved the earth around the knob where the lone diamond was perched and found nothing. Where nearby earth was disturbed, siftings revealed "amethysts, emeralds, sapphires, garnets and spinels – an unheard of combination in nature," wrote Emmons. Examing ant hills, they discovered traces of small holes as if "made by a stick pushed through the crust." Rubies were found in those pierced ant hills, along with the "storm-worn footprints of a man." On their fourth and last day at the site, the men dug deep pits where geologic knowledge told them diamonds might be, but nothing was found. Now they were convinced the whole thing was a swindle. While Emmons led the pack train back to Ft. Bridger, King and Wilson rode forty-five miles across country to the nearest train station and set out for San Francisco.

King broke the news to Henry Janin, and they both went to Ralston and the other investors to reveal they had been victims of fraud. The group sent one more expedition to the site to confirm King's report and found he was right. The San Francisco and New York Mining and Commercial Company was officially dissolved. Ralston refunded the money each early investor had staked, but was ruined financially. Arnold and Slack had already fled the area; neither man was ever prosecuted for the crime. Embarrassed, Charles Tiffany had to admit he was only familiar with cut and polished diamonds. Henry Janin came out all right, thanks to King's sympathy to his plight when writing his report, and the two remained friends.

Clarence King at Uinta Lake ca. 1868; photo by Timothy O'Sullivan

After the San Francisco Chronicle broke the story of "The Great Diamond Fiasco" in November 1872, Clarence King was hailed as a national hero and dubbed "The King of Diamonds." Seven years later, King would become the first director of the U.S. Geological Survey.

Sources:
REPORT ON THE PROGRESS OF THE SURVEY OF THE STATE LANDS.

To the Honorable the Legislature of the State of New York:

The work of the Adirondack survey, circumscribed by the limited appropriations, during the past season has been confined to the preparation of maps, the arrangement of data and computations, and the supervision of the engraving of the maps and plates contained in the large volume of reports transmitted to the last Legislature.

The first section directs the Superintendent of the Adirondack Survey to make surveys showing the location and area of the lands. It also requires that this new work shall be connected with the surveys of the interior. It further requires that the position of such lands shall be shown upon a map or maps.

The second section of the law directs that "the methods of survey shall be in accordance with those now in use on the Adirondack Survey" and that copies of all maps relating to such State lands shall be filed in the office of the Comptroller and State Engineer and Surveyor, and that the Superintendent shall, within sixty days after the meeting of the Legislature, render a report to the Legislature of the results of the work.

In order to carry out the provisions of the law, I commenced on the 4th of June, 1883, the organization of the Survey parties.

One general principle was adopted as a rule governing every section of the work of the Survey, in the restoration of the boundaries:

The re-discovery of the original lines and corners, as identified by means of the original line marks and proved by witnesses, both by indisputable oral and documentary evidence;

The re-marking and monumenting of none but the original lines, of patents tracts or lots, separating and eliminating them from the more recent and erroneous compass lines.

In advance of the actual field work it was necessary to obtain a list of the lands owned by the State as recorded in the books of the Comptroller. Application was therefore made to the Comptroller for an abstract of the State lands then recorded, and upon the receipt of this abstract, the approximate location of the several tracts, pieces and parcels of land in the counties mentioned in the law was studied upon the preliminary maps of those counties, which had been prepared during the preceding survey of the wilderness.

The area of the several pieces thus recorded as State property was found to be more than five hundred and seventy-three thousand acres, nearly all in detached portions, except those interior townships heretofore located.

It was found that the Comptroller and the officers of the Tax Department were unable to locate many pieces of State land, owing to the uncertainty and the obliterating of the boundary lines, and that valuable timber was in different places being removed from the State lands without the authorities possessing the power to prevent it or to prove the trespass or punish the offenders.

I caused thorough searches to be made through the different State Departments for all ancient records relating to the old land patents, which I thought would aid in determining the manner in which the re-survey and re-location of these important boundaries should be undertaken. Research was also made for the original grants, deeds and descriptions of all of the tracts in the several counties wherein State lands were situated, and extracts made from all records which might aid in identifying the boundaries. It was soon apparent that the records were both imperfect and conflicting, the Colonial and early State records differing very materially in the description of what should have been identical boundaries. These differences, or errors were thought by many to be proof of the absolute falsity of the Colonial surveys. This was not, however, my opinion. From long acquaintance with the ancient compass lines I was inclined to believe that the differences in most old records arose from the hasty manner in which the surveys of that period had been made and the lack of observations of the variation of the magnetic needle. I had confidence that, where the original forest
remained, if any line had been run and marked upon the trees as described in the original field notes, careful study of the topography of the section with search for such marked trees would not fail to reveal enough to identify them, even though the marks should have become ingrown deeply into the hearts of the trees.

