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## A COMPLICATED RELATIONSHIP: AN INTRODUCTION TO THE CORRESPONDENCE BETWEEN PERCIVAL LOWELL AND GIOVANNI VIRGINIO SCHIAPARELLI

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**Abstract:** From 1896 until Schiaparelli's death in 1910, Percival Lowell and Giovanni Schiaparelli exchanged letters, telegrams, packages, and postcards apprising them of each other's work and commenting on the other's latest theories. Lowell, who greatly admired Schiaparelli's astronomical career, wrote in search of approval for his oft-criticized theories about the perceived presence of canals and vegetation on Mars. Schiaparelli, who courted many theories about Mars but never truly invested himself entirely in one, gently guided Lowell to see other possibilities or recognize faults in his work, criticism that Lowell took with difficulty from others but accepted from Schiaparelli. The correspondence, translated from the original French here and made newly available to the public, shows a complex but respectful, warm, and gentlemanly relationship between two giants of Martian astronomy.

**Keywords:** Lowell Observatory, Brera Astronomical Observatory, Percival Lowell, Giovanni Schiaparelli, Mars, Mars photography, correspondence, E. M. Antoniadi, canals

### 1 FROM LIBRARY TO OBSERVATORY

The emergence of Percival Lowell (1855–1916) on the astronomical scene in 1894 was dramatic and unexpected. Although he had been interested in astronomy since boyhood and, in 1892, had met the great observer Edward Emerson Barnard (1857–1923) in San Francisco before shipping out to Tokyo on the last of four voyages to the Far East (taking along a six-inch Clark refractor), he had given no clear indications that he was about to make a career change

as sharp as the hairpin turn of a Kreutz comet bending its way around the Sun. As late as October 1893, still in Tokyo, he was musing with a friend, Ralph Curtis, about spending the following Easter together in Seville. When he sailed from Yokohama Bay for San Francisco the following month (for what was to be the last time), there were still no premonitory rumblings to be heard of his subsequent dramatic transformation. For USA localities mentioned in the text see Figure 1.



Figure 1: USA localities mentioned in the text (map: Jennifer Putnam).

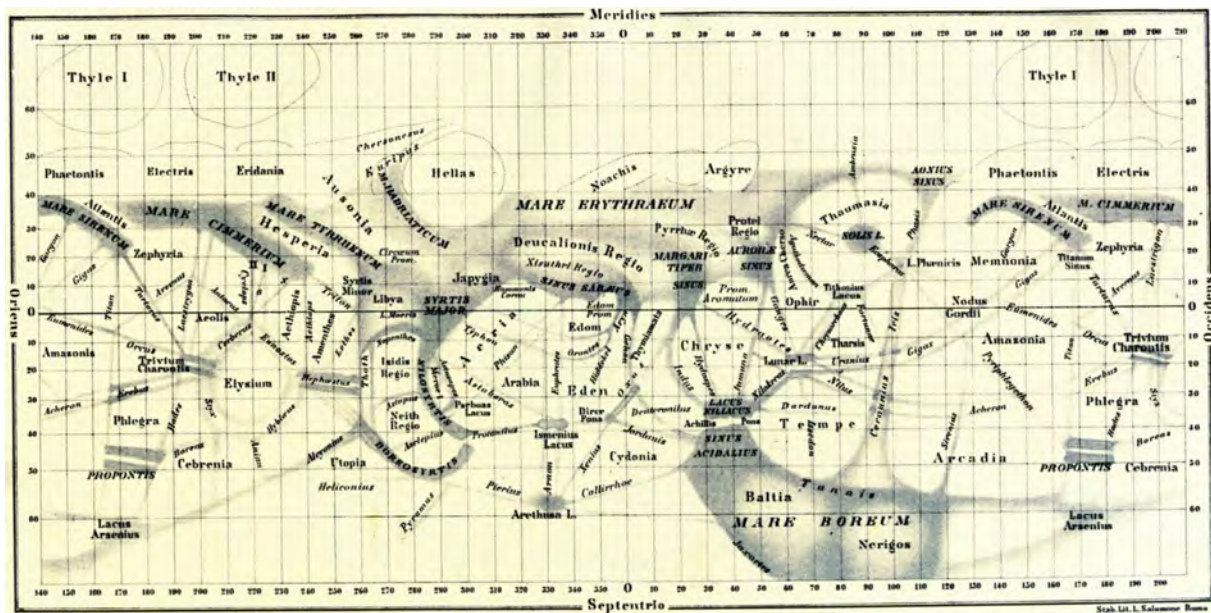


Figure 2: Schiaparelli's map of Mars for 1883–1884, showing some of the geminations of the canals. Note that some of the smaller dark patches (e.g. Trivium Charontis and Propontis) are also shown as double (courtesy: Brera Observatory Archives).

Even when account is taken of Lowell's flamboyant and impetuous personality, it has always seemed rather incredible at what speed he sorted things out in equipping and organizing what biographer David Strauss has called "... a speculative, high risk, sensational, and very idiosyncratic project." (Strauss, 2001: 173). The closest thing to what he was about to accomplish was perhaps the trip to the Noto Peninsula (in Japan) which he organized in 1889 (described in his charming book *Noto*—see Lowell, 1891).<sup>1</sup> But that, though ambitious, was hardly on the scale of setting up a major scientific institution on a tight schedule. The latter's purpose was, however, rather specific—and singular. Lowell wanted to study the possibility of life—and, more particularly, intelligent life—on Mars.

He had given indications of his interest as early as 1890, when he discussed Mars with Harvard astronomer William H. Pickering (1858–1938) and requested from his older brother Edward Pickering (1846–1919), the Director of the Harvard College Observatory, copies of Mars maps by our other protagonist, Giovanni Virginio Schiaparelli (1835–1910; see Figure 2). He had also written to his brother-in-law William Lowell Putnam II (1861–1923) a plan to write a "... philosophy of the cosmos, with illustrations from celestial mechanics." (A.L. Lowell, 1935: 60). But this only suggests a building up of what he referred to as his "... budget of literary event-ualities." (*ibid.*). His meeting with Barnard should be seen in the same light. It hardly was enough to foreshadow the amazing turn of events which 1894 was to see.

The event which clinched Lowell's fate was

the receipt of a Christmas 1893 gift from his aunt Mary Putnam (1810–1898). The gift was a book, *La Planète Mars, Volume 1*, by Camille Flammarion (1842–1925), published in 1892 and was the French astronomer's monumental compilation of all Mars observations made up to that time. Flammarion was an enthusiast, and nothing captivated him more than the idea that Mars (and other planets) might be living worlds. As evidence, Flammarion included synopses of the Mars memoirs in which Schiaparelli, without doubt the greatest student of Mars of that time, had summarized his long series of observations begun in 1877 with the 8-inch and 18-inch refractors at the Brera Astronomical Observatory in Milan. Lowell was fluent in French and apparently read Flammarion's work from beginning to end at lightning speed. His imagination was stirred and recognizing an opportunity when he saw it, followed the family motto, *Occasionem Cognosce* (Seize the Opportunity), and formulated a plan breath-taking in scope by the end of January.

Meeting with William Pickering, who had just returned from Peru where he had observed the 1892 opposition of Mars from Harvard's Boyden Station, high in the Andes near Arequipa, he was made aware of the upcoming favorable Mars opposition in October 1894, when the planet would be much farther north of the celestial equator than in 1892 (and thus more accessible to observation from Northern Hemisphere observatories), after which the planet would retreat through a series of increasingly unfavorable oppositions for the next decade or so. Lowell, who did not lack resources, proposed underwriting the expenses for an expedition to observe Mars.<sup>2</sup>



Figure 3: The pre-fab dome designed by William H. Pickering, on Mars Hill, awaiting the arrival of the 18-inch and 12-inch telescopes in May 1894 (courtesy: Lowell Observatory Archives).

As is well known, in support of this bold plan and at very short notice, Pickering borrowed two telescopes, an 18-inch refractor from optician James Brashear and a 12-inch Clark from Harvard College Observatory. He also designed a pre-fab dome (Figure 3) that could be taken apart and shipped across country by rail to its final destination. At the same time, Andrew Ellicott Douglass (1867–1962), his assistant in Peru, was dispatched with the 6-inch refractor Lowell had taken to Tokyo, to the arid climate of the Arizona Territory where Pickering had surmised that the seeing for planetary work would be the best anywhere in the continental United States, possibly even comparable to what it had been in Peru.

Douglass tested 10 sites in all, beginning in the southern part of the state, then moving northward; from Tombstone and Tucson, he reached Tempe, Phoenix, and Prescott. Finally, in early April, he arrived in Flagstaff, a site which had been added to the list at the end of March. He set up his telescope on the wooded hill on the mesa just west of Flagstaff. Time was passing; Lowell was becoming increasingly anxious to get started, and so on 16 April 1894 he decided on Flagstaff.<sup>3</sup>

Just before he boarded the train for Flag-

staff and a fateful rendezvous with Mars and destiny, Lowell on 22 May 1894 made the following remarks about the thin lines first observed by Schiaparelli in 1877, in a talk to the Boston Scientific Society:

The most self-evident explanation ... is probably the true one; namely, that in them we are looking upon the result of the work of some sort of intelligent beings. (Anonymous, 1894: 3).

Thus, it was not only Pickering's dome that was pre-fab: so were some of the ideas Lowell took with him to Arizona.

Though Lowell himself would do much to inspire the great late-Victorian era 'Mars furor', in which the red planet dominated the public imagination as never before (or since), and though scores of observers entered the field eager to take their places in observing chairs at the eyepieces of their telescope to peruse and sketch details on the planet's tantalizing, quivering disk, the gold standard was always Schiaparelli.

That Lowell's expectations were framed even before he arrived to put eye to eyepiece in Flagstaff by what the Italian astronomer had seen on Mars is attested not only by his Boston Scientific Society talk but by a poem he almost

certainly began during the period when he was still getting organized for the grand adventure, “Mars.” It exists in manuscript form in the Lowell Observatory archives (Lowell, 1894), and captures better than anything else something of the mood of the man as he began his quest. A few of the first lines read:

One voyage there is I fain would take  
While yet a man in mortal make;  
Voyage beyond the compassed bound  
Of our own Earth’s returning round;  
Voyage whose shining goal by day  
From stupid stare lies hid away ...  
But when staid night reclaims her sphere  
And the beshadowed atmosphere  
Its shutters to sight once more unbars,  
Letting the universe appear  
With all its wonder world of stars,  
My far-off goal draws strangely near,  
Luring imagination on,  
Beckoning body to be gone—

The last line shows his debt to Schiaparelli’s views at the time. Schiaparelli had thought what appeared to many observers of the planet as blue-green areas were seas and the ochre areas lands.<sup>4</sup>

It is fitting that some of his earliest utterances on Mars were in verse, for Lowell began his great adventure more as a literary man than as a practiced astronomer. In fact, though no doubt a fast study, he was virtually without experience as a planetary observer. Though the observations got underway at the beginning of June, when Mars was still a very long way from the Earth, Lowell’s time at the telescope was in reality rather intermittent, and sustained in rather short, intensive bursts rather than protracted campaigns at the eyepiece. Thus, he was back in Boston from the end of June until August, and after returning for two weeks from late August to early September, was away again until 10 October, just before opposition, whereupon he remained at the observatory until late November. During his absences Pickering and Douglass continued the observations.

Lowell’s observing log books in the Lowell Observatory Archives are fascinating to study as from first to last they show someone already strongly committed to a Schiaparellian view of the planet and growing increasingly more adept at seeing (or more practiced in the arts of autosuggestion) what he knew in advance to be there:

June 19. With the best will in the world, I can certainly see no canals.  
June 23. Phasis the most persistent of the canals. Owing to very poor seeing, the canals are not sharp lines.  
June 24. Plenty of markings just on the verge of location about Terby Sea [Phoenix Lake].

June 25. No canals in the northern regions as yet.

As a veteran of all of one month of observation, Lowell returned to Boston, and at Sevensels, the family mansion in Brookline (Figure 4), conceived his ‘Theory’ of intelligent life on Mars, in which he accepted without hesitation the reality of the *canali* that had so far been so furtive in their apparitions while substituting for Schiaparelli’s seas tracts of blue-green vegetation.<sup>5</sup> *Presto!* The *canali* (to use Schiaparelli’s term, one which can have many meanings in Italian) were actual canals (as the term was translated into English), that is, artificial waterways built by a civilization of intelligent Martians to irrigate their progressively dried-up dying planet. The historian William Graves Hoyt notes, regarding this development, that though Lowell

... had already arrived at some positive and quite sensational conclusions about life on Mars in particular and extraterrestrial life in general before he ever looked through a telescope from Flagstaff ... on his own testimony at least, he did not formalize his thinking into what he considered to be a full-blown scientific theory until late in July of 1894 ... (Hoyt, 1976: 68).

“Full-blown” might be a bit of an exaggeration, for Lowell’s theory was straightforward enough for an intelligent ten-year-old child to understand. Lowell himself could sketch the theory in a short paragraph, as in a letter to Douglass written on 25 March 1895:

Roughly speaking the evidence seems to be that Mars has (1) some but not much atmosphere; (2) is an aged world with no water to speak of except what makes the polar caps; (3) is provided with an elaborate system of line markings which are best explained by artificial construction ... (4) shows what seems to be artificially produced oases as the termini of the canals—what we see and call canals being merely strips of vegetation watered by the canals, the canals themselves being too narrow to be seen. (Lowell, 1895a).

It appears that he must at about this time have resumed work on his poem, for it now includes striking passages such as this:

Far sights have been seen there stranger  
yet,  
Adventure’s appetite to whet,  
Tracings Schiaparelli has spied,  
So-called canals, in parallel pairs  
That for a thousand miles run straight nor  
swerve,  
Save as parts of great circles curve  
In bended centres stretching out  
To band the whole great globe about,  
And changing in hue with the changing year  
From a dark green tint to an ochre clear  
With the varying mantle that verdure wears



Figure 4: A view of the garden at Sevenels, 70 Heath Street and Warren Street, Brookline, Massachusetts, where Percival Lowell devised his theory of intelligent life on Mars at the end of July 1894, after only one month of observing the planet from Flagstaff (courtesy: Historic New England).

When fields of grain from lush grow sere,  
Colors that elsewhere come and go  
Over the surface of Mars as its seasons  
grow.

His modified Schiaparellian vision became ever more detailed in August and especially after he returned for the main thrust of the campaign, in mid-October. A few ‘canals’ were certain and definite; most, however, hovered at the uncertain border between verifiable fact and illusion, as fugitive threads that would appear in brief flashes that came and went with the seeing:

... fine lines and little gossamer filaments only, cobwebbing the face of the Martian disk, but threads to draw one’s mind after them across the millions of miles of intervening void ...

as Lowell (1908: 146) later put it. Their evanescent quality, as if they were written in disappearing ink, is attested in many of the entries in the log book (see, also, Figure 5):

Aug. 21. Suspected multitudinous canals, all too fugitive to be positively figured.

Aug. 22. 12h Canals only glimpsed.  
-- 12h 55m. Network of canals.  
General effect quite like Schiaparelli’s globe.  
-- 13h 40m. Three short thick canals seen for an instant.

Sept. 3. Had a glimpse showing Ganges double, but do not credit it.

Oct. 9. Canal connecting Tithonius Lake and Phoenix Lake certainly not direct; but whether made up of two straight lines or one curved one, am not sure.

Oct. 10. Suspected longitudinal line in Nectar, the opening of Solis Lacus.

Oct. 13. 11h 35m Saw my line again p[receding] Margaritifer Sinus [Ochus]

-- 11h 37m Saw Mr. Douglass’s f[ollowing] Margaritifer Sinus, but think it illusion.

Oct. 21. Imagined Hellas crossed by Peneus and Alpheus.

Nov. 1. Canals as conspicuous (!) as the seas.

Nov. 2. 9h 12m The canals came out in distinct flashes, as well as being, the more conspicuous of them, always dully there.

-- 9h 26m. This is the first time the canals have really appeared strikingly straight and in profusion.

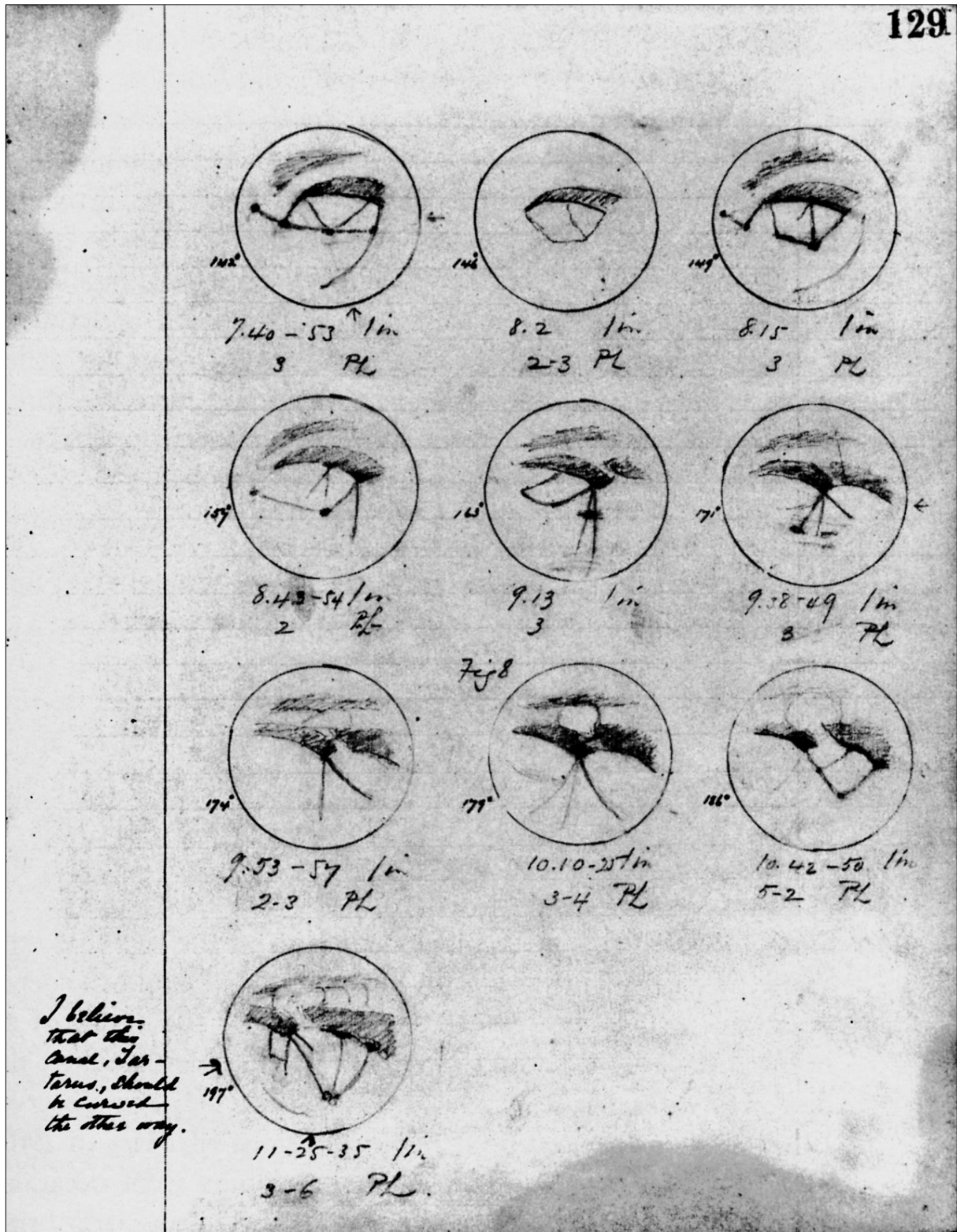


Figure 5: An observing page of Lowell's notebooks, showing the canals seen in glimpses (courtesy: Lowell Observatory Archives).

Nov. 8. Can see the spider's web about the Lake of the Sun because I know it is there.

Nov. 17. Glimpses of canals

Nov. 18. 6h 3m Suspect Euphrates double.  
-- 6h 8m Phison double

Nov. 19. Strange glimpses of other double stars which I seriously doubt.

The double canals were a particularly impressive showing, as this phenomenon—in which a canal that had at one time been single might later appear as two parallel canals side by side, a process Schiaparelli called *geminatio*—had been one of the most baffling phenomena reported by Schiaparelli. In Schiaparelli-

li's most recent published map, from 1888, almost all the canals were double, and Lowell was able, usually in glimpses or 'revelation peeps', as he put it, in which the seeing ceased its usual wavering and steadied for a moment, to confirm many of them.

These, like all the others, were evanescent apparitions, and yet as soon as they were set down in a drawing—and later a map—they became something fixed and permanent and definite. Not many of those who would look at the maps of that era were aware of the transformation from fleetingly glimpsed detail to the definite features shown. The maps suggested a more perfect knowledge than was achievable from such marginal perceptual data. As a case in point, Lowell's map based on his 1894 observations was the most prolific in turning uncertain apparitions into seeming facts; it showed no fewer than 184 named canals, a veritable spider's web!

It is worth comparing what the leading planetary observer of the time, Edward Emerson Barnard, was seeing with the 36-inch refractor at Lick Observatory on Mount Hamilton, California—with many of his views taking place simultaneously with those of the Flagstaff observers. Internationally celebrated for his discovery of the fifth satellite of Jupiter in 1892—the first satellite discovered since Galileo's time—he had made a grand tour of European observatories the following year, including a pilgrimage to Brera in which he had discussed planetary observations with Schiaparelli (Van Biesebroeck, 1934). At that time he was inclined to give the Schiaparellian canals the benefit of a doubt, since Mars had been too low in the sky to be seen clearly from Mt. Hamilton. But conditions in 1894 were very favorable, and on September 3 he wrote in his observing log book:

The past two nights while making drawings I have examined Mars most thoroughly under good conditions. The region of the lake of the Sun [Solis Lacus] has been under review. There is a vast amount of detail ... I however have failed to see anything of Schiaparelli's canals as straight narrow lines. In the regions of some of the canals near the Solis Lacus there are details—some of a streaky nature but they are broad diffused and irregular and under the best conditions could never be taken for the so called canals. (Sheehan, 1995: 244).

About 10 October Barnard, along with several observers in England, recorded the beginning of a vast regional dust storm—a rather momentous Martian event not fully appreciated by Lowell owing to the gaps in coverage occasioned by his frequent absences from the

Observatory. Lowell returned to Flagstaff to resume his series of observations the day before the dust storm began and was just getting his bearings as it spread rapidly across the southern hemisphere of Mars, brightening a vast swath of formerly blue-green areas with a dusty ochre pall. Lacking a clear reference to the planet's pre-dust storm appearance and failing to recognize the cause of the change (as well as by then having committed himself to the idea that the dark blue-green areas were tracts of vegetation instead of seas), Lowell inferred incorrectly that in the period in which he had left off observations the Martian vegetation had passed to late-summer sere, rather than seeing that in fact the whole area had simply fallen beneath a cloak of dust (see Figure 6). Instead of being witness to an inconvenient fact, Lowell's observations merely provided further reinforcement of his theory.

## 2 FROM OBSERVATORY TO LECTURE HALL

After wrapping up his observations at the end of November and returning to Boston, Lowell proceeded to set out his rather hastily assembled 'theory' of intelligent life on Mars in four lectures at 1000-seat capacity Huntington Hall on the Massachusetts Institute of Technology campus in Boston in January and February 1895. These were published as a series of articles in *The Atlantic Monthly* between May and August and finally served up attractively in book form in *Mars*, published in December 1895, which included drawings by Lowell and his colleagues and a new map of Mars (Figure 7) that was covered with spider-threadlike canals (which, he noted, "... agree[d] fairly within the errors of observation with those figured in Schiaparelli's chart." (Lowell, 1895b: 158).

The lectures, articles, and especially the book created a sensation with the general public. Professional astronomers were more wary, or even downright dismissive. Barnard was skeptical, while the pioneering astrophysicist James E. Keeler (1857–1900) of Lick Observatory was downright hostile. Noting Lowell's neophyte status as an observer, Keeler wrote to George Ellery Hale (1868–1938) of the Yerkes Observatory:

I dislike his style ... It is dogmatic and amateurish. One would think he was the first man to use a telescope on Mars, and that he was entitled to decide offhand questions relating to the efficiency of instruments; and he draws no line between what he sees and what he infers. (Sheehan, 1995: 247).

The two were co-editors of *The Astrophysical Journal* and after what they regarded as a sub-





Figure 6: Lowell's drawings of Mars, showing supposed seasonal fading of the southern dark blue-green areas correlated with the melting of the polar caps. It was this kind of evidence that made Lowell strongly suspect that the dark areas were vegetation. He did not realize that the complete fading out shown in the late-summer drawing was owing to the effects of a large regional dust storm on Mars (courtesy: Lowell Observatory Archives).

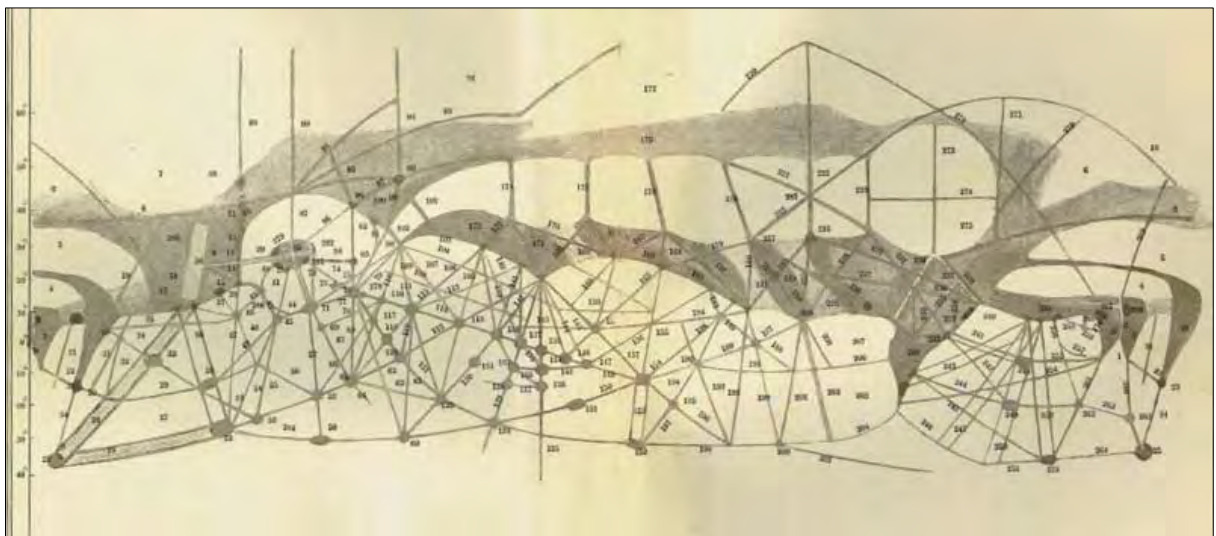


Figure 7: Lowell's 1894 map, published in *Mars* (Lowell, 1895b) (courtesy: Lowell Observatory Archives).

standard submission from Lowell's pen, banished Lowell henceforth from the pages of that august journal—leading Lowell to establish his own outlet, the *Annals* (and later *Bulletins*) of the Lowell Observatory. But despite the criticisms of men like Keeler and Hale, Lowell certainly deserves a great deal of credit; he did for astronomy what his cigar-smoking younger sister Amy would do for poetry, contributing "... enthusiasm and salesmanship ..." They both "... knew how to package and sell the goods."

