



Poland

The man who decamped Earth from the center of the cosmos is something of a national hero in Poland — the subject of many a statue, street name, and, formerly, the 1,000-zloty bank note. As you might expect in such a land, Poles take their astronomy education seriously.

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One of the smallest planetariums in Poland is embedded in an octagonal tower belonging to the fortifications around the Gothic cathedral in Frombork. This planetarium is visited by many tourists, because Frombork, a small town on the Baltic Sea, is where Nicolaus Copernicus lived for nearly 30 years. From his rooms in another of the old towers, Copernicus could just see the humble houses of fishermen, the small port, and the sea at the horizon. Here, in what he called “the remotest corner of the Earth,” Copernicus prepared the six volumes of *De revolutionibus*.

Today the planetarium is one of a dozen in Poland. Their main activities are popular shows for the general public, didactic shows for schools, activities aimed at teachers, and astronomical contests.

For 40 years, the largest Polish planetarium (22 meters), in the southern city of Chorzów, has been conducting a national Astronomical Olympiad for secondary-school students. The contest consists of three stages. The first stage, advertised in autumn by posters sent to every high school, consists of a few calculations and observational tasks. These may be, for instance, “Give the times exact to 1 second of stellar occultations by the Moon observed at your place,” or “Take a photograph of Polaris and measure the angular distance from the northern pole.” The number of participants is between 100 and 150.

The second stage is organized in January in one or two places according to the geographical distribution of the participants, their number being 40 to 50. They work for four hours and have to solve five physics-astronomical problems. The 20 finalists meet in the planetarium for three days in order to resolve another set of more difficult problems. If the skies are clear, they are also given an observational problem; if not, they work under the planetarium artificial sky. The jury is composed of 10 professional astronomers.

A small planetarium on top of a secondary school in Grudziadz is the place of another contest: an astronomical seminar. Secondary-school students prepare scientific papers and present them to audiences in their provinces. About 20 winners from the whole country meet for the finals in

Grudziadz. The jury is composed of professional astronomers, teachers, and members of the two Polish astronomical societies.

This September, Polish television began an astronomical tele-contest for secondary students, transmitted from the Torun Planetarium on the first Saturday of each month. This planetarium, built inside a 19th-century gas tank, opened in 1994; it is situated in the middle of the Old City and gets a large number of visitors, especially at the height of the season in May.

These contests are aimed at secondary schools, but the Torun Planetarium also has organized a competition for elementary schoolchildren. Pupils in Torun and neighboring provinces take a written test, and the 20 best participants come for the final contest to the planetarium. My colleagues and I have found that the competition not only can enlarge children’s astronomical knowledge, but also can give them some general ability to express themselves. One item, for instance, is “to speak on a given subject for three minutes.” The improvement has been especially visible in the case of very young children, who can take part in successive years.

The numerous contests are but one facet of astronomy education in Poland. Some basic astronomy notions are introduced in geography and physics lessons in elementary school. In secondary school, astronomy was once a separate subject in the last year, but the introduction of school-free Saturdays 20 years ago reduced the total number of school hours, and the astronomy lessons were discontinued. In 1992 a reform in physics education instituted a basic program for one-third of the class time; the remaining two-thirds were reserved for physics problems selected by the teachers, so that teachers could choose astronomical problems to illustrate physical laws.

Most physics and geography teachers come to the subject with one semester of university astronomy. Some universities also have special courses for teachers for one weekend per month. All subjects have to be taught in a very condensed way, and the students must do much work at home. The larger planetariums offer summer astrono-

my courses or regular conferences for the physics teachers of their provinces. In recent years, the Polish Astronomical Society has organized workshops for physics teachers. The teachers’ magazine *Fizyka w Szkole* (*Physics at School*) publishes some astronomical didactic material.

For the general public, two associations publish astronomical magazines: the Polish Astronomical Society, the quarterly *Postępy Astronomii* (*Progress in Astronomy*), and the Polish Amateur Astronomers Society, the monthly *Urania*. Astronomical columns may be found in some general science magazines, and there are science programs on television and radio. In many larger towns, the local amateur groups organize series of popular astronomical lectures by professional astronomers.

Five-year astronomical studies leading to a master’s degree in astronomy are conducted at four universities: Kraków, Torun, Warsaw, and Wrocław, while at Gdansk and Poznan students can specialize in astrophysics within physics. After graduating, young people can continue predoctoral studies at some universities, join the university staff as assistants, or teach physics at school. Some try to find administrative posts where a good knowledge of computers is needed.

Torun, the birthplace of Copernicus, was where modern Polish astronomy began in 1945, when a new university bearing his name was organized. The astronomical observatory of that university, situated 12 kilometers north of the town, came into existence four years later. Its largest instruments are now a 60/90-centimeter Schmidt-Cassegrain telescope and a 32-meter radio telescope. Other observatories exist at the universities of Kraków, Poznan, Warsaw, and Wrocław, as well as the Kraków Pedagogical University. The Polish Academy of Sciences in Warsaw also carries out astronomical research. The spirit of Copernicus, to fathom “the marvelous symmetry of the universe,” lives on in his native land. **m**

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