Upon the staff of the preceding survey I had been fortunate in securing the services of experienced forest surveyors, whose acquaintance with old marked lines rendered them of great value for such work. These men, being the inheritors of the woodcraft of, and acquainted with the methods pursued by the Colonial surveyors in marking the boundaries of the early patents and grants, were not only of service in tracing the lines, but as experts and local authorities as to such lines their services were needed to aid in proving and attesting the lines when found.

It was my intention to place the measurements and survey work under the modern system with the refined methods and instruments of the present day in the hands of skilled engineers, wherever transit or theodolite work should be needed to determine the real location of lines, or their connection——as was required by the law——with the surveys of the interior, but the retracing of lines of ancient marked trees required the presence of expert foresters.

It was soon found that before it would be practicable to make any complete plan for the field work over so vast an area——exceeding half a million of acres of wild land——it would be necessary to prepare diagrams or plans showing the approximate location of the several tracts of State land, graphically upon paper, on which, side by side, by the use of variously colored lines the questionable boundaries and problems as to disputed corners, etc., could be made a preliminary study. This done, written instruction could be prepared for the guidance of the surveyors; these, together with a tracing of the diagram of the plan of work, would be sufficient to guide the assistant in charge of any one of the many detached survey parties, which I soon found it would be necessary to place in the field.

Verbatim copies were also needed of the ancient field notes and records, in order to identify the marked trees with the original notes so as to compare the general description of the country and aid the search for the lost lines.

To do this work promptly a considerable clerical force was found to be necessary and was immediately organized. Clerks were sent to the offices of the Secretary of State, the State Engineer and Surveyor and the Comptroller, and papers and books, many of them long disused and discolored by age, were brought to light, copied and compared.

Some of these ancient documents were very curious and interesting, but they often failed to be intelligible, so that the work of copying them was, at times, a work of interpretation if not of translation.

The most toilsome research often failed to give any information, even of the date when the old patents were surveyed. This was a matter of great consequence, inasmuch as the boundary lines were originally run with the magnetic needle, and, in order to retrace such lines, it is essential that the date of the original survey should be known, to make the proper allowance for the change in the variation of the needle.

This preparatory work also included the repairing of instruments and the arrangement of camp equipments for the survey parties.

Many of the instruments, in being brought down from the icy ledges of mountain summits at the close of field-work the preceding winter, (December 1882), had been jarred and otherwise injured by breaking of cleats within their boxes and required thorough repairing.

In order to accomplish the field-work promptly, I found that it would be necessary to place a separate survey party in each county; and to tie the work together and connect it with the interior triangulation of the Adirondack Survey, twenty-inch and twelve-inch theodolites would be required in the measurement of the larger triangles——the lands in Clinton county being over one hundred miles from those in Fulton county, and only to be connected by special triangles based upon the triangle sides of the Adirondack Survey.

To do this in compliance with the law, which required that the "methods of survey should be in accordance with those now in use on the Adirondack Survey," the large theodolites were needed and were placed in the hands of the instrument makers, Stackpole & Brother of New York, and improvements made in their construction from drafts which I prepared. These improvements made the instruments much more effective and the progress of the work more rapid.

The transit theodolites and solar transits were placed in the hands of W. & L. E. Gurley, of Troy, for thorough repair. Messrs. Gurley also had charge of all the smaller instruments, stadia rods, transit-staffs with tripods (adjusted by levels) and the compasses, used in searching for and retracing the old lines.

A great amount of correspondence was entailed by the complicated nature of the work. The State lands are adjacent to valuable tracts of private property, and owners were naturally much interested in the work of the survey. Many inquiries also had to be made as to private records, and a voluminous correspondence arose between the Superintendent and the resident Engineers as to the methods proper to be taken and the details of the work proposed in each of the ten counties. Some idea of the great labor involved in this portion of the work may be obtained from the fact that thousands of letters and dispatches were received, and that more than one thousand answers, dispatches' and letters of instruction as to details of work were written by the Superintendent, copied and sent out, and recorded in a book of abstracts.

