

ASTRONOMICAL
WONDERS

天象奇观

章云华 ● 著

路东平 ● 译

甘肃科学技术出版社

飞碟探索丛书

英汉对照系列



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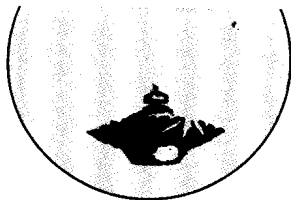
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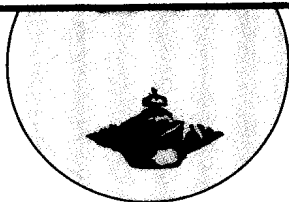


内 容 简 介

随着很多灾难题材的影视剧的热播，我们是否对我们赖以生存的地球更加重视了呢？对那些在广袤的宇宙空间中来去自如的小天体，我们是否多了一些敬畏的心情呢？

在这本《天象奇观》里，作者从1994年7月的那场彗木“死亡之吻”谈起，说到了在宇宙空间中运行的小天体对地球的威胁以及人类为预防小天体的入侵所做的一系列防范措施。同时，书中还对人类已经议论纷纷的“太阳系第十大行星是否存在？如果存在，它是否是在地球轨道的另一侧运行的‘地球的兄弟’？”等一些内容做了全面地探讨。

此外，书中还对存在于现实生活中的各种奇异的天空景观进行了讨论，比如：神奇的“白昼夜景图”、古已有之的“夜太阳”和“日月并升”的奇观等等，带你一起去领略宇宙中的奥秘。



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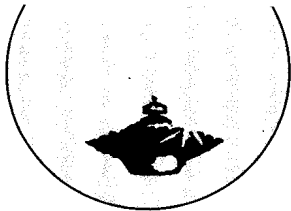
“The kiss of death between the comet and the Jupiter” happening in July 1994 was really an exciting event. While looking up at this wonder, we can't help feeling it fortunate for the earth to survive the disaster at this time. But the critical scientific facts compel us to doubt

Can the earth escape the disaster forever?

This is a dialogue, which not just helps us to have an idea of the earth's safety and danger in the future, but more importantly, calls on the human beings to be able to prevent them from being harmed by the other heavenly bodies. The human beings should change their way of thinking and be on guard after the kiss of death between the comet and the Jupiter.

Zhang Yunhua: *Although the kiss of death between the comet and the Jupiter took place 780 million kilometers away from us, we as bystanders on the earth still felt shocked. The people can't help but ask this question: Will the “unexpected guests” invade the earth someday?*

Liu Yan (An associate research fellow from Zijinshan Observatory, Chinese Academy of Sciences, head of the project on the observation and study of 10-meter-wave radio radiation, one of twenty-one projects on “the collision between the comet and the Jupiter” in China): *This is possible. As the latest astronomical study shows, the collision between the small heavenly bodies and the earth, which is likely to cause a global disaster, takes place once*



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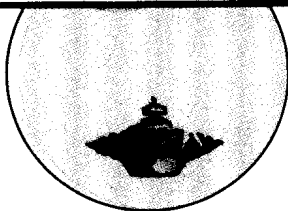
1994年7月的那场彗木“死亡之吻”，着实让世人热闹、兴奋了一番。大家在翘首观望天上奇观的同时，也不由庆幸地球此番能幸免于难，但严峻的科学事实又使得我们不得不产生这样的疑问——

地球：躲过了初一，能躲过十五吗？

这是一篇对话文章，它的作用不仅仅在于让人们对地球的未来安危有一个了解，更深远的意义在于呼吁人类要有保护自己不受其他天体伤害的能力，人类的思维应在那次“彗木之吻”后有所改变，引起全球性的警惕。

章云华：“彗木相撞”虽然发生在远离地球的7.8亿千米处，但隔岸观火的地球人仍有一种惊心动魄的感觉。人们不禁要问：“不速之客”会闯入地球吗？

刘炎（中国科学院紫金山天文台副研究员、中国“彗木相撞”21项研究课题中“10米波段射电辐射的观测研究”课题负责人）：这种可能性确实存在。天文学的最新研究表明：造成全球性灾难



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500, 000 years, while those small heavenly bodies about 50 meters in diameter are likely to strike the earth once 100 years.