(Heymann, 1980: 200).

A few passages from his book show to what extent Lowell was in debt to Schiaparelli's earlier results—indeed, standing on the shoulders of a giant:

Previous to the present chart, the most detailed map of the planet was Schiaparelli's made in 1888. On comparison with his, it will be seen that the present one confirms all his details and adds to it about as much more. I have adopted his nomen-

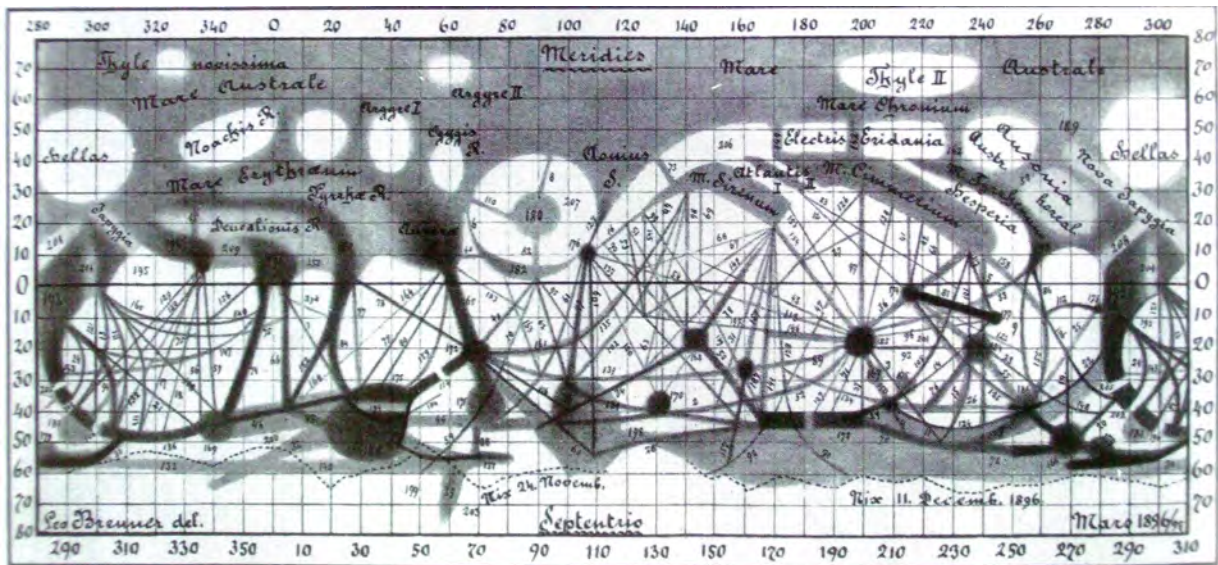


Figure 8: Leo Brenner's 1896–1897 map. Note that the maps are somewhat displaced in longitude relative to one another (William Sheehan collection).

clature ... (Lowell, 1895b: 94).

And:

The first hint the world had of their existence [that of the *canal*] was when Schiaparelli saw some of the lines in 1877, now eighteen years ago. The world, however, was anything but prepared for the revelation, and, when he announced what he had seen, promptly proceeded to disbelieve him. Schiaparelli had the misfortune to be ahead of his time, and the much greater misfortune to remain so ... For many years fate allowed Schiaparelli to have them all to himself, a confidence he amply repaid. While others doubted, he went on from discovery to discovery ... (Lowell, 1895b: 136).

After publishing *Mars*, Lowell set off on what would become a perennial visit to Europe and made a point of visiting Schiaparelli, whom he saw at Brera sometime in February or March 1896. No doubt they communicated in French, but there does not seem to be any record of their visit. He also met Flammarion and another astronomer who was then attracting a great deal of publicity for his Mars observations, Leo Brenner (nom de plume of Spiridon Gopčević; (1855–1928), who had a private observatory equipped with a 7-inch refractor at Lussinpiccolo (on an island in the Adriatic Sea) and, like Lowell, claimed to enjoy unusually fine climatic conditions for planetary observations.<sup>6</sup> Another prolific mapper of canals was Schiaparelli's countryman, Vincenzo Cerulli (1859–1927), who set up a private observatory at Teramo, in Abruzzi, and was about to become one of the foremost critics of the canals, concluding that they were mere optical illusions. Yet another was Eugène Michael Antoniadi (1870–1944), a

skillful observer who was Flammarion's assistant at the latter's Juvisy Observatory.

At that moment, canals were all the fashion. To not see them was as much as to admit that one was rather hopeless as an observer.<sup>7</sup> In 1895, the systematic observation of the planets was quite limited. Also, it was still mainly descriptive and subjective—a matter of visually inspecting a planet and making a drawing. Thus, it was easy for someone to acquire a moderately sized telescope, claim keen-sightedness and exceptional seeing conditions, and set themselves up as the next scientific prodigy as Leo Brenner did. Brenner's 1896–1897 map of Mars (Figure 8) showed no fewer than 164 canals, most of them new; fully 18 of them radiated in various directions from a single dark spot, Trivium Charontis. Moreover, Brenner claimed that he had been able to detect no fewer than 34 canals with only a 3-inch refractor! But far more credible observers like Cerulli, Lowell, and E.M. Antoniadi (a skillful observer who was Mars Section Director of the British Astronomical Association), and many others, also recorded canals in profusion.

The canal furor illustrates a point made by the great art historian E.H. Gombrich (1969: 82) that

... the familiar will always remain the likely starting point for the rendering of the unfamiliar; an existing representation will always exert its spell over the artist even while he strives to record the truth ...

as well as a further point by the psychologist William Zangwill, that

... reproducing the simplest figures constitutes a process itself by no means psycho-

logically simple. This process typically displays an essentially constructive or reconstructive character, and ... reproduction was mediated pre-eminently through the agency of verbal and geometrical formulae ... (Gombrich, 1969: 74).

Certainly, the canals were as much a psychological and sociological phenomenon as an astronomical one. Mars historian K. Maria D. Lane has pointed out, "... given the authority and nature of the cartographic data-recording format ..." used by astronomers at the time,

... it was nearly impossible to erase canals that had been mapped by a credible astronomer. Just as was true for many of the terrestrial expeditions of the day, prestige inhered in putting things *on* the map, not taking them off. (Lane, 2010: 45).

Lowell himself admitted as much in *Mars*,

We easily see what we expect to see, but with great difficulty what we do not. Fashion is as potent here as elsewhere ... A few years ago it was the fashion not to see the canals of Mars, and nobody except Schiaparelli did. Now the fashion has begun to set the other way, and we are beginning to have presented suspiciously accurate facsimiles of Schiaparelli's observations. (Lowell, 1895b: 160).

Schiaparelli's views about Lowell were complex. From what we have already said, it should be obvious that Lowell saw in Schiaparelli a much-admired 'Master' whom he wished to emulate and impress. Schiaparelli's initial comments about Lowell show that he was pleased with his enthusiasm but not entirely convinced about the soundness of his observations—much less of the correctness of his 'theory'. Already in 1893, Schiaparelli had written:

The network formed by these [*canali*] was probably determined in its origin in the geological state of the planet, and has come to be slowly elaborated in the course of centuries. It is not necessary to suppose them the work of intelligent beings, and notwithstanding the almost geometrical appearance of all of their system, we are now inclined to believe them to be produced by the evolution of the planet, just as on the Earth we have the English Channel and the Channel of Mozambique. (Pickering, 1921: 88).

In 1896, Schiaparelli wrote to Otto Struve (1819–1905) at the Pulkova Observatory, with whom he had trained during his student days and who, with François Terby (1846–1911) of the University of Louvain, was the correspondent who most enjoyed his confidence. By then his own ability to observe Mars successfully was hampered both by growing problems with his eyesight and the deteriorating conditions

within the increasingly industrialized city of Milan, and so he followed with cautious interest what Lowell and Cerulli were doing:

Mars is already within reach of the observatories where one can observe its minute details. Here it is almost always impossible; this is why I have not yet started to observe it regularly. But Mr. Lowell at the Flagstaff Observatory (Arizona) and Mr. Cerulli at Teramo (Abruzzo) have already announced that they have seen remarkable things. We hope that they will not see too much, and especially that they will see well. Lowell in 1894 discovered a great many things that had completely escaped me, so I'm anxious to know if I will be able to confirm at least part of his extremely complicated tracery, which would make of the lines of Mars an almost indecipherable network. I am very satisfied to see that the interest of this study increases rather than decreases, and it is probable that after the uncertainty of the first tests one will manage to fix the results of it in a sure way by setting aside any fantastic element.--As regards the explanation of the phenomena, I must admit that the more I advance in this study, the less I see clearly. (G. Schiaparelli to O. Struve, 6 Oct. 1896; trans. W. Sheehan. Schiaparelli, 1963: 206).

He continued to worry, however, about the fantastic profusion of canals on the recent maps. After expressing his hope in 1896 that Lowell and Cerulli "... will not see too much ..." but will "... see well ..." he complained in 1899 of "... chaos into, which MM. Lowell and Brenner threaten to plunge us." (G. Schiaparelli to O. Struve, 24 March 1899. Schiaparelli, 1963: 297). By then, the correspondence between Lowell and Schiaparelli has begun (see Section 5, below); it is still quite formal at first, and Lowell addresses Schiaparelli merely as *Monsieur*. It mainly concerns the exchange of documents; Schiaparelli sends Lowell his papers on Mercury and Venus (which Lowell had begun to observe in August 1896 with the newly commissioned 24-inch Clark refractor), as well as his memoirs on Mars. The fifth memoir, on the observations of 1886, was published in 1896–1897, and the sixth, on those of 1888, appeared in 1899, the year before Schiaparelli retired. Lowell sent Schiaparelli the first volume of the Lowell Observatory Annals, published in 1898 and modeled studiously on Schiaparelli's *Memoirs*.

Very little is said about Venus, other than Lowell's claim (in one of the letters published here, which Lowell wrote from Mexico City on 4 January 1897) that "In the air of Flagstaff, the spots—even on Venus—are ... easy to see." In fact, that claim was to cause Lowell a great deal of trouble. Before Lowell, most other observ-

ers had seen nothing definite on Venus; only, as Schiaparelli confided to Barnard when the latter visited Brera in the summer of 1893, "... dark markings ... so nebulous that it is dangerous to make use of them for the rotation." In his entire career, Schiaparelli had seen something definite on the planet only once, in 1877, when he saw two luminous spots on the upper cusp of the planet. But Lowell claimed to make out a series of spoke-like markings organized around a central hub, which were 'surprisingly distinct' and about as evident to the naked eye as the dark spots on the Moon. W.G. Hoyt (1976: 110) wrote:

But while Lowell could claim that other observers had seen the canals of Mars, no other astronomer had, or indeed has, ever seen anything like the 'surprisingly distinct' features he described on Venus.

The one person who came closest was his secretary, Wrexie Leonard. The reaction of astronomers was immediate and caustic; the censures of E.M. Antoniadi were especially severe, and the relationship between the two men remained strained forever after. Lowell published observations not only made at Flagstaff but also at Tacubaya (near Mexico City) to which he had temporarily moved the observatory at the end of 1896 (Figure 9). As usual he defended the work on the basis of the supposed superiority of Flagstaff's air. Soon after he returned from Mexico, he suffered an attack of 'nervous exhaustion'; it proved a difficult thing to shake, and saw him retire from the field for almost four years. Lowell biographer David Strauss (2001: 193) notes:

Lowell's entire astronomical project seems to have come crashing down upon him in early 1897. Serious doubts had been cast on the viability of Flagstaff as an environment for good seeing, and questions had been raised about the validity of the Mars work and other planetary observations. To what extent such doubts may have contrib-

uted to Lowell's depression is not clear. But it is certainly plausible that his own hesitations about the validity of the work contributed to the exhaustion ...

While recovering, Lowell and his secretary decided to accompany Professor David Todd (1855–1939) from Amherst College and his wife Mabel to Tripoli in order to observe the 28 May 1900 total solar eclipse. Prior to their departure from Amherst, Lowell observed Venus and



Figure 9: Percival Lowell observing with the 24-inch Clark refractor during its sojourn in Mexico, in 1897. Presumably he was scrutinizing one of the inner planets, Mercury or Venus, in daylight, or perhaps this is merely a staged photograph (courtesy: Lowell Observatory Archives).

Mars with the University's 7-inch refractor, once again reporting markings on Venus (Figure 10) and canals on Mars (Figure 11), notwithstanding the modest aperture of the Amherst telescope and less than ideal atmospheric conditions found there near sea level.

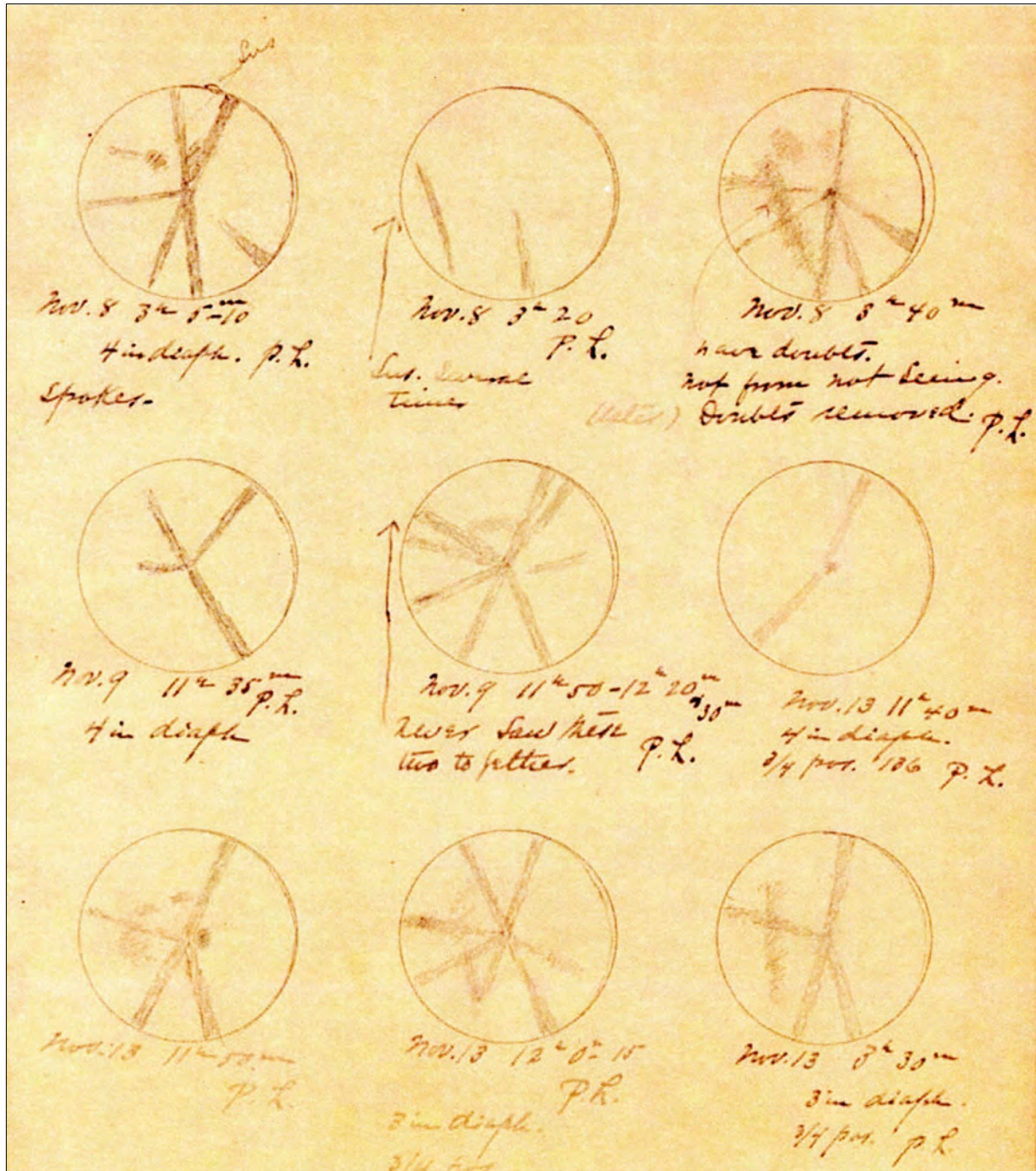


Figure 10: Lowell's drawings of Venus, November 1899. First seen with the 24-inch Clark telescope at Flagstaff in August 1896 and subsequently at Tacubaya, Mexico, the spoke-like markings on Venus seen by Lowell (and to a certain extent his secretary Wrexie Leonard) were unlike anything seen elsewhere and provoked a fierce reaction from the astronomical world. Though largely sidelined from astronomical work with 'nervous exhaustion', probably at least in part occasioned by these criticisms, Lowell made these observations with the 7-inch refractor at Amherst College. Though he defended his observations by claiming that the air at Flagstaff was particularly fine for revealing planetary detail, these drawings from near sea level show the markings as well as at Flagstaff (courtesy: Lowell Observatory Archives).

### 3 THE MARTIAN MASTER AND THE HEIR-APPARENT

Schiaparelli was aware of Lowell's illness, and wrote to Cerulli on 4 April 1900: "I was hoping for Mr. Lowell but I see that he cannot or will not continue." (G. Schiaparelli to V. Cerulli, 4 April 1900. [Schiaparelli, 1963: 317](#)). He added that he was still not sure what to make of Lowell's

work: "We must confess that [it] is full of flaws and leaves itself open on many sides to challenges."

In fact, however, Lowell was 'down but not out', and he returned to Flagstaff in the spring of 1901, determined to vindicate his controversial planetary observations with new assistants (Douglass, the last of the assistants from the

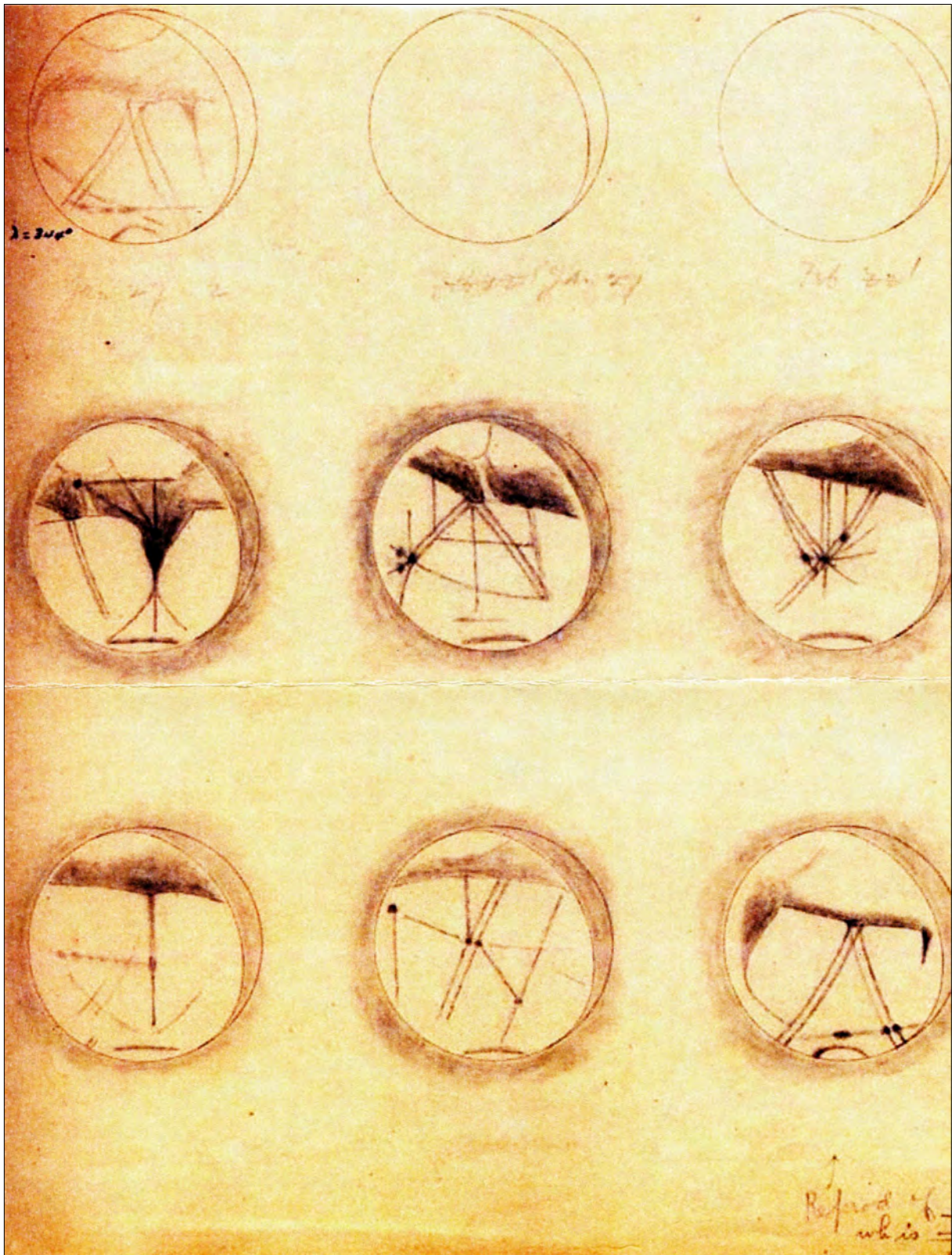


Figure 11: Mars drawings from November 1899, also made with Amherst College's 7-inch refractor, while Lowell and Wrexie Leonard were guests of David and Mabel Todd (courtesy: Lowell Observatory Archives).

early years, was fired in part because he had become skeptical of many of the Flagstaff markings) and instruments—now cameras and a spectrograph supplemented the old visual methods. During these years, he also cultivat-

ed his relationship with Schiaparelli, whom he identified both as a Master and as someone who had suffered from persecution by his uncomprehending contemporaries. This is the period documented in the correspondence here, in

## Section 5.

Lowell had met Schiaparelli (Figure 12) at Brera in February or March 1896, and on a European adventure during the summer of 1904, in which he was accompanied not by Miss Leonard as he had often been on previous adventures but with Philadelphia socialite Miss Edith Pettit. Lowell (Figure 13) succeeded in tracking Schiaparelli (and not without considerable difficulty) to his country villa at Sorino di Monticello, near Lake Como (Figure 14), where the retired Director of Brera Astronomical Observatory escaped to during the hot summers. Lowell recorded in his diary (7 August 1904) his second encounter with his hero, which again seems to have been rather brief and formal:

He seemed neither ill nor old but little changed from nine years ago. He told me that 1890 was the last opposition at which he was able to make observations of worth—these he may sometime publish—From him, I learnt that the 8-inch, not the 18-inch, was specially achromatic for the red rays but he used a red glass on the other. He expressed surprized [*sic*] chagrin that Barnard could not see the canals and I explained to him my idea of the two kinds of eye, the sensitive (Barnard's) and the acute (that necessary to the detection of the canals). He said this tallied with his personal experience as he had never been able to see the satellite of Sirius, nor that of Procyon ... (Lowell, 1904: 14–15).

It does not appear that Lowell, despite continuing his perennial travels overseas, ever met Schiaparelli in person again, but he continued to view the Italian astronomer as his lodestar. As discussed in several letters in this collection (beginning with Lowell to Schiaparelli, 27 June 1906), Lowell dedicated his Martian *magnum opus*, *Mars and Its Canals* (1906), to the Italian master:

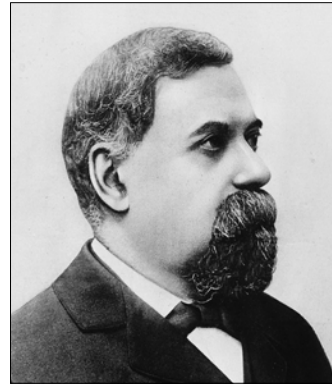


Figure 12: Schiaparelli as he looked in 1895, at about the time of Lowell's first visit (courtesy: Lowell Observatory Archives).



Figure 13: Percival Lowell, 1904, as he would have looked when he met Schiaparelli the second time (courtesy: Lowell Observatory Archives).



Figure 14: The villa, inherited from his wife's family, to which Schiaparelli often retreated during the summers after his retirement (courtesy: Museo Scienza, Milan).

To G.V. Schiaparelli, the Columbus of a New Planetary World, this investigation upon it is appreciatively inscribed.

Schiaparelli was somewhat embarrassed at first, and wrote to Lowell (1 February 1907):

... the new Columbus is entirely devoid of the terrible ambition which was the principal cause of the misfortunes in which the great Admiral was overwhelmed.

However, he allowed the dedication to stand and also praised Lowell's book, which he called "... a small masterpiece ...", noting the progress Lowell had achieved in Areography:

You have walked straight and steady ... Where many times I have wandered in uncertainty, embarrassed by the unexpectedness and strangeness of what I have seen.

Schiaparelli, previously inclined to straddle the fence, now admitted that he found Lowell's theory

... more and more satisfying in general. I am now persuaded by you that the hypothesis of oceans and continents cannot represent the facts, and the hypothesis of vegetation is, for the moment, the most probable of any.

Henceforth, their correspondence seems to have moved to the level of friendship and even affection. Much of their ongoing discussion concerned the photographs of Mars that were being taken at Lowell Observatory by Lowell's assistant C.O. Lampland. As far back as 1905, when Schiaparelli learned from an article in the German journal of record, *Astronomische Nachrichten*, that the photographs were "Sufficiently detailed to show many dark lines ... I would never have believed that it would be possible ..." (Schiaparelli to Lowell, 30 June 1905), he added:

The climate of the Flagstaff Observatory should be very exceptional and the observers of a very extraordinary skill. I congratulate you on the result and I congratulate myself on having again helped the stunning progress of Areography.

Lowell (to Schiaparelli, 14 August 1905) apologized for not sending the photographs directly to Schiaparelli, stating that he had believed based on what he read in a newspaper that Schiaparelli was dead! Even better photographs were taken in 1907, both by Lampland in Flagstaff and by E.C. Slipher who went to Alianza, Chile, to photograph Mars as a member of the 'Lowell Observatory Expedition to the Andes', and Lowell sends these to Schiaparelli for examination. A number of astronomers, including E.M. Antoniadi, in examining these images had disagreed about what they showed. Now Lowell, who in his letter of 16 March 1909

for the first time addresses Schiaparelli as his "Maître Martien et honoré Collègue" (Martian Master and Honored Colleague), asks Schiaparelli to render his judgment. "You and you alone should create the representation of what one might see in the photographs of Mars that I sent you," Lowell also writes:

Because, in spite of what you write to me about your poor eyes, you can still see much better than Mr. Antoniadi or anyone else who has not studied the planet well ... Do this honor, please, for science.<sup>8</sup>

Schiaparelli receives Lowell's new book *Mars as the Abode of Life* (1908), and praises it in a letter of 26 March 1909 in which he now addresses Lowell as "professor and illustrious colleague." He writes:

My attention was above all captured by the second part, that which contains notes on various questions; I see there that you leave no corner of Areography without bringing the light of your study.