No portion of the work was taken up in the field, until written contracts as to rates of compensation had been made with the assistants and surveyors employed. Only by such means could exact estimates be made of the expense of the work, and its cost at any given moment be ascertained. The regular weekly reports of work done, expenses, and time and pay-roll, were in accordance with the Manual of the Adirondack Survey, required from each division, and greatly aided the Superintendent in watching and directing the progress of the work. — V. Colvin

The last appropriation made by the State of New York for the next 12 years of surveying totaled $15,000. Verplanck Colvin did not claim personal compensation for 1893 although he worked tirelessly on the survey. ■
EYE TO EYE
Events, Notes & News

NATIONAL EVENT
Nov. 13, 2015. North Carolina Society of Surveyors presents "State Line Boundary & History of Chains" by James Davis, PLS and SHS Member Timothy Guisewhite, PLS, covering a history of the NC/SC State Line, its retracement survey and the re-established state line; also, how chains were developed, giving the modern retracement surveyor knowledge needed to follow in the footsteps of the colonial surveyor. 8 PDH credits. Gold Hill Mines Historic Park, Gold Hill, NC. For more information, call (919) 556-9848 or email info@ncsurveyors.com.

EXHIBITS, NOTES AND NEWS
- In the summer of 1790, the U.S. Congress authorized President George Washington to select a 100-square-mile site along the Potomac River as the new nation's capital. A year later, Continental Army Maj. Andrew Ellicott, joined by Benjamin Banneker, a freed slave and self-taught mathematician, was commissioned to carve out the boundaries of what would soon be Washington, D.C. As a way of clearly demarcating the new city from Maryland and Virginia, the two men began planting 40 limestone markers along the new borders in 1791. These boundary stones, as they came to be known, were planted every mile, creating the diamond-shaped swath of land that marked the original District's borders. "These stones are our nation's oldest landmarks," said Sharon K. Thorne-Sulima, regent for the Martha Washington chapter of the D.C. Daughters of the American Revolution. Now, 223 years later, a team lead by Thorne-Sulima's chapter is working to restore 26 of the boundary stones along the District-Maryland border. The group is in the middle of an effort to raise more than $50,000 to preserve the stones, which are six feet in length. There is also a separate effort to restore the 14 boundary stones in Virginia, which are part of the original city land that was returned to the state in 1846. "Our historic preservation staff has been working over the past several years to make this project happen," said David Maloney, state historic preservation officer in the D.C. Office of Planning. "We have partnered with the National Park Service Historic Preservation Training Center to fully restore these important historical artifacts."

The conditions of the stones vary wildly. In some cases, they have been buried in brush. In other cases they have weathered 200 years of elements well. Each stone, which some liken to mini-Washington monuments because of their shape, is inscribed with "Jurisdiction of the United States" on the side of the stone facing the District. The opposite side has "Maryland" or "Virginia" engraved on the side facing that state. Each time a stone is successfully restored, Thorne-Sulima's group holds a ceremony presided over by a local group of Freemasons from the Most Worshipful Prince Hall Grand Lodge of the District of Columbia. Earlier this month, a group of volunteers gathered around stone SE6 in Southeast Washington and discussed the conditions of the 26 stones slated for restoration. "Some of the stones were cleaned, some had fences that were repainted, some stones needed to be reset because they are six feet tall with three feet below the ground," Thorne-Sulima said. "Four stones were severely damaged or lost, and replicas have been created." The first stone was placed April 15, 1791, by George Washington during a ceremony in which corn, wine and oil was poured on the stone. That Masonic ritual was repeated at the ceremony earlier this month. — Hamil R. Harris, The Washington Post, Sunday May 31, 2015