In fact, in the earth's 4.6 billion years, the earth has been hit by the heavenly bodies beyond it for countless times. In spite of weathering and erosion through centuries, there still exist over 140 crater relics. The famous ones are as follows:

(1) 300 million years ago, an asteroid left behind a pit thirteen kilometers in diameter, one hundred and three kilometers south of today's Chicago;

(2) An aerolite pit, with a diameter of 1,200 meters and a depth of two hundred meters, located in Arizona, America, was created by the strike of a small heavenly body which has a diameter of sixty meters 20,000 years ago;

(3) Two aerolites hit the area of Siberia in 1908 and 1947 respectively, causing great damages to the local ecosystem;

Some researchers even claimed that 65 million years ago, an asteroid of 10 kilometers in diameter struck the earth, killing all the dinosaurs that had ruled the earth for more than 100 million years.

Zhang Yunhua: This danger still exists now. As calculated, about 21,000 asteroids over 1,000 meters in diameter can fly to the equator of the earth, only 10% of which can be observed by us, so the rest may "invade" the earth at any time.

Liu Yan: That's true. Those asteroids located in the "blind area" of the observation have "intended" to invade the earth and cause dangers to both the earth and the human beings.

(1) On October 30, 1937, an asteroid called Hermes flew over the



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的小天体碰撞地球的概率为 50 万年一次,而直径 50 米左右的小天体撞击地球则可能 100 年发生一次。

事实上,在地球 46 亿年的历史,曾经无数次遭到外来天体的撞击,虽然历经风剥雨蚀,迄今仍有 140 多处环形山遗址,著名的有:

(1) 3 亿年前,一颗小行星在今天的芝加哥南部 109 千米处留下了三个直径为 13 千米的深坑;

(2) 位于美国亚利桑那州直径 1.2 千米、深 200 米的陨石坑,是 20 000 年前,一颗直径为 60 米的小天体撞击而成的;

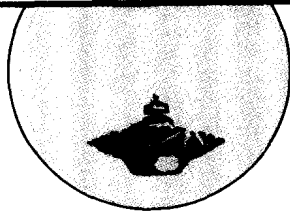
(3) 在西伯利亚地区,1908 年和 1947 年先后发生两次陨星撞击事件,给当地生态环境造成很大破坏。

更有研究者称,6500 万年前,统治了地球 1 亿多年的恐龙灭绝,是一颗直径为 10 千米的小行星撞击所致。

章云华:这种危险性现在依然存在。因为据推算,目前能够飞到地球轨道附近、直径 1 千米以上的小天体有 21 000 颗左右,而我们能够观测到的仅为 10%,其余的小天体随时会“入侵”地球。

刘炎:是的。这些位于观测“盲区”的小天体,已经多次“图谋不轨”,给地球和人类带来险情。

(1) 1937 年 10 月 30 日,一颗名为赫米斯的小行星,在地球上



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earth at a height of 780, 000 kilometers, causing a panic in the world;

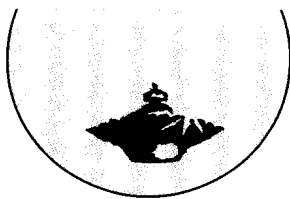
(2) On August 10, 1972, an asteroid having a diameter of 10 meters, at a speed of 15 kilometers per second, rumbled over California at a height of 580, 000 kilometers, America at daytime;

(3) At 1: 20 a. m. on December 10, 1988, an asteroid flew over Hubei province, in China. Many people mistook it for a UFO and made much fuss over it.