Referring back to the manner in which he had been addressed in Lowell's last letter (16 March 1909), "O, my well esteemed colleague and successor, you have exceeded in so many ways him whom you call your master." He agrees to explain to the world what is shown in the photographs, but there are a number of preliminaries to be addressed before he makes the attempt. Here we see that Schiaparelli, even in the last year of his life, had not changed; he was ever the meticulous scholar, able to take even the most extraordinary pains to get at the truth of a matter.<sup>9</sup>

In the end, the business turned out to be rather involved, and Schiaparelli's efforts did little to further Lowell's cause:

The enormous quantity of details that one could easily recognize on your disks do not all belong on the planet, at least such is my opinion at present ...

he wrote in what is perhaps the most critical letter in the collection, dated 2 September 1909 (and discussed previously by [McKim and Sheehan \(2009\)](#)). Many of these details instead seemed to be artifacts of the granular emulsions and the way the plates were prepared. So the photographs were less the Q.E.D. to Lowell's theory of canals and oases than Lowell had hoped. "Mars," Schiaparelli told his younger colleague, "promises to exercise our patience for some time, especially yours." To add to the general tone of perplexity suggested by this letter, Schiaparelli also comments on Lowell's *New Observations of the Planet Mercury*, a *Memoir of the American Academy of Arts and Sciences* based on Lowell's 1896–1897 observations (see [Lowell](#),



1902). Apparently Lowell had just sent Schiaparelli a copy. Schiaparelli, whose own observations of Mercury had been considered seminal, was clearly shocked by the drawings and map reproduced (see Figure 15) therein and says:

I had seen, I don't remember anymore where, some drawings of Mercury that were said to have resulted from your observations. These drawings seemed to me so different at first sight from what I had seen myself that I believed it was unnecessary to attempt a comparison before having seen your definitive publication. Now that I have it, this publication, it terrifies me, that is the word! Would Mercury, then, have the approximate structure of a polyhedron, regular and symmetrical, like a faceted diamond?

This was the next-to-last letter Schiaparelli sent to Lowell. The last (23 April 1910), contains positive comments on Lowell's book *The Evolution of Worlds* (1909). This book had been crushingly reviewed by Forest Ray Moulton (1872–1952), a leading University of Chicago expert on celestial mechanics—another area Lowell ventured into 'where angels feared to tread'—who regarded Lowell as "... the mysterious 'watcher of the skies' whose scientific theories, like Poe's vision of the raven, 'have taken shape at midnight'." (Sheehan, 2016: 224). But Schiaparelli was more gentle, and thanked Lowell for

... this so instructive and inviting reading, as much by the form of the exposition as by the new ideas that you have sown the seeds of everywhere.

Lowell's next letter, 14 June 1910, which includes some positive images of Mars, left just as Schiaparelli was laid low at Monticello by a stroke; without regaining consciousness he passed away on 4 July 1910.

#### 4 CODA

Schiaparelli passed from the scene just as Lowell's work was suffering from its most scathing rebuke—from E.M. Antoniadi, who used the 32.7-inch Henry Brothers refractor at Meudon, near Paris, to reveal that the true structure of the Martian surface as seen in a large telescope under excellent conditions was as Barnard had shown it in 1894:

The planet revealed a prodigious and bewildering amount of sharp or diffused natural, irregular, detail, all held steadily; and it was at once obvious that the geometrical network of single and double canals discovered by Schiaparelli was a gross illusion. (Sheehan, 1988: 244).

Lowell, of course, did not agree; dismissing Antoniadi as a man without knowledge of how

to observe, he carried on the battle over the Planet of War for the rest of his life—increasingly casting himself as a persecuted pioneer trying to gain a hearing against the uncomprehending and unappreciative 'troglodytes' arrayed against him. Predictably, he saw himself as heir to Schiaparelli, both in his pioneering work and the failure of the world to recognize it. In an obituary written shortly after Schiaparelli's death, he intoned:

Unwittingly the world pays to its pioneer minds the tribute of distrust. To nescience the advances of science are distasteful in proportion as they are correct; in accordance with the common-law maxim, the greater the truth, the greater the libel. No one likes his beliefs overthrown nor what he thought he knew upset, and the louder the outcry the more symptomatic is it of defeat

...

All this Schiaparelli had to endure ... (Lowell, 1910: 465).

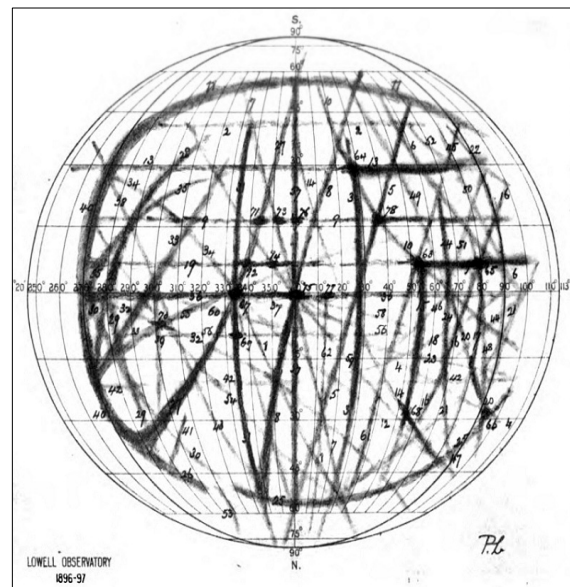


Figure 15: Lowell's map of Mercury. From the *Memoirs of the American Academy of Arts and Sciences* (1902).

In the months before his death, Lowell barnstormed colleges in the Pacific Northwest hoping that—if his unimaginative professional peers were hidebound old fogeys, unable to recognize the promise of a new idea—the minds of youth were still open and capable of forming new impressions. He insisted:

Progress is first obstructed by the reticence of nature and then opposed by the denunciation of man ... A really new idea is a foundling without friends. Indeed a doorstep acquisition is welcome compared with the gift of a brand-new upsetting thought.... A generation or more is needed to secure it a hearing and more time still till its worth is recognized. (Lowell, 1916a).

Again, he put forth Schiaparelli as a leading

example of one who had been opposed by the denunciation of man—along with other great figures such as Copernicus and Darwin.

And yet—it isn't clear that Schiaparelli himself had ever felt particularly persecuted. He defended his observations against all comers but was not so attached to any particular interpretation of them. Indeed, even the most formidable opponent of the canals, Antoniadi, credited Schiaparelli's observations to a certain degree. They had (in contrast to the Lowellian cobwebs) a basis in reality,

... so that in the positions of each of them, single or double, on the surface of the planet, there is present an irregular trail, a jagged edge of half-tone, an isolated lake, in

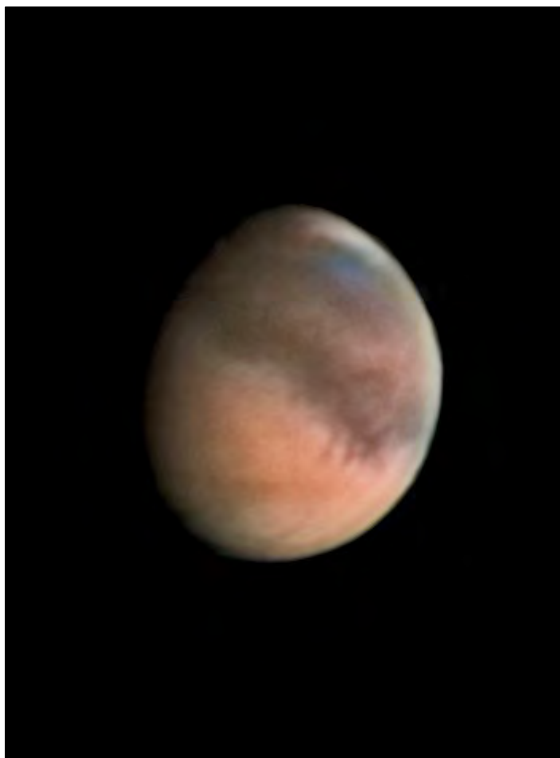


Figure 16: A CCD image of Mars by the Belgian amateur astronomer Leo Aerts, with a 14-inch Celestron Schmidt-Cassegrain, taken on 31 July 2020. The planet was still months away from opposition, but already had an apparent diameter of 14.5 seconds of arc, which is as large as it gets at its aphelic oppositions. There are tantalizing details in the ochre areas that one can easily imagine might be perceived as 'canals' by visual observers managing with only fleeting glimpses of the fine details (courtesy: Leo Aerts).

a word something complex. These details are extremely varied ... Due to the exceptional acuity of his sight, Schiaparelli surpassed all the observers who worked with equally-sized instruments; but his modest refractors did not permit him a glimpse of the trails and other complex details in any other form than that of fleeting lines ... (Sheehan, 1988: 248).

The key is that the canals were seen in glimpses. A glimpse is not a definitive view; it

is but a hint, a suggestion, that is all (e.g. see Figure 16 for a possible 'modern' example). They were hardly enough to fix a definite interpretation of the underlying reality, as Schiaparelli understood. While eager, with his childlike, playful nature, to entertain any of a host of possible ideas of what the canals might be, he never committed to any one interpretation as anything other than a possibility. Even in acknowledging (letter of 1 February 1907) that Lowell's theory of vegetation was "... for the moment, the most probable of many ...", he resisted steadfastly the temptation for premature closure. His religion in the end was agnosticism. He had written about the puzzling phenomena of the geminations in 1893:

... for us, who know so little of the physical state of Mars, and nothing of its organic world, the great liberty of possible supposition renders arbitrary all explanations ... and constitutes the gravest obstacle to the acquisition of well-founded notions. All that we may hope is that with time the uncertainty ... will gradually diminish ... We may also confide a little in what Galileo called "the courtesy of Nature," thanks to which, some time from an unexpected source, a ray of light will illuminate an investigation at first believed inaccessible to our speculations, and of which we have a beautiful example in celestial chemistry. Let us therefore hope and study. (Pickering, 1921: 95–96).

Lowell, on the other hand, had a mind of a very different order from the master. Schiaparelli possessed in high degree what the poet John Keats (Amy Lowell's favorite) called

Negative Capability, that is when [a] man is capable of being in uncertainties, [m]ysteries, doubts, without any irritable reaching after fact & reason. (Keats, 1817).

Lowell had very little capacity for Negative Capability—he wanted things sharply defined as black and white, without ambiguity, which appears even in his planetary drawings where everything—even the notoriously diffuse and nebulous markings on Venus—is depicted as hard, sharp, clearly bounded, well-defined. Perhaps this need for definiteness and certainty had something to do with a rather rigid and obsessive personality structure; he could not tolerate disorder, unpunctuality, delay. Perhaps it had something to do with the deep-seated Puritanism of his New England culture. There is a hint in what Hattie Bundy once said of her mother, Percival's niece Katharine Lawrence Putnam Bundy (1890–1983),

Mother's sense of righteousness was very deep ... How well I remember our fights over the dining room ... For her, things were black and white. It's an outlook that des-

cends directly from the Puritans and we all have it. (Bird, 1998: 36).

There is an analogy, too, with his sister Amy's poetry. She once described the aspiration of her imagist poems. They should be, she said, "Hard and clear, never blurred or indefinite." (A. Lowell, 1917: 239). In other words, they should be like mathematics, or Percival's drawings of the planets.

Lowell rapidly organized his expedition to observe Mars from Flagstaff, and even before he arrived, he had a strong preconceived notion, largely inspired by Schiaparelli, of what he would find. After no more than a month of observing, he formulated the 'Theory' which he was to defend for the rest of his life. To have committed himself so completely in this way shows that he possessed nothing of Schiaparelli's tentativeness. There was no 'Negative Capability' in his make-up. Schiaparelli's ideas were in constant flux; and he threw many suggestions out about Mars without ever committing himself to any of them. He knew there were too many possibilities yet untried to do that. Lowell on the other hand, in some of his last remarks about Mars, wrote in most un-Schiaparellian fashion:

I have said enough to show how our knowledge of Mars steadily progresses. Each opposition as it comes round adds something to what we knew before. It adds without subtracting. For since the theory of intelligent life on the planet was first enunciated 21 years ago, every new fact discovered has been found to be accordant with it. Not a single thing has been detected which it does not explain. This is really a remarkable record for a theory. It has, of course, met the fate of any new idea, which has both the fortune and the misfortune to be ahead of the times and has risen above it. New facts have but buttressed the old, while every year adds to the number of those who have seen the evidence for themselves. (Lowell, 1916b: 427).

To which we find it impossible to resist recalling what he wrote long before, in the most influential of the books he wrote on the basis of his travels in Korea and Japan, *The Soul of the Far East*:

Only the superficial never changes its expression; the appearance of the solid varies with the standpoint of the observer. In dreamland alone does everything seem plain, and there all is unsubstantial. (Lowell, 1888: 5).

## 5 THE LOWELL–SCHIAPARELLI CORRESPONDENCE

### 5.1 Introduction

The 'Lowell–Schiaparelli Correspondence' com-

prises 47 postcards, telegrams and handwritten letters, that range in date from August 1896 to June 1910 (which was just weeks before Schiaparelli's death), and housed in the historic archives of Brera Astronomical Observatory in Milan (Italy), the Domus Galilaeana in Pisa (Italy) and the Archives of Lowell Observatory in Flagstaff, Arizona.

Most of the letters are in French, but neither Lowell nor Schiaparelli spoke French natively, and thus they both made mistakes, misspellings, and sometimes invented their own words. These mistakes have been left in the French transcription, and the English translation was done in a manner that reflects their awkwardness and attempts at grandeur. Inconsistencies in the names of celestial bodies are kept and, where needed, referenced in the footnotes. The punctuation and grammar used in the English translations correspond to modern American English standards, with reference to older terms in appropriate places. There are a few words that were not decipherable—the reader may notice that most of those words are from letters written by Schiaparelli. As his eyesight declined, his handwriting became more 'prickly' as the researchers at the Brera Astronomical Observatory would say.

Of the 42 letters in this selection, 37 of them were transcribed in French in the book *Giovanni Virginio Schiaparelli – Percival Lowell Unpublished Epistolary Exchange (1896–1910)*, which is held in the archives at Brera Astronomical Observatory. The five remaining letters that were not transcribed were recently uncovered by Lauren Amundson, the Archivist at Lowell Observatory.

Originals have been obtained for every piece of correspondence in this collection, and have been compared with the transcription to maintain accuracy; some changes have been made from the original transcriptions after comparing them with the correspondence.

The last letter in the series was written just a few weeks before Schiaparelli passed away, and it seems from his previous letter that he knew the end was near. Ever devoted to astronomy and to his friendship with Lowell, he wrote:

In spite of this, I will always be very interested in the great progress that Astronomy makes every day and some of which will mark the belle époque in the history of this science.

Here, now, are the English translations of the Lowell–Schiaparelli letters.

### 5.2 The Letters

**17 agosto 1896**

P. Lowell a G.V. Schiaparelli  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 105 bis.  
 Telegramma.

Mylan de Flagstaff Arizona 35 7 voie Brest  
 Anglo.

GANGES IS DOUBLE.

LOWELL

**14 ottobre 1896**

P. Lowell a G.V. Schiaparelli  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 124 bis.  
 Telegramma.

Flagstaff Ariz 257 11 Via Westernunion

PRIÈRE ENVOYER BOSTON  
 PUBLICATIONS MERCURE VENUS.

LOWELL

**17 novembre 1896**

G.V. Schiaparelli a P. Lowell  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 151 bis.  
 Minuta.

A Percival Lowell 17 novembre 1896

Monsieur,

je répond un peu tard à votre télégramme concernant mes publications sur Mercure et Vénus. C'est que j'ai du chercher d'en trouver quelque exemplaire n'en possédant plus qu'un seul pour mon propre usage. Ce que je vous expédie aujourd'hui par la poste, se rapport aux dernières observations de Vénus faites en 1895.<sup>a</sup> Ma publication de 1890, contenant la démonstration que l'ancienne rotation de 23h 20m n'a aucun sérieux fondement, vous parviendra d'ici à quelques jours. Cette publication de 1890<sup>b</sup> a été traduite en français (avec quelques suppressions faites par le traducteur) et publiée dans la Revue *Ciel et Terre* qui s'imprime à Bruxelles.

Pour ce qui concerne Mercure, la seule publication importante a paru dans le no CXXIII 2944 des *Astronomische Nachrichten*.<sup>c</sup> Je ne puis vous en envoyer aucun exemplaire; mais les *Astr. Nachr.* sont si répandues, qu'il ne vous sera pas difficile de les procurer.

Vos dessins de Mercure prouvent que vous avez vu la planète mieux que moi: en même

**17 August 1896**

From Percival Lowell to Giovanni Schiaparelli  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 105 bis. Telegram.

To Milan from Flagstaff, Arizona 35 7 Anglo-Brest route.

GANGES IS DOUBLE.

LOWELL

**14 October 1896**

From Percival Lowell to Giovanni Schiaparelli  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 124 bis. Telegram.

Flagstaff, Arizona 257 11 via Western Union

PRAY SEND BOSTON PUBLICATIONS  
 MERCURY VENUS.

LOWELL

**17 November 1896**

From Giovanni Schiaparelli to Percival Lowell  
 A.O.B., *Corrispondenza Scientifica*, cart.  
 168, n. 151 bis. Draft.

To Percival Lowell 17 November 1896

Sir,

I am responding a bit late to your telegram concerning my publications on Mercury and Venus. It is because I had to search to find a copy apart from the one for my own use. What I send you today in the mail relates to the latest observations of Venus, done in 1895.<sup>a</sup> My 1890 publication, containing proof that the old rotation of 23h 20m has no serious foundation, will arrive to you in a few days. This publication from 1890<sup>b</sup> has been translated into French (with some deletions made by the translator) and published in the journal *Ciel et Terre*, which is printed in Brussels.

Concerning Mercury, the only important publication appeared in no. CXXIII 2944 of *Astronomische Nachrichten*.<sup>c</sup> I am not able to send you a copy, but *Astr. Nachr.* is so widespread that you will not find it hard to procure one.

Your drawings of Mercury prove that you have seen the planet better than I; at the same time, they prove that you have seen the same things. The angular spot that exists near the

temps ils prouvent que vous avez vu le mêmes choses. La tache angulaire qui existe près du corne supérieur et forme une espèce d'angle obtus a été vue par moi un très grand nombre de fois. Aucun doute n'est possible sur la réalité de ces résultats et les astronomes vous seront reconnaissants d'avoir enfin mis hors de doute un fait dont beaucoup de personnes doutaient encore.

Pour ce qui concerne Mars, je suis encore plus malheureux cette fois, que pendant l'opposition<sup>d</sup> de 1894. J'ai raison de croire que mon œil est encore assez bon: mais l'état atmosphérique depuis juillet dernier a été toujours très mauvais, et il n'y a aucun indice d'amélioration. Dans ces circonstances je dois m'estimer très heureux que d'autres personnes soient en position de continuer mes observations.

Dans quelques jours [sera tiré]<sup>e</sup> mon Mémoire IV<sup>f</sup> sur Mars contenant l'opposition 1883–84. Et je pense que dans quatre ou cinq mois je serai en mesure de vous envoyer le Mémoire V<sup>g</sup> contenant l'opposition de 1886!

Votre dévoué

G.V. Schiaparelli

upper corner and forms a type of obtuse angle has been seen by me a great number of times. No doubt is possible about the reality of these results, and astronomers will thank you for finally having put beyond doubt a fact that many people still doubt.

Concerning Mars, I am even more unhappy this time than during the opposition<sup>d</sup> of 1894. I am right to believe that my eye is again good enough, but the atmospheric state since last July has always been poor and there is no indication of improvement. In these circumstances, I should consider myself very lucky that other people are in a position to continue my observations.

In a few days, my Memoir IV<sup>f</sup> on Mars, containing the opposition 1883–84, [will be published].<sup>e</sup> And I think that, in four or five months, I will be able to send you Memoir V,<sup>g</sup> containing the opposition of 1886.

Your devoted

G.V. Schiaparelli

- a In 1895 two papers about Venus by Schiaparelli were published: "On a few new appearances on the planet Venus", *Records of the Lombard Institute of Sciences and Letters*, Series II, Volume XXVIII and "Two writings by Prof. G. Schiaparelli in Milan of importance to the publisher about the spots seen on the surface of Venus", *Astronomische Nachrichten*, Volume 138, n. 3304. Besides, in the *Bulletin of the Royal Academy of Belgium*, 3rd Series, Volume XXX, an extract of a letter from Schiaparelli to Terry was published with the title: "On a spot recently observed on the surface of Venus and on the duration of the rotation of this planet."
- b The original publication is: "Considerations on the rotating motion of the planet Venus", which appeared in the *Records of the Lombard Institute*, Series II, Volume XXIII and includes five notes. The first three and the summary of the last two were translated into French by F. Terry and were published in the journal *Ciel et Terre*, 11th year, 1890–91. The same translation by Terry is reproduced in the journal *Astronomie*, 9th year, 1890. Beyond these five notes, in part freely translated and in part summarized in German they also appeared in *Sirius*, New Series, Volume XVIII.
- c On the basis of repeated observations of the planet, Schiaparelli arrived at the conclusion that the period of rotation of Mercury was 87.9693 days, equal to the period of its revolution.
- d An opposition occurs whenever Mars and the Earth line up on the same side of their orbits from the Sun, and the two planets make their closest approach to one another. Because their orbits are elliptical rather than circular, their separations vary from opposition to opposition, and because Mars' orbit departs far more from circular than the Earth's, it is mainly Mars' position that is decisive. Once every 15 or 17 years, when Mars is near perihelion at opposition, a particularly favorable approach occurs, when the two planets can be as little as 56 million kilometers apart.
- e Unclear writing, possibly 'sera tiré', meaning 'will be published'.
- f This refers to the Fourth Recollection on Mars by G. Schiaparelli with the title: *Astronomical and Physical Observations on the Axis of Rotation and on the Topography of the Planet Mars done at the Royal Observatory of Brera in Milan with the Mertz Equatorial (8 inches)*. It is published in the Acts of the Royal Academy of the Lincei, Year CCXCIII (1895–1896), Series 5, *Records of the Class of Physical, Mathematical and Natural Sciences*, Volume 2. Session of June 6, 1896, Rome.
- g This refers to the Fifth Recollection on Mars by G. Schiaparelli entitled: *Astronomical and Physical Observations on the Axis of Rotation and on the Topography of the Planet Mars made at the Royal Observatory of Brera in Milan with the Mertz Equatorial (Opposition of 1886)*. It is published in the

Acts of the Royal Academy of the Lincei, Year CCXCIV (1896–1897). Series 5. *Records of the Class of Physical, Mathematical and Natural Sciences*, Volume 2. Session of May 16, 1897, Rome.

**4 gennaio 1897**

**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**169, n. 4 bis.**  
**Originale.**

City of Mexico, Jan 4 1897

Monsieur,

Je vous remercie infiniment de vos belles brochures sur Venus et Mars (1883–84).

Votre dessin de Mercure me rappelle tant les miens que je dirais l'avoir fait moi-même.

Je vous envoie la suite de mes observations sur cette dernière, qui sont encore plus satisfaisantes que les premières. Il n'y a point de doute possible sur la période de rotation ni de Mercure, ni de Venus et je m'étonne que vous seul ait pu le reconnaître plus tôt car mes observations ont été fait sans aucun rapport aux précédentes. Je vous fait mon sincère éloge.

Dans l'air de Flagstaff les taches – même de Venus – se voient si bien, qu'il n'y a n'on plus de doutes sur la condition physique des deux planètes au moment.

Avec la plus grande estime

Votre dévoué

Percival Lowell

**4 January 1897**

**From Percival Lowell to Giovanni Schiaparelli**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**169, n. 4 bis.**  
**Original.**

Mexico City, 4 January 1897

Sir,

I would like to thank you infinitely for your beautiful booklets on Venus and Mars (1883–84).

Your drawing of Mercury reminds me so much of mine that I would say I had done it myself.

I am sending you the rest of my observations on the latter, which are even more satisfying than the first. There is no possible doubt about the period of rotation of Mercury, nor of Venus, and it astounds me that you alone could recognize it earlier because my observations were made without any relation to the previous ones. I owe you my sincere praise.

In the air of Flagstaff, the spots – even on Venus – are so easy to see that there are no more doubts about the physical condition of the two planets at the moment.

With the greatest esteem

Your devoted

Percival Lowell

**15 dicembre 1898**

**G.V. Schiaparelli a P. Lowell**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**172, n. 96.**  
**Minuta.**

A P. Lowell, 15 Xbre 1898

Je viens de recevoir votre grand ouvrage sur Mars;<sup>a</sup> vous comprendrez aisément avec quel intérêt je vais l'étudier.

Je vous ai expédié, il y a deux ou trois semaines, mon cinquième Mémoire sur cette planète; et j'espère d'être en position de vous envoyer dans le cours de 1899 le sixième Mémoire auquel je travaille maintenant.

See<sup>b</sup> m'apprend que votre santé n'à pas été très bonne dernièrement. Tous désirent vraiment qu'elle soit améliorée afin que vous soyez en gré de continuer vos travaux commencés d'une manière si brillante et si

**15 December 1898**

**From Giovanni Schiaparelli to Percival Lowell**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**172, n. 96.**  
**Draft.**

To P. Lowell, 15 December 1898

I have just received your grand work on Mars;<sup>a</sup> you can easily understand how interestedly I will study it.

I have sent you, two or three weeks ago, my fifth Memoir about this planet; and I hope to be in a position to send you, in the course of 1899, the sixth Memoir that I am working on now.

See<sup>b</sup> informed me that your health has not been very good lately. Everyone truly hopes that it will get better so that you may be able to continue your unfinished works in a manner as

grandiose.

Quant a moi, j'ai fini. Ma vue devient toujours plus imparfaite et plus insuffisante pour cette sorte d'observations. Je dois si bien à observer la planète pour ma propre instruction. Combien je suis content de pouvoir vérifier les nombreuses découvertes dont vous avez enrichis l'Aréographie!<sup>c</sup>

J'ai l'honneur ...<sup>d</sup> avec les plus illustres [découvertes].<sup>e</sup>

Je vois sur votre ouvrage que vous citez mes recherches par l'intermédiaire de M. Flammarion.<sup>f</sup> Si vous ne possédez pas tous mes Mémoires, je me ferai plaisir et un devoir de vous en expédier un exemplaire de ce qui vous manque.<sup>g</sup>

brilliant and as grandiose as before.