- When the ball dropped in New York City at noon on Sunday, November 18, 1883, it signaled not a new year, but a new way of keeping time. Until that day the nation had run on solar time — from coast to coast each town marked noon at the moment when the sun hit its zenith in that area. Consequently there were at least 80 "time zones" in North America. In the horse-and-carriage era such disparities were easily tolerated, but with the advent of intercity railroading, such imprecision caused chaos — and collisions. It was a problem tailor-made for the fastidious imagination of Charles F. Dowd, who in the late 1860's began tinkering with time. He ultimately concluded that the nation should be divided into four one-hour time zones, using meridians 15 degrees apart, and published his proposal in 1870. Shortly afterward William F. Allen, editor of two railroad guides, took up the study of standardizing time for the American Railroad Association. After much investigation he recommended Dowd's plan, and railroad leaders made it official in 1883. Across the nation time stood still while clocks caught up with the new decree. Crowds gathered in train stations, watches in hand, making a subtle yet profound shift in the way things were done. Dissenters vowed that they would continue to live on "God's time, not Vanderbilt's," but the benefits of the new system were swiftly apparent. Dowd, however, did not live to see Congress finally pass the Standard Time Act in 1918. In 1904, at age 70, he was run over by a train. — Getting Time on Track, from Discovering America's Past, Reader's Digest 1993.

The original time-zone plan used straight meridians. Later plans, based on geography and local custom, created the now-familiar bends.
VOLUNTEERS SOUGHT FOR NEW SHS STANDING RENDEZVOUS COMMITTEE

This new committee will "pool knowledge" from members across the country, identifying good future Rendezvous ideas and locations. We'd like SHS to be represented in more areas, so we can find out sooner about survey-history events nationwide. Each year a surprising number of reenactments and dedications take place, where SHS could have helped but never learned in time. The SHS Standing Rendezvous Committee will assist with all future annual Rendezvous, answering questions and providing guidance as needed, but will not be responsible for organizing actual events. That will be handled by individual planning teams. Chairing our new committee will be long-time member Chas Langelan, who helped organize three past Rendezvous. SHS was founded to preserve, promote and celebrate the largely unknown accomplishments of our profession over centuries. At each Rendezvous we unveil another piece of that amazing untold story—the remarkable achievements of surveyors. Our Rendezvous has grown to be the finest national surveyors' event of the entire calendar year. This new Standing Rendezvous Committee will work to keep it that way. We seek ideas and suggestions from everyone. Travel won’t be required. Please consider volunteering to serve on our new group. If interested, kindly contact SHS executive Melinda Gilpin - Info@SurveyorsHistoricalSociety.com; or Committee Chair Chas Langelan - clangelan@comcast.net. Many thanks from SHS.

THE NATIONAL MAP CORPS - VOLUNTEER MAP EDITORS ARE NEEDED - The US Geological Survey (USGS) is recruiting volunteers to collect and update USGS geographic data. Similar to how other online crowdsourcing cartographic applications allow anyone to collect, edit, and use geographic data through an online map editor, the USGS has developed an online editor customized to our data needs that allows volunteers to contribute data to The National Map. We are looking for people like you to work with us to collect data for the USGS. The data you will collect during this project will be loaded into The National Map. If you have access to the Internet and are willing to dedicate some time editing map data we hope you will consider participating! You do not need to live in any particular area to participate. Our editing guidelines explain how you can contribute data from anywhere. The project continues until 12/31/2016; to learn more, please go to https://www.volunteer.gov/results.cfm?ID=13605.

MASON & DIXON’S TRANSIT is now undergoing meticulous repair and reconstruction by a team of craftsmen. Fittingly, surveyors across the country are funding the effort. When complete, the instrument will be proudly and prominently displayed to thousands of Independence Hall visitors. Please consider making a donation to this important piece of surveying history. For more information contact SHS Member Chas Langelan clangelan@comcast.net or (240) 394-0825; or David Thaler DSThaler@DSThaler.com or (410) 946-3647. To donate, send a check payable to "The Friends of Independence National Historic Park" to this address: Save Mason & Dixon's Transit, P.O. Box 47428, Baltimore, MD 21244-7428.

GEORGIA HISTORY PRESS announces the release of Dr. William J. (Bill) Morton's latest book, Andrew Ellicott: The Stargazer Who Defined America. SHS Member Bill Morton's research has culminated in a new work which focuses on the famous astronomer and surveyor's four-year surveying expedition to measure and mark the first International Boundary between the United States and Spain. Available on Amazon for $29.95. An autographed edition which includes six maps from the Journal of Andrew Ellicott is available for $49.95 (includes taxes, shipping & handling), please purchase this edition from georgiahistorypress.com. A percentage of the sales to surveyors will be donated to the National Society of Professional Surveyors. Bill can be reached at www.wjmortonmdjd.com.