Zhang Yunhua: Fortunately, the above - mentioned heavenly bodies didn't explode or hit the earth. However, we are not so lucky all the time. Once an asteroid "breaks into" the earth, what will be the result?

Liu Yan: According to the latest astronomical research, if an asteroid having an diameter of over one kilometer strikes the earth, it will give out an energy totaling as many as over one trillion tons of TNT. It can destroy an area of one million square kilometers. Besides, "the winter of planetary collision" will appear on the earth.

At that time, a large amount of submicron dust will be thrown into the stratosphere, and the earth will be in the middle of dust. There will be neither sunlight nor photosynthesis, bringing about a sharp fall in the grain output. A worldwide famine is inevitable, and epidemic and diseases will begin to spread as well. Furthermore, at least 1/4 of the population on the earth will die. The historical process of the human civilization will be turned back. As a result, we should not be blind to the danger from the space, or we will be caught unprepared.



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空约 78 万千米处掠过,引起一片恐慌;

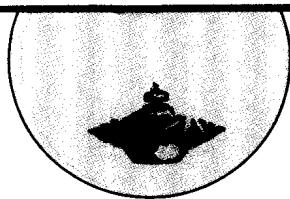
(2) 1972 年 8 月 10 日,一颗直径 10 米、飞行速度为每秒 15 千米的小行星,大白天从美国加利福尼亚州上空 58 万千米处飞过;

(3) 1988 年 12 月 10 日凌晨 1 时 20 分,也有一颗小行星划破湖北大地的夜幕,被人们当做是 UFO 而闹得不亦乐乎……

章云华:幸运的是,上述小天体没有发生爆炸或碰撞。然而,并不是每次都会如此幸运,一旦一颗小行星“闯入”地球,又将会发生怎样的场景呢?

刘炎:根据最新的天文学研究可知,直径 1 千米以上的小行星与地球相撞,其爆炸释放出来的能量高达 1 万亿吨 TNT,除了直接摧毁 100 万平方千米的地区之外,地球还会出现“星击之冬”。

那时,大量的亚微米爆炸尘埃抛向同温层,地球将被尘埃笼罩,无法接受阳光照射,光合作用不能进行,粮食会大幅度减产,全球性的饥荒将不可避免地产生,瘟疫、疾病也开始流行。同时,地球上将至少有 1/4 的人口死亡,人类文明的历史进程将出现历史性的倒退。因此,我们对这种来自太空的威胁,绝对不可以漠然处之,届时又措手不及。



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However, the human wisdom is different from that of the dinosaurs over sixty – five million years ago, the accelerating technology has helped us to lay a good foundation for the protection against the “invasion” from the outer space. As to the threat from the asteroids

The earth will calmly accept the severe challenge

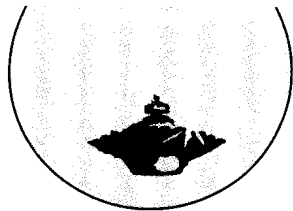
Luckily, the earthmen have recovered from the shock of “the great explosion on the Jupiter”, for they become wiser by learning from “the collision between the comet and the Jupiter”.

Meanwhile, because of this accurate prediction of that collision, the human beings are even more confident in terms of the observing, tracking and defending the possible strike of the earth by the small perigee heavenly bodies.

After a recall of history and warning, the dialogue between the author and associate research fellow Liu Yan, turns to how to protect us against the threat.

Zhang Yunhua: *With the end of the cold war, the international scientific circles have turned their focus to the issue on the strike of the earth by the small heavenly bodies. Since 1991, the international academic conferences concerned have been held for several times, which attracted much attention.*

Liu Yan: *Yes, that is true. Two conferences are most fruitful. One is on “The danger of the collision of the Comet and Asteroid into the*



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然而,人类的智慧毕竟不同于 6500 万年前的恐龙,日新月异的科学技术,已经奠定了防范“外敌”的基础,对于小天体的威胁,可以说——