As for me, I am done. My vision becomes always more imperfect and more insufficient for this sort of observation. I should be able to observe the planet well enough for my own instruction. How happy I am to be able to check the numerous discoveries with which you have enriched Areography!<sup>c</sup>

I have the honor ...<sup>d</sup>with the most illustrious [discoveries].<sup>e</sup>

I see in your work that you have cited my research by the intermediary of Mr Flammarion.<sup>f</sup> If you do not possess all of my Memoirs, I would think it a pleasure and duty to send you a copy of what you lack.<sup>g</sup>

- a This refers to the first volume of the Annals of the Lowell Observatory, published in 1898 with the title *Observations of the Planet Mars during the Opposition of 1894-5 made at Flagstaff, Arizona*. The volume, with a dedication autograph of Lowell, is conserved in the library of the A.O.B. In the introduction, there is contained a detailed description of the Observatory and its instruments. Schiaparelli reviewed the book in an article entitled "Observations of the planet Mars", which appeared in *Science*, New Series, Volume IX, n. 227, pages 633–637, 5 May 1899.
- b Thomas J.J. See (1866–1962) studied at the University of Berlin, then in Columbia, Missouri, and then at the University of Chicago; he was an Assistant and Astronomer at Lowell Observatory. In 1899, he became Professor of Mathematics at the Naval Observatory of Washington in Washington, D.C. In 1903, he then went to the Naval Observatory on Mare Island, California. He occupied himself with the evolution of the stellar systems, the structure and dynamics of the Solar System and its extension beyond Neptune. He also did research in the field of geodesy, on the causes of solar spots and their periodicity. In the archives of Brera Astronomical Observatory are conserved about twenty letters from See to Schiaparelli and almost all the corresponding responses of Schiaparelli to See, relating to the period 1907–1909. The topics treated are multiple: terrestrial seas, the origin and development of double stars, the formation of mountains and the physics of the Earth, the evolution of the Solar System. Having lived through the San Francisco earthquake of 1906, See commiserated with Schiaparelli after Italy experienced a particularly catastrophic earthquake in Calabria and Sicily in 1908.
- c 'Areographie' or 'Areography' is a word frequently used by Lowell to describe the study of Mars. Coming from the God of War, Ares, for whom Mars is named, it is a term that has fallen out of regular use in the astronomical community.
- d Illegible writing.
- e Unclear writing, possibly 'découvertes', meaning 'discoveries'.
- f A reference to the work *La Planète Mars* by Camille Flammarion (1892).
- g This paragraph is missing from the copy of the letter at Lowell Observatory, but was transcribed in the collection of letters from Alessandro Manara and Franca Chlistovsky, entitled *Giovanni Virgilio Schiaparelli, Percival Lowell: Scambi Epistolari Inediti (1896–1910)*.

**30 settembre 1900**

**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**176, n. 53.**  
**Originale.**

Boston – Mass.  
 53 State – St.  
 30th September 1900

Dear Professor Schiaparelli,

In looking over the 2nd vol. of the Annals<sup>a</sup> – a copy of which I have had sent to you – I have

**30 September 1900**

**From Percival Lowell to Giovanni Schiaparelli**  
**A.O.B., Corrispondenza Scientifica, cart.**  
**176, n. 53.**  
**Original.**

Boston – Mass.  
 53 State – St.  
 30th September 1900

Dear Professor Schiaparelli,

In looking over the 2nd vol. of the Annals<sup>a</sup> –

been pained to see that the references to you and your great work are not to your own Memoirs but to Flammarion.<sup>b</sup> I am the more grieved at this as I had given instructions that it should be otherwise but through some accident it was overlooked. Hoping that you will excuse this slip and find at least something to interest you in the volume. I am, with great respect and esteem,

Very faithfully yours –

Percival Lowell

a copy of which I have had sent to you – I have been pained to see that the references to you and your great work are not to your own Memoirs but to Flammarion.<sup>b</sup> I am the more grieved at this as I had given instructions that it should be otherwise but through some accident it was overlooked. Hoping that you will excuse this slip and find at least something to interest you in the volume. I am, with great respect and esteem,

Very faithfully yours –

Percival Lowell

- a This refers to the second volume of the Annals of the Lowell Observatory published in 1900. The second part of this volume is entitled *Observations of Mars 1896 and 1897*.
- b Camille Flammarion (1842–1925), French astronomer and geophysicist, is noted for studies of double stars and for observations of the Sun and Moon. He is also particularly remembered for his assiduous activity in the popularization of astronomy. He wrote several popular texts, among which is *Popular Astronomy* published in 1880. He was among the most strenuous champions of the existence of life on Mars.

**4 novembre 1900**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Corrispondenza Scientifica, cart.  
176, n. 53a.  
Minuta.**

4 Nov. 1900

Cher Monsieur Percival Lowell,

Je réponds à votre lettre du 30 septembre. Je vous remercie bien de l'envoi que vous annoncez de Vol. II des Annales de votre Observatoire. Vous pourrez bien imaginer l'intérêt avec le quel je le lirai lorsque il sera parvenu entre mes mains. Quant aux citations tirées de Flammarion plutôt que des mes mémoires originaux, je ne pense pas ce que soit là un inconvénient très important, d'autant plus que le français est plus universellement connu que l'italien: ce qui rende peut-être ces citations plus utiles, quoique peut-être un peu moins exactes.

Notre Observatoire vient d'expédier à l'Observatoire Lowell le no XXXIX<sup>a</sup> de ses publications.

[Sur]<sup>b</sup> le premier de ce mois novembre 1900 je me suis retiré de la direction de l'Observatoire de Milan.<sup>c</sup> Je continuerai cependant mes relations avec l'Observatoire, de sorte que vous pourrez toujours m'y adresser vos lettres et vos belles publications.

Avec la plus grande estime  
Votre dévoué

G.V. Schiaparelli

**4 November 1900**

**From Giovanni Schiaparelli to Percival Lowell A.O.B., Corrispondenza Scientifica, cart. 176, n. 53a.  
Draft.**

4 November 1900

Dear Mr. Percival Lowell,

I am responding to your letter from 30 September. I thank you kindly for the telegram in which you announce Vol. II of the Annals of your Observatory. You can imagine the interest with which I will read it when I have it in my hands. As for the references made to Flammarion instead of to my original memoirs, I do not think that it will be too important of an inconvenience, especially since French is more universally known than Italian, which renders, perhaps, the references more useful, however perhaps a bit less accurate.

Our Observatory just sent no. XXXIX<sup>a</sup> of its publications to Lowell Observatory.

[Since]<sup>b</sup> the first of this month, November 1900, I am retired from the direction of the Observatory of Milan.<sup>c</sup> I will nevertheless continue my relations with the Observatory, such that you can still address your letters and beautiful publications to me there.

With the greatest esteem  
Your devoted

G.V. Schiaparelli



- a The Publications of the Royal Observatory of Brera in Milan were printed starting in 1873. Volume XXXIX, printed in Milan by Ulrico Hoepli in 1900, is entitled *Determination of the Difference of Longitude between Naples and Milan According to Observations made in 1888 by Prof. Emanuele Fergola and Dr. Michele Rajna*.
- b Unclear writing, probably 'Sur', meaning 'since.'
- c Schiaparelli was nominated Director of Brera Astronomical Observatory by decree on 8 September 1862. Having left the Directorship, he continued to go to the Observatory, near to which he lived at 7 Fatebenefratelli Street. In the final years of his life, Schiaparelli spent long periods at Monticello in Brianza. In the archives of Brera Astronomical Observatory one also finds the correspondence (perhaps not in its entirety) that Schiaparelli received after the time when his institutional role as Director had ceased.

**2 marzo 1903**

**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 597,**  
**fasc. 1, n. 43.**  
**Originale.**  
**Allegato un disegno di Marte del 25 febbraio**  
**1903.**

Lowell Observatory, Flagstaff, A. T.  
 March 2, 1903

Cher Monsieur Schiaparelli,

Ci-inclus je vous envoie le dessin d'une observation d'un certain intérêt: la re-observation après beaucoup d'années de votre *Nix Olympica*. C'est la première fois que je le vois. Je m'en suis aperçu sur le terminateur le 23 Feb à 17h 44m ou Feb 24 0h 44 G.M.T. et en calculant de l'angle de position que j'avais pris pour le point du terminateur qui brillait il résultat lat 19°.8N long 130°.5, presque exactement où se trouve le *Nix Olympica* sur votre carte de 1879. Le surlendemain je l'ai vue sur le disque et depuis. Aujourd'hui j'ai observé une autre petite tache blanche dont j'ai marqué la position sur le dessin que je vous envoie. Elle est plus petite encore que le *Nix Olympique* lequel a un diamètre de 3°.5. *Tharsis* aussi est très blanche, ce qui rappelle vos observations là-dessus en 1886 car la saison est presque la même qu'alors. Cette partie du disque donnait l'apparence d'être parsemée de points blancs mais je n'ai pas constaté que les ci-devants.

Je n'ai jamais reçu vos mémoires de 1888, 1890 et 1892. Auriez-vous l'obligeance peut-être de me les envoyer.

Votre dévoué

Percival Lowell

**18 marzo 1903**

**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 597,**  
**fasc. 1, n. 49.**  
**Originale.**

**2 March 1903**

**From Percival Lowell to G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 597,**  
**fasc. 1, n. 43.**  
**Original.**  
**Accompanied by a drawing of Mars from 25**  
**February 1903.**

Lowell Observatory, Flagstaff, A. T.  
 March 2, 1903

Dear Mr. Schiaparelli,

Enclosed I am sending you the drawing of an observation of certain interest: the re-observation after many years of your *Nix Olympica*. It is the first time that I have seen it. I viewed it at the terminator on 23 February at 17h 44m or Feb 24 at 0h 44m G.M.T. and, in calculating the position angle, which I had taken through the terminator point that was illuminated, the result was lat. 19°.8N, long. 130°.5, almost exactly where *Nix Olympica* was located on your map from 1879. Two days later and since, I have viewed it on the disk. Today, I observed another small, white spot whose position I marked in the drawing that I am sending you. The spot is even smaller than *Nix Olympique*, which has a diameter of 3°.5. *Tharsis* is also very white, which recalls your observations on the subject in 1886 as the season is almost the same as then. This part of the disk gives the appearance of being studded with white points, but I could only note the above.

I never received your Memoirs from 1888, 1890, and 1892. Would you be kind enough to send them to me?

Your devoted

Percival Lowell

**18 March 1903**

**From Percival Lowell to Giovanni**  
**Schiaparelli A.O.B., Fondo G.V. Schiaparelli,**  
**cart. 597, fasc. 1, n. 49.**  
**Original.**

To Mr. G.V. Schiaparelli  
Professeur et Directeur émérite  
Brera Milan

Lowell Observatory, Flagstaff, A. T.  
Le 18ème Mars 1903

Cher Monsieur,

Je viens de trouver votre *Mémoria Sexta* sur la planète Mars que vous avez eu l'obligeance de m'envoyer lors de sa publication et je suis fâché de vous avoir dérangé à son compte. Si vous avez déjà été aussi aimable que de m'envoyer une autre exemplaire et que vous le désirerez vous-même, je me haterai de le vous renvoyer.

La planète présente une surface très intéressante cette opposition. Déjà le *Phison*, l'*Euphrate*, l'*Oronte*, le *Sitacus*, le *Djihoun* (je le distingue de l'autre *Oxus* qui va au *Siloe Fons*), le *Protonilus*, le *Thoth* et le *Gigas* sont double et aussi le *Lacus Ismenius*. C'est de très bon heure et aussi ces «canaux» sont extrêmement faible pour la plupart. Mais ce qui m'a le plus intéressé ce sont des vues que j'ai eu du *Gigas* double et le lac *Ascraeus* et du *Protonilus* et le lac *Ismenius*. J'ai vue avec certitude la manière dont les doubles débouchent dans ces «lacs» que je considère oases.



C'était comme ceci

Le lac *Ascraeus* semblait parfaitement round, très petit et noir et les deux canaux du *Gigas* le rencontraient à ces deux côtés. C'était le même avec le *Deuteronilus* (?) et *Protonilus* et le lac *Ismenius*. Le dédoublement de ce dernier longeait ces canaux aussi.



Et je crois, quoique je n'en suis pas positif, que l'*Euphrate* l'entraîne comme je l'ai dessiné. La distance entre les deux *Gigas* était  $3^{\circ}.7$  sur la planète, entre les deux *Protonilus* à peu près  $3^{\circ}.0$ . L'*Euphrate* est plus large et comme du coutume plus large que le *Phison*.

Votre dévoué

Percival Lowell

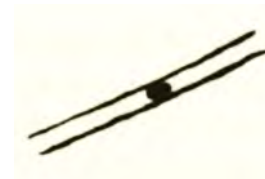
To Mr. G.V. Schiaparelli  
Professor and Director Emeritus  
Brera Milan

Lowell Observatory, Flagstaff, A. T.  
18th March 1903

Dear Sir,

I just found your *Mémoria Sexta* about the planet Mars that you were so kind as to send me at the time of its publication, and I am sorry to have disturbed you. If you have already been kind enough to send me another copy and you would like it for yourself, I would hasten to send it back to you.

The planet presents a very interesting area this opposition. Already *Phison*, *Euphrates*, *Orontes*, *Sitacus*, *Djihoun* (I distinguish it from the other *Oxus* that goes to *Siloe Fons*), *Protonilus*, *Thoth*, and *Gigas* are double, as well as *Lacus Ismenius*. It is a very good time, and the majority of the "canals" are also extremely weak. But what interests me most are the views that I had of the double *Gigas* and *Lacus Ascraeus* and *Protonilus* and *Lacus Isenius*. I saw with certainty the manner in which the doubles break in these "lakes" that I consider oases.



It was like this.

*Lacus Ascraeus* appeared perfectly round, very small, and black, and the two canals of *Gigas* met it on both sides. It was the same with *Deuteronilus* (?) and *Protonilus* and *Lacus Ismenius*. The duplication of the latter followed along these canals as well.



And I believe, although I am not positive, that *Euphrates* entered as I have drawn it. The distance between the two *Gigas* was  $3^{\circ}.7$  on the planet, between the two *Protonilus* nearly  $3^{\circ}.0$ . *Euphrates* is the largest and, as usual, was larger than *Phison*.

Your devoted

Percival Lowell

27 marzo 1903

G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 597,  
fasc. 1, n. 43a.  
Minuta in calce alla lettera di P. Lowell del 2  
marzo 1903. Al Lowell Observatory è  
conservato l'originale.

Je vous remercie bien pour votre lettre et pour le dessin de la réapparition de la *Nix Olympica*.<sup>a</sup> Ce phénomène paraît confirmer une opinion que j'ai déjà eu occasion d'exprimer autrefois, savoir: que les changements de Mars sont sujets à certaines règles. Un phénomène se montre, puis disparaît.\* Il faut donc que la cause locale, qui a déterminé la production du phénomène, soit quelque chose de persistant, quoique elle ne produise son effet que à des intervalles plus ou moins longs.

Vous recevrez avec cette lettre, ou peu après, un autre exemplaire de mon sixième mémoire sur Mars,<sup>b</sup> contenant l'opposition de 1888. C'est le dernier que j'ai publié. J'ai composé une partie du septième Mémoire 1890,<sup>c</sup> mais une longue maladie m'a rendu tellement faible, que je ne puis bien savoir moi même de jour que j'arriverai à le publier. Ce sera le dernier de mes Mémoires sur Mars. J'ai bien observé aussi les oppositions suivantes, mais avec une force de vision toujours décroissante. Vers 1892 mon œil commença à se déformer peu a peu, et les observations deviennent de plus en plus insuffisantes. Enfin en 1899 j'ai dû cesser non seulement les études de Mars, mais toute observation astronomique. Maintenant mon œil gauche, qui jadis a été si parfait, est presque complètement aveugle.

\* Tout change dans cet endroit; mais après un intervalle quelquefois bien long, il [réapparaît]<sup>d</sup> lorsque on ne l'attendait pas.

- a *Nix Olympica* is the former name for the Olympus Mons, a huge volcano on Mars. Back in Lowell's time, no one knew it was a volcano; it was not identified as such until spacecraft were able to take images up close, decades later.
- b This refers to the *Sixth Recollection on Mars* by G. Schiaparelli with the title: *Astronomical and Physical Observations on the Topography and Composition of the Planet Mars made at the Royal Observatory of Brera in Milan with the Merz–Repsold Equatorial (18 inches)*, during the Opposition of 1888. It is published in the *Acts of the Royal Academy of the Lincei*, Year CCXCVI (1899). Series 5. *Records of the Class of Physical, Mathematical and Natural Sciences*, Volume 3. Session of June 3, 1899, Rome.
- c This refers to the *Seventh Recollection on Mars* by G. Schiaparelli with the title: *Astronomical and Physical Observations on the Topography and Composition of the Planet Mars made in the Royal Observatory of Brera in Milan with the Merz Equatorial during the Opposition of 1890*. It is published in the *Acts of the Royal Academy of the Lincei*, Year CCXCVI (1899). Series 5. *Records of the Class of Physical, Mathematical and Natural Sciences*, Volume 8. Session of June 16, 1910, Rome.
- d Unclear writing, probably 'réapparaît', meaning 'reappears'.

27 March 1903

From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 597,  
fasc. 1, n. 43a.  
Draft at the foot of Lowell's letter from 2  
March 1903. The original is kept at Lowell  
Observatory.

I would like to thank you very much for your letter and for the drawing of the reappearance of *Nix Olympica*.<sup>a</sup> This phenomenon seems to confirm the opinion that I already had the occasion to express before: to know that the variations in Mars are subject to certain rules. A phenomenon shows itself, then disappears.\* It must be that the local cause, which has determined the production of this phenomenon, is something persistent, although it does not produce this effect except at intervals that are more or less prolonged.

You will receive with this letter, or a bit after, another copy of my sixth memoir on Mars,<sup>b</sup> containing the opposition of 1888. It is the latest that I have published. I composed a part of the seventh Memoir in 1890,<sup>c</sup> but a long illness has rendered me so weak that I am not able to know myself what date I will be able to publish it. It will be the last of my Memoirs on Mars. I have also observed the subsequent oppositions, but with a strength of vision which is ever decreasing. Around 1892, my eyesight began to degrade little by little, and the observations become more and more insufficient. Finally in 1899, I had to cease not only my studies of Mars, but all astronomical observation. Now, my left eye, which had always been perfect, is almost completely blind.

\* Everything changes in this place; but after an interval, sometimes a very long interval, it [reappears]<sup>d</sup> unexpectedly.

**27 marzo 1903****G.V. Schiaparelli a P. Lowell  
Lowell Observatory Archives. Originale.**Milan, le 27 Mars 1903  
(Via Fatebenefratelli, 7)

Cher Monsieur Lowell,

Je vous remercie bien pour votre lettre et pour le dessin de la réapparition de la *Nix Olympica*. Ce phénomène paraît confirmer une opinion que j'ai déjà eu occasion d'exprimer autrefois, savoir: que les changements de Mars sont sujets à certaines règles. Un détail se montre, puis disparaît, tout change en cet endroi; mais après un intervalle quelque fois de plusieurs années, il reparaît lorsque on ne s'y attendait. Il faut donc que la cause locale, qui a déterminé la production du phénomène, soit quelque chose de persistant, quoique elle ne produise son effet que à des intervalles plus ou moins longs.

Vous recevrez avec cette lettre, ou peu après, un autre exemplaire de mon sixième Mémoire sur Mars, contenant l'opposition de 1888. C'est le dernier que j'ai publié. J'ai composé une partie du septième (et dernier) Mémoire 1890, mais une longue maladie m'a rendu tellement faible, que je ne puis bien prévoir moi-même quand j'arriverai à le publier. Ce sera le dernier de mes Mémoires sur Mars. J'ai bien observé aussi les oppositions suivantes, mais avec une force de vision toujours décroissante. Vers 1892 mon œil commença à se déformer peu à peu, et mes observations à cette date ne sont plus comparables aux observations antérieures. Enfin en 1899 j'ai dû cesser non seulement les études sur Mars, mais toute observation astronomique. Maintenant mon œil gauche, qui jadis a été si parfait, est presque complètement aveugle.

Votre dévoué

G. Schiaparelli

**9 maggio 1903****G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 597,  
fasc. 1, n. 49a. Minuta in calce alla lettera di  
Lowell del 18 marzo 1903.**

9 May 1903

Cher Monsieur,

Je vous remercie bien des nouvelles que vous m'envoyez sur vos observations de Mars. Ne pouvant plus rien faire moi-même, je vois avec plaisir le succès des autres.

**27 March 1903****From Giovanni Schiaparelli to Percival  
Lowell  
Lowell Observatory Archives. Original.**Milan, 27 March 1903  
(7 Fatebenefratelli Street)

Dear Mr Lowell.

I would like to thank you very much for your letter and for the drawing of the reappearance of *Nix Olympica*. This phenomenon seems to confirm the opinion that I already had the occasion to express before: to know that the variations in Mars are subject to certain rules. A detail shows itself, then disappears, everything changes in this place; but after an interval of sometimes many years, it reappears unexpectedly. It must be that the local cause, which has determined the production of this phenomenon, is something persistent, although it does not produce this effect except at intervals that are more or less prolonged.

You will receive with this letter, or a bit after, another copy of my sixth memoir on Mars, containing the opposition of 1888. It is the latest that I have published. I composed a part of the seventh (and last) Memoir in 1890, but a long illness has rendered me so weak that I am not able to predict myself when I will be able to publish it. It will be the last of my Memoirs on Mars. I have also observed the subsequent oppositions, but with a strength of vision which is ever decreasing. Around 1892, my eyesight began to degrade little by little, and my observations since this date are no longer comparable to earlier observations. Finally in 1899, I had to cease not only my studies of Mars, but all astronomical observation. Now, my left eye, which had always been perfect, is almost completely blind.

Your devoted

G. Schiaparelli

**9 May 1903****From Giovanni Schiaparelli to Percival  
Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 597,  
fasc. 1, n. 49a. Draft at the foot of Lowell's  
letter from 18 March 1903.**

9 May 1903

Dear Sir,

I would like to thank you very much for the news you sent me about your observations of Mars. Not being able to do it myself, I look with

Les phénomènes dont vous m'écrivez, vous trouverez quelque chose d'analogue dans mon dernier Mémoire, surtout dans la planche dernière. C'est le cas de dire *E pur si muove!*<sup>a</sup> Car bien de personnes n'ont connue pas la profondeur de la vérité des choses que nous avons pu si bien observer.

Je possède encore un nombre suffisant d'exemplaires de mon VI<sup>e</sup> Mémoire, 1888. Aussi ne prenez pas la peine de me renvoyer l'exemplaire que je vous ai adressé dernièrement.

Avec les meilleures souhaits pour vos succès.

Je suis votre

a An Italian phrase meaning "And yet it moves!"

**10 agosto 1903**

**P. Lowell a G.V. Schiaparelli**

**A.O.B., Fondo G.V. Schiaparelli, cart. 597, fasc. 1, n. 80. Originale.**

Boston

Aug 10, 1903

Cher Monsieur Schiaparelli,

Je viens de vous faire envoyer les bulletins<sup>a</sup> de cet observatoire dans lesquels j'espère que vous trouverez des nouvelles intéressantes de Mars. Surtout dans le no 2 sur la manière de l'accroissement initiale de la calotte polaire du nord que j'ai eu le bonheur d'attraper dans le fait pour la première fois, aura pour vous je suis sure quelque chose de bien venue.

La saison a été d'ailleurs fort satisfaisante. Votre *Thoth* et *Lacus Moeris* ont reparus apres beaucoup d'années d'invisibilité. Je n'avais jamais pu les voir et je me demandais si l'*Amenthes*, comme je l'avais nommé, n'était pas le *Thoth*. Mais cet année a rendu tout ça. La configuration est comme ci-dessous.

Le *Lacus Moeris* était noir, petit, rond et caillant et je ne l'aurais jamais manqué si ça eut été de cette façon en 1894 et 1896.

Ce que vous m'écrivez de vos yeux me donne bien de peine. Ils ont tant vus pour la science dans leurs jours heureux.

Votre dévoué

Percival Lowell

pleasure on the success of others.

The phenomena about which you write, you will find something analogous in my last Memoir, above all on the last plate. It is the time to say *E pur si muove!*<sup>a</sup> Because a good many people have not known the depth of the truth of things that we have been able to observe so well.

I still possess a sufficient number of copies of my sixth Memoir, 1888. Also, do not go through the trouble of returning the copy that I sent you recently.

With the best wishes for your success.

I am yours

**10 August 1903**

**From Percival Lowell to G.V. Schiaparelli**

**A.O.B., Fondo G.V. Schiaparelli, cart. 597, fasc. 1, n. 80. Original.**

Boston

August 10, 1903

Dear Mr Schiaparelli,

I have just sent you this observatory's bulletins,<sup>a</sup> in which I hope you will find some interesting news about Mars. Especially in Issue no 2, on the manner of the initial growth of the northern polar ice cap, which I had the pleasure of catching, in fact, for the first time, and which will be for you, I am sure, something of a welcome arrival.

The season, otherwise, has been incredibly satisfying. Your *Thoth* and *Lacus Moeris* have reappeared after many years of invisibility. I have never before seen them and asked myself if *Amenthes*, as I have called it, was not *Thoth*. But a year has returned all of that. The configuration is as below.

*Lacus Moeris* was black, small, round, and clotting, and I would have never missed it if it had appeared this way in 1894 and 1896.

What you wrote to me about your eyes gives me much sorrow. They have seen so much for science in their happy days.

Your devoted

Percival Lowell

a The Lowell Observatory Bulletins began publication in 1903.

**4 dicembre 1904 G.V. Schiaparelli a P. Lowell**

**A.O.B., Fondo G.V. Schiaparelli, cart. 589, fasc. 1, n. 86. Minuta.**

**4 December 1904**

**From Giovanni Schiaparelli to Percival Lowell**

**A.O.B., Fondo G.V. Schiaparelli, cart. 589,**

**(Manca l'indicazione dell'anno sulla minuta, ma quasi sicuramente si tratta del 1904)**

4 Xbre a Percival Lowell

Cher Monsieur:

Revenu à Milan j'y ai trouvé plusieurs numéros des Bulletins of the Lowell Observatory, qui ont fixé particulièrement mon attention.

Votre Mémoire sur les cartouches de Mars,<sup>a</sup> dont vous m'aviez expliqué en peu de mots le contenu, est un essai bien remarquable d'une nouvelle méthode de considérer les phénomènes de Mars, une méthode qui pourra conduire à des résultats importants. Votre théorie de la végétation devient de plus en plus probable.

J'ai aussi beaucoup admiré le travail sur la rotation de Venus.<sup>b</sup> M. Slipher<sup>c</sup> est parvenu à résoudre le problème que M. Belopolsky<sup>d</sup> avait cru pouvoir attaquer avec des moyens insuffisants. L'idée d'employer Mars comme terme de comparaison a été excellente. Je vous prie d'accepter mes remerciements pour ces communications si importantes, et pour la visite dont vous m'avez honoré l'automne dernier.<sup>e</sup>

Ma santé, qui n'était pas bonne alors est beaucoup améliorée maintenant et je recommence à travailler un peu.