ALL SHS MEMBERS are encouraged to use this space; there is no charge. Send a postcard or email with your notice or advertisement to the Editor (address on pg. 15). Non-member's ads, also at no charge, will be considered if space allows.
Naturalists in Paradise: Wallace, Bates and Spruce in the Amazon
By John Hemming
Thames & Hudson. 368 pp. $34.95
One of the three heroes of John Hemming’s new book, “Naturalists in Paradise,” Alfred Russel Wallace, was one of the greatest field biologists of all time. As a young man, Wallace set sail for the Amazon with his friend Henry Walter Bates who studied insects. After four years, Wallace sailed for England, publishing several important papers and two books about his work in the Amazon, and then set sail for the distant and little-known Malay Archipelago. There he spent eight years and traversed the world. Lying in a hammock in the Maluku Islands, in the depths of a malarial fever, he had an extraordinary insight: that as species struggle for existence, the fittest survive, a process that would become known as natural selection. He scribbled his thoughts in a letter to Charles Darwin, who had been developing the same concept, and their papers were published together in 1858 in what is considered the founding document of the science of evolutionary biology. Much of Wallace’s thinking had been shaped by the work of and his interaction with his friend Bates. While the range of Wallace’s research interest was quite broad, Bates focused almost solely on insects. By concentrating so closely on one group of organisms, Bates was able to observe phenomena that supported Wallace’s theory — for example, how the coloration of unpalatable butterflies is mimicked by more tasty species, a process now known as Batesian mimicry. A third member of this triumvirate was botanist Richard Spruce, a Yorkshireman who arrived in Brazil a year after Bates and Wallace. Spruce lived 14 years in South America, spending some of his time with Bates and Wallace but traveling mostly on his own. He made the first scientific description of the then-legendary hallucinogen ayahuasca and played a vital role in the collection of cinchona trees — whose bark was the source of the antimalarial quinine — and their shipment to the Asian corners of the British empire. The success of the ensuing cinchona plantations made quinine available to much of the world and, in so doing, saved millions of lives.
John Hemming is the former director of the Royal Geographical Society. He has previously written more than 10 books on South America and has probably traversed more of the Brazilian Amazon in the 20th century than any other Englishman. Hemming’s crowning achievement is the full integration of the stories of Bates, Spruce and Wallace. Wallace has been the focus of numerous books, while few narratives have concentrated on the great scientific contributions by Bates or Spruce. Hemming makes a very clear and compelling case that the other two’s friendship, partnership, conversations, correspondence and research amply influenced Wallace’s thinking and his great theory.

Passing Strange: A Gilded Age Tale of Love and Deception Across the Color Line
By Martha A. Sandweiss. Penguin Press. 370 pp. $27.95
There was another side to geologist and mapmaker Clarence King that neither the public nor his glittering friends knew, a side that Martha A. Sandweiss explores with great sensitivity, insight and painstaking research in “Passing Strange.” The title of this immensely fascinating work provides a broad hint: King lived a racial double life. It would be hard to imagine a man more “white,” meaning a man who was more thoroughly steeped in the privileges available only to whites of his class during the Gilded Age. But he was also secretly married to Ada Copeland, a black woman who had been born a slave in Georgia. Even more astounding, she knew nothing of his life as Clarence King. Indeed, she did not even know that he was Clarence King. From the day they met in Manhattan in 1887 until 1901, when King died, she knew him as “James Todd.” When they married in 1888, she became Ada Todd. And when their five children were born over the next 13 years, their last name was Todd, too.
King invented an ingenious identity, posing as a light-skinned Pullman porter. Why a porter? First, it was well known that Pullman hired only black men as porters and waiters on the company’s trains. So his wife and neighbors assumed that if the fair-complexioned, blue-eyed, blond-haired James Todd worked as a Pullman porter, he must be black. Second, the job provided an explanation for his frequent absences from home. A Pullman porter would be able to provide a decent life for Ada and any children they might have — and over the years, that is what he did.
Much more is known about Clarence King than about Ada Copeland. Sandweiss succeeds in piecing together a portrait of a young woman who achieved stability in a domestic setup that would seem unendurable in today’s world. One must remember the times and what Ada escaped when she came north and met her James Todd. The Georgia of Ada’s childhood was, quite simply, a deadly place for blacks.
Raised by an abolitionist mother and grandmother, King romanticized blacks and believed, Sandweiss says, that racial mixing would “improve the virility of the human race and create a distinctively American people.” But his society friends lived by the racial order of the day. King strained mightily to hold on to the two worlds that he loved, terrified to lose either one.
King died penniless, wiped out by disastrous investments. But King’s talent for friendship stood him in good stead. His friends bought a house for Ada and provided the family with a monthly stipend, all anonymously; racial decorum had to be maintained. This part of his life was a tragedy, because all King wanted was to marry the woman he loved while maintaining the respect and amity of his white family and friends. That was too much to ask of his time.

