Edwin Hubble's Silence Don Lago

A few years ago I visited the hometown of V.M. Slipher, Frankfort, Indiana.

On the Frankfort town square there's a mural showing the most famous people who came from Frankfort. There's Will Brimley, the actor, and there's the lady who created the Dick and Jane books. There's no V.M. Slipher. I went to the county historical society, which is housed in the old high school that VM Slipher attended. There are no exhibits about V.M. Slipher. When I asked the museum director about V.M. Slipher, she identified him as "a member of the team that discovered Pluto."

There are still some Sliphers in Frankfort, and I arranged to go and visit them. One of their families was still living in the house where V.M. Slipher grew up. The Sliphers gave me directions to their house, which required making a left turn at an old-fashioned drive-in cafe that was famous for its milk shakes. It was called the Milky Way. Thus the directions to V.M. Slipher's house were: "Turn left at the Milky Way."

The Sliphers were great hosts, and they spent a whole hour showing me around their huge barn, which was "the oldest barn in Clinton County." It included some farm equipment so ancient that V.M. Slipher probably used it as a kid. But I was surprised to discover that some of the Sliphers thought that V.M. Slipher's most important work was that he supervised the search for Pluto. I had to explain to them that V.M. Slipher had done some other research, on the motions of the galaxies, and that Edwin Hubble had used Slipher's research to prove that the universe is expanding.

This struck me as a rather strange and sad situation. There I was in the house where V.M. Slipher grew up, talking with the Slipher family, and I had to explain to them why V.M. Slipher was important.

Unfortunately, this lack of recognition for Slipher's work has also been true in the writing of astronomy history. As evidence for this I'll point to the book that, for a quarter of a century, was the primary history book about the idea of the expanding universe, *The Red Limit*, by Timothy Ferris. Ferris mentions Edwin Hubble on 27 pages, Harlow Shapley on 21 pages, Einstein on 39 pages, George Hale on 11 pages, and Fred Hoyle and his steady-state theory get an entire chapter. How many pages does VM Slipher get? In a 200-page book, Slipher and his work get about half a page. But I'm not blaming Ferris for this. He was just repeating a habit that had already existed for nearly half a century.

I've done a survey of dozens of astronomy books that deal with the expanding universe, especially books published in the 1930s, when this story was first being defined. It's a widespread pattern that VM Slipher gets short notice, and sometimes none at all.

This pattern was established early on. One of the first important books about the subject was Arthur Eddington's *The Expanding Universe* in 1933, and he too only briefly mentions Slipher. Eddington was mainly interested in relativity theory and its varied theoretical, mathematical cosmologies, and he gives the theorists the credit for the idea of the expanding universe. The first sentence in his book is: "The first hint of an 'expanding universe' is contained in a paper published in November 1917 by Prof. W. de Sitter." Of course, 1917 was three years after VM Slipher announced his findings that most galaxies are red-shifted, which offered far more than a hint about the expanding universe. Several important astronomers, including Slipher himself, felt that this was the easiest explanation for his redshift findings, however extravagant it might

seem. Eddington's version of events is a misleading picture of astronomical history. The leading observational astronomers of that generation were not inspired by relativity theory; they were following a logical chain of inquiry that had been developing for a long time. Or perhaps it would be more accurate to say: they finally had the technology to explore questions astronomers had been wondering about for a long time. But Eddington's approach, and the powerful aura of Albert Einstein, has left its imprint on astronomical history, and it could leave readers with the impression that observers like Slipher were merely technicians who were validating Einstein's ideas. So this is one reason why Slipher has been neglected.

But it's not the main reason. For many authors, this story is mainly the story of Edwin Hubble. V.M. Slipher and Harlow Shapley may receive brief mentions, but it's often not clear that these two men provided the two halves of the equation—cosmic velocities plus cosmic distances—that Hubble put together to produce the expanding universe. One author lumped Slipher in with several other astronomers who had studied redshifts, as if there was nothing special about Slipher's work. If a book was written by a professional astronomer, especially one who was working in this era and who watched the story unfold, there was a much better chance that it gave Slipher's work a larger role, and sometimes generous praise. But often enough, the only name in the story is that of Edwin Hubble.

