R E G U L U S

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

MARCH, APRIL, 1985

# DISCOVERY OF A COMET

by

DAVID LEVY

(Editor's Note: The last two issues of our newsletter have carried reports of the discovery of a comet on November 13th by our Vice-President, David Levy. Now at last we have the real thing — an article by David himself and one in which he shares with us some thoughts concerning the discovery of the object that has been the centre of attention for astronomers over the past three months. This article also appears on the front page of The Reflector, the national newsletter of the Astronomical League in the United States.)

Hunting for new comets, a process by which I slowly sweep across the sky with a telescope, is not a confrontation. It is more a cajoling, hour after hour, to move ever deeper into strange cosmic territory. What will the next field bring? An interesting double star I have not seen before? A pencil-thin spiral galaxy seen edge-on toward us? The field of one of my favorite variable stars? Or perhaps a comet?

I began comet hunting on December 17, 1965, after being absolutely amazed by the sight of the great sungrazing comet of that year,Ikeya-Seki. A few months later I read the freshly published Starlight Nights by Leslie C. Peltier, and my urge to hunt for comets grew. In retrospect, I was impressed more by the hunt than by the possibility of discovery, anxious to look through a telescope to learn the sky, field by field, star by star, nebula by nebula. I remember thinking how nice it would be to find a new comet, but I knew the competition was stiff and the sky that was needed would have to be better than what was available for me.

During the summer of 1966 I took my first paid position in astronomy, at the Adirondack Science camp. I hunted through the dark Adirondack sky through Hercules, and only later I learned that my telescope must have passed right over Comet Kilston, bright enough to be found, but obviously needing someone who knew what he was looking for!

Beginning with an 8-inch f/7 reflector, I switched in 1967 to a wide field 6-inch f/4 reflector. But shortly after that I also switched to a greater interest in English Literature and though my interest was strong through the 1970's, my comet hunting hours were reduced. In 1983, in Tucson with a new 16-inch f/5 reflector, a telescope I had saved for for a long time, and

planned to use it for comet sweeping, I independently discovered Comet Hartley-IRAS just after it had brightened sufficiently to be observed visually.

Early in the evening of November 13, 1984, I had just completed my 917th hour with eye at the eyepiece hunting for comets, a process that now has taken me nineteen years, when I saw a patch of haze in my telescope's field of view. I knew that part of the sky well enough to get suspicious, but I had been fooled before. It was not a resolvable cluster of stars; it did not look like a galaxy; and it did not have the appearance of a gas cloud in space. Within ten minutes, through its perceptible motion through a rich field of background stars, the new comet gave its identity away. I called Brian Skiff, a friend at Lowell Observatory, who confirmed that the object was not already known, and then, armed with position, direction and speed of motion, and a magnitude estimate that was a bit too approximate, I notified the International Astronomical Union's Central Telegram Bureau of the discovery.

A few statistics: I found Comet 1984t on Tuesday, November 13, 1984. I was using a 16-inch f/5 reflector whose mirror is commercial, tube assembly and mount made by a friend, and sliding roof observatory made mostly by me. The discovery took place after 917 hours 28 minutes of comet hunting, spread out over 19 years and approximately 850 hunting sessions. I discovered the comet during observing session 6684E (in my observing log), which started an interest in astronomy late in the 1950's. I am especially happy that this discovery took place 59 years to the day after that of Peltier's first comet, and that Venus and Jupiter were close together in the evening sky on both nights.

I am thrilled to share the credit for this comet with another amateur hunter, Michael Rudenko of Massachusetts, who independently found Comet 1984t the following evening. Also a comet seeker, he has spent almost 250 hours in his program. I don't feel a sense of competition with other people who share the same tranquil hours with a telescope. The competition for comets is not with other seekers but with the sky itself. I do not share the idea that has been suggested in some books that comet seekers mistrust each other. How can we? The nocturnal activity we share is far more important than some mythical race to be first. It is only during the minutes and hours after a discovery that a feeling of competition sets in. I like to think that most comet hunters agree with Leslie Peltier's words from Starlight Nights:

*Time has not lessened the age-old allure of the comets. In some ways, their mystery has only deepened with the years. At each return a comet brings with it the questions which were asked when it was here before, and as it rounds the sun and backs away toward the long, slow night of its aphelion, it leaves behind with us those questions, still unanswered.*

*To hunt a speck of moving haze may seem a strange pursuit, but even though we fail, the search is still rewarding, for in no better way can we come face to face, night after night, with such a wealth of riches as Croesus never dreamed of.*

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## REVIEWS: A STUNNING MOVIE AND A TIMELY BOOK

(Editor's Note: I am very pleased to have received from Terence Dickinson a review of the recent Hollywood movie 2010 and from Larry Manuel a review of the book, The Comet is Coming.)

