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SUMMARY.—SCIENCE: Wonders of the Heavens; lecture delivered at the Lachute College by John Bruce, Esq., Inspector of Schools, (concluded). — OFFICIAL NOTICES: Books Approved by the Council of Public Instruction.—Diplomas granted by the Boards of Examiners.—Situations Wanted.—Notice to Teachers.—EDITORIAL: The Coming Elections of School Commissioners and Trustees.—PUBLIC EXAMINATION: Bishop's College, Lennoxville. — High School Department of McGill College.—Model School of McGill Normal School.—OFFICIAL DOCUMENTS: Report on the Inspection of Schools in Lower Canada.


## SCIENCE.

### The Wonders of the Heavens.

(Lecture delivered in the College of Lachute, Feb., 1863.)

(*Concluded.*)

THE COMETARY WORLD.

The *Cometary* worlds now court attention—those wonderful tenuous bodies, which have so perplexed, bewildered, and terrified our race, ever since first observed. What they are, we do not know. Their intimate nature, and the offices they perform in the economy of our systems, are altogether unknown. Of their substance or matter—whether gaseous—electric—calorific, or something different from them all, we are in total ignorance. But of one thing, we hazard not a conjecture, namely, that whether they are sun feeders—or gas feeders—electric or heat feeders—or something else— they are just as essential appendages of our system as the sun itself; and that instead of coming with a threat of heaven's frown—the forerunners of some coming calamity, or dread catastrophe, they come fraught with heaven's blessing to our earth or our system. Had we time, we might say not a little about the strange notions entertained by the ancients, respecting them—and the consternation with which their appearance filled their leading sages. But with these I shall occupy as little of your time as I can. A comet appeared in 1456, and passed very near the Earth. It filled Christendom with alarm. It swept the heavens with a tail, extending over sixty degrees in the form of a sword or sabre. When it appeared in 1531, its tail was changed to a bright gold colour; and at its next appearance the tail had again changed colour. Its light was pale and watery; and the tail was long and thick like a flaming lance or sword. The magnitude of its head exceeded that of Jupiter. Among its direful effects was the death of the Duke of Lorraine, and a great war between the Swedes and the Danes. So gravely wrote the sage chroniclers of that age!—"The comet did me much honour," was a remark of Cardinal Mazarin on his death bed, when informed that one had made its appearance. Referring, perhaps, to which, Shakespeare wrote—

When *beggars* die—no comets are *seen*.

There are many kinds of comets, and their phenomena and forms are various. Some are of short periods, and easily identified. Others visit the neighbourhood of the sun so seldom and irregularly, that they cannot with certainty be distinguished. From the number that astronomers have marked, it is evident that a vast number belong to our system. Competent judges declare it to be enormous. Sir John Herschel states that 140 have appeared within the *earth's orbit* within the last 100 years, which have not been seen again. Now, if 1000 years be regarded as the average period of these, then it is reasonable to expect as many new ones in another century, till we have seen them all at once; and then at least 1,400 must come within the orbit of the earth. Now the orbits of the comets are so extensive, that even the perihelion distance of many is beyond the orbit of Mars; and as it is not unreasonable to suppose that they are distributed with the uniformity of infinite wisdom, the number ranging within the orbit of the more distant planets, may be computed from that ranging within the orbit of the earth by estimating their relative distances. By one such computation the estimated number within the range of Uranus is 11,200,000; and if we take in the vast orbit of the newly discovered planet—Neptune, it must greatly increase the number. Of Neptune I may state in passing, that they have lately discovered it to have a ring like Saturn and a moon. More may yet be discovered. You have been told that comets are material bodies. They are so, first, because they reflect the light of the sun, or shine by their own light,—which of the two has never been distinctly proved. Perhaps both suppositions may be true. Secondly, because they are subject to the laws of gravitation; and, thirdly, because their luminosity is subject to change: for the same comet or its tail, when it has one—has at one time a red-rose colour, at another, a bright golden colour, at another, a dark leaden colour. At other times the same comet looks as if it were a furnace of fire, and on again appearing, as if it were a globe of vapour—of extreme tenuity. The bodies of comets have not all the same appearance with respect to their *tenuity*. Some have no nuclei, their light being nearly uniform; others have appeared with heads, or nuclei as large and brilliant as Jupiter; and a few have been discovered, with a very minute stellar point—indicating the existence of a solid body; and others change their form and magnitudes during their visibility; when they approach the sun the nebulous head of the body diminishes, and when they recede from the sun they begin again to dilate. The tails of comets have also something very remarkable in their phenomena. The luminosity of some, streams out in every direction. A great number have single tails, shooting out to immense distances. One appeared in 1680, whose tail was 141 millions of miles in length: another appeared in 1843, whose luminous train extended 200 millions of miles—double the distance of the sun from the earth; and one is expected this year after an absence of 300 years,