This pattern began with the James Jeans book *The Universe Around Us,* which Jeans finished only two months after Hubble published his findings in 1929. The next year Jeans published another important book interpreting modern astronomy, *The Mysterious Universe.* Both books identify Edwin Hubble with the expanding universe

and make no mention of Slipher. This could have been influenced by the fact that Jeans had spent some time at Mt. Wilson Observatory and become good friends with Hubble. Jeans makes an obvious reference to Slipher's work: "…it has for some years been remarked that the remote spiral nebulae are, to all appearances, rushing away from the earth, and so presumably from one another, at terrific speeds…"[1] But he doesn't mention Slipher by name.

The first time that most of the general public heard about the expanding universe was probably in January, 1931 when newspapers all over America reported on Albert Einstein's visit to Mt. Wilson, during which he endorsed the idea of the expanding universe. Again, these articles didn't mention Slipher.

Edwin Hubble certainly deserves to be celebrated. But the huge discrepancy between Hubble's fame and Slipher's neglect is really not deserved. I'll illustrate this discrepancy with another adventure in astronomical tourism.

If you drive into Edwin Hubble's hometown, Marshfield, Missouri, you'll see state highway signs on Interstate 44 proclaiming this to be the "Edwin Hubble Memorial Highway." You'll see billboards inviting you to get off the interstate to see a replica of the Hubble Space Telescope. This stainless steel replica is on the courthouse square, and it is 1/4th scale and weighs over half a ton. A mural on the town square shows Edwin Hubble, and there's a public school in town named for him. For years the local newspaper depicted on its masthead the Hubble Space Telescope. In the county historical museum there are several display cases devoted to Hubble, and you can buy Edwin Hubble souvenirs, including a bumper sticker that says: "Marshfield, Mo: Birthplace of Edwin Hubble."

So why is it that the story of the expanding universe is usually the story of Edwin Hubble? I'd like to offer you an obscure episode from astronomical history that may go right to the heart of this question.

It was in the summer of 1928 that Edwin Hubble began his work to correlate Slipher's studies of galactic redshifts with his own studies of galactic distances. It was half a year later, on January 17, 1929, that Hubble submitted his findings to the *Proceedings of the National Academy of Sciences*. Right in the middle of that half year, Edwin Hubble traveled to Flagstaff and met with V.M. Slipher. Both before and after this visit Hubble wrote to Slipher about his visit, and Slipher wrote two letters to others about Hubble's visit. From all the evidence, it appears that Hubble never said a word to Slipher about being right in the middle of using Slipher's research to transform the universe. At the least, this silence is symbolic, a foretelling of the silence with which astronomical history would often treat Slipher's work.

Edwin Hubble's journey to Flagstaff didn't have anything to do with Slipher's research. That same summer George Hale was trying to select a location for his planned 200-inch telescope. Hale was a very insecure man to begin with, and now he had good reasons to feel insecure about his judgment about observatory locations. Hale had ignored all the boastings of Los Angeles boosters that their town of 100,000 people would soon be a giant metropolis glowing with bright lights, and Hale had placed Mt. Wilson Observatory right where it was doomed to be rendered blind. For his 200-inch telescope Hale took pains to devise an elaborate process for testing possible sites. He directed Russell Porter to design a special telescope just for these tests; these were

four-inch and two-inch telescopes, but they had lots of special features. Hale designed an elaborate system for comparing test observations from different sites.

On September 30, 1928, the *New York Times* ran a nearly full-page article announcing that the best place in the world for an astronomical observatory was the rim of the Grand Canyon. At least, this was the conviction of George Ritchey. Ritchey had been Hale's master telescope designer, the man who had figured out how to build giant reflecting telescopes, but Ritchey and Hale had a falling out and now were bitter rivals. Ritchey was now working for the Paris Observatory.

Ritchey had first visited the Grand Canyon in 1907, and he continued visiting it for years, and at some point he became obsessed with the idea of building a great observatory on the canyon rim. It may be true that the Grand Canyon offers Earth's most awesome view of deep time and the forces of creation, but this does not apply to its view of the sky. In truth, the hot updrafts welling out of the canyon bottom create a great deal of turbulence on the rim, and this makes the rim a terrible spot for astronomical seeing. But Ritchey drew up plans for a 25-story tall observatory with a Romanesque design, and he made a drawing of this observatory on the canyon rim. And now the *New York Times* was proclaiming that Ritchey's plans were brilliant.