### 2010: A VISUALLY STUNNING BUT ULTIMATELY DISAPPOINTING FILM

by Terence Dickinson

The long-awaited sequel to Stanley Kubrick's spectacular film 2001: A Space Odyssey has some stunning visual moments but ultimately it fails to capture the wonder and vision of the Arthur C. Clarke novel on which it is based.

For me, 2010's strongest moments were the scenes outside the spacecraft in the vicinity of Jupiter and its moons, Io and Europa. The technical detail and the scientific accuracy of these scenes are unequalled in any other space film I have seen. (And being a fan of this sort of thing, I've seen them all.)

Using detailed close-up images of Jupiter and its satellites taken by the Voyager spacecraft as a basis, the movie's producers constructed models of these objects with extraordinary accuracy and attention to detail. The sulphur volcanoes of Io, the creviced icy surface of Europa, and the colourfully banded swirling surface of Jupiter are portrayed so well that I came close to feeling that parts of the film were documentary footage from an actual mission, rather than a studio re-creation.

The stunningly realistic cloudscapes of Jupiter were produced by Digital Image, a company specializing in computer-created visuals. Using a Cray computer, the fastest number cruncher made, visual effects supervisor Richard Edlund fed in digital data of the Voyager spacecraft photos of Jupiter and correlated them with information about atmospheric circulation and computer models of cloud vortex motion. The result in the film is images of a rotating Jupiter with its clouds in motion showing more detail than anything I have seen. The colours are a little more intense than depected in the Voyager imagery, but this may well be an appropriate compensation: the Apollo astronauts and space shuttle crews say that colour photographs of Earth do not totally convey the delicate range of tones and contrast that the eye perceives when looking back from space.

During a visit to the United States from his reclusive abode in Sri Lanka, author Arther C. Clarke visited the filming in April 1984. Director Peter Hyams cast him in a cameo role as a pigeon-feeding wino on a park bench outside the White House. I missed this Hitchcockian touch on my first viewing of the film.

However, the unsatisfying ending that Hyams created to conclude the film obscures some of the most potent elements of the Clarke novel almost as well as Clarke himself melts into the background in that brief scene in front of the White House.

In the film, the inscrutable black monolith in orbit around Jupiter—the object of enquiry of both the spaceship Discovery of 2001: A Space Odyssey and the centre of scrutiny in the sequel—mysteriously begins to multiply like a dividing biological cell. The multiplying monoliths bore a hole into Jupiter and rework its material into a small star. Meanwhile, back on Earth, World War III is about to break out, but the creation of the star by some omnipotent other civilization is taken as a symbol of some

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Greater Power, and mankind lives in peace happily ever after. There is a brief scene of a monolith on the surface of Jupiter's moon, Europa, a world that is identified in a cryptic message received from HAL as out of bounds for Earthlings.

Now anyone who has not read Clarke's novel 2010: Odyssey Two will probably have a hard time sorting out this mumbo-jumbo. Indeed, I have read numerous reviews claiming that all the mysteries of 2001 are neatly explained by the sequel. But these same reviewers then proceed to give an explanation largely at odds with that given in the novel.

The key thread of Clarke's two novels is that a highly advanced spacefaring civilization explored Earth long ago and aided some of the planet's creatures over a few difficult evolutionary hurdles to ensure that intelligence would arise on our planet. They left the black monoliths (sort of all-purpose robots) to monitor the progress. By the time humans discover the monoliths, the aliens have ceased to have recognizable physical form. In Clarke's words, they are "creatures of radiation, free at last from the tyranny of matter." The monoliths are their machines, and David Bowman was usurped as an intermediary between humanity and the alien intelligence.