Avec les meilleurs souhaits pour la bonne réussite de vos nobles travaux.

Votre

- a This refers to *The Cartouches of the Canals of Mars* that form Bulletin No. 12 of the Lowell Observatory. Lowell defined *cartouche* of a canal on Mars, his percentage of visibility in respect to a certain date (the percentage of visibility is determined from the numerous drawings at his disposal for all the periods of the year).
- b This refers to *A Spectrographic Investigation on the Rotation Velocity of Venus* by V.M. Slipher, that forms Bulletin, No. 3 of the Lowell Observatory
- c Vesto Melvin Slipher (1870–1963), Assistant to Lowell, together with C.O. Lampland developed spectrographic and photographic studies of the atmosphere and of the surface of Mars. His spectroscopic studies demonstrated the existence of aqueous vapor and oxygen on the surface, and he claimed to have confirmed photographically the existence of a network of canals on Mars.
- d In 1894 the Russian astronomer Aristarkh Belopolsky (1859–1934) discovered periodic variations in the radial velocity of  $\delta$  Cephei, establishing that it was a general property of certain variable stars with short periods. He also conducted a spectroscopic study of Saturn and determined the period of rotation of its ring.
- E No other testimony of this visit from Lowell to Schiaparelli exists in the archives of Brera Astronomical Observatory; however, Lowell's travel diary contains a passage describing a visit on 7 August 1904 to Schiaparelli's country home, Monticello. This was his second visit after the preceding one which occurred in February or March 1896, according to *A. Lawrence Lowell's Biography of Percival Lowell*. In the book *The Planet Mars* by W. Sheehan (University of Arizona Press, 1996: 110–111), we read, in fact, that in December 1895 Lowell went to Europe in order to meet the most famous observers of Mars. In Paris, he met Flammarion, and then he went to Milan in order to meet Schiaparelli whom he admired most of all, so much so that he called him in the letter of 16 March 1909 "... dear teacher of Mars." Also, even though Schiaparelli was then still Director of Brera Astronomical Observatory, no documentation of this first meeting was found in the archives of that Observatory.

**fasc. 1, n. 86. Draft.**

**(There is no indication of a year on the draft, but it is almost certainly from 1904)**

4 December to Percival Lowell

Dear Sir:

Having returned to Milan, I have found here several numbers of the Lowell Observatory Bulletins, which have particularly caught my attention.

Your Memoir on the cartouches of Mars,<sup>a</sup> the contents of which you explained to me in few words, is a remarkable attempt of a new method of considering the phenomena of Mars, a method that could lead to important results. Your theory regarding vegetation is becoming more and more likely.

I also greatly admired the work on the rotation of Venus.<sup>b</sup> Mr. Slipher<sup>c</sup> has managed to resolve the problem that Mr. Belopolsky<sup>d</sup> had believed he could attack with insufficient methods. The idea of employing Mars as a comparison was excellent. Please accept my thanks for these important communications and for the visit that you honored me with last autumn.<sup>e</sup>

My health, which has not been good, is greatly improved now and I am starting to work a bit again.

With the best wishes for the success of your noble work.

17 gennaio 1905

P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 100. Originale. Allegato un  
disegno di Marte del 13–14 gennaio 1905.

Lowell Observatory, Flagstaff, A. T.  
Le 17 Janvier 1905

A Monsieur le Docteur Schiaparelli  
Milan

Cher Docteur,

Vous m'écriviez une fois qu'à l'avenir il vous fallait observer par les yeux des autres. En souvenir de cette triste déclaration, je vous envoie les primeurs de mes observations de cette opposition de 1905. Je leur souhaite qu'ils vous donnent quelques instants d'agrément.

Le dessin représente ce que j'ai pu voir les deux premières nuits, c'est à dire le 13 et 14 de janvier. Sur ce dessin on remarque d'abord une grande différence entre les *maria* et les canaux au nord du *L. Niliacus* et ceux au sud de cet endroit. Pour les *maria*, le *M. Acidalium* et le *L. Niliacus* sont beaucoup plus foncés que le *M. Erythraeum*. Plus ces *maria* envoient le pôle nord plus ils sont sombres. En ce qui concerne les canaux la même gradation de teinte se fait voir, mais en outre on y distingue une dissemblance d'état, ou tout au moins de façon, entre ceux du nord et ceux du sud. Les canaux au nord, le *Symaetus*, le *Sybaris*, le *Zygatus*, le *Jaxarte* et le *Callirrhoe* sont des lignes simples, étroites et noires, tandis que les canaux au sud du 30<sup>ème</sup> degré de latitude nord sont larges et diffus, i.e. le *Nilokeras*, le *Gange*, le *Jamuna* et l'*Indus*.

En second lieu, la calotte polaire est assez petite et mal définie, à cause apparemment d'une espèce de brume de printemps qui l'environne. Ce qui se montre aussi dans la visibilité des canaux arctiques. Ainsi le *Sybaris*, le *Zygatis* et le *Jaxartes* se distinguent plus facilement du côté sud. Au nord on les suit à peine jusque la calotte.

Les deux *Nilokeras* se voient bien, parallèles l'un à l'autre à 10°.5 de distance. Cette valeur tient des mesures de six dessins. Ça s'accorde bien avec ce que j'ai trouvé pour la même distance en 1903, à peu près 10° alors. Le *Nilokeras I*, la ligne du nord, diffère du *Nilokeras II* en ce qu'il est plus étroit et, chose intéressante, se trouve courbé là où il entre dans le *L. Lunae*. C'est exactement ce qui c'est présenté en 1903. Le *L. Lunae* lui même est faible et difficile à voir. Le *Jamuna* est en façon de ruban cendré, bien défini des deux bords et large de 4°. Le *Gange* semble plus faible et mal

17 January 1905

From Percival Lowell to G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 100. Original. Accompanied by a  
drawing of Mars from 13–14 January 1905.

Lowell Observatory, Flagstaff, A. T.  
17 January 1905

To the Doctor Schiaparelli  
Milan

Dear Doctor,

You wrote to me once that in the future you would have to observe through the eyes of others. In remembrance of that sad declaration, I am sending you the first of my observations of this opposition of 1905. I hope that they will give you a few moments of pleasure.

The drawing depicts what I was able to see the first two nights, that is to say the 13th and 14th of January. On this drawing, one notes first the large difference between the *maria* and the canals north of *L. Niliacus* and those to the south of that place. For the *maria*, *M. Acidalium* and *L. Niliacus* are much darker than *M. Erythraeum*. The closer these *maria* are to the north pole, the darker they are. In regards to the canals, the same gradation of color is shown, but, on the other hand, one can distinguish a dissimilarity of state, or at the least of manner, between those of the north and those of the south. The northern canals, *Symaethus*, *Sybaris*, *Zygatus*, *Jaxartes*, and *Callirrhoe* are simple lines, straight and dark, whereas the southern canals from the 30th degree of northern latitude are wide and diffuse, i.e. the *Nilokeras*, the *Ganges*, the *Jamuna*, and the *Indus*.

Secondly, the polar cap is rather small and poorly defined, apparently due to a kind of spring-time mist that surrounds it. This is also apparent in the visibility of the arctic canals. Thus, *Sybaris*, *Zygatis*, and *Jaxartes* are more easily distinguished from the southern side. To the north, we hardly follow them up until the cap.

The two *Nilokeras* are quite visible, parallels one to the other at 10°.5 of distance. This value upholds the measurements of six drawings. It fits well with my findings of the same distance in 1903, about 10° then. *Nilokeras I*, the northern line, differs from *Nilokeras II* in that it is narrower and, something interesting, it is curved there where it enters into *L. Lunae*. It is exactly what was present in 1903. *L. Lunae* itself is weak and difficult to see. *Jamuna* is a sort of ashen ribbon, well defined on both sides and 4° wide. *Gange* seems weaker and indistinct. Between *Ganges* and *Indus*, we can perceive fuzzy shadows,

tranché. Entre le *Ganges* et l'*Indus* on aperçoit des ombres confus, le *Hydaspes* et d'autres, probablement, que je n'ai pu déceler.

En se souvenant que le 13 janvier était le jour du solstice d'été de l'hémisphère nord, on voit comme tout ça confirme le résultat de l'opposition passée sur le développement des canaux (Bulletin 12 L. Obs.) du nord au sud à cette saison Martienne.

Votre dévoué

Percival Lowell

**30 giugno 1905**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 142. Originale.**

A Percival Lowell, Flagstaff, Arizona  
30 giugno 1905

Avant de partir pour la campagne, je veux payer ma dette de reconnaissance envers vous, en vous remerciant pour des nouvelles sur la dernière opposition de Mars, et pour le télégramme affectueux que vous m'avez envoyé le 14 Mars<sup>a</sup> et aussi l'envoi des derniers numéros si intéressants du Bulletin du Lowell Observatory.

Par les *Astr. Nachr.* j'ai appris la grande nouvelle que vous avez réussi à faire sur Mars des photographies suffisamment détaillées pour montrer plusieurs des lignes sombres. Je n'aurais jamais cru que cela fut possible, et je doute qu'on puisse arriver à quelque chose semblable dans nos climats d'atmosphère si agitée. Le climat du Flagstaff Observatory doit être très exceptionnel, et les observateurs d'une habileté bien extraordinaire. Je vous félicite de ce résultat et je me félicite moi-même d'avoir pu encore assister à ces progrès étonnant de l'aréographie.

a Schiaparelli's birthday was on 14 March.  
Lowell's was on 13 March.

**14 agosto 1905**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 147. Originale. Allegati 5 fogli con  
fotografie e disegni di Marte.**

Lowell Observatory, Flagstaff, A. T.  
le 14 Aout 1905 Cher Monsieur,

Cher Monsieur,

Je vous aurais envoyé les primeurs des photographies de Mars si un journal n'eut

*Hydaspes* and others, probably, that I cannot detect.

Remembering that the 13th of January was the day of the summer solstice of the northern hemisphere, we see how all of this confirms the past opposition on the development of the canals (Bulletin 12 L. Obs.) from north to south at this Martian season.

Your devoted

Percival Lowell

**30 June 1905 From Giovanni Schiaparelli to  
Percival Lowell A.O.B., Fondo G.V.  
Schiaparelli, cart. 589, fasc. 1, n. 142.  
Original.**

To Percival Lowell, Flagstaff, Arizona 30 June  
1905

Before leaving for the countryside, I want to pay my debt of gratitude toward you, in thanking you for the news about the recent opposition of Mars and for the fond telegram that you sent me on 14 March<sup>a</sup> and also the package of the latest, interesting numbers of the Bulletin of the Lowell Observatory.

By the *Astr. Nachr.*, I learned the big news that you have succeeded in taking photographs of Mars that are sufficiently detailed to show many dark lines. I would never have believed that it would be possible, and I doubt that we could arrive at something similar in our climate of such an agitated atmosphere. The climate of the Flagstaff Observatory should be very exceptional and the observers of a very extraordinary skill. I congratulate you on the result and I congratulate myself on having again helped the stunning progress of Areography.

**14 August 1905**

**From Percival Lowell to G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 147. Original. Accompanied by 5  
sheets of photographs and drawings of  
Mars.**

Lowell Observatory, Flagstaff, A. T.  
14 August 1905

Dear Sir,

I would have sent you the first photographs



vosre mort. Heureusement le journal – comme toujours – eut tort. Maintenant je suis en état de vous envoyer encore de plus belles que M. Lampland<sup>a</sup> vient de tirer et où vous pourriez reconnaître ce que vos yeux ont les premiers vus. C'est vraiment presque inconcevable que l'art photographique ai pu les reproduire. L'habileté de M. Lampland et l'atmosphère en sont venus à bout.

Votre dévoué

Percival Lowell

of Mars if a newspaper had not announced your death. Fortunately, the newspaper was – as always – wrong. Now I am in a position to send you even more beautiful photographs that Mr. Lampland<sup>a</sup> has just taken and where you will even be able to recognize what your eyes saw first. It is almost inconceivable that the art of photography could reproduce them. Mr. Lampland's skill and the atmosphere have overcome the odds.

Your devoted

Percival Lowell

- a Carl Otto Lampland (1873–1951) was a specialist in planetary photographic studies at the Lowell Observatory.

**10 ottobre 1905**

**P. Lowell a G.V. Schiaparelli**  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 154. Originale.

Boston  
53 State Street  
le 10 Octobre 1905

Monsieur,

Le professeur E.S. Morse<sup>a</sup> désire beaucoup posséder un portrait de vous pour le reproduire dans un ouvrage qu'il écrit actuellement sur la planète Mars.<sup>b</sup> Auriez vous la bonté de vos rendre à son souhait, il vous en serait reconnaissant ainsi que.

Votre très dévoué

Percival Lowell

**10 October 1905**

**From Percival Lowell to Giovanni Schiaparelli**  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 154. Originale.

Boston  
53 State Street  
10 October 1905

Sir,

The professor E.S. Morse<sup>a</sup> greatly desires to possess a portrait of you to reproduce in a work that he is currently writing about the planet Mars.<sup>b</sup> If you would be so kind as to reply to his request, he would be grateful as well.

Your very devoted

Percival Lowell

- a Edward Sylvester Morse (1838–1925) was the Director of the Peabody Museum in Salem, Massachusetts, founder of the East India Marine Society, and author of a book on Mars. In the letter of 7 December 1906, conserved in the archives of Brera Astronomical Observatory, he asks Schiaparelli if he could publish his favorable opinion on the work together with a photograph. Lowell was the intermediary of such correspondence. On the back of the letter from Morse to Schiaparelli, there is the reply (draft) of the latter, who agrees to Morse's wish.
- b Morse published *Mars and Its Mystery* in Boston in 1906.

**30 ottobre 1905**

**G.V. Schiaparelli a P. Lowell**  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 147a. Minuta.

30 Octobre 1905

Mon cher Monsieur,

Je dois vous remercier pour plusieurs intéressants envois que j'ai reçu de votre part pendant les quatre mois qui viennent de s'écouler: la continuation des Bulletins du Lowell Observatory, l'atlas de vos dessins de

**30 October 1905**

**From Giovanni Schiaparelli to Percival Lowell**  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 147a. Draft.

30 October 1905

My dear sir,

I should thank you for the many interesting shipments that I have received from you during the four months that have just flown by: the continuation of the Lowell Observatory Bulletin,

Mars faits en 1903<sup>a</sup> et les cinq planches photographiques.<sup>b</sup> Ces dernières sont vraiment étonnantes non seulement par ce qu'elles offrent déjà, mais encore beaucoup plus par ce qu'elles donnent le droit d'espérer. La ligne qui termine le *Mare Erytraeum* du côté du Nord est marquée sur la photo du 6 juin avec précision tout-à-fait inattendue dans ce genre de choses, elle suffit pour démontrer que l'Aréographie par votre initiative et par l'habileté de M. Lampland va entrer dans une phase nouvelle, dont on ne peut pas même prévoir l'extension; non seulement par ce qui concerne la topographie de la planète mais aussi pour l'histoire naturelle de ses phénomènes et encore pour le degré bien ...<sup>c</sup> d'exactitude qu'on va gagner pour les mesures de toute sorte et pour la direction de l'axe. Ce que on a vu jusqu'ici ne sera rien en comparaison de ce que vous allez trouver en suivant la vie que vous venez d'entrevoir.

Votre très dévoué

G.V. Schiaparelli

the atlas of your drawings of Mars done in 1903,<sup>a</sup> and the five photographic plates.<sup>b</sup> The latter are truly stunning not only for what they already offer, but still more for the right to hope that they give. The line that separates *Mare Erythraeum* from the northern coast is marked on the photo from 6 June with a precision that is quite unexpected in these kinds of things; it suffices to show that Areography by your initiative and by the skill of Mr. Lampland will enter into a new phase, of which we cannot foresee the extent; not only concerning the topography of the planet but also the natural history of its phenomena and even more for the degree ...<sup>c</sup> of accuracy which we will benefit from for the measurements of everything and for the direction of the axis. What we have seen up until now will hardly be anything in comparison to what you will find following the life that you have seen.

Your very devoted

G.V. Schiaparelli

- a This refers to the volume "Drawings of Mars" selected directly from the record book, and conserved in the library of Brera Astronomical Observatory. It is devoid of text and contains ten plates with drawings of Mars.
- b Attached to the preceding letter.
- c Unclear writing. It possibly says 'hyperion'.

**1 novembre 1905**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 154a. Minuta in calce alla lettera di  
P. Lowell del 10 ottobre 1905.**

Milan, le 1er novembre 1905

Revenu de la campagne, j'ai saisi avant tout à satisfaire votre désir exprimé par votre lettre du 10 Octobre. Voici ce que j'ai trouvé de mieux parmi mes anciens portraits, faits en 1895. Je n'en ai pas de plus récents; il me répugne d'avoir des témoins importants d'une décadence qui n'est que trop visible et à laquelle malheureusement il est impossible de se soustraire; je souhaite qu'elle vienne bien tard pour vous, le plus tard possible et qu'il vous soit donné d'enrichir encore pour longtemps la science avec des belles découvertes.

Votre très dévoué

Schiaparelli

Je viens d'avoir vos publications et je vous remercie ...<sup>a</sup> pour les cinq feuilles des photos de Mars.

**1 November 1905**

**From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 589,  
fasc. 1, n. 154a. Draft at the foot of Lowell's  
letter from 10 October 1905.**

Milan, 1st November 1905

Returned from the countryside, I considered before everything satisfying the desire expressed by your letter from 10 October. Here is what I found best among my old portraits, taken in 1895. I don't have any more recent ones; it revolts me to have important witnesses to a deterioration which is only too visible and which it is unfortunately impossible to avoid; I hope that it will come late for you, as late as possible, and that you will again be able to enrich science for a long time with beautiful discoveries.

Your very devoted

Schiaparelli

I just received your publications and I would like to thank you ...<sup>a</sup> for the five pages of photos of Mars.

a Illegible writing.

**Undated. Between 29 December 1905 and 1 January 1906.**

**P. Lowell a G.V. Schiaparelli  
Lowell Observatory Archives.**

Cher Collègue et Ami:

Permettez-moi de vous envoyer avec ceci de plus récents résultats de M. Lampland en fait de photographies de Mars, que ceux dont je vous ai d'abord fait part. Je crois que vous serez de mon avis qu'elles sont encore plus surprenantes que les premières.

Votre dévoué

Percival Lowell

**Undated. Between 29 December 1905 and 1 January 1906.**

**From Percival Lowell to G.V. Schiaparelli  
Lowell Observatory Archives.**

Dear Colleague and Friend:

Allow me to send you with this some of the more recent results from Mr. Lampland of the photographs of Mars, more recent, in fact, than those that I first told you about. I believe that you will be of my opinion that they are even more surprising than the first ones.

Your devoted

Percival Lowell

**27 giugno 1906**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 40. Originale.**

Boston, le 27ème Juin 1906

À Monsieur le docteur G.V. Schiaparelli  
Milan

Cher collègue et ami,

Je viens de mettre main à la conclusion d'un nouvel livre sur la planète Mars et je voudrai témoigner mon estime en le dédiant à vous à qui on doit les magnifiques primeurs de ces recherches.

Je pars de suite pour l'Europe, mon adresse là étant:

Jo Brown, Shipley Co.  
123 Pall Mall  
Londres

Votre dévoué

Percival Lowell

**27 June 1906**

**From Percival Lowell to G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 40. Original.**

Boston, 27th June 1906

To the Doctor G.V. Schiaparelli  
Milan

Dear colleague and friend,

I have just put my hand to the conclusion of a new book about the planet Mars and I would like to show my respect by dedicating it to you to whom it owes the magnificent success of this research.

I am leaving at once for Europe, my address there is:

Jo Brown, Shipley Co.  
123 Pall Mall  
London

Your devoted

Percival Lowell

**Dopo il 27 giugno 1906**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Corrispondenza Scientifica, cart.  
590, fasc. 1, n. 40a. Minuta senza data in  
calce lettera di P. Lowell del 27 giugno 1906.**

J'accepte bien volontiers la marque d'estime dont vous proposez de m'honorer: d'abord par ce qu'elle me vient de vous, ensuite pour montrer en quelque manière combien j'apprécie vos importants travaux. Je me déclare avec la plus grand reconnaissance.

Votre

**After 27 June 1906**

**From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Corrispondenza Scientifica, cart.  
590, fasc. 1, n. 40a. Draft without a date at  
the foot of the letter from P. Lowell from 27  
June 1906.**

I willingly accept the mark of esteem with which you propose to honor me: first because it comes from you, then to show in some way how much I appreciate your important work. I declare myself with the greatest respect.

Yours

**20 settembre 1906**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 56. Originale.**

Boston le 20 Septembre 1906

à Mons. G. Schiaparelli  
Milan

Cher collègue et ami:

Votre lettre m'a trouvé à Londres et c'est avec vive reconnaissance que je vous remercie et de la permission qu'elle contient et des paroles appréciés parce qu'elles viennent de celui qui le premier dévoilait ce monde et dont l'opinion me sera toujours la plus chère.

Votre dévoué

Percival Lowell

**20 September 1906**

**From Percival Lowell to Giovanni Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 56. Original.**

Boston, 20 September 1906

to Mr. G. Schiaparelli  
Milan

Dear colleague and friend:

Your letter found me in London, and it is with deep gratitude that I thank you and for the permission it contains and for the appreciated words because they come from he who first revealed this world and whose opinion will always be the most dear to me.

Your devoted

Percival Lowell

**Dopo il 20 settembre 1906**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 56a. Minuta senza data in calce  
alla lettera di P. Lowell del 20 settembre  
1906.**

Revenu de la campagne, je trouve à Milan votre bonne lettre du 20 septembre, et le superbe Volume III des Annales de votre Observatoire, contenant les observations de cinq oppositions, 1894–1903.<sup>a</sup>

Je n'ai pas besoin de dire combien je vous suis reconnaissant pour cet envoi, qui me donne un sujet agréable d'étude pour l'hiver qui va commencer.

Les prochaines oppositions présenteront Mars sous un diamètre considérable, et je vous souhaite d'y faire les plus brillantes découvertes.

Votre dévoué

a The third volume of the Annals of Lowell Observatory is entitled *Observations of the Planet Mars during the Oppositions of 1894, 1896, 1898, 1901 and 1903 made at Flagstaff, Arizona*. It was published in 1905. The copy sent by Lowell to Schiaparelli is conserved in the library of Brera Astronomical Observatory.

**After 20 September 1906**

**From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 56a. Draft without a date at the  
foot of the letter from Percival Lowell from  
20 September 1906.**

Returned from the countryside, I find in Milan your good letter from 20 September and the superb Volume III of the Annals of your Observatory, containing the observations of five oppositions, 1894–1903.<sup>a</sup>

I do not need to tell you how grateful I am for this post, which gives me an agreeable subject to study for the coming winter.

The next oppositions will present Mars with a considerable diameter, and I hope that you will make some brilliant discoveries.

Your devoted

**1 febbraio 1907**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 102. Minuta.**

A Percival Lowell  
1° febbraio 1907

Monsieur,

**1 February 1907**

**From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 590,  
fasc. 1, n. 102. Draft.**

To Percival Lowell  
1 February 1907

La saison mauvaise que nous avons ici m'a obligé à interrompre ma correspondance pendant quelque temps.

Vous me pardonnerez d'avoir différé si longtemps de vous envoyer mes remerciements pour l'envoi de votre nouvel ouvrage sur la planète Mars.

Je suis fort embarrassé pour savoir quelle mine je dois faire en présence de nouveau Columbus que vous venez de découvrir. Ordinairement, dans de semblables occasions, il faut montrer une ...<sup>a</sup> tout à fait particulière. Mais cela ne me paraît point nécessaire dans le cas actuel. La différence entre les deux Columbus est tellement visible à tout le monde, que je puis me dispenser de la constater.

Cela n'empêche pas de rester le nouveau Columbus supérieur à l'ancien. Par exemple, le nouveau Columbus est tout-à-fait dépourvu de cette terrible ambition, qui a été la cause principale des malheurs dont le grand Almirante a été accablé.<sup>b</sup>

Votre livre<sup>c</sup> est tout simplement un petit chef d'œuvre. En le lisant, j'ai pu me faire une idée plus synthétique et plus complète des progrès que vous avez réalisés dans l'Aréographie. Vous avez marché droit et sûr là ou bien de fois je suis resté dans l'incertitude, embarrassé par l'inattendu et par l'étrangeté de ce que je voyais. Votre livre contient un vrai programme de recherches pour les observateurs à venir. Il faut cela est la fruit de la méthode logique et rationnelle que vous avez appliqué à tous ces problèmes. Cette même méthode vous a permis de construire, dans la quatrième partie une théorie que je trouve de plus en plus satisfaisante dans son ensemble. Je suis maintenant persuadé avec vous que l'hypothèse des mers et des continents ne peut représenter les faits et que l'hypothèse de la végétation est pour le moment de beaucoup la plus probable. En tout cas, même les plus sceptiques devront y reconnaître une excellente working hypothesis. Le lecteur arrivé à la fin, voit avec étonnement l'astronome minutieux, qui après avoir fait les observations les plus subtiles, sort de son observatoire et se transforme en un philosophe plein de bon sens et dans un brillant écrivain.

Mes nouvelles ne sont pas tout à fait bonnes. L'âge et les infirmités continuent leur œuvre. Pour passer le temps je m'amuse maintenant avec les Babyloniens. Je vous prie d'agréer un petit mémoire que je viens de publier sur leurs observations de Vénus. Ces ...<sup>d</sup> Babyloniens ont laissé aussi des observations sur Mars, mais pas aussi intéressantes que celles qu'on font et qu'on va faire à Flagstaff.

Votre dévoué

Sir,

The wicked season that we have here required me to interrupt my correspondence for some time.

You will forgive me for having deferred so long in sending you my thanks for the shipment of your new work on the planet Mars.

I am too embarrassed to know what reaction I should have in the presence of your new Columbus that you have just discovered. Ordinarily, on similar occasions, it would be necessary to show a completely particular ...<sup>a</sup> But that does not seem to me at all necessary in the present case. The difference between the two Columbus is so visible to all the world that I can dispense with noting it.

This does not preclude keeping the new Columbus above the old. For example, the new Columbus is entirely devoid of this terrible ambition, which was the principal cause of the misfortunes in which the great Admiral was overwhelmed.<sup>b</sup>

Your book<sup>c</sup> is quite simply a small masterpiece. In reading it, I could create an idea more concise and more complete of the progress that you have realized in Areography. You have walked straight and steady there where many times I have stayed in uncertainty, embarrassed for the unexpected and the strangeness of what I have seen. Your book contains a true program of research for the observers to come. It must be that this is the fruit of the logical and rational method that you have applied to all these problems. This same method has allowed you to create, in the fourth part, a theory that I find more and more satisfying in general. I am now persuaded by you that the hypothesis of oceans and continents cannot represent the facts, and the hypothesis of vegetation is, for the moment, the most probable of many. In any case, even the most skeptical should recognize in it an excellent working hypothesis. The reader arrives at the end, sees with astonishment the precise astronomer, who, after having done the most subtle observations, leaves his observatory and transforms into a simple philosopher of good sense and a brilliant writer.

