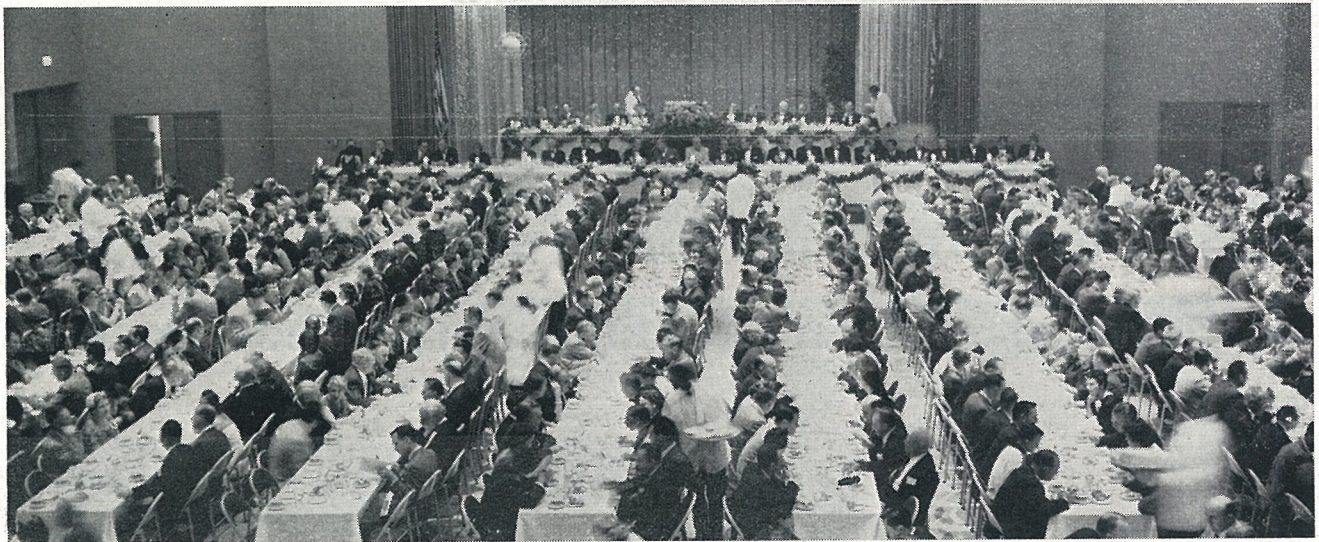


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ASME News

With Notes on the Engineering Profession

E. S. Newman, News Editor



Grand Banquet of World Symposium on Applied Solar Energy was attended by nearly 1000 people who heard John Jay Hopkins, chairman and president, General Dynamics Corporation, speak on world-energy community. Robert C. Swain, vice-president, American Cyanamid Company, presided. Banquet was held in Thunderbird Room of Hotel Westward Ho,

Phoenix, Ariz., where symposium ran from November 1 to 5. General chairman of the conference was Lewis W. Douglas, chairman of the board, Southern Arizona Bank and Trust Company. Mr. Douglas was United States Ambassador to Great Britain from 1947 to 1950. A Solar Engineering Exhibit, comprising 94 exhibits, showed "The Sun at Work."

World Symposium on Solar Energy Held in Arizona Hailed by Scientists¹

900 Scientists and Industrialists From 34 Countries, in Six Continents, Attended

THE increasing dependence of civilization on adequate supplies of energy and the progressive reduction of our energy resources in the form of fossilized fuels has again focused attention on the availability of suitable alternatives, by means of which we can live (in part at least) on our income rather than on our rapidly diminishing capital. An obvious source of energy supply is solar radiation, which is estimated, roughly, to amount to 1 caloric per minute per square centimeter of the earth's surface. This is a very approximate and aver-

age figure but it does indicate that, if properly applied, most, if not all, of our energy requirements could be met from this source.