That much was suggested by the first film and recapped in the sequel. Proceeding with Clarke's story, the alien intelligence regards the experiment with the creatures from Earth as reasonably satisfactory; so they turn to Europa, the second major moon of Jupiter, where primitive forms of life exist in a subterranean ocean encased by a thick layer of ice that overcoats the moon. After Jupiter has been turned into a sun, the ice of Europa melts, exposing the ocean and accelerating evolution.

In the final scenes of the film, a swamplike environment is seen on the surface of Europa with a block monolith standing among the weeds—an image just as cryptic for most viewers as the star child was in the original movie. Yet an obscure ending is what Hyams vowed he wouldn't make. It is particularly inexplicable because he takes pains to have the players or the narrator explain in detail other, more pedestrian aspects of the film.

In the novel, Clarke explains that David Bowman, who has taken HAL as an intellectual companion, has been given charge of overseeing the emergence of new life forms on Europa. Europa is protected from interference by human explorers just as Earth was protected for millennia from other spacefaring civilizations in the galaxy. In Clarke's view, then, the role of superintelligences in the universe is to ensure that intelligence can evolve on as many worlds as possible, but once its emergence is assured, higher life forms maintain a strict "hands-off" policy.

Clarke characterizes this activity in the novel as "the Great Game." He says: "They were lords of the galaxy and beyond the reach of time. They could roam at will among the stars and sink like a subtle mist through the very interstices of space. But, despite their godlike powers, they had not wholly forgotten their origin in the warm slime of a vanished sea, and they still watched over the experiments their ancestors had started so long ago."

In 1968, Stanley Kubrick effectively created this mood of detachment in 2001: A Space Odyssey by distancing the viewer from the events. We were observing the feeble attempts of the creatures of Earth to come to grips with the fact of a higher intelligence at large in the cosmos; their chilling feeling of awe and helplessness when faced with such an abyss of unknowns is largely overshadowed in 2010 by too much dialogue and too many shots of Roy Scheider looking concerned and clenching his jaw muscles. Annoying as well is the intrusion of the narrator, a device that Stanley Kubrick had included in the original cut of his film, but wisely decided to eliminate in the version released to theatres.

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In entertainment value, 2010 has to be regarded as a success in that audiences seem to be generally satisfied, if not overwhelmed. In addition, astronomy buffs get the finest and most accurately portrayed extraterrestrial vistas ever put into a commercial film. However, considering that it is based on such a splendid example of science fiction, one has to conclude that the mishandling of the source work's most cerebral elements is a major disappointment.

## A BOOK REVIEW

by Larry Manuel

The Comet is Coming! by Nigel Calder, 160 pgs., 24 cm. x 17 cm. The Viking Press, New York, 1981 Price: (US) $12.95

The subtitle: "The Feverish Legacy of Mr. Halley" hints strongly at the general tone of this book. The author adopts a strongly skeptical and often amused attitude toward the myths and legends, as well as the contemporary science and parasciences, surrounding comets through the ages. It is very easy to read, and has many illustrations and some wonderful colour plates of comet photographs.

A number of extracts from the text will perhaps pique the reader's interest, but these in no way exhaust the number of interesting anecdotes. Regarding the seriousness with which comets have been regarded as omens of doom, the author states: "By an oversight no comet at all appeared in AD 814, to herald the death of Charlemagne, Emperor of Europe. Yet to the chroniclers this precursor of the death of kings was as natural as a pregnancy before birth; so, undismayed by want of facts, they duly recorded that a comet came." (page 13)

In 1910, predictions were that the head of Halley's Comet would hit the earth. “One social historian who noted the public mood was James Thurber, sixteen years old at the time. He was aware of certain predictions that Halley was going to strike the planet somewhere between Boston, Massachusetts, and Boise, Idaho, and knock it into the outer darkness, far from the sun. As Thurber recorded:

> Nothing happened, except that I was left with a curious twitching of my left ear after sundown and a tendency to break into a dog-trot at the striking of a match or the flashing of a lantern." (page 26)