My news is not entirely good. Age and infirmity continue their work. To pass the time, I amuse myself now with the Babylonians. I ask you to please accept a small memoir I have just published on the observations of Venus. These ...<sup>d</sup> Babylonians have also left some observations of Mars, but not as interesting as those we are doing and those which will be done in Flagstaff.

Your devoted

I wish for you to be able to continue for a long time your noble work. And again I make

Je vous souhaite de pouvoir continuer encore longtemps ces nobles travaux. Et encore je fais des vœux afin que vous trouviez un successeur qui puisse les continuer dans le même esprit et avec le même succès.

wishes for you to finally find a successor who can continue in the same spirit and with the same success.

- a Illegible writing.
- b Schiaparelli is referring to Lowell's *Mars and its Canals* book that Lowell just sent to him. Lowell dedicated the book to Schiaparelli – “To GV Schiaparelli – The Columbus of a new planetary world, this investigation upon it is appreciatively inscribed”. Here, Schiaparelli is making a joke comparing himself to the great admiral Columbus. It is of course meant to be flattering—both discovered New Worlds, in a sense—but Schiaparelli, who was a very modest individual, was clearly not entirely comfortable with it. He accepts the dedication only because he believes it to be so over-the-top that the difference will be obvious; but he also—interestingly—says that “... the new Columbus is entirely devoid of the terrible ambition which was the principal cause of the misfortunes in which the great Admiral was overwhelmed.” He also wrote to his closest friend, Francois Terby, on 11 May 1886: “It is a New World, this world of Mars, believe me, and it will be necessary for us to conquer it little by little as a prize. It will be a less difficult and less bloody conquest than the exploits of Cortes and Pizarro.”
- c This refers to the book by P. Lowell entitled: *Mars and Its Canals* (New York, MacMillan, 1906).
- d Illegible writing.

**Dopo il 1 febbraio 1907 (marzo [?] 1907)**  
**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 590,**  
**fasc. 1, n. 121. Originale senza data.**

Cher collègue,

C'est l'envoi qui plait, non la grandeur du brochure. C'est ainsi que je vous remercie des *Venusbeobachtungen*.<sup>a</sup>

J'espère que la comparaison à Colomb ne vous a pas déplu.

Le 14 de ce moi je pars pour Flagstaff et Mars. De plus une expédition sous les mêmes auspices ira au Peru. Donnez moi vos souhaits.

Votre dévoué

Percival Lowell

**After 1 February 1907 (March [?] 1907)**  
**From Percival Lowell to Giovannie**  
**Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 590,**  
**fasc. 1, n. 121. Original without a date.**

Dear colleague,

It is the shipment that pleases, not the size of the booklet. It is thus that I thank you for *Venusbeobachtungen*.<sup>a</sup>

I hope that the comparison to Columbus has not displeased you.

The 14<sup>th</sup> of this month I leave for Flagstaff and Mars.

Furthermore, an expedition under the same auspices will go to Peru. Send me your best wishes.

Your devoted

Percival Lowell

- a A German title meaning ‘Venus Observations’.

**Dopo il 1 febbraio 1907**  
**G.V. Schiaparelli a P. Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 590,**  
**fasc. 1, n. 121a. Minuta senza data in calce**  
**alla precedente lettera di P. Lowell.**

Pourquoi la comparaison que vous avez fait de moi à Colomb m'aurait-elle déplu? Comme je vous ai écrit en vous remerciant de l'envoi de votre magnifique ouvrage sur Mars, il n'arrive pas très souvent d'être en si bonne compagnie.

Je vous écris à Flagstaff, une autre lettre de moi vous aura probablement précédé. Vous

**After 1 February 1907**  
**From Giovanni Schiaparelli to Percival**  
**Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 590,**  
**fasc. 1, n. 121a. Draft without a date at the**  
**foot of the letter from Percival Lowell.**

Why would the comparison that you made of me with Columbus have displeased me? As I wrote to you in thanking you for the shipment of your magnificent work on Mars, it does not often happen to be in such good company.

I write to you in Flagstaff, another letter of mine will probably precede its arrival to you. You

allez commencer une nouvelle campagne: mon désir est qu'elle soit encore plus heureuse que toutes les précédentes, et c'est beaucoup dire.

J'ai dernièrement étudié quelques observations des Babyloniens sur Mars. Ces sont des essais assez informes, mais c'est le commencement de l'astronomie planétaire. Cette planète est vraiment précieuse. Elle a partie les premiers essais des Babyloniens; avec son moyen, Kepler a découvert ses deux premiers lois: maintenant elle va dévoiler les mystères de la vie sur un autre monde. C'est le Mars terrestre, c'.à dire<sup>a</sup> la guerre, qu'il faut abolir.

Votre dévoué

a Shorthand for 'c'est-à-dire'.

are going to begin a new campaign: my desire is that it is even happier than all of its predecessors, and that is saying a lot.

I have recently studied some observations from the Babylonians of Mars. These are fairly crude attempts, but they are the commencement of planetary astronomy. This planet is especially precious. It has evaded the first attempts of the Babylonians; with his method, Kepler discovered its first two laws; now, it will reveal the mysteries of life on another world. It is the terrestrial Mars, that is to say war, that must be abolished.

Your devoted

**2 luglio 1907**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 591,  
fasc. 1, n. 6. Originale con inserite due  
fotografie di Marte del giugno 1907.**

Lowell Observatory, Flagstaff, A. T.  
le 2 Juillet 1907

Al Prof. G.V. Schiaparelli  
Milano

Cher Collègue et Ami,

A vous, avant personne, doivent être envoyées les premières épreuves des nouvelles photographies de Mars que M. Lampland vient de faire. Ainsi c'est à vous qu'elles se hâtent de partir.

Avec respect et affection  
Votre dévoué

Percival Lowell

**2 July 1907**

**From Percival Lowell to Giovanni  
Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 591,  
fasc. 1, n. 6. Original with the insertion of  
two photographs of Mars from June 1907.**

Lowell Observatory, Flagstaff, A. T.  
2 July 1907

To Prof. G.V. Schiaparelli  
Milan

Dear Colleague and Friend,

To you, before anyone, should be sent the first proofs of the new photographs of Mars that Mr. Lampland has just made. Thus it is to you that they must go.

With respect and affection  
Your devoted

Percival Lowell

**28 aout 1907**

**P. Lowell a G.V. Schiaparelli  
Lowell Observatory Archives.  
Originale.**

Cher Collègue:

A vous plus qu'à personne doivent aller les nouvelles photographies de Mars. C'est surprenant ce qu'elles montrent. Vous allez même y découvrir encore le petit fons juventae.<sup>a</sup> Notez aussi comme les dessins et les photographies, indépendamment faits, se vérifient les uns les autres.

Avec tous mes hommages et mes souhaits pour votre santé  
Votre dévoué

**28 August 1907**

**From Percival Lowell to Giovanni  
Schiaparelli  
Lowell Observatory Archives.  
Original.**

Dear Colleague:

The new photographs of Mars should go to you more than anyone. It is surprising what they show. You yourself will go there to discover the little fons juventae<sup>a</sup> again. Note also how the drawings and the photographs, independently made, verify one another.

With all my respect and wishes for your health  
Your devoted

Percival Lowell

Percival Lowell

- a The Juvantae Chasm on Mars was named by Schiaparelli after the *fons juvantae*, the 'Fountain of Youth'.

**4 novembre 1907**

**G.V. Schiaparelli a P. Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 591,**  
**fasc. 1, n. 34. Minuta.**

A Percival Lowell, Flagstaff, Arizona  
 4 novembre 1907

Malgré les instructions que j'avais données, vos deux envois si précieux et si intéressants sont restés à Milan pendant plusieurs mois et c'est seulement à mon retour dans cette ville que j'ai pu lire votre lettre affectueuse, et examiner les photographies

J'avais bien raison de vous écrire que les photographies de 1905 n'étaient que le premier pas dans une carrière ainsi fructueuse que brillante!

Quoique ma vue fatigué aient perdu beaucoup de sa précision, j'ai bien pu reconnaître là une quantité de formes qui n'étaient autrefois très familières et que je n'avais jamais pu dessiner exactement malgré tous mes efforts. Les photographies du 11 juillet montrent à la première vue déjà beaucoup de choses et je croie qu'on pourra en voir ...<sup>a</sup> davantage lorsqu'on les examinera avec un certain grossissement sous une forte lumière.

Je remarque que la traduction de l'image colorée dans le clair-obscur est faite dans une manière différente pour l'œil et pour la plaque photographique: non seulement celle-ci montre une disproportion plus grande entre les aires sombres et les aires jaunes mais il y a encore une tendance à noircir plus qu'il faut les nuances plus intenses du rouge. Cela est inévitable sans doute. Mais dans la comparaison des dessins avec les photographies il faudra savoir compter avec cette circonstance. Ce qui ne pourra être bien fait que par les connaissances exactes de la planète.

J'espère que vos nouveaux clichés [convaincront]<sup>b</sup> à des idées plus justes un bon nombre des sceptiques.

Avec les plus grands reconnaissances.

a Illegible writing.

b Unclear writing, possibly 'convaincront', meaning 'convincing'.

**4 November 1907**

**From Giovanni Schiaparelli to Percival Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 591,**  
**fasc. 1, n. 34. Draft.**

To Percival Lowell, Flagstaff, Arizona  
 4 November 1907

Despite the instructions that I had given, your two so precious and so interesting shipments were kept in Milan for many months and it was only upon my return to that city that I was able to read your affectionate letter and examine the photographs.

I have been correct in writing to you that the photographs from 1905 were but the first step in a career as fruitful as it is brilliant!

Although my fatigued gaze has lost its precision, I was able to recognize the quantity of forms that were again very familiar and that I could never draw exactly despite all my efforts. The photographs from 11 July show, at the first look, again many things and I believe that one will be able to see ...<sup>a</sup> if one examines them at a certain enlargement under a strong light.

I remark that the renderings of the colored image in the halftone are done with different methods for the eye and for the photographic plate: not only does this show a larger disproportion between the dark areas and the yellow areas, but there is also a tendency to darken the more intense shades of red more than one should. This is, without a doubt, inevitable. But in comparing the drawings with the photographs, it is necessary to account for this circumstance. What can only be done with the exact knowledge of the planet.

I hope that your new plates [convince]<sup>b</sup> a good number of skeptics of some more just ideas.

With the greatest respect.

**31 gennaio 1909**

**G.V. Schiaparelli a P. Lowell**

**31 January 1909**

**From Giovanni Schiaparelli to Percival**



**A.O.B., Fondo G.V. Schiaparelli, cart. 592, fasc. 1, n. 50. Minuta.**

A Percival Lowell  
31 Gen 1909

Mon cher Professeur et ami,

Une nouvelle opposition de Mars aura lieu bien tôt et je ne doute point que vous allez continuer vos essais de photographie sur cette planète. L'article publié dernièrement par M. Antoniadi dans le *Monthly Notices* de la R.A.S. montre que ces essais sont déjà parvenus à un haut degré de perfection et que vos photographies peuvent déjà, pour la quantité des détails, être placées sur la même ligne que les observations visuelles, tout en les surpassant beaucoup par l'exactitude du trait et par leur indépendance de toute équation personnelle.

L'article de M. Antoniadi me rappelle que moi aussi j'ai fait une étude détaillée de vos photographies de 1907,\* qui portent la date du 11 juillet, c'est à dire la même date que les photographies examinées par M. Antoniadi. Mais les deux positions de la planète ne sont pas les mêmes et il y a dans les détails une différence très considérable, quoique l'intervalle entre les époques ne soit que d'un quart d'heure tout au plus.

Mes photographies contiennent beaucoup plus de détails. Entre autres choses on y voit la quadripartition de *Hellas* par l'*Alphi* et par le *Penio*, le dédoublement du *Cerberus* y est plus évident que sur la figure de M. Antoniadi, le *Xantus* et le *Scamander* s'y trouvent dédoublés de la manière plus indubitable; entre l'*Elisium* et la *Mer Cimmerium*, il y a un enchevêtrement prodigieux de lignes, parmi les quelles il n'est pas aisé de s'orienter, bien qu'il soit possible d'y reconnaître plusieurs des anciens tracés.

Je n'ai rien publié de cet examen, pour deux motifs. Le premier est que vous avez le droit d'être le premier à faire cette publication dans la forme que vous estimerez être la meilleure et plus complète. En second lieu, ayant essayé de construire un dessin agrandi de l'un des 40 petits disques, j'ai constaté avec douleur que ma main et mon œil sont devenus tout-à-fait insuffisants pour un travail si difficile. J'ai perdu toute habitude du dessin! Pour la même raison je me trouve dans l'impossibilité de publier mon VIIe Mémoire sur Mars, dont le texte est tout préparé, mais dont j'ai vainement essayé de reproduire les dessins fait au télescope en 1890.

Dans cet état des choses j'ai pensé qu'il serait dommage, si les photographies dont vous m'avez faits présent, restaient inédites. Sans doute le mieux serait de les voir publiés

**Lowell**

**A.O.B., Fondo G.V. Schiaparelli, cart. 592, fasc. 1, n. 50. Draft.**

To Percival Lowell  
31 Jan 1909

My dear Professor and friend,

A new opposition of Mars will take place very soon, and I do not doubt at all that you will continue your attempts to photograph this planet. The recently published article by Mr. Antoniadi in the *Monthly Notices* of the R.A.S. show that these attempts are already undertaken to a high degree of perfection and that your photographs can already, for the quantity of details, be placed on the same line as visual observations, all in surpassing many by the exactitude of traits and by their independence from any personal equation.

Mr. Antoniadi's article reminds me that I too did a detailed study of your photographs of 1907,\* that have the date of 11 July, that is to say the same date of the photographs examined by Mr. Antoniadi. But the two positions of the planet are not the same and there is, in the details, a very considerable difference although the interval between the periods is nothing more than a quarter of an hour.

My photographs contain many more details. Among other things, one can see the quadripartition of *Hellas* by *Alpheus* and by *Peneus*, the doubling of *Cerberus* is here more evident than on the picture card of Mr. Antoniadi, *Xanthus* and *Scamander* find themselves doubled in an unmistakable manner; between *Elysium* and *Mare Cimmerium*, there is an amazing entanglement of lines amidst which is it not easy to orient oneself, however it would be possible to do so by recognizing various older traces.

I have not published anything of this test for two reasons. The first is that you have the right to be the first to create this publication in the form that you deem the best and the most complete. In the second place, having tried to create a drawing out of one of the 40 small plates, I have ceased with the pain that my hand and my eyes have become totally insufficient for such a difficult work. I have lost all the ability to draw! For the same reason, I find myself in the impossibility of publishing my VII Memoir on Mars, for which all the text is prepared, but for which I have tried in vain to reproduce the drawings done at the telescope in 1890.

In this state of things, I thought that it would be too bad if the photographs that you took remained unedited. Without a doubt, the best

sur vos livres; d'autant plus que vous êtes en possession des négatives, ce qui est une circonstance bien essentielle pour l'exactitude de la publication. Mais si vous ne pouvez vous charger de cette tâche, ne serait-il pas le cas de profiter de la bonne volonté de Mr. Antoniadi, qui s'est déclaré prêt à faire une semblable publication pour toute cliché qu'on mette à sa disposition? Si vous êtes d'accord dans cette idée, je pourrais envoyer mon cliché à Antoniadi qui pourrait le reproduire de la même manière que l'autre déjà publié. Sa publication laisse beaucoup à dessin; mais cela sera toujours mieux que de laisser inédit un matériel ainsi précieux.

Mes nouvelles ne sont ni trop bonnes, ni trop mauvaises: la décadence naturelle continue, come il faut s'y attendre. Mais j'espère bien de voir encore les résultats de vos travaux de l'opposition de 1909, sur la réussite des quels j'ai les plus grandes espérances.

Vos photographies de 1907 marquent un pas gigantesque sur celles de 1905; un autre pas égal nous conduira à des conséquences inattendues, que les clichés de 1907 me font pressentir.

Votre dévoué

G. Schiaparelli

\*que vous avez eu la bonté de me communiquer

**16 marzo 1909**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 592,  
fasc. 1, n. 79. Originale.  
Allegata una post card Spectrogram of  
Moon and Mars by V.M. Slipher.**

Boston le 16 Mars 1909

Cher Maître Martien et honoré Collègue,

Vous et vous seulement devez faire la représentation de ce qu'on puisse voir sur les photographies de Mars que je vous ai envoyé. Car, malgré ce que vous m'écrivez de vos pauvres yeux, vous pouvez encore beaucoup mieux de voir que M. Antoniadi ou tout autre qui n'a pas bien étudié la planète. Je vois ça sans contredit par votre lettre et les canaux que vous avez entrevu. Ainsi faites je vous prie la chose, dictant si c'est nécessaire à quelque amanuensis. Faites cet honneur, je vous prie, à la Science.

Votre dévoué

Percival Lowell

would be to see them published in your books; especially since you are in possession of the negatives, which is a very essential circumstance for the exactitude of the publication. But if you cannot take charge of such a task, would it not be the case to profit from the good will of Mr. Antoniadi, who has declared himself ready to create a similar publication for every image that is put at his disposal? If you are in agreement with this idea, I will be able to send my plate to Antoniadi who will be able to reproduce it in the same manner as the other that was already published. His publication leaves much to drawing; but this will always be better than leaving such precious material unedited.

My news is not too good nor too bad; the natural deterioration continues, as one should expect. But I hope to see again the results of your work on the opposition of 1909, on the success of which I have the highest hopes.

Your photographs from 1907 mark a gigantic step compared to those from 1905; another equal step drives us to unexpected outcomes, that the copies from 1907 have presented me.

Your devoted

G. Schiaparelli

\*that you had the good will to send to me

**16 March 1909**

**From Percival Lowell to Giovanni Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 592,  
fasc. 1, n. 79. Original. Attached to a post  
card Spectrogram of Moon and Mars by V.M.  
Slipher.**

Boston, 16 March 1909

Dear Martian Master and honored Colleague,

You and you alone should create the representation of what one might see in the photographs of Mars that I sent you. Because, in spite of what you write to me about your poor eyes, you can still see much better than Mr. Antoniadi or anyone else who has not studied the planet well. I see this without contradiction through your letter and the canals that you have glimpsed. So do, I beg of you, the task, dictating if necessary to some amanuensis. Do this honor, please, for Science.

Your devoted

Percival Lowell

**Testo della post card:**

Hommages pour l'anniversaire du 14 mars  
– et souhaits pour beaucoup encore.

Si par hasard vous voyagez cet été à  
Dresde vous verrez à l'exposition là des  
photographies de Mars faisant le tour de la  
planète.

P.L.

**26 marzo 1909**

**G.V. Schiaparelli a P. Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 79a. Minuta.**

A Percival Lowell  
26 marzo 1909

Cher professeur et illustre collègue,  
en répondant à votre lettre du 16 mars je  
dois avant tout vous remercier pour le nouveau  
volume que vous venez de m'envoyer sur *notre*  
planète. Mon attention a été surtout captivée  
par la seconde partie, celle qui contient les  
notes sur diverses questions; je vois par là que  
vous ne laissez aucun coin de l'Aréographie  
sans y porter la lumière de vos études.

O, mon bien stimé<sup>a</sup> collègue et  
continuateur, vous qui avez dépassé à tant  
d'égard celui que vous appelez votre maître!  
Êtes vous bien sérieux lorsque me proposez  
d'expliquer au monde ce qu'on voit dans vos  
photographies? Si excellentes qu'elles sont,  
elles ne peuvent suffire à une semblable tâche.  
Voyons. En dehors des photographies elles  
mêmes, je ne possède aucune des notions  
nécessaires. Je ne sais absolument rien sur  
elles, pas même la date; car quoique mon  
exemplaire et cliché étudié par M. Antoniadi  
portent celle du 11 juillet 1907, je ne pourrai  
jamais croire qu'ils puissent présenter l'état du  
même jour à peu de minutes d'intervalle. Il y a  
là doute qu'il serait très important d'éclaircir.<sup>b</sup>

Comment voulez-vous que j'explique de  
quelle manière ces photographies ont été  
prises, l'appareil optique, l'endroit (Flagstaff ou  
Arequipa?), la durée des expositions, la qualité  
des plaques et des écrans ...,<sup>c</sup> la suite des  
essais jusqu'à la réussite, les défauts de  
plusieurs disques et leurs causes (j'en devine  
quelques unes mais il y a en a de tout-a-fait  
mystérieuses pour moi), comme si faut-il que  
des disques pris à très court intervalle montrent  
de différences aussi considérables?

Enfin quelle autorité aurai je pour décider  
les sceptiques à croire aux géminations? Ils  
hausseront les épaules et diront: «Notre vieux  
hibou de Milan a vu double avec son telescope

**Text from the postcard:**

Best wishes for your birthday on 14 March  
– and wishes for still more.

If, by chance, you are traveling to Dresden  
this summer, you will see at the exposition there  
some photographs of Mars circling the planet.

P.L.

**26 March 1909**

**From Giovanni Schiaparelli to Percival**  
**Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 79a. Draft.**

To Percival Lowell  
26 March 1909

Dear professor and illustrious colleague,  
responding to your letter from 16 March, I  
should before everything thank you for the new  
volume that you have just sent me on *our*  
planet. My attention was above all captured by  
the second part, that which contains the notes  
on various questions; I see there that you leave  
no corner of Areography without bringing the  
light of your studies.

O, my well esteemed colleague and  
successor, you have exceeded in so many  
ways him who you call your master! Are you  
serious when you proposed me to explain to the  
world what we see in your photographs? As  
excellent as they are, they cannot suffice for  
such a task. We will see. Apart from the  
photographs themselves, I do not possess any  
of the necessary notions. I do not know  
absolutely anything about them, not even the  
date; for although my copy and image studied  
by Mr. Antoniadi bear that of 11 July 1907, I will  
not ever be able to believe that they could  
present the state of the same day within  
minutes of each other. There is the doubt that  
would be very important to clear up.

How would you like me to explain the  
manner in which the photographs were taken,  
the optical device, the place (Flagstaff or  
Arequipa?), the duration of the exposures, the  
quality of the plates and the screens ...,<sup>c</sup> the  
sequence of tests until success, the defects of  
several disks and their causes (I can guess a  
few, but there are some that are a mystery to  
me), like how it is possible for disks taken at a  
short interval to show such considerable  
differences?

Finally, what authority do I have to convince  
skeptics to believe in these geminations? They  
shrug their shoulders and say: "Our old owl from

sur Mars, maintenant il voit double avec ses bésicles sur les photographies: rien de plus naturel». Non, ce n'est pas à moi mais c'est à vous d'exposer tout ce que vous avez fait: car vous en avez tous les moyens.

Cela n'empêche pas que je puisse entrer comme témoin auxiliaire, ce que je ferai toujours très volontiers.

On ne nous croira pas: mais du moins les vrais savants auront entre les mains un document exact et complet que, abandonné à mes propres moyens, je ne pourrai jamais fournir.

Si j'étais un peu plus jeune, le voyage de Dresde ne me semblerait pas trop considérable pour y voir photographier la planète sous d'autres longitudes que 260°: mais je suis entré dans ma 75e année et ma force suffit tout juste pour m'aider à faire le tour de mon appartement. Ainsi je me devrais contenter de ce que j'ai vu en fait de photographie martienne. Mais non, pas de tout. Peut être à la fin de 1909 tout cela sera de l'histoire ancienne. Si vous serez aussi heureux en 1909 que vous l'avez été en 1907 nous allons encore apprendre bien de choses. Que le ciel entende mes vœux!

J'oublia de vous remercier pour le spectre de la vapeur d'eau martienne qui est une autre conquête de votre activité et du bon souvenir que vous conservez même d'une circonstance si peu important que mon entrée dans le monde terrestre. Cela a eu lieu trop tôt, beaucoup trop tôt, voilà ce que je pense quelquefois.

- a Mis-spelling of the word 'estimé', meaning 'esteemed'.  
b Mis-spelling of the word 'éclaircir', meaning 'to clear up'.

- c Illegible writing.

**11 giugno 1909**

**G.V. Schiaparelli a P. Lowell**

**A.O.B., Fondo G.V. Schiaparelli, cart. 592, fasc. 1, n. 123. Minuta.**

A Percival Lowell  
11 Juin 1909

Hier j'ai reçu vos photographies. J'ai vérifié l'enveloppe et j'ai trouvé tout en parfait ordre. Toutes les pièces de verre du reste étaient à leur place et elles avaient conservé toutes leur orientation. Une des pièces était cassée mais la cassure était toute en dehors du disque de Mars.

Pour le moment je n'ai encore fait aucun examen: quelque coup d'œil a suffit cependant pour me persuader que un étude attentive va mettre en évidence bien de choses. J'ai enfin trouvé l'explication des différences entre les clichés étudiés par M. Antoniadi et ceux dont

Milan has seen double with his telescope on Mars, now he sees double with his spectacles on the photographs: nothing more natural." No, it is not for me but it is for you to expose all that you have done: because you have all the means.

This does not prevent me from acting as an auxiliary witness, which I will do very willingly.

They will not believe us: but at least the true scholars will have in their hands an exact and complete document that, abandoned to my own means, I would never be able to render.

If I were a bit younger, the voyage to Dresden would not seem too significant to see the planet photographed from other longitudes than 260°: but I have entered my 75th year and my strength only suffices to help me make it around my apartment. Thus, I should content myself with what I have actually seen in Martian photography. But no, not entirely. Maybe at the end of 1909, all of that will be ancient history. If you are as happy in 1909 as you were in 1907, we will learn again many things. May heaven hear my wishes!

I forgot to thank you for the spectrum of Martian water vapor that is another conquest of your activity and of the good memory that you keep even of a circumstance so little important as my entrance into the earthly world. This took place too early, much too early, that is what I think sometimes.

**11 June 1909**

**From Giovanni Schiaparelli to Percival Lowell**

**A.O.B., Fondo G.V. Schiaparelli, cart. 592, fasc. 1, n. 123. Draft.**

To Percival Lowell  
11 June 1909

Yesterday I received your photographs. I checked the envelope and I found everything in perfect order. All the remaining pieces of glass were in their place and they all kept their orientation. One of the pieces was broken, but the break was completely outside of the disk of Mars.

For the moment, I have not yet done any examination; a few glances were sufficient to persuade me that an attentive study will bring to light many things. I have finally found the explanation for the differences between the

vous m'aviez fait présent. La date et la configuration étaient les mêmes, 11 juillet  $\omega = 260^\circ$ ; mais les deux images ont été prises l'une à Flagstaff, l'autre au Chile, et l'une est bien plus parfaite que l'autre. Ce sera une comparaison fort instructive.

Je vais tâcher de me procurer un réticule micrométrique pour faire quelque essai de reproduction sur grande échelle. Pour le moment je ne promets rien; mais je vais bien faire tous mes efforts pour utiliser autant que possible l'envoi précieux que vous venez de me faire.