Measuring Egypt
by Mary Root, LS

In contrast to earlier funerary art, the painted tombs of Egypt’s New Kingdom (1570 – 1070 BC) reflected an era of growth and prosperity, which brought forth a new type of tomb wall decoration. Whereas the old style depicted the deceased seated at his offering table, the new style showed the tomb owner’s pride of office and the work he performed to justify his worldly rewards. In Thebes, wealthy officials caused their tomb walls to be filled with detailed scenes of their work and play, and due to this decoration trend, early depictions of surveyors at work are recorded. It must be noted that Egyptian artists could draw and paint lively descriptive scenes, but had no mathematical concept of perspective; their method of conveying depth was to layer multiple figures. The lack of perspective appears odd to modern eyes.

The most reproduced of surveying scenes is from the Tomb of Menna, known as Theban Tomb 69 (TT69 in archaeological parlance), situated on the Theban Necropolis in Luxor. Menna served during the reigns of Tutmosis IV and Amenhotep III (circa 1419 – 1370 BC) and the titles inscribed within his tomb variously describe his eminence as “The favorite of the good god, the Scribe, the Overseer of the tillage; Great confidant of the Lord of the Two Lands; The eyes of the King in every place; Scribe of the estates of the Lord of the Two Lands of the South and North; The scribe, the overseer of the field-labors; and Overseer of the estates of Amon.”

In Menna’s measurement scene, the ripened wheat signals it is time for his men to measure the field and estimate its yield and therefore, the king’s portion. Naturally, this did not make Menna popular with segments of the Egyptian population; throughout the tomb decorations Menna’s face is obliterated (which one scholar termed “damnation memorai”). Animosity extended also to Menna’s scribes’ faces in the measurement scene. Note-keeping palettes in hand, they wear pleated kilts beneath long belted shirts. As to the transparent garment, it is symbolic as a sign of office; ancient textile experts note that the best quality Egyptian flax linen was “so fine it was nearly see-through.” Clearly the scribes earned more pay than the surveyors (“harpordonaptae” or “rope-stretchers”), as the latter wear simple kilts. In the painting the surveyors carry spare coils of rope around one shoulder as they convey their knotted measuring-rope through the field. Scholars suggest the surveyor’s rope would have been 100 cubits long with knots placed at regular intervals. [Using the “royal cubit” of ancient Egypt means the rope would be 171.75 feet long. Royal cubit = seven palms = 20.61 inches.] The two men bearing staffs seem to baffle scholars, but it seems likely they are keeping and projecting the line to be measured and are part of the surveying crew.

Another image of harpordonaptae is in the Theban Tomb 38 of Djoserkaraseneh, another official who appears in his measurement scene wearing fine garments (along with sandals and shin-guards). In his right hand he holds a scribe’s palette, while in his left hand he carries a staff appearing much like the one from Menna’s measurement scene.

For Egyptian officials Menna and Djoserkaraseneh, the life they had on earth was the one they desired in eternity. The ancient Egyptians had no word for art and no concept of art for art’s sake. For them, the purpose was representing the life of the tomb’s occupant and forming the basis of their life after death. For recording a scene of our profession over 3,000 years ago, we are fortunate that the details of Menna’s and Djoserkaraseneh’s life narratives involved surveyors.
I was informed that I was to be recalled to Bangkok, but considering the orders I took with me Kras with the great seal for the Chief Commissioners of Chiang Mai, Luang Phrabang, Nawng Kai, Bassae, and Phartom Bong, and Kras with the small seal for my own personal use. The wording of each was presumed to be the same, and the following was the substance of the orders:

“The Minister of the North to the Commissioner, Governors, and petty officials of provinces.”