In the chapter tracing the development of the various comets' Heads and Tails, several examples are given of comets' heads that have been observed to split up: Sawerthal (1888), Campbell (1914), Whipple-Fredtke-Tewzadze (1943, Honda (1955) and Tago-Sato-Kosaka (1969). "The ones with cumbersome names deserve to split up, but that cannot be said for West (1976). This was the great comet that the public did not see, because news editors, feeling foolish after they promoted Kohoutek of 1973 as the spectacle of the century, virtually banned any mention of comets from their papers and television screens." (page 67)

The chapter which the reviewer found most interesting is called "An Inter-Planetary 'Flu Machine?" Here, the theory of Sir Fred Hoyle and Chandra Wickramasinghe, the topic of their joint book Diseases from Space, is examined.

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Calder has a field day, nicely balancing objectivity and what may be called alarmed common sense:

"Judicious astrononers and biologists in the early 1980's might rate the stages of the thesis as follows:

a) Comets supplied a rich soup of chemicals to the young Earth. -Plausible.
b) Life can originate independently in the nucleus of a comet. -Doubtful.
c) Our own microbial ancestors came to Earth in a comet. -Doubtful squared.
d) Some diseases are transmitted unexpectedly via the air, rather than from person to person. -Possible.
e) Diseases sometimes help evolution along by introducing new genes. -Plausible.
f) Diseases come from present comets. -Yes, and pigs can fly." (page 114)

Finally, referring to the ambitious International Halley Watch: "In their efforts to unmask Halley, the professional astronomers and space scientists will lose a lot of sleep, but probably less than the amateur astronomers. For many of these, with no comets to their names, the apparition will be the event of a lifetime, and they will take upon themselves the solemn duty of watching over Halley night after night, whenever it is visible. Only friendly clouds and the Earth's horizon, blotting out the view, will stand between the amateurs and the divorce courts." (page 145)

For anyone with even a passing interest in comets, astronomy, or science in general, Calder's book is a worthwhile net that draws many disciplines together in a careful way. Regarding Halley's Comet in particular, the review suggests that the reader will be left with a sixth sense of what Halley's Comet really is and what it continues to mean to people around the Earth.

The Comet is Coming! may be found in the Kingston Public Library on Johnson St., and it is available from Sky Publishing Corp.

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## REPORT OF THE JANUARY 1985 NATIONAL COUNCIL MEETING

The first meeting in 1985 of the National Council took place at the National Office on January 26, with ten of the Centres being represented by officers or representatives. The agenda included reports from officers and committees and a number of announcements.

The National Treasurer, Mrs. Fidler, presented a proposed budget for 1985 which was discussed by Council; an additional meeting of the Budget Committee was also scheduled. An amount of $3,000.00 was allowed for possible Travel Grants to the General Assembly in June, and a grant to the Quebec Centre of $350.00 from the Ruth Northcott Fund was approved in response to a request for assistance in the production of the Almanach Graphique. Ms. Robinson, representing the Property Committee, reported that the apartment above the Society's headquarters had been repainted, some new equipment had been installed, and it would be rented to new tenants for $100.00 more than previously charged. As editor of the Observer's Handbook, Dr. Bishop announced that 14,000 copies of the 1985 edition had been printed and over 10,000 had been mailed as of late January. Mr. Enright, the Astronomy Day Coordinator, presented a package of information to assist centres in celebrating International Astronomy Day on April 27th. As a representative of the Edmonton Centre, Mr. Loehde reported that plans were proceeding well for the General Assembly in the Alberta capital in June. Dr. Bishop informed Council, that

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as National President, he had made visits to four of the Centres, and had received invitations from a number of others.

Seven regular members of the Society were elected to life membership, and no less than seventy-two recent applications for unattached membership in the Society were approved. Council also approved the Nominating Committee's suggestion of inviting Dr. Stephen Hawking, a noted British Cosmologist, to be an Honorary Member of the Society. Dr. Arthur Covington, a pioneer in radio astronomy and solar activity studies, and member of the Ottawa Centre, will be invited to serve a four-year term as our Honorary President.

More complete details of all of the items discussed at the meeting may be found in the minutes of the meeting which have been distributed to all Centre Presidents and National Council Representatives.