地球,镇定自若地迎接严峻挑战

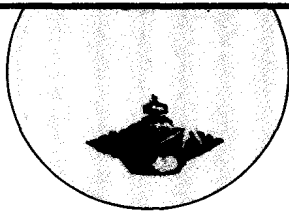
幸运的是,地球人已经从“木星大爆炸”的余波中彻底清醒过来,因为“彗木相撞”已经给了人类太多的启迪。

同时,对这次“彗木相撞”的准确预报,使人类对近地小天体撞击地球的观测、追踪和防卫更加充满了信心。

笔者和刘炎副研究员的话题,也由此进一步从回忆历史、提出警示,延伸到了如何防范。

章云华:随着冷战的结束,国际科学界已经把关注的焦点聚集到了小天体撞击地球的问题上。从 1991 年开始,有关的国际性学术会议已先后召开了数次,引人注目。

刘炎:这当中,以 1993 年 1 月 4 日~9 日在美国图森市召开的“彗星、小行星碰撞地球危险性”会议和同年 4 月 28 日~5 月



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Earth” held in Tucson, U. S. from January 4 to 9, the other being “The Collision of the Comet or Asteroid into the Earth” held in Alice, Sicily, Italy from April 28 to May 4 in the same year. Associate research fellow Wang Sichao from Zijinshan Observatory was invited to attend these two conferences. He joined in the discussion as to how to make concerted efforts to protect against the “invasion” of the “unexpected guests” with over 60 scientists from those countries such as the U. S., the U. K., France, Japan and Russia.

Zhang Yunhua: *The conference held in Alice, Italy was concluded with Alice Declaration, which is reportedly the first announcement about the strike of small bodies into the earth, and will have a far-reaching effect on the human space activities.*

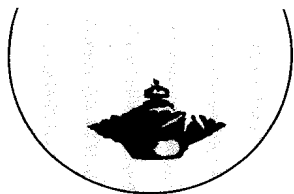
Liu Yan: *That’s true. This can be seen from the main contents in the Declaration. The Declaration maintains that:*

(1) The strike of the earth by the small perigee heavenly bodies will play a very important role in the evolution of the life and environment on the earth;

(2) Unless vigorous measures are taken, the comets and asteroids will end the human civilization on the earth. In the short term, their threats are not second to those of other natural disasters such as earthquake, flood and so on;

(3) These small heavenly bodies of lesser mass, if happening to explode in the sensitive areas in the world, would be mistaken for the nuclear strike and cause some wrong reactions;

(4) Whether for science or for the human society, it is very necessary to make more study of these small perigee heavenly bodies and set up a



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4日在意大利西西里岛埃里斯举行的“小行星或彗星与地球的碰撞”会议收获最大,紫金山天文台的王思潮副研究员应邀出席,与来自美国、英国、法国、日本、俄罗斯等国家和地区的60多名科学家共商大计,齐心协力抵挡“不速之客”的“入侵”。

章云华:在埃里斯举行的会议上,产生了一个《埃里斯宣言》。据悉,这是国际社会通过的第一个针对小天体撞击地球的公告,必将对人类的空间活动带来深远影响。

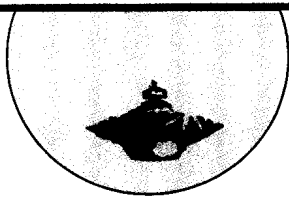
刘炎:是的,这一点完全可以从《埃里斯宣言》的主要内容看出。《埃里斯宣言》认为:

(1) 近地小天体撞击地球,对地球的生命与环境演变起着非常重要的作用;

(2) 如果不采取强有力的措施,彗星和小行星可能结束人类文明史。从近期看,它们的威胁并不亚于其他自然灾害(如地震、洪水等);

(3) 较小质量的小天体在国际紧张地区爆炸,可能被误认为核攻击而触发错误反应;

(4) 无论是对科学还是对人类社会来说,对近地小天体加强



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global protective network with the cooperation of the international society.