“Royal commands have been received that Survey officers must proceed to the Boundary, and must make surveys in the following provinces: Nakawn Sawan, Pitsunlak, Pichai, Tak, Chiang Mai, Tern, Nakawn Lampang, Nan, Luang Phrabang, Nawngkai, Puann, Nakawn Chummpasak, Ubonratchathani, Phratabang, Nakawnratchasima, Sakon Nakawn, Nakawn Panom, Ta-Uen, and all the smaller provinces along the frontier under the jurisdiction of the Ministry of the Interior.

When the Survey officers arrive let all the officials give every assistance in procuring transport, labor, and provisions, and as the Survey officers have been provided with funds for the prosecution of the Surveys, let everything be paid for according to the custom of the country, with the exception of provisions for menial work provided by the Government.”

The order covered a great deal of ground, and as I had not half performed my task I could not very well return without special instructions, and for these I was return waiting. We occupied our time in preparing the computations of the work, and as I was feeling somewhat indisposed we went up Pu Kumi Kao, a splendid hill overlooking Luang Phrabang. I remained there for a week, and though it rained nearly the whole time, the atmosphere was very pure, and one left the better for having been there.

When we returned the Me Kawng was a magnificent sight. It was full to the banks, having risen more than fifty feet above low-water mark. The water was red, and the people were out in boats catching the drift wood, which was floating in every direction. The Nam Khan was also full, and near the mouth there was no flow. The water remained banked up by the Nam Kawng, which rushed madly past.

My first visit to Luang Phrabang was in 1884, but in the early sixties the Siamese Government sent Europeans to Luang Phrabang to make surveys, especially M. Garnier, on his journey up the Me Kawng, which produced such good results. In those days Luang Phrabang was a cluster of huts hidden away in a forest of areca and cocoa-nut palms, and abounding in marshes whence an unpleasant odor arose.

As we all had fever, it was thought better to return to Bangkok and prepare for the next season, which promised to be full of exciting incidents in more ways than one. Mr. J. Collins, from the Indian Survey, joined me to help in the work of surveying, and Leonowens at the last moment gave up the idea of returning to Luang Phrabang. He entered the service of the Borneo Company and took charge of their trading operations at Chiang Mai, where he has been very successful.

An escort of thirty marines accompanied us, and Lieutenant Rossman of the Danish Artillery was in charge. I was instructed “to consult with the two military commanders, Phya Rajawaranakul and Phya Pichai, who had been desired to take vigorous steps for the suppression of the Haw, to look after the safety of the survey party, and to render every assistance.” We reached Luang Phrabang on the 14th of January, 1885. My instructions were to place myself under the orders of Phya Surisak. My idea was that I should go to M. Lai and survey along the boundary of Siam. Phya Surisak desired that I should go to Soob Ett and meet a section of his army there, then follow the boundary of Huu Pum Tung Ha Tang Hok, and eventually go to Nawng Kai. I had gone to M. Ya, and there was laid up. On my way to Teng and at Teng, I was subject to severe attacks of colic, but at M. Ya the attack was so prolonged that I was quite exhausted, and fever came on. Night was made hideous by the howls of men of the village exorcising the evil spirits from some fever victims of the village. I fell ill on the 23rd of December, and it was not till the 10th of January I was able to move off again. I then went on to Luang Phrabang and thence to Bangkok.
The Knights of the Golden Horseshoe Expedition (also known as the Transmontane Expedition) took place in 1716 in the British Colony of Virginia. The Royal Governor and a number of prominent citizens traveled westward across the Blue Ridge Mountains on an exploratory expedition. The "lifting ledge" lies along today's Skyline Drive. This poem and illustration appeared in the September 1941 issue of Child Life Magazine; Nancy Byrd Turner (1880 - 1971) was an American poet, editor and lecturer.

GOVERNOR SPOTTWOOD night and day
Spoke of a land he knew must lie
Hundreds of miles beyond, away
Over the ridge that hemmed his sky.
He gathered his gentlemen. "Sir, ye be
Ready for venture? We ride to the west."
Soone, in a goody company,
They rode as all men ride on a quest.