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## FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Did you know that solar radiation strikes our bodies at night as well as during the daytime. How can that be possible, since the earth stands between us and the sun? The answer is that solar neutrinos, produced by nuclear reactions deep within the sun, can simply pass through the earth without being halted whatever. As a result, solar neutrino radiation shines up on us at midnight, just as it and other forms of solar radiation shine down on us at midday. In fact, every second of every day and night hundreds of trillions of solar neutrinos pass through our bodies without any hindrance.

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## REPORTS AND OTHER ITEMS

1. Observing reports during January and February were scarce indeed. I managed to make a few solar observations but sunspot numbers were quite low. In fact, out of eight solar observations during January the Zurich Sunspot Number was zero on six occasions, and similarly in February on two out of three observations the Z.S.N. was zero. In early January, Comet Levy-Rudenko was large and bright, but with no clear evidence of a tail, as it moved northward through the constellations Lyra, Hercules, and Draco. It was easily seen in the morning sky with an eight-inch telescope but was too difficult for binoculars, even large ones. My latest sighting of "David's Comet", as of this writing, was on the evening of February 19-20 when it was about one degree from the star 23 Ursae Majoris and had faded considerably to about tenth magnitude. On that night, as often is the case on clear nights in late February, the Zodiacal Light was quite evident in the north-west for over two hours after sunset.

2. We urge all our members to make serious preparations for Astronomy Day on April 27th. Let us have our exhibits as well organized as last year and let us make it a time for sharing our many projects with the public.

3. All those who plan to attend the General Assembly in Edmonton from June 28th to July 2nd should follow the instructions in the February issue of the National Newsletter in order to register and arrange for accommodation.

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4. Over the next few weeks you should plan to observe some of the following objects if our spring skies allow it:

   1) Comet Levy-Rudenko which is now circumpolar but becoming fainter. Be sure to use the ephemeris and map included in our last newsletter.

   2) Venus and Mars which are low in the western sky at sunset. Try to see how late in the month of March you can observe Venus in the west as it moves down closer to the sun approaching an inferior conjunction in early April. Try, also, to observe the changing phase of Venus. Its quarter-and gibbous-phases were readily observed even in binoculars in February.

   3) Zodiacal Light which should be visible throughout March in the northwest for a couple of hours after sunset—if you have clear, dark skies.

   4) Minima of the variable star, Algol, which should be observable on the nights of March 9/10th and March 12/13th. Remember that the constellation Perseus is now in the northwest in the late evenings and the star, Algol, will be setting shortly after midnight; so be sure to start observing it as soon as it becomes dark enough to do so.

   5) The planet Pluto which reaches opposition on April 23rd. March, April, and May are the ideal months for owners of medium-sized and large amateur telescopes to try to observe this faint and distant planet. Be sure to use the map provided on page 108 in the Observer's Handbook.

   6) The Lyrid Meteor Shower which peaks on the night of April 21st/22nd and the Eta Aquarid Shower which reaches its peak on the evening of May 4th/5th. The first one should be very good since it occurs just two nights after a new moon. However, the second one, known to be associated with Halley's Comet, occurs at the time of the full moon. Nonetheless, it should be observed to see if it is unusual near the time of the approach of the comet.

5. This is a calendar of our upcoming meetings and the list of speakers and topics of their presentations.

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| February 22 | Robert Heaton: The Search For Solar Neutrinos |
| March 8 | Dr. Chou: A topic relating to Stellar Evolution |
| March 22 | Martyn McConnell: Search For Extraterrestrial Intelligence |
| April 12 | Jocelyn Boily: Rocket Designs |
| April 26: | Leo Enright: Astrophotographic Favorites |
| May 10 | Peter Jedicke: The Planned Space Station (the Kingston-London Centres Exchange) |
| May 24 | Rolf Meier: (The discoverer of four comets will talk to us on a topic of his choosing.) |

The meetings begin at 8:00 p.m. and are held in Room 222 in Ellis Hall on University Avenue in Kingston. We hope to see you there.

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6. Our address is: R.A.S.C. - Kingston Centre,
P.O. Box 1793,
KINGSTON, Ontario,
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We would be very glad to hear from our readers at any time. Articles for this newsletter are most welcome.

*Clear skies!*

*Good observing!*

Leo Enright