Votre dévoué

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**28 giugno 1909**

**P. Lowell a G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 132. Originale. (è una cartolina)**

Al Signor Prof. G.V. Schiaparelli  
 7, via Fatebenefratelli

Milano  
 Italy

Très honoré collègue et ami,

Le 7 Mai on vous a envoyé une suite de photographies de Mars encadrées – un assez gros tableau. Vous y sont elles parvenues?

Votre dévoué

Percival Lowell

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**7 luglio 1909**

**G.V. Schiaparelli a P. Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 141. Minuta. Risposta al biglietto**  
**del 28 giugno arrivato a Milano il 6 luglio.**

A Percival Lowell  
 7 luglio 1909

J'apprend par votre billet du 28 juin que ma dernière lettre n'est point parvenue entre vos mains.

Votre envoi est arrivé à Milan le 10 juin. Après avoir vérifié que tout était en bon ordre, et que rien n'était cassé, je vous ai écrit le lendemain, en adressant ma lettre à Flagstaff, je ne possède pas votre adresse exacte de Boston.

Ayant bien vu de quoi il s'agissait, le 14 juin je me mis en relation avec M. Koristka, qui est un constructeur habile de microscopes et je lui ai ordonné un microscope de bas grossissement avec un réticule micrométrique pour dessiner et éventuellement pour mesurer

images studied by Mr. Antoniadi and those which you have presented to me. The date and the configuration are the same, 11 July  $\omega = 260^\circ$ ; but the two images were taken, one in Flagstaff, the other in Chile, and the one is much more perfect than the other. This will be a very instructive comparison.

I will attempt to procure a micrometric reticule to do some reproduction tests on a large scale. For the moment, I do not promise anything, but I will make all efforts to use as much as possible the precious shipment that you have just sent me.

Your devoted

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**28 June 1909**

**From Percival Lowell to G.V. Schiaparelli**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 132. Original postcard.**

To Prof. G.V. Schiaparelli  
 7, via Fatebenefratelli

Milan  
 Italy

Very honored colleague and friend,

On 7 May we sent you a series of photographs of Mars enclosed in a box – a large enough tableau. Have they reached you?

Your devoted

Percival Lowell

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**7 July 1909**

**From Giovanni Schiaparelli to Percival Lowell**  
**A.O.B., Fondo G.V. Schiaparelli, cart. 592,**  
**fasc. 1, n. 141. Draft. Response to the letter**  
**from 28 June, which arrived in Milan 6 July.**

To Percival Lowell  
 7 July 1909

I understand from your note from 28 June that my last letter has not yet reached your hands.

Your shipment arrived in Milan 10 June. After having confirmed that everything was in good order and nothing was broken, I wrote to you the next day, addressing my letter to Flagstaff, I do not have your exact address in Boston.

Having well seen what the note from 14 June was about, I put myself in touch with Mr. Koristka, who is a skilled maker of microscopes, and I instructed him to make a microscope of low magnification with a micrometric reticle for drawing and eventually measuring as well. With

aussi. Avec cet appareil je ne gagne pas beaucoup pour l'œil nu quant à la finesse des détails mais les dimensions plus considérables de l'image me permettent d'y travailler assez longtemps sans me fatiguer l'œil.

À l'aide de cet instrument j'ai commencé par faire une revue sommaire de chaque image: je en ai examiné jusqu'à présent les 72 images de Flagstaff parmi les quelles. Dans le nombre il y en a quelques unes d'une grande perfection: elles ont les dates Flagstaff 11, 15, 26, 27, 28 juillet. Parmi les 12 images d'Alianza que j'ai examinées jusqu'à présent, j'en ai trouvées deux vraiment excellentes, toutes les deux du 26 juin: et j'espère d'en trouver encore d'autres. Ces images ne donnent pas seulement des choses déjà bien connues, mais elles fournissent de nouveaux éclaircissements sur d'objets connus, et en font entrevoir d'autres nouveaux. Les géminations ne sont pas nombreuses mais il y en a de très bien marquées.

L'examen de ces photogrammes exige beaucoup de précaution, à cause des grains de poudre et du petits filaments de la couche sensible positive ou negative, qui simulent quelquefois de belles oasis et des canaux fort bien marqués. À cet égard je vous dirai qu'il est tout à fait nécessaire de savoir exactement plusieurs circonstances relatives à l'histoire de chaque image. En premier lieu il est surtout fort nécessaire de savoir (à une, ou même à quelques minutes près) l'époque de l'exposition de chaque négative. Ensuite il faut pouvoir distinguer l'une de l'autre toutes les négatives prises le même jour: il suffit pour cela de leur assigner un numéro d'ordre pour chaque jour. Et pour chaque positive il faudra désigner la négative dont elle a été tirée par la date et par son numéro d'ordre.

De cette manière on pourra aisément discerner la relation qui existent entre plusieurs images qui portent la même date. Cela est très essentiel. Car la comparaison des différentes images du même jour ne peut se faire avec certitude sans cela. Lorsque une de ces images présente quelque détail remarquable qui n'existe pas dans les autres images du même jour il est évidemment utile de savoir si parmi ces autres images il y en a qui dépendent de la même negative, ou s'il en y a pas. Vous comprenez que si plusieurs images ont été tirées de la même négative, et le même détail remarquable se trouve en plusieurs d'elles, la réalité du détail reste douteuse. Au contraire si ce détail se trouve dans deux images tirées de négatives différentes, la réalité du détail est presque certaine.

Le 11 juillet je vais à la campagne; je vous prie d'adresser vos envois à l'adresse:

this device, I will not gain much on the naked eye in regard to the fineness of the details, but the more substantial dimensions of the image will permit me to work for longer amounts of time without tiring the eye.

With the aid of this instrument, I began to do a summary review of each image; I have examined to date 72 of the images from Flagstaff. In the number, there are some of great perfection: they have the dates Flagstaff 11, 15, 26, 27, 28 July. Among the 12 images from Alianza that I examined to date, I found two truly excellent ones, both of the images from 26 June, and I hope to find others. These images do not only show what is already well known, but they provide further clarification for known objects and make sight of other new objects. The geminations are not numerous, but those that appear are very well marked.

The examination of these frames requires a good deal of caution because of the grains of powder and the small filaments of sensitive film, positive or negative, that sometimes simulate beautiful oases and strong, well-marked canals. In this regard, I will tell you that it is quite necessary to know the exact circumstances relative to the history of each image. In the first place, it is of course very necessary to know (within one or even a few minutes) the length of the exposure of each negative. Next, it is essential to be able to distinguish one from another all of the negatives taken on the same day; it suffices to assign numbers in order for each day. And for each positive, it would be essential to designate the negative from which it was taken by the negative's date and number.

In this manner, one could easily discern the relationship that exists between various images that bear the same date. This is essential. Because the comparison of different images from the same day cannot be done with certainty without this method. When one of these images presents some remarkable detail that does not exist in the other images from the same day, it is evidently useful to know if, among these other images, there are some that depend on the same negative or if there are not. You understand that if several images are taken from the same negative, and the same remarkable detail is found in several of them, the reality of that detail remains doubtful. On the contrary, if this detail is found in two images taken from different negatives, the reality of this detail is almost certain.

On 11 July, I am going to the countryside; please address your shipments to this address:

Prof. Schiaparelli  
Monticello (province of Como)  
Italy

Prof. Schiaparelli  
Monticello (province de Como)  
Italie

jusqu'à premier novembre. Je porterai avec moi l'appareil relatif à Mars, et je tâcherai d'extraire de vos clichés tout ce que je pourrai. Dans le même temps vous serez aux prises avec Mars. Je vous souhaite de faire encore mieux qu'en 1907. Mais même si le progrès ...<sup>a</sup> devenant impossible, le point auquel vous êtes déjà arrivé marquera sur les anciens dessins un énorme progrès. N'oubliez pas, en exposant vos clichés, de marquer l'heure de votre montre (cela suffit) et de numéroter vos négatives de chaque jour selon l'ordre chronologique.

Votre dévoué

a Illegible writing.

**28 luglio 1909**  
**P. Lowell a G.V. Schiaparelli**  
**Lowell Observatory Archives.**  
**Originale.**

53 State Street  
Boston  
le 28 juillet 1909

Cher ami:

Votre avant dernier lettre m'eut parvenue presque immédiatement après que je vous avais écrit le contraire. Ainsi tout va bien.

Touts mes clichés sont numérotés et inscrits avec la date et les conditions sous lesquelles ils ont été exposé. Sur chaque nous prenons de trente à cinquante images en suite. Les empreintes que vous avez sont tirées toutes de différentes images et si elles portent la même date elles se suivent de peu de minutes si elles viennent du même cliché. Puisque et M. Lampland et moi ont pris des photographies à Flagstaff – M. E.C. Slipher à Alianza – et nos plaques se suivent il se peut que vos images soient de différents clichés et ainsi se trouvent séparées d'environ une demi-heure ou même plus. Mais ça ne ...<sup>a</sup> pas du tout à leur interprétation. En plus nous avons noté que les images photographiques sont comme les vues de l'œil eu ceci qu'elles vous présentent un moment en détail, le suivant un autre – l'*Euphrate* par exemple, puis le *Sitacus*, puis tout deux. Vous allez reconnaître ça sur l'empreinte d'une plaque entière que je vous ai envoyé auparavant.

Votre examen et description donneront à ces images une valeur rehaussé pour tout le monde mais pour moi une toute particulière. Ce sera comme l'apothéose de vos propres études.

until the first of November. I will carry with me the device relative to Mars, and I will try to extract from your images all that I can. At the same time, you will be struggling with Mars. I wish you to do even better than in 1907. But even if the progress ...<sup>a</sup> becoming impossible, the point which you have already arrived at will mark huge progress compared to the old drawings. Do not forget when exposing your images to mark the hour of your timepiece (this will suffice) and to number your negatives each day in chronological order.

Your devoted

**28 July 1909**  
**From Percival Lowell to Giovanni Schiaparelli**  
**Lowell Observatory Archives.**  
**Original.**

53 State Street  
Boston  
28 July 1909

Dear friend:

Your second-to-last letter arrived to me almost immediately after I had written you a response. Thus, all is well.

All my images are numbered and inscribed with the date and the conditions under which they were exposed. On each, we took from thirty to fifty images in a row. The prints that you have were printed from all of the different images and, if they bear the same date, they follow each other by just a few minutes if they come from the same plate. Since then, Mr. Lampland and I have taken some photographs in Flagstaff – Mr. E.C. Slipher at Alianza – and if our plates follow, it is possible that your images are from different images and thus find themselves separated by approximately half an hour or even more. But that does not ...<sup>a</sup> at all to their interpretation. Additionally, we have noted that the photographic images are like the eye's view in that they present to you a moment in detail, the following moment another – *Euphrates* for example, then *Sitacus*, then both. You will recognize this on the print of a whole plate that I have sent you previously.

Your examination and description give great value to the images for all the world, but for me in particular. This will be the culmination of your own studies.

Sous peu je pars encore pour Flagstaff.  
De cœur, votre dévoué

Percival Lowell

Shortly, I will leave again for Flagstaff.  
From the heart, your devoted

Percival Lowell

a Illegible writing.

**2 settembre 1909**

**G.V. Schiaparelli a P. Lowell  
Lowell Observatory Archives.  
Originale.**

Monticello (Como) le 2 Sept. 1909

Cher ami:

Je vous suis infiniment obligé pour votre dernière lettre du 28 juillet<sup>a</sup> et pour votre grand Mémoire sur Mercure,<sup>b</sup> qui m'était resté entièrement inconnu jusqu'à ce jour. J'avais bien vu, je ne me rappelle plus quelle part, quelques dessins de Mercure qu'on disait résulter de vos observations. Ces dessins m'ont paru au premier abord si différents de ce que j'avais vu moi même, que j'ai cru nécessaire de ne pas essayer une comparaison avant d'avoir vu votre publication définitive. Maintenant je la tiens, cette publication; elle m'a terrifié, c'est le mot! Mercure aurait-il donc une structure presque de polyèdre régulier et symétrique, comme un diamant à facettes? Cependant, malgré toute dissemblance apparente, il ne manque pas quelques points de contact, et ce sont ceux-là que j'aborderai les premiers, si jamais je me décide à publier encore quelque chose sur cette planète, ce qui n'est pas en dehors de toute possibilité. Mais à présent, parlons de Mars, qui, à ce qu'il paraît, promet d'exercer encore notre patience pendant quelque temps, surtout la vôtre.

Depuis deux mois environ je me suis appliqué à l'étude de vos merveilleux photogrammes. Après une inspection préliminaire, j'ai commencé une étude plus détaillée, et je suis arrivé au nombre de 22, la plus grande partie appartenant à la région comprise entre la *Jamuna* et le *Phasis* et comprenant le système du *Ganges*, *Thaumasias* et ce que j'ai appelé autrefois le *Lacus Tithonius*. Le travail marche assez lentement par plusieurs causes. D'abord je n'y consacrer plus qu'une heure de suite, vu la grande difficulté de bien distinguer chaque détail dans leur accablante multitude, et la faiblesse de l'œil, quoique aidé d'une très bonne lentille. Ensuite avec mon appareil il me faut employer une lumière assez forte, que le ciel ne me donne pas toujours. Enfin, je ne puis me contenter d'explorer un ou deux disques par

**2 September 1909**

**From Giovanni Schiaparelli to Percival Lowell  
Lowell Observatory Archives.  
Original.**

Monticello (Como) 2 Sept. 1909

Dear friend:

I am infinitely indebted to you for your last letter from 28 July<sup>a</sup> and for your great Memoir on Mercury,<sup>b</sup> which had remained entirely unknown to me up to this day. I had seen, I don't remember anymore where, some drawings of Mercury that were said to have resulted from your observations. These drawings seemed to me so different at first sight from what I had seen myself that I believed it was unnecessary to attempt a comparison before having seen your definitive publication. Now that I have it, this publication; it terrifies me, that is the word! Would Mercury, then, have the approximate structure of a polyhedron, regular and symmetrical, like a faceted diamond? However, despite the total apparent dissimilarity, it does not lack points of contact, and these are the ones that I will approach first, if I ever decide to publish something again about this planet, which is not beyond all possibility. But, at present, we speak of Mars, which, as it appears, promises to exercise our patience for some time, especially yours.

For about two months, I applied myself to the study of your marvelous frames. After a preliminary inspection, I began a more detailed study, and I arrived at the number 22, the largest part pertaining to the region between *Jamuna* and *Phasis* and including *Ganges*, *Thaumasias*, and what I have formerly called *Lacus Tithonius*. Work goes slowly enough for several reasons. First, I cannot spend more than an hour at a time, given the great difficulty to distinguish each detail in their overwhelming multitude, and the weakness of my eye, although aided by a very good lens. Next, with my device, I need to use a strong enough light, which the sky does not always give me. Finally, I could not content myself to explore one or two disks for each date and for each value of  $\lambda$ . I decided to explore all that you have sent me with the exception of some disks that were less



chaque date et pour chacun valeur de  $\lambda$ . Je me suis décidé à explorer tout ce que vous m'avez envoyé à l'exception de quelques disques moins bien réussites dans l'impression; j'ai pu constater que leur nombre n'est pas considérable.

La première découverte que j'ai fait est bien désagréable! L'énorme quantité de détails qu'on peut aisément reconnaître sur vos disques n'appartient pas *toute* à la planète, du moins telle est à présent mon opinion; mais dans bien de cas, je puis même dire très-souvent, aux lignes et aux tâches de la planète s'ajoutent d'autres détails trop nombreux, que je ne saurais admettre comme faisant part de la surface de Mars, et beaucoup d'autres qui me paraissent de nature douteuse. Voici comment et pourquoi:

Sur beaucoup de disques, examinés avec un grossissement effectif de 1950 fois environ (1), on voit, entre beaucoup de bandes et de lignes sombre plus ou moins nettement terminées, et sur les quelles il ne peut y avoir aucun soupçon, une, deux, ou même plusieurs lignes *brillantes*, blanches comme la neige polaire, ordinairement simples, quelquefois doubles. Ces lignes imitent, quant à leur forme et disposition, les lignes sombres, et ne semblent différer de celles-ci que par leur lumière blanche et souvent intense. Souvent elles sont parallèles (ou presque) à quelque ligne sombre voisine. Je ne pense pas que ce soient là des lignes de Mars. Je crois plutôt, qu'elles représentent des *fissures* de la couche sensible dont le verre est couvert. Il n'y a rien de bien étrange dans une telle supposition. Comme une légère couche de vernis dans les peintures à l'huile ou sur certains vases anciens, ou comme une légère couche de boue molle exposée au soleil produisent de systèmes de fissures parallèles ou formant un réseau, il est bien possible qu'un effet semblable se dessine sur la couche sensible pendant son dessèchement. Si la fissure est assez profonde pour occuper toute l'épaisseur de la couche, on doit voir la lumière du jour en travers de cette couche, lorsqu'on examine le photogramme par transparence.

Tant que de telles fissures se produisent sur une positive, elles ne sont pas bien dangereuses: mais on ne peut dire de même pour les négatives. Car il est à croire (je n'ai pas encore d'expérience à cet égard) que si leur lumière devient sensible à l'œil par transparence, elle peut donner lieu à un effet appréciable sur la couche sensible positive exposée sous la négative en question en produisant sur la positive des lignes sombres bien capables d'imiter les lignes réellement tracées sur la planète. Je crois de pouvoir même

successful in their printing; I can note that their number is not significant.

The first discovery that I made is very disagreeable! The enormous quantity of details that one could easily recognize on your disks do not *all* belong on the planet, at least such is my opinion at present; but in many cases, I can even say very often, to the lines and spots of the planet are added other, too numerous details, that I would not know to admit as being part of the surface of Mars, and many others which seem to be of a doubtful nature. Here is how and why:

On many disks, examined with an effective magnification of about 1950, one sees, between many dark bands and lines more or less clearly completed, and about which there can be no suspicion, one, two, or even more *bright* lines, white like the polar snow, ordinarily single, sometimes double. These lines imitate, because of their form and arrangement, the dark lines, and do not seem to differ from those but for their white and often-intense light. Often they are parallel (or almost) to another dark, neighboring line. I do not think that these would be the lines of Mars. I believe, rather, that they represent *fissures* in the sensitive film where the glass is covered. There is nothing too strange about such an assumption. Like a light layer of varnish on oil paintings or on certain old vases, or like a light layer of soft mud exposed to the sunlight, producing systems of parallel cracks or forming a grid, it is very possible that a similar effect draws itself on the sensitive layer as it dries. If the crack is deep enough to go through the entire thickness of the layer, one should be able to see the light of day through this layer when viewing the frame through transparency.

As long as such fissures appear on a positive, they are not very dangerous: but one cannot say the same for negatives. Because it is believed (I do not yet have experience in this regard) that if the light becomes visible to the eye through transparency, then an appreciable effect could take place on the negative in question by producing dark lines on the positive which are very capable of imitating the actual traced lines on the planet. I believe it can even be said that the false lines should be blacker than the others.

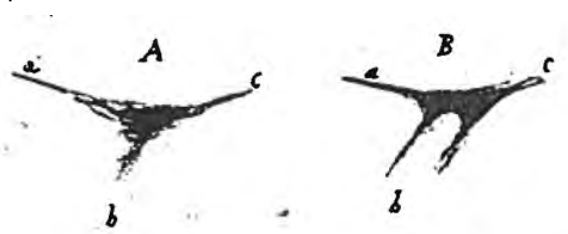
At what stage of their preparation should be placed the production of the thus-cracked plates? I believe that I have found that the bright lines have a marked tendency to form parallel systems, in some cases two systems, one of which is nearly perpendicular to the other.

I noted this recent fact on several disks presenting the large oval of *Thaumasia* and

dire que ces lignes fausses devront être plus noires que les autres.

A quelle époque de leur préparation devons-nous placer la production des plaques ainsi fendillées? Je crois avoir trouvé que les lignes brillantes ont une tendance marquée à former des systèmes parallèles, en quelque cas deux systèmes dont l'un est à peu près perpendiculaire à l'autre.

J'ai remarqué ce dernier fait sur plusieurs disques présentant la grande ovale de *Thaumasia* et ce que j'appelais autrefois le *Lacus Tithonius*: sur ce dernier cela arrive au point de donner lieu à une espèce de carrelage grossier. Sur ces disques le système des lignes peut arriver à perdre ainsi toute ressemblance avec les configurations télescopiques bien connues. Par là je trouve le *Phasis* tout à fait déplacé, et je ne sais où chercher l'*Araxe*; le profil de *Thaumasia* le long du *Phasis* est perdu et aussi ailleurs modifié d'une manière qui ne peut être réelle, et se trouve d'ailleurs en pleine contradiction avec les dessins fait par tous les observateurs avec le télescope à la manière ordinaire. Dans certains endroits de plusieurs disques la tendance au système perpendiculaire et à un certain carrelage de dessin uniforme est telle, qu'on croit voir un morceau de *plaid* écossais; un système de lignes est ordinairement vertical, l'autre horizontal ou peu s'en fait (j'entend ici la *verticalité* dans le sens du parallélisme à l'axe de rotation de la planète). Les éléments du dessin qu'on trouve quelques fois isolés, d'autre fois combinés ensemble, sont ordinairement de la forme ☞ quatre points formant carré et orienté à peu près de la manière que j'ai dit. Pour donner un idée plus exacte je choisirai comme exemple les différentes formes que je vois dans l'aire qu'autrefois j'appelais le *Lacus Thitonius* (sous le *Lac du Soleil*) et que maintenant je ne sais plus comme nommer.



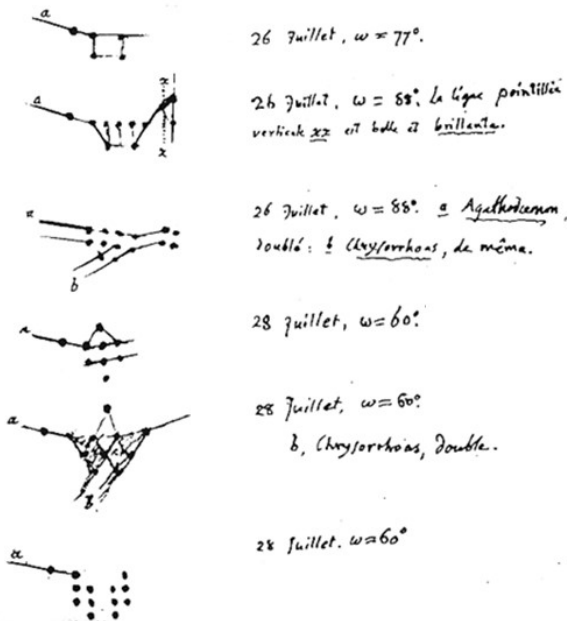
Ce lac m'avait toujours paru comme un renflement ac de l'*Agathodaemon* combiné avec une connexion inférieure du *Chrysorrhoeas*, b. Lorsque le *Chrysorrhoeas* était simple (comme en A) le *Tithonius* était simple aussi; lorsque le *Chrysorrhoeas* était double (comme en B) le *Tithonius* était double aussi. Sur vos photogrammes c'est tout différent; on

what I called again *Lacus Tithonius*: on the latter, this happens to the point of giving rise to a kind of crude tiling. On these disks, the system of lines can arrive at a point of losing all resemblance with the well-known telescopic configurations. From this, I find *Phasis* completely displaced, and I do not know where to search for *Araxes*; the outline of *Thaumasia* along *Phasis* is lost and also elsewhere altered in a way that cannot be real, and finds itself in plain contradiction with the drawings done by all the observers with a telescope by the ordinary method. In certain places on several disks, the tendency to the perpendicular system and to a certain uniform tile pattern is such that we believe we are seeing a piece of Scottish plaid; a system of lines is ordinarily vertical, the other horizontal or almost (I understand here the *verticality* in the sense of parallelism to the axis of rotation of the planet). The elements of the design that one finds sometimes isolated, sometimes combined together, are ordinarily of the form ☞ four points forming a square and oriented in much the way that I said. To give a more exact idea, I will choose as an example the different forms that I see in the air of what I have otherwise called *Lacus Tithonius* (under the *Solis Lacus*) and that I do not know what to call anymore.



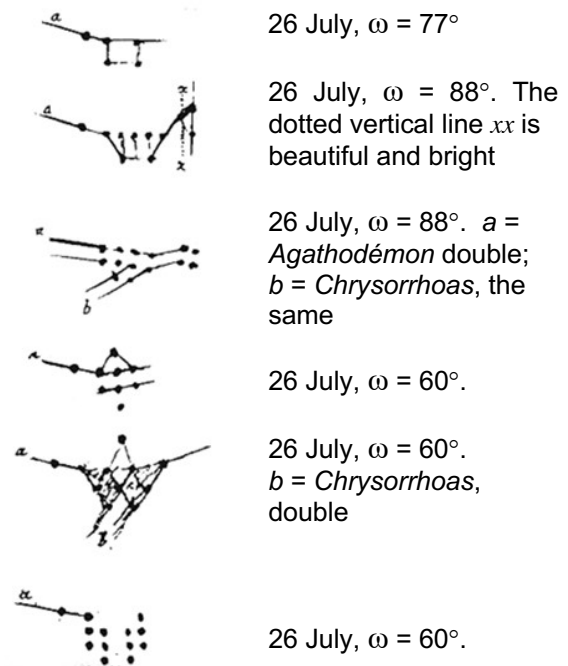
This lake has always seemed to me like a bulge ac of *Agathodaemon* combined with a lower connection of *Chrysorrhoeas*, b. When *Chrysorrhoeas* was single (as in A), *Tithonius* was single as well; when *Chrysorrhoeas* was double (as in B), *Tithonius* was double as well. On your frames, it is all different; one sees four, five, eight, even 12 or 13 small, dark spots of undecided shapes, all or almost all equal in dimension and in color, usually united by nebulous, but sometimes isolated, bands that are related (it is not easy to say in what way) laterally to *Agathodaemon*, which is always well outlined on the left side, not as well on the right, often double to the right, less often to the left. When *Chrysorrhoeas* exists, there is a connection with *Chrysorrhoeas*. I am endeavoring to render these aspects (of which many belong to the same day) in the rough sketches here: a is always *Agathodaemon*, eastern extremity.

voit quatre, cinq, huit, même 12 ou 13 petites taches sombres de contour indécis, *toutes* ou *presque toutes* égales en dimension et en couleur, ordinairement réunies par de bandes nébuleuses mais quelquefois aussi isolées qui se rattachent (il n'est pas aisé de dire en quel manière) latéralement à l'*Agathodémon* qui est toujours bien tracé du côté gauche, moins bien du côté droit, souvent double à droit, moins souvent à gauche. Lorsque le *Chrysorrhoeas* existe, il y aussi connexion avec le *Chrysorrhoeas*. Je me suis efforcé de rendre ces aspects (dont plusieurs appartiennent au même jour) dans les grossières esquisses que voici: *a* est toujours l'*Agathodémon*, extrémité orientale.



