Name	Country	Height (feet)
Thyril	Iceland	1800
Torfa	Ditto	1400
Valino, Mont, highest of the Apennines	Italy	8300
Venlatta Peak	Spain	11,300
Vesuvius (volcano)	Italy	3731
Volcano (Stromboli)	Lipari Islands	2556
Wetter-horn	Alps	10,630
Wharnside	England	2384
Wrekin	Ditto	1320

Comparing these with present accepted figures in metres:

	Auldjo	Modern figure
Mont Blanc	4775	4807
Mount Etna	3314	3308
Ben Nevis	1335	1343
Mont Cervin	4497	4477

It is unclear exactly what methods were used to determine the heights of mountains in these early days. They may have been done by primitive angle measurement and trigonometry, by the carrying of mercury barometers to accessible places or by boiling point determinations. In any case the effort involved was considerable and the possibility of error a spectre ever-present.

An historical account of the measurement of mountain heights would provide a welcome and highly instructive addition to the pages of this journal.[1]

[1] Will someone volunteer, please—Ed.

Big science in the Pyrenees

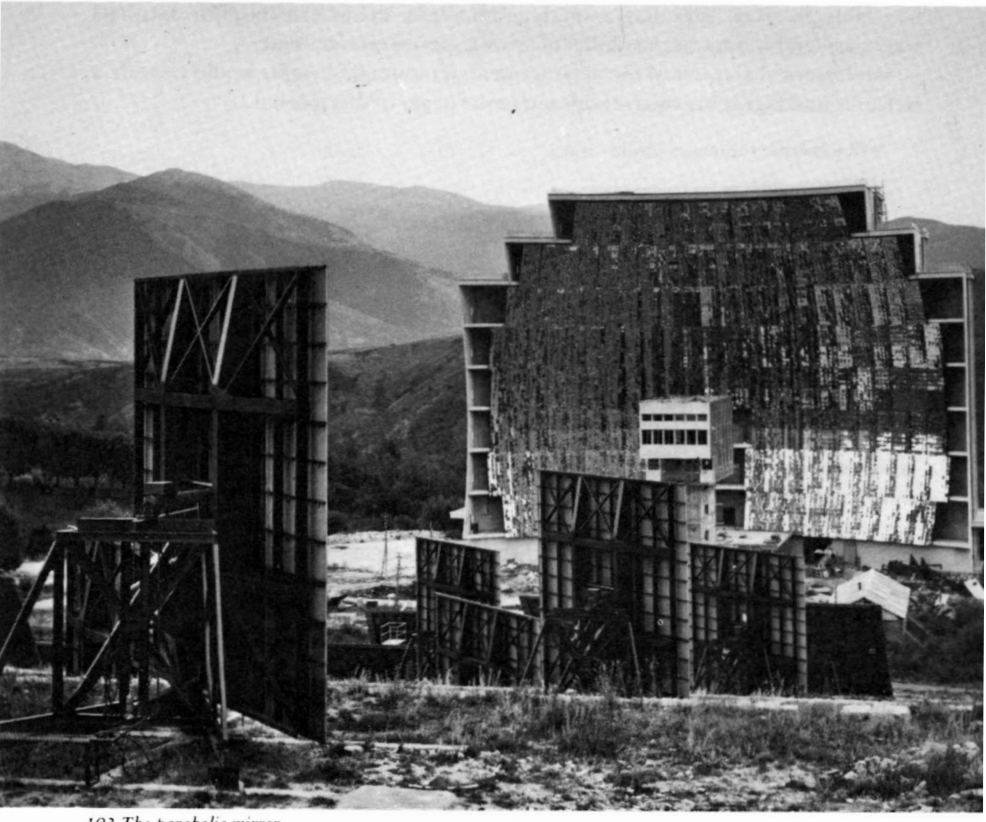
Peter Hillman

In the eastern Pyrenees, only a few kilometres W of the Col de la Perche, is the ski resort of Font-Romeu-Odeillo-Via. Sited at 1800m and S facing, it has all the grim amenities—hotels, chair-lifts, ski-tows, ice-rink, swimming pool, casino and so on. It is also the site of an extremely interesting piece of large-scale scientific hardware, a solar furnace, in which the rays of the sun (shining here for 170 to 180 days per annum) are concentrated to produce 1MW of heating power.

As long ago as the 18th Century Lavoisier, concentrating the sun's rays by the use of large liquid-filled lenses, produced temperatures high enough to melt iron and even platinum. To compensate for the movement of the sun he maintained the alignment of the system by hand control. In the late 1940s French scientists at the Centre National de la Recherche Scientifique began work on this modern version. After smaller prototypes had been set up at Mont Louis nearby, the full scale furnace was completed at Font-Romeu in 1970 at a cost of $2 million.

Sixty-three flat orienting mirrors, which can track the motion of the sun over a period of 8 hours automatically, reflect the sun's radiation on to a fixed parabolic

102 General view of the Solar Energy Laboratory (This and next 2 photos; Laboratoire de l'Energie du CNRS, France)



103 The parabolic mirror

104 The orienting mirrors

reflector. The latter consists of 9500 mirrors, each slightly curved under mechanical tension, which concentrate the rays on to a target at the focus to produce a thermal power of 1MW. This enables a temperature of 3800°C to be achieved in the heated volume.

Each of the orienting mirrors is composed of 180 smaller mirrors; its position is controlled by a hydraulic servo-system automatically guided by a small telescope. The fixed parabolic reflector is 40m high (ie the height of a 10-storey building), 54m wide and has a focal length of 18m. The focal axis is 13m above ground and oriented N and S.

The focus of the system is located in a tower. The reflector is asymmetrical and yields an approximately elliptical focal spot some 40cm across. Inside this the illumination is practically uniform within a circle between 5 and 10cm diameter. Lower temperatures over a larger region are available in front of, or behind the focal zone.

The advantages compared with other high temperature sources are the extended focal region, with large free space around it; steep temperature gradients, allowing specimen containers to remain cool; fast response; absence of electromagnetic fields; easy mechanical control of energy by defocusing or insertion of screens away from the focal point. The furnace has been utilized for carrying out high temperature reactions; the preparation of materials in a controlled atmosphere; operation with fast turn-on or interrupted heating times; search for new materials; electrical tests on materials at high temperatures; the study of solar furnaces in industrial processing and for power generation.

Already mountains have become established as sites for astronomical observatories above the dust and fumes of the earth's lower atmosphere, as reservoirs for water supply and hydroelectric generation, as pastures and forests and as sources of metalliferous ores; here now is a new use—to get an uninterrupted and uncontaminated view of the sun and thus be able to harness its energy for the benefit of man. Applications of this principle, particularly to power generation, may well take place in the future. In the meantime Font-Romeu is where it all began.

Mountaineers may well deplore this as yet another despoliation of mountain scenery, and so indeed it is. Certainly we would not want to see solar furnaces springing up everywhere. But alongside the monstrous architecture of most modern ski resorts, who is going to notice one more 10-storey folly?