George Hale must have been unnerved. A few days later he ordered Edwin Hubble to drop everything and rush to the Grand Canyon to make observing tests.

Hubble wrote to V.M. Slipher saying that he was coming. "Mr. Hale is rather anxious for me to start as soon as possible—I am writing within a few hours of his communication—so I shall take the liberty of asking you to wire me as to whether the visit will be convenient and agreeable to you."[2]

Hubble was somewhat secretive about the purpose of his visit, not admitting that it was related to building the world's greatest telescope. All he said was that he was looking into "a proposed plan for another observing station in the Southwest."[3] Hubble did tell Slipher that he wanted to talk with him—about seeing conditions in northern Arizona.

Hubble visited Lowell Observatory for what Slipher called "a day or two," in a letter Slipher wrote to a former Lowell astronomer.[4] Slipher related various details about Hubble's visit: "He was making tests with a 2-inch telescope!!"[5] Slipher used two explanation marks here, which I'll mention in a few minutes. Slipher was underestimating the value of the test telescopes that Hale and Porter had designed, but his skepticism was probably also due to his familiarity with the Grand Canyon and his recognition that the canyon rim was a wildly inappropriate site for an observatory. On January 12, 1929 Slipher wrote to Roger Lowell Putnam: "Dr. Hubble was over this fall making some tests…He had only a two inch aperture telescope for the work!" Another exclamation mark. "And he thought he was getting worth while tests…"[6] Roger Lowell Putnam was the trustee of Lowell Observatory, to whom Slipher was usually eager to report news that reflected well on the observatory. Remember, these were tough years for Lowell Observatory. This was before Pluto, and this was the decade when the observatory's survival was in doubt. You might think that if the famous Edwin Hubble had traveled to Lowell Observatory and mentioned that he was right in the middle of using Slipher's redshift data to revolutionize astronomy, Slipher would have mentioned it to Putnam. But in the two letters Hubble wrote to Slipher about his visit, and in the two

letters Slipher wrote about it, there is no hint that Hubble ever said a word about what he was doing with Slipher's research.

There could be innocent explanations for this silence. Perhaps Hubble did say something to Slipher, and Slipher didn't tell anyone. Or perhaps like any scientist in the middle of doing research, especially revolutionary research, Hubble didn't want to go around blabbing about it before it was finished. Perhaps.

But there was nothing innocent about Edwin Hubble's silence when he published his velocity/distance paper in 1929. Hubble included no citation of V.M. Slipher's contribution. This was amazing because Slipher's redshift data had been well-known in the world of astronomy for fifteen years and many of those reading Hubble's paper would recognize that Hubble was using Slipher's work. This silence was a major breach of scholarly protocol. And I think it also initiated the silence with which astronomical history would often treat Slipher's work.

Why was Hubble silent about Slipher's work? It's impossible to avoid the matter of Edwin Hubble's personality. Almost all the biographical accounts about Hubble, even those written by his protégés and admirers, agree that he was not a modest or generous man. Indeed, Harlow Shapley regarded Hubble as an absurdly vain and pompous man, to the point of dishonesty. In his autobiography Shapley complained: "The work that Hubble did on galaxies was very largely using my methods…He never acknowledged my priority, but there are people like that."[7]

There's also the matter of institutional rivalry. This generation of astronomers came of age before the age of big science, deep academic support, and tenured astronomy careers. The big observatories were owed to rich, eccentric, proud, and

sometimes tyrannical men—Charles Yerkes, James Lick, John Hooker, Andrew Carnegie, and yes, Percival Lowell—not that I'm suggesting there was anything eccentric about Percival Lowell. George Hale was certainly a master at massaging the big egos of his benefactors, and this required hoarding all the glory he could get for their observatories.

It appears that Edwin Hubble too was eager to hoard glory for Mt. Wilson. In 1930 Willem de Sitter wrote an article mentioning the new distance/velocity findings, and Hubble wrote to him scolding him for not making it clear that this was a Mt. Wilson achievement.

It wouldn't be surprising if in 1929 Lowell Observatory might be envious of Mt. Wilson, with all its resources. And I think we've caught a glimpse of this in the letters Slipher wrote about Hubble's visit. Remember those exclamation marks? To me it looks like Slipher was getting some mischievous pleasure at the idea that the most famous astronomer from the mighty Mt Wilson Observatory was making a fool of himself by running around with a two-inch telescope and the nutty idea of building an observatory on the rim of the Grand Canyon.