Dans toute l'extension que j'ai explorée jusqu'ici, le nombre des taches sombres est très considérable; il y a tel disque où on les compte par douzaines. Cela regarde les photogrammes de Falstaff:<sup>c</sup> je n'ai pas encore examiné ceux de Alianza avec le même soin, mais je crois pouvoir affirmer que les phénomènes à Alianza ne diffèrent pas essentiellement de ceux de Flagstaff, si non peut-être par des menus détails. Il faut considérer aussi que les dates des photogrammes de Flagstaff sont: Juillet 26 et 28; celles de photogrammes d'Alianza, Juillet 23 et 25; et que d'un jour à l'autre on rencontre souvent de variations sensibles; même dans l'espace de quelques heures pendant la même nuit.

Maintenant, que dites-vous de tout cela? Avez-vous constaté quelque chose de semblable? Je me sens très peu disposé à considérer ces étranges images comme existant réellement sur planète. Peut-être elles sont un effet de l'état moléculaire particulier de



In all of the extensions that I have explored so far, the number of dark spots is significant; there is such a disk where one can count them by the dozens. That is how the frames from Flagstaff look: I have not yet examined those from Alianza with the same care, but I believe it possible to assert that the phenomena at Alianza do not differ essentially from those from Flagstaff, except for perhaps by some small details. It is also necessary to consider that the dates of the frames from Flagstaff are: July 26 and 28; those of the frames from Alianza, July 23 and 25; and that from one day to another one often encounters delicate variations; even in the space of a few hours during the same night.

Now, what do you say about all of this? Have you found something similar? I feel very reluctant to consider these strange images as actually existing on the planet. Maybe they are an effect of the particular molecular state of the sensitive film, or even of the plate of glass that holds it. The pieces of glass that were reduced to small pieces of glass following two *orthogonal* directions between them, one of which is almost parallel to the diameter that represents the axis, must have undergone a considerable violence during this process! It will be very easy to verify this by comparing them with the plates in their natural state. I have already talked about the cracks in the sensitive film and the explanation for it. Again, one could think of the efflorescence and the crystallization that one notes on our window panes during winter frosts: the beautiful blossoms are in part ruled by the different quantity of water vapor that condenses on the different regions of the plate. Similarly, considering the different thicknesses of the

la couche sensible, ou même de la plaque de verre qui la porte. Les morceaux de verre qu'ont été réduits en petits morceaux suivant deux directions *orthogonales* entre elles, dont l'une est presque parallèle au diamètre qui représente l'axe ont dû subir pendant ce procès une violence considérable! Il sera bien aisé de vérifier cela en comparant avec des plaques à leur état naturel. J'ai déjà parlé de fissures de la couche sensible et de l'explication qu'on pourrait en tirer. Encore on pourrait songer aux efflorescences et aux cristallisations qu'on remarque sur les carreaux de nos fenêtres pendant nos gélées d'hiver: ces belles floraisons sont en partie réglées par la différente quantité de vapeur d'eau qui se condense dans les différentes régions de la plaque. De même en considérant la différente épaisseur de la couche sensible dans les différentes régions d'un photogramme, on pourrait s'expliquer ces fleurs si abondantes à quatre pétales. Une semblable inégalité d'épaisseur de la couche pourrait être la conséquence de la vicieuse manière de préparer la plaque sensible, de la vitesse du dessèchement, et des variations de température. Cela expliquerait comment il se fait que des photogrammes pris à peu de minutes (ou même de secondes) d'intervalle *sont bien loin* de donner des images identiques, ainsi qu'on *pourrait* s'y attendre et comme il *devrait* arriver, si toutes conditions d'égalité étaient exactement remplies. En étudiant votre positive sur papier contenant 40 images du 19 juillet 1907 j'ai été fort étonné de ces différences énormes, qu'il était impossible d'expliquer par la seule différence de la durée d'exposition.

Dans l'examen sommaire initial que j'ai fait de tous vos photogrammes il me paraît d'avoir remarqué que dans leur nombre il y en a beaucoup qui ne paraissent avoir aucun des inconvénients ci-dessus. Si cela est, nous somme sauvés. Une telle plaque, bien et dûment décrite et mesurée, pourra fournir du travail pour plusieurs semaines, et nous mettre dans la position de donner à l'Aréographie un degré d'exactitude qu'elle n'a pas eu jusqu'à ce jour. La direction de l'axe de Mars, son diamètre, peut-être encore son aplatissement, les variations de toute espèce pourront être bien étudiées: la Carte Aréographique pourra être rectifiée pourvu *qu'on trouve sur la planète des pointes fixes!* C'est ce que nous ne savons pas encore.

Dans une de mes lettres précédentes je vous avais prié de marquer, à la minute près, l'époque de l'exposition de chaque négative. Aux raisons que j'ai indiquées alors il faut ajouter que cela est absolument nécessaire afin

sensitive film on the different regions of the frame, one could explain these abundant flowers with four petals. A similar inequality of thickness of the film could be the consequence of the vicious manner of preparing the sensitive plate, of the speed of drying, and of the variations of temperature. This would explain how it happens that some frames, taken a few minutes (or even seconds) apart *are very far* from producing identical images, as one would be able to expect and how it should happen, if all the conditions of equality are fulfilled exactly. By studying your positive on paper containing 40 images from 19 July 1907, I was astonished by the enormous differences, that it was impossible to explain but only by the difference of the duration of exposure.

During the initial, perfunctory examination that I did of all of your frames, I seem to have noted that in their number, there were a lot that did not possess any of the above inconveniences. If this is so, we are saved. Such a plate, well and duly delineated and measured, could provide work for several weeks, and put us in a position to give a degree of exactitude to Areography that it has never had until this day. The direction of the axis of Mars, its diameter, maybe even its flattening, the variations of every kind could be well studied: the Areographic Map could be rectified provided that *there are fixed points on the planet!* That is what we do not yet know.

In one of my previous letters, I asked you to record, nearly to the minute, the time of the exposure of each negative. For the reasons that I already indicated, it is essential to add that this is absolutely necessary in order to be able to extract from your frames the periods of the passage of *Aryn* at the central meridian; this is indispensable for the determination of the longitudes on Mars. One could thus perfect and complete my Catalog of positions taken from observations from 1877 and 1879, which is deficient enough, and for the regions of the Boreal hemisphere, incomplete enough.

I will add again another request, which is to indicate to me the approximate geographical longitude of the point called *Alianza*, which I cannot seem to find on any Map.

Finally, for what other research can be attempted with the aid of your frames (i), it will be essential that during the present-day opposition of 1909 and during the successive oppositions, each disk, or at least each plate (if there are several disks on the same plate), bears the trace (very visible and sufficiently long) of the celestial parallel in order to be able to measure the position angles.

de pouvoir tirer de vos photogrammes les époques des passages d'*Aryn* au méridien central: ce qui est indispensable pour la détermination des longitudes sur Mars. On pourra ainsi perfectionner et compléter mon Catalogue des positions tiré des observations de 1877 et 1879 qui est assez défectueux, et pour les régions de l'hémisphère boréal, assez incomplet.

J'ajouterai encore une autre prière, c'est de m'indiquer à peu près la longitude géographique du point appelé *Alianza*, que je ne puis trouver sur aucune Carte.

Enfin, pour que l'on puisse tenter d'autres recherches à l'aide de vos photogrammes (i) il sera nécessaire che<sup>d</sup> dans l'opposition actuelle 1909 et dans les oppositions consécutives chaque disque, ou du moins chaque plaque (s'il y a plusieurs disques sur la même plaque) porte la trace (bien visible et suffisamment longue) du parallèle celeste afin de pouvoir y mesurer des angles de position.

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Je vous demande pardon de cette lettre si longue, et d'autant plus je doit vous le demander, que peut-être beaucoup de choses indiquées ci-dessus ne seront probablement pas nouvelles pour vous, et que vous avez dans ce moment très peu de temps à perdre. Je continuerai mes recherches, bien qu'à présent je me trouve un peu désorienté. Adieu, que le beau *Gradivus*<sup>e</sup> vous soit encore plus favorable qu'en 1907.

Votre dévoué

G. Schiaparelli  
(jusqu'au 1 Novembre, Monticello (Como)  
Italie.

P.S. Je viens de vérifier que presque toutes les lignes brillantes sont à peu près parallèles à la droite qui représente le méridien central par groupes de 1,2,3–4,5,6 également espacées. Quelquefois il en manque une, alors sa place est occupée par une ligne sombre.

Faut-il une preuve plus évidente que ces lignes n'ont rien à faire avec Mars? Je pense cela dépend de ce qu'instinctivement nous plaçons presque toujours l'axe de l'image parallèlement à l'un des côtés de la plaque rectangulaire, qui est probablement la direction des lignes de la plus petite ou de la plus grande résistance à la rupture. Mais quoiqu'il en soit, ce fait est bien remarquable.

Ars longa, vita brevis!<sup>f</sup>

- (1) J'entends par là le nombre qu'on obtient Endivisant l'angle sous le quell on voit le

I beg your forgiveness for such a long letter, and for so much more I must beg it of you, that perhaps many things indicated above are probably not news to you, and that you have, in this moment, very little time to lose. I will continue my research, although at present I find myself a bit disoriented. Farewell, may the beautiful *Gradivus*<sup>e</sup> be as favorable to you as it was in 1907.

Your devoted

G. Schiaparelli  
(until 1 November, Monticello (Como)  
Italy)

P.S. I have just verified that almost all the bright lines are almost parallel to the straight line that represents the central meridian by groups of 1,2,3–4,5,6 equally spaced. Sometimes, one is missing, but its place is taken by a dark line.

Must there be more evident proof that these lines have nothing to do with Mars? I think that this depends on the fact that one almost always instinctively places the axis of the images parallel to one of the sides of the rectangular plate, which is probably the direction of the lines with the smallest or greatest resistance to breaking. But whatever it is, the phenomenon is truly remarkable.

Ars longa, vita brevis!<sup>f</sup>

- (1) By that I mean the number that one obtains from dividing the angle under which we see the diameter of Mars on the frame placed in the microscopic field of my device by the apparent diameter of Mars given in the Ephemerides for the date corresponding to the moment when the photograph was taken. Such a magnitude under good illumination is nothing excessive: the advantage given by the stability of the object and the possibility of prolonging the examination and of repeating it as much as one wants is, in comparison to telescopic vision, truly enormous. The photographic granulation under this magnitude is hardly discernible.

- (i) There is a lot to do, for example the direct measurement of the areographic positions independent of the polar snow, the study of the direction of the axis, be it by means of the polar spot or by means of other spots distant from the pole (particularly through the study of latitudes), the apparent thickness<sup>g</sup> of phases, the verification of the constant or variable direction of certain canals, the exact determination of the shape of the polar snow, etc.

diamètre de Mars sur la photogramme placé dans le champ microscopique de mon appareil par le diamètre apparent de Mars donné dans les Ephemerides pour la date correspondante au moment où la photographie a été prise. Un tel grossissement sous une bonne illumination, n'a rien d'excessif: l'avantage que donne la stabilité de l'objet et la possibilité de prolonger l'examen et de le répéter tant qu'on veut, est par rapport à la vision télescopique, réellement énorme. La granulation photographique sous ce grossissement est à peine sensible.

- (i) Il y en a beaucoup à faire, par exemple la mesure directe des positions aréographiques indépendamment de la neige polaire, l'étude de la direction de l'axe soit par la tache polaire, soit par d'autres taches éloignées du pôle (particulièrement par l'étude des latitudes), l'épaisseur<sup>9</sup> apparent des phases, la vérification de la direction constante ou variable de certains canaux, la détermination exacte de la figure de la neige polaire, etc.

- a The original publishers of this collection of correspondence chose to include this letter, unsure of whether it was meant for Lowell or not. Since beginning the translation of these letters, the letter from 28 July 1909 has been rediscovered, confirming that the intended recipient of this letter was indeed Lowell.
- b There is no note of any work by Percival Lowell with this title.
- c Schiaparelli presumably meant to write *Flagstaff* but accidentally wrote *Falstaff*, an opera that premiered in 1893.
- d 'Che' is an Italian word meaning 'that'.
- e 'Gradivus' is a possible mis-spelling of 'Gradivus'.
- f 'Art is long, life is short!': the first two lines of the *Aphorismi* by Hippocrates.
- g It is unclear what he means by 'épaisseur', or 'thickness', here.

**22 octobre 1909**

**P. Lowell a G.V. Schiaparelli  
Lowell Observatory Archives.  
Originale.**

le 22 Octobre 1909

Cher ami:

Il ne faut pas scruter les photographies trop minutieusement. De là proviennent toutes les difficultés que vous me signalez –

D'abord, l'écran peut avoir de la poussière dessus. C'est impossible de s'en défendre. Nous l'évitons en le changeant de place plusieurs fois pendant l'exposition d'une plaque de sorte que les diverses images n'ont pas les mêmes défauts.

Ensuite le grain des plaques affecte des monstruosité, dont vous avez fait une si fine étude. On doit se méfier de lignes nettement

**22 October 1909**

**From Percival Lowell to Giovanni Schiaparelli  
Lowell Observatory Archives.  
Original.**

22 October 1909

Dear friend:

It is not necessary to scrutinize the photographs too closely. From the start, all the difficulties that you report to me –

First, the screen can have dust on top. It is impossible to defend against. We avoid it by changing it several times during the exposure of a plate in such a way that the different images will not have the same defects.

Next, the grain of the plates affects the deformities, on which you have done a deft study. One should distrust sharp lines and all

dessinés, et de toutes lignes blanches.

Enfin puisque l'atmosphère change de moment en moment une image vous révèle un détail qui échappe à la seconde. Je vous envoie une épreuve d'une plaque que je viens de prendre comme illustration.

A cause de tout cela il n'est pas praticable de s'en servir pour les images, détermination de l'axe etc. que vous me proposez, fort intéressants qu'ils seraient.

Par exemple dans l'épreuve que je vous adresse, la calotte polaire, vue l'irradiation sur la plaque, s'étend jusqu'à la limbe qui est contraire au fait. Non l'œil de l'observateur vaut encore beaucoup mieux que tout cliché.

L'avancement des canaux, en apparence de la calotte vers l'équateur, s'est montré cette opposition comme auparavant. La théorie tient. Je vous enverrai sous peu des photographies de mes dessins.

De cœur  
Votre dévoué

Percival Lowell

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**23 avril 1910**

**G.V. Schiaparelli a P. Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 593,  
fasc. 1, n. 58. Minuta.**

A M. Percival Lowell  
23 Avril 1910

Monsieur et honoré collègue,

Je viens de lire le nouveau Volume sur l'Évolution des Mondes dont vous venez de me faire présent, et je vous remercie du plaisir que j'ai tiré de cette lecture si instructive et si attrayante, autant par la forme de l'exposition que par les idées nouvelles dont vous avez semé les germes partout. Il y a des personnes qui n'aiment pas ces excursions dans le domaine des possibilités et des probabilités, pour elles il n'existe d'autre science qu'entre les limites des démonstrations mathématiques et expérimentables portées au plus haut degré de rigueur et de certitude logique. C'est sans doute un point de vue très justifiable et qui a son mérite, que celui de définir exactement les bornes des champs où l'on peut dire: jusqu'à ce point nous savons. Mais il arrive assez souvent que les mêmes personnes ajoutent: au delà nous ne savons plus, et il est inutile de s'en occuper.

Où en serions nous si une telle opinion devait servir de règle dans nos études? L'œuvre de Copernic elle-même n'était pas elle fondée d'abord sur de simples probabilités? La certitude n'est arrivée que 150 ans plus tard.

white lines.

Finally, because the atmosphere changes from moment to moment, an image reveals to you a detail that escapes in an instant. I am sending you as an illustration a print of a plate that I have just made.

Because of all of this, it is not practicable to use it for the images, determination of the axis, etc. that you propose to me, as interesting as they may be.

For example, in the proof that I am addressing to you, the polar cap, viewed in the irradiation on the plate, extends until the limb that is contrary to the fact. No, the eye of the observer is much better than any image.

The advancement of the canals, apparently from the cap towards the equator, showed this opposition as before. The theory holds. I will send you shortly some photographs of my drawings.

From the heart  
Your devoted

Percival Lowell

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**23 April 1910**

**From Giovanni Schiaparelli to Percival Lowell  
A.O.B., Fondo G.V. Schiaparelli, cart. 593,  
fasc. 1, n. 58. Draft.**

To Mr. Percival Lowell  
23 April 1910

Sir and honored colleague,

I just read the new volume on *The Evolution of Worlds* which you gave me, and I would like to thank you for the pleasure that I have drawn from this so instructive and inviting reading, as much by the form of the exposition as by the new ideas that you have sown the seeds of everywhere. There are people who do not like these excursions in the domain of possibilities and probabilities, for them there does not exist another science but between the limits of mathematical and experimental demonstrations carried out at the highest degree of rigor and logical certainty. It is without a doubt a very justifiable point of view and that has its merit, that of defining exactly the limits of the fields where one can say: *up to this point, we know*. But it happens too often that the same people add: *beyond that, we do not know anymore, and it is useless to try*.

Where would we be if such an opinion would serve as a rule in our studies? Was the work of Copernicus, itself, not based on simple probabilities? The certainty did not transpire until 150 years later. Thus, I find your efforts to

Ainsi je trouve bien dignes d'éloge vos efforts pour pénétrer dans le domaine de l'inconnu, même lorsque il faut faire une part à l'hypothèse.

Je serais bien heureux d'apprendre quelque chose sur les résultats de vos travaux sur Mars pendant la campagne de 1909. Autant que je puis juger par les publications d'autres observateurs, l'aspect de Mars pendant cette opposition a été assez différent de l'ordinaire, et il a présenté quelque analogie avec ce que j'avais observé en 1877 et en 1892.

L'absence ou le peu de visibilité des nombreux détails remarqués en d'autres époques serait elle un phénomène périodique lié à la révolution de la planète? Ou bien cette absence doit elle être attribuée à un défaut d'attention et de pouvoir optique?

Il y a cependant les derniers temps un recrudescence de scepticisme à l'égard des configurations martiennes et c'est pour moi un malheur que de n'être plus en position de m'assurer par mes propres observations de ce qui est et de ce qui n'est pas. Je crois que toute contestation sera finie le jour où l'on pourra obtenir des photographies de Mars assez grandes pour mettre une fin aux incertitudes provenant de la granulation photographique. Il faudrait aussi essayer par quels procédés on pourrait arriver à réduire cette granulation à un degré de finesse plus considérable. Autrement on obtiendra toujours des images qui à côté des détails réels contiendront des autres détails sur la réalité des quels il sera difficile de décider.

Vous recevrez (ou vous avez reçu) un envoi de deux volumes d'observations d'étoiles doubles qui contiennent environs 11000 mesures prises pendant 26 ans, 1875–1900. Ce sera mon avant-dernier publication. La dernière est en ce moment sous presse: elle contient mon VII<sup>a</sup> et dernier<sup>b</sup> Mémoire sur Mars qui est rédigé sous la même forme que les autres et contient quelques résultats nouveaux. *Hic certus, artemque repono.*<sup>c</sup>

Malgré cela je m'intéresserai toujours vivement aux grands progrès que l'Astronomie fait chaque jour, et dont quelques-unes marqueront une belle époque dans l'histoire de cette science.

Votre dévoué

penetrate the domain of the unknown well worthy of praise, even when you have to make a contribution to a hypothesis.

I will be very happy to learn something about the results of your work on Mars during the campaign of 1909. As far as I am able to judge the publications of other observers, the phase of Mars during this opposition was very different from the ordinary phase, and it presents some resemblance with that which I observed in 1877 and in 1892.

The absence or the poor visibility of numerous details noted in other periods, could this be a periodic phenomenon linked to the revolution of the planet? Or perhaps this absence should be attributed to a lack of attention or optical power?

There is, however, a recent upsurge of skepticism towards the Martian configurations, and it is for me a misfortune not to be in a position to assure myself through my own observations of what is and what is not. I believe that all the contestation will be finished the day that we can obtain photographs of Mars large enough to put an end to all the uncertainties stemming from photographic granulation. It is also necessary to test which processes one could use to reduce this granulation to a more significant degree of sharpness. Otherwise, we will always obtain images which, apart from the real details, will contain other details about the reality of which it will be difficult to decide.

You will receive (or you have received) a shipment of two volumes of observations of double stars that contain about 11,000 measurements taken over 26 years, 1875–1900. This will be my penultimate publication. The last is in this moment in press: it contains my VII<sup>a</sup> and last<sup>b</sup> Memoir on Mars, which is written in the same form as the others and contains some new results. *Hic caestus artemque repono.*<sup>c</sup>

In spite of this, I will always be very interested in the great progress that Astronomy makes every day and some of which will mark the *belle époque* in the history of this science.

Your devoted

- a This refers to the Seventh Recollection on Mars by G. Schiaparelli with the title: *Astronomical and Physical Observations on the Topography and Composition of the Planet Mars made at the Royal Observatory of Brera in Milan with the Merz Equatorial during the Opposition of 1890*. It is published in the *Acts of the Royal Academy of the Lincei*, Year CCXCVI (1899). Series 5. *Records of the Class of Physical, Mathematical and Natural Sciences*, Volume 8. Session of 16 June 1910, Rome.
- b On 17 January 1910 the President of the Academy of the Lincei sent Schiaparelli a telegram, kept in the Archive of the Observatory, whose text is: "Academy grateful gift seventh Recollections on Mars feeling itself proud to possess the entire series period Mars of Schiaparelli pure Italian glory."



President Blaserma.” This telegram follows by several days the letter from Schiaparelli to the President of the Academy dated 11 January 1910, in which he presents the manuscript and the drawings of his *Seventh Recollection*.

- C *Hic certa, artemque repono* may be a misremembered version of *Hic victor caestus artemque repono* from Virgil, *Aeneid*, Book 5, Line 484: “Here as victor I put down my boxing gloves and my art.” This understanding was achieved with the help of Mary Post Chatfield, great niece of Percival Lowell, and Professor Michael C.J. Putnam, Virgil scholar and great nephew of Percival Lowell. This quote demonstrates Schiaparelli’s sentimentality for his career, as the *Seventh Recollection* was Schiaparelli’s last.

**14 giugno 1910**

**P. Lowell a G.V. Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 593,  
fasc. 1, n. 83. Originale.**

Lowell Observatory, Flagstaff, A. T.  
le 14 Juin 1910

Cher confrère et ami,

Ci-joint je vous envoie des positifs choisis de parmi nos clichés de Mars 1909. L’opposition n’a pas été bonne pour la photographie pour cause dont vous savez bien, le nondevelopment à cette saison des canaux.

Deux d’entre ces clichés sont par mon assistant M. E. C. Slipher, les trois autres par moi. Parmi eux vous allez remarquer une qui montre les nouveaux canaux, à gauche du *Sytr Major*, fait intéressant et important.

De cœur.

Votre dévoué

Percival Lowell

**14 June 1910**

**From Percival Lowell to Giovanni Schiaparelli  
A.O.B., Fondo G.V. Schiaparelli, cart. 593,  
fasc. 1, n. 83. Original.**

Lowell Observatory, Flagstaff, A. T.  
14 June 1910

Dear colleague and friend,

Attached, I am sending you some positives chosen from among our images of Mars 1909. The opposition was not good for imaging because, as you know well, of the nondevelopment at this season of the canals.

Two of these images are by my assistant, Mr. E.C. Slipher, the other three by me. Among them you will note the one which shows the new canals, to the left of *Syrtis Major*, is interesting and important.

From the heart.

Your devoted

Percival Lowell

## 6 CONCLUDING REMARKS

When translating these ‘letters’ the first author of this paper (JP) found that she was drawn into the friendship between the two men, their mutual respect and affection, and their desire to know the truth about Mars. It has truly been a pleasure to get to know Lowell and Schiaparelli through these letters, to feel their highs and lows, and to share their awe in their discoveries. We hope that you, the reader, will equally enjoy the translations, in the light of the international scientific context of Lowell’s work, as outlined by the second author (WS) in Sections 1-4 above.

## 7 NOTES

1. Henceforth, all Lowell references mentioned in this paper refer specifically to Percival Lowell, unless indicated otherwise.
2. At first it was assumed Lowell was simply planning to be a Maecenas to the project; however, it soon became clear that he in-

tended to participate himself, as director of the expedition and as an observer of the planet (Strauss, 1994: 47).

3. Its advantages included its altitude of 7000 feet, its location on the Santa Fe railroad, and, perhaps not least important as Douglass confided late in life, the best saloons.
4. We now know that the colors were partly illusory and owing to simultaneous contrast in the eye; Schiaparelli, by the way, suffered from red–green color blindness.
5. Critical to the latter were two discoveries by his associates: Douglass had discovered linear markings in the dark areas as well as the light areas, and Pickering had used a polariscope to show that the light from the dark areas was not polarized as it would have been were they bodies of water (Hoyt, 1976: 78).
6. The meeting was a complete disaster, and when the two men parted they were no longer on speaking terms.

7. This is why Barnard's failure to make out canals was so remarkable and this probably also explains why he did not publish his Mars observations at first.
8. Remember that Lowell and Antoniadi had been estranged ever since the latter had severely criticized Lowell's Venus observations.
9. And given his poor eyesight, examining these plates through the eyepiece of a microscope of low magnification must have been excruciating.

## 8 ACKNOWLEDGEMENTS

We wish to acknowledge the wonderful and thorough work of Alessandro Manara and Franca Chlistovsky of Brera Astronomical Observatory for their publication of letters and drafts. Of the 42 letters in this selection, 37 were transcribed in French in the book *Giovanni Virgilio Schiaparelli – Percival Lowell Unpublished Epistolary Exchange (1896–1910)*, which is held in the archives at Brera in Milan. These transcriptions were a great help in deciphering some of the more undecipherable passages in Schiaparelli's handwriting.

We would also like to thank Barbara Post,

great-great-niece of Percival Lowell, who made the book accessible to us by translating the Italian footnotes and introductory texts and whose work was vital for this research.

The five remaining letters that were not transcribed have been recently uncovered by Lauren Amundson, archivist at Lowell Observatory, to whom we owe many thanks.

We would also like to thank Agnese Mandrino, the historical librarian at the Brera Astronomical Observatory for her help with accessing the archives at Brera despite the distance and difficult circumstances.

We want to thank William Lowell Putnam IV, current Sole Trustee of Lowell Observatory, whose interest in reading one of these letters inspired this project, and David Baron and Kevin Schindler, whose close readings of the manuscript, and subsequent comments and suggestions, improved this project immeasurably.

Finally, we are grateful to the Brera Astronomical Observatory for kindly supplying Figure 2; Historic New England for Figure 4; Museo Scienza (Milan) for Figure 14; Leo Aerts (Belgium) for Figure 16; and the Lowell Observatory Archives for Figures 3, 5–7 and 9–13.

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He is a past fellow of the John Simon Guggenheim Memorial Foundation, a recipient of the Gold Medal of the Oriental Astronomical Association, and a member of the IAU Working Group on Planetary System Nomenclature. The IAU has named asteroid 16037 after him.