

## BOOK REVIEWS

**The Big Splash** by Dr. Louis A. Frank with Patrick Huyghe. Birch Lane Press, 1990.

I learned about the Frank theory of small comets some years ago but it seemed to have faded away. It came as quite a surprise when it surfaced again at a meeting I was attending and was even available in the form of a book. The idea struck me as absurd, but our creed requires keeping an open mind so I ventured to read the book.

This book has everything: mystery, suspense, real people who I know and seemingly airtight arguments. If you have a pet hobbyhorse for explaining some geophysical phenomenon or event you had better read this book. Your explanation may have been preempted by a small comet explanation.

In books like this, one of the favorite examples of putting science in its place is that of the origin of meteorites. Frank and Huyghe have it right when they say that mainstream science had to do an about face and accept the fact that meteorites come from non-terrestrial sources. They do not point out that there were perfectly acceptable explanations for those rocks and there was nothing to prove these explanations lacking or wrong. They also do not point out that as soon as analytical techniques in chemistry developed to the point that an assay showed beyond a shadow of doubt that the rocks were non-terrestrial all scientists accepted that proof and went on from there. If you want an example in pure physics, just review the history of the aether.

Very often the techniques and the technology are not available and we remain unaware of the existence of some fundamental object or phenomenon. Whether there are stars fainter than we can see with our eyes is interesting speculation, but totally idle until we invent and apply the telescope. Similarly, objects in the cosmos vary, but very slowly, so why build rapid response time equipment and enhance the effects of random photon noise? So the millisecond pulsars are undetectable even though we could build equipment that would detect them. Finally, someone uses equipment intended to study something else and there they are. Another example is the discovery of quasars. Spectra were taken in 1958 and deemed to look like that of a white dwarf. They were a bit perplexing so they were filed away for later study. In 1960 they were given to a young post-doctoral fellow who was instructed to see what he could make of them. In 1963 he hit on the key, broad emission line objects with redshifts one-third the velocity of light! So it may be with the small comets, though I doubt it.

The **Big Splash** develops the observational evidence and interpretation of this evidence in detail. Along the way we learn a bit about Frank and his credentials and how he perceives the scientific establishment. We are disarmed by statements about scientists who are his friends and then alarmed when these same scientists try to dismember him limb from torso. On the assumption that the small comets exist, a long series of events are explained. The water on earth comes from them, they bring organic life, etc., and are tied in with mass extinctions, a tenth planet and so on. In the end the authors make a case for telescopic detection of small comets.

It is not obvious why the orbits of the small comets are all **prograde** while we know those of the large comets are distributed isotropically. Frank and Huyghe have Pluto at a distance of a hundred astronomical units (it should be forty). The dust giving rise to the zodiacal light is attributed to the moon. There are numerous other minor points like this. They even call Gene Shoemaker an astronomer although the last time I talked to him he was a (planetary) geologist.

Huyghe said that the shuttle should encounter a small comet about once in every two-hundred orbits, *i.e.* an encounter every mission or two. One astronomer who has been up there as often as anyone else and would love to cash in on such a discovery has not seen them. Another astronomer who has flown only once hasn't seen anything remotely resembling a small comet as described by Frank and Huyghe. I would guess that one of these small comets would occasionally wipe out one of the geo-stationary satellites. A few have failed catastrophically, but they are still in their proper orbits as confirmed by their tracking beacons and radar. If they had been run into by a 100-ton small comet they would have been pushed out of their orbit if not demolished.

The book is quite readable and conveys **Frank's** love for experimental physics. It also reveals a bit of a persecution complex ("Not everyone was out to get me.") and at times resorts to ridicule of individuals "Astronomers should have learned their lesson long ago. Galileo . . . could not get people to look through a telescope. . . . But now, three centuries after Galileo, Gehrels, who as an astronomer should know better. . . ." These last two points are distracting because they **interrupt** the flow of reading. Still, read the book and if you are so inclined—go out and search for small comets.

Where should you search? That is a good question because the book is not clear on this. It seems to me you should be looking on the meridian from about an hour after sunset to two hours **after** sunset. At this point the nearest small comet will be almost entering the earth's shadow at an altitude of about 1000 miles and **subtend** about two seconds of arc. There are astronomers around the world who do just this, not so many, but not so few either and they have been doing it since about 1836. My prescription is not that given in the book. In the book they are detected by the glow they produce passing through the earth's atmosphere.

If you decide to search for these elusive objects, be a good observer. Record everything in great detail, sky conditions, temperature, time, etc. Not so long

ago I was going to observe right **after** sundown. The rule of thumb is "Do not start an exposure until 40 minutes after sunset." Experience has told me that you can start when you can see a 9th or 10th magnitude star drift through the field. My way of deciding when to start is to open up and let the telescope sit near the meridian unclamped, *i.e.* not tracking. About 25 minutes after sunset I start to glance through the eyepiece and when I can see an appropriate star drift through I start work. Imagine my surprise when I saw what appeared to be a very faint star just sitting there. It stayed in the field of view and at a declination of about  $-9^\circ$ . I had to move off and take my plates on the object I was interested in. As soon as I finished I tried to reset the telescope, drive **off**, on the meridian at exactly the same declination, an almost impossible task since the eyepiece views only a few minutes of arc and the declination scale is only good to a few minutes of arc. Also, the telescope may not have been exactly on the meridian. I never recovered the mysterious star, but I figured out what it must have been—a geosynchronous communications satellite.

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**Fire from Ice: Searching for the Truth Behind the Cold Fusion Furor** by Eugene F. Mallove. New York: John Wiley & Sons, 1991, xviii + 334 pp.

This is the third, and by far the best book published about "cold fusion"; indeed, it is the only one that can be unhesitatingly recommended. Its **virtues**—absent from the earlier two (by David Peat and by Frank Close)—include that it is well written and produced and that it sets cold fusion into proper contexts: the pre-history of anomalous results with palladium and deuterium, the search for controlled "hot" (thermonuclear) fusion and the need for such sources of energy, and the nature of scientific activity.

One important caveat is that Mallove is an unabashed enthusiast about the reality of cold fusion, and his judgment may not be correct. However, his declared belief does not seem to hinder him from giving a balanced account on the significant points. Sociologists of science may find interest in comparing Mallove's account—that of an engineer turned writer—to that of Close, a physicist who also writes popular science: it is not uncommon for engineers to accept the reality of phenomena that are not yet understood, as it is very common for physicists to disbelieve the reality of phenomena that seem to