Zhang Yunhua: After the issuing of Alice Declaration, all the countries in the world have taken actions. American government also made a series of plans ——

(1) NASA announced that six 2.5-meter-caliber telescopes would be installed in the southern and northern hemispheres respectively, along with the advanced probes, for the purpose of tracking these asteroids;

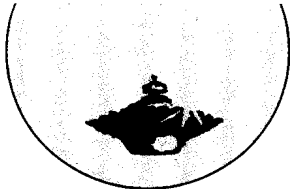
(2) NASA has already started to categorize those comets and asteroids that have a diameter of more than one kilometer and are likely to strike the earth so that the scientific circles can discover and track these “unexpected guests”.

And what measures our side has taken?

Liu Yan: Chinese astronomical circles plan to build a powerful reflective telescope with a calibre of 1.5 – 2.5 meters within five years, equipped with the new high-speed probe. After its operation, we will be able to discover 500 – 1,000 small perigee heavenly bodies, 50 – 100 of which will be more than 1,000 meters in diameter.

Zhang Yunhua: Of course these are all preventive measures. Once such small heavenly bodies as the comet “Machall – 2” or the comet “Staff – Tuter” which has been predicted by the scientists “invade” the earth, how can the humans cope with them?

Liu Yan: In case that really happens, humans will not wait for death. Doctor Taylor, “the father of hydrogen bomb” in U. S., has put forward a feasible plan. That is, cruise missiles or spaceships are



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研究是必须的,应在国际社会协调下建立一个全球空间警戒网。

章云华:《埃里斯宣言》产生后,世界各国已纷纷行动起来,美国的一系列计划也相应出台——

(1) NASA 宣布,将六架 2.5 米口径的望远镜分置南、北半球,并配备先进的电子探测仪进行追踪;

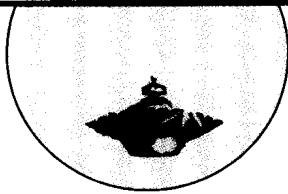
(2) NASA 已开始着手对直径大于 1 千米、有可能与地球相撞的彗星和小行星分类编目,以使科学界能够及时发现并跟踪这些“不速之客”。

那么,中国方面又采取了哪些防范措施呢?

刘炎:中国天文学界计划在 5 年内建造一架口径 1.5 米~2.5 米的强反光望远镜,并佐以新一代高速探测器。投入使用后,力争在 20 年内发现 500 颗~1000 颗近地小天体——其中的 50 颗~100 颗直径在 1 千米以上。

章云华:当然,这一切均属预防性的。一旦有小天体,如“麦克豪尔-2”号彗星或者科学家预测的“斯特夫特-图特尔”彗星真的向地球发动“入侵”,人类又将如何应付这种危险呢?

刘炎:如果真的被不幸言中,人类也绝对不会束手待毙。美国的“氢弹之父”泰勒博士就提出了一项可行性计划:提早发射巡航



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launched in advance to have small nuclear devices installed on these small heavenly bodies and detonated in order to change the speeds and the flying courses of these bodies, in this way the collision can be avoided.

Besides, some scientific dreamers also put forth “a project on the asteroid development” so as to turn them into “space cities”, where the humans can be emigrated someday.

In short, we can summarize our attitudes to the small heavenly bodies in a sentence: We should neither have groundless fear nor treat it lightly.

The soul of all things, your fate is in your own hands! Humans will eventually win in the face of the challenges from “the unexpected guests”—— the small heavenly bodies.

The tenth planet, where are you?

If asked how many planets there are in the solar system, most people will give a right answer: there are nine planets. They include:

(1) The inner planets: Mercury, Venus, Earth and Mars.

(2) The outer planets: Jupiter, Saturn, Uranus, Neptune and Pluto.

However, the scientists' concern is: Is there a tenth planet —— a trans - Plutonian planet in the solar system? If there is, where is it?

Controversial guesses

In the beginning, people thought that there existed a tenth planet —— a trans - Plutonian planet in the solar system. Its reason is very