Maybe it's a bit more surprising that Mt. Wilson might be jealous of Lowell Observatory, but, after all, these were the years when Mt. Wilson was being rendered obsolete by light pollution, and by now it was clear that Percival Lowell had been smarter than George Hale about where to locate an observatory. On top of that, even after Mt. Wilson began using the 60-inch reflector that should have rendered a 24-inch refractor pitifully obsolete, Slipher was using Lowell's telescope to make a major, revolutionary discovery.

I can't really prove how Mt. Wilson felt about Lowell Observatory, but I'll mention a curious piece of folklore that seems to have thrived at Mt. Wilson for a long time, a story that reveals an odd attitude about VM Slipher. I am quoting from Allan Sandage's 2004 book about the history of Mt. Wilson: "For many years he [Slipher] was the mayor of the growing town, soon to be a city, of Flagstaff." Actually, Slipher was never mayor. He once tried to get elected to the city council, but apparently he didn't have enough political charm to get elected. "Mars Hill, then and yet today, overlooks 'main street' that over the years became increasingly well lit. The light pollution began seriously to interfere with astronomical observations on the Hill, especially for the very faint objects that Slipher had on his programs. It is said that Slipher, as mayor of the town and in control of the city council, the fire and police departments, the department of public works and the local politicians, had a great electric switch that was central to the lighting system of Flagstaff, in his observatory office. On nights when he needed a dark sky, Slipher would simply throw the switch, leaving main street dark as he observed his spectra at the 24-inch refractor."[8]

You could dismiss this as just some eccentric Mt. Wilson folklore, but there is a more serious message here: V.M. Slipher didn't earn his achievements because he was an ingenious and dedicated observer, but only because he was the petty tyrant of a hick town where he could turn out all the lights. Actually, the idea of a master light switch sounds more like the fantasy of Mt. Wilson astronomers staring down at the ever-growing lights of Los Angeles.

In any case, it is plausible that Mt. Wilson begrudged giving credit to an observatory they looked down upon. And Mt. Wilson was well located to influence the

spin of this story. Edwin Hubble was hanging out with famous writers, Hollywood directors, and newspaper tycoon William Randolph Hearst.

It is true that V.M. Slipher deserves some of the blame for his obscurity. He was a very modest and cautious man who wasn't ambitious about publishing his work. And he was in charge of an observatory that had damaged its reputation with claims about Martian canals. Was Slipher now going to stake Lowell Observatory's reputation on an idea that was far more outrageous than Martian canals? And as an observer, Slipher was now stuck: he had reached the limits of the 24-inch telescope, and he didn't have the ability to prove what his redshifts really meant. Certainly Hubble deserves the credit for doing that.

But certainly Edwin Hubble knew the debt he owed to Slipher. In a major 1931 paper on galactic redshifts Hubble did give Slipher's work an outright compliment. In 1935 Hubble gave some lectures at Yale, and he praised Slipher's pioneer role: "…the first steps in a new field are the most difficult and most significant. Once the barrier is forced, further development is comparatively simple. But the accumulation of nebular velocities was a slow process and became increasingly laborious after the brightest objects had been observed. Slipher carried on the work almost alone."[9]

That's fairly strong praise. But this is also now 1935, and the story has already been pretty well set into the pattern that we find in *The Red Limit* four decades later. But there are some signs that this is changing. And this conference is one of those signs.

[1] James Jeans, *The Mysterious Universe* (New York: Macmillan, 1932) p 76.
[2] Edwin Hubble to VM Slipher, October 5, 1928. VM Slipher papers, Lowell Observatory Archives (LOA).
[3] Ibid.
[4] VM Slipher to W. A. Gogshall, December 11, 1928. LOA.
[5] Ibid.
[6] VM Slipher to Roger Lowell Putnam, January 12, 1929. LOA.
[7] Harlow Shapley, *Through Rugged Ways to the Stars.* (New York: Charles Scribner's Sons, 1969), p 57.
[8] Allan Sandage, *Centennial History of the Carnegie Institution of Washington, Volume One: The Mount Wilson Observatory.* (Cambridge: Cambridge University Press, 2004) p 450.
[9] Edwin Hubble, *The Realm of the Nebulae.* (New Haven: Yale University Press, 1936). P 105.