Unfortunately, however, in most parts of the world the receiving temperature is too low to enable solar energy to be used economically for large-scale operations. Nevertheless, there are some applications and some localities where the sun's heat can be employed with advantage. This, then, was the reason for the various conferences that have been held within the past few years to discuss various applications of solar energy and to stimulate additional research work in that field.

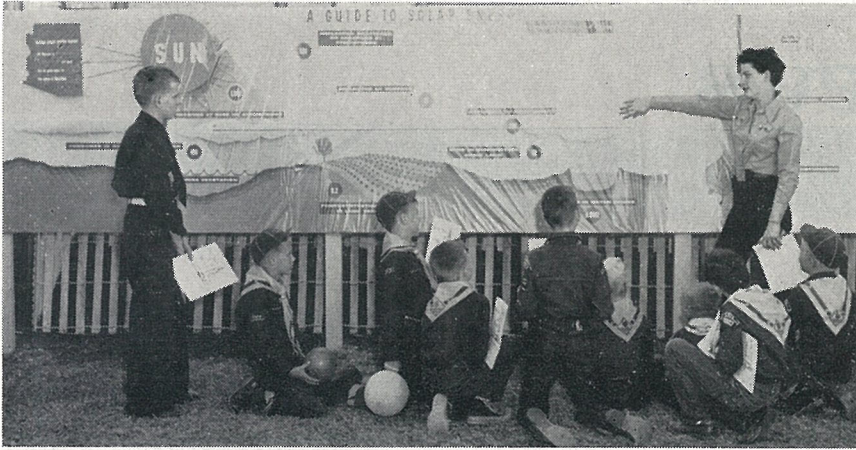
effort on a large scale should have started in the sunny and somewhat arid state of Arizona, with the formation on March 17, 1954, of the Association of Applied Solar Energy. This Association, together with Stanford Research Institute and the University of Arizona, sponsored the first World Symposium on Applied Solar Energy, which took place between Oct. 31 and Nov. 5, 1955, and was attended by more than 900 scientists and industrialists from 34 different countries, located in six continents.

The list of participants was impressive, as practically all of the principal research workers in the solar-energy field were present and most of them took part in the discussions. The general chairman was the Hon. Lewis W. Douglas, former U. S. Ambassador to Great

¹ Report by E. A. Allcut, Professor of Mechanical Engineering, University of Toronto, Toronto, Ont., Can. Fellow ASME. Photographs supplied by Stanford Research Institute, Menlo Park, Calif.

Association of Applied Solar Energy

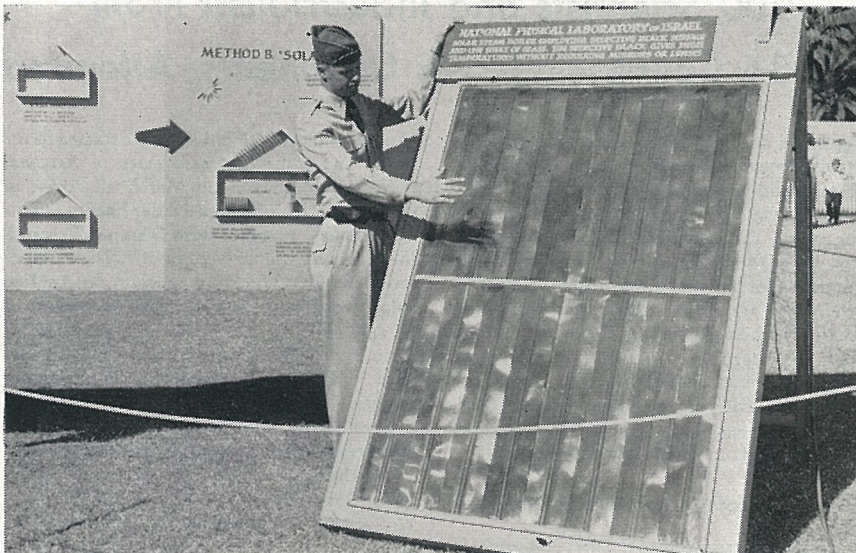