The riders sang as they topped each hill,
Seeing their prowess put to proof;
The horses galloped with right good will,
Flint spark struck from each flying hoof;
The stars were cold and the nights were black,
There were paths no rider had known before,
But oathing, they vowed, should turn them back—
They were pledged for the venture and on they bore.

And then, one bright dawn, clearing a crest,
They pulled up short. From a lifting ledge
They stared. A new land thrust to the west
With mighty ranges guarding its edge,
A wide land cliff by a splendid stream—
Silent, they bared their heads and knew
They had ridden far to follow a dream,
They had ridden well and had found it true!

FALL 2015
The Blunt Dividing Engine

WE give an illustration of E. & G. W. Blunt's celebrated dividing engine. This wonderful piece of mechanism is designed for graduating rules and circles with an accuracy hitherto unattained. The Messrs. Blunt are manufacturers of instruments used in navigation and surveying, and the dividing engine is used in connection with this delicate and exceedingly difficult work. The first machine used for dividing was made by Ramsden, and was known as Ramsden's dividing engine. Several more or less successful attempts have, from time to time, been made to improve this machine, without securing the perfection requisite for satisfactory results. In 1851 Messrs. E & G. W. Blunt decided to undertake the construction of a dividing engine on a novel plan, which should be free from the defects of all previous instruments. And after more than six years of unremitting effort they succeeded in finishing their new dividing engine which performs its work automatically, with a rapidity that equals a hundred hand-working engines, and with microscopic accuracy. The capacity to construct this wonderful engine implies the power on the part of Messrs. Blunt to produce the most difficult and delicate instruments used in the various departments of navigation, surveying, engineering, astronomical and scientific researches, and perfectly entitles them to the unequalled reputation they have achieved in the scientific world.

Edmund March Blunt opened a chart and instrument store in New York in 1811. His sons, Edmund and George William Blunt, trading as E. & G. W. Blunt, opened a similar store in 1824. In the early days, most of these instruments were imported. An advertisement from 1837 states: "One of the firm is now in England superintending the manufacture of Theodolites, Transit Instruments, etc., and any orders for Instruments not now on hand, will be forwarded to him, and executed promptly." In the mid-1850s, after having built a dividing engine, the Blunts advertised that they could "divide Astronomical and Nautical Instruments to a degree of precision which they will guarantee to be equal to the best of foreign make." The firm, with its dividing engine, became Blunt & Nichols (in 1866), Blunt & Co. (in 1868), Eckel & Imhoff (in 1872), and H. A. Kolesch (in 1885). Heinrich Adolph Kolesch (1855-1903) was a German immigrant who began in business in 1885, taking over the firm that had been founded by E. & G. W. Blunt. Kolesch & Co. was still using the Blunt dividing engine in 1925. (The firm was incorporated in New York State in 1904, and dissolved in 1947). The Kolesch & Co. 1913 catalog stated, "This engine is one of the first built in this country and its accuracy has been attested by the late J. E. Hilgard, of the U. S. Coast Survey. Work divided on this engine has stood the most critical tests of Engineers during the many years of its constant use, and the engine ranks today as one of the most accurate of its kind."

The dividing engine was simple to operate. The instrument being divided was fixed to a large wheel on top of the engine. When the treadle was pressed, the wheel and the instrument were turned through a fixed angle. Then, with the right hand, a cutting tool guided by a system of swinging links was used to mark the instrument scale. The process was repeated until the complete scale had been divided. ■

Sources:
Image from Frank Leslie's Weekly, JULY 9, 1859.
Text: Frank Leslie's Weekly, JULY 9, 1859; Harold Burstyn, At the Sign of the Quadrant (Mystic, Ct., 1957); Kolesch & Co., Illustrated Catalogue and Price-List (New York, 1913).
DONATIONS

SHS is open to the donation of gifts of money or property, under any methods your estate or attorney may think acceptable to transfer ownership of artifacts or items of educational benefit to the Society. The Society has a set of guidelines for donations: please contact our Administrator for details. We have a non-profit tax exemption status. This will allow a donation with full tax deductions.

A Special Projects Fund raises money for worthy surveying history preservation projects. Donations to this fund will be used for this purpose only.

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Chas Langelan (Co-Chair)

Herbert Hoover (lower left) at Stanford University 1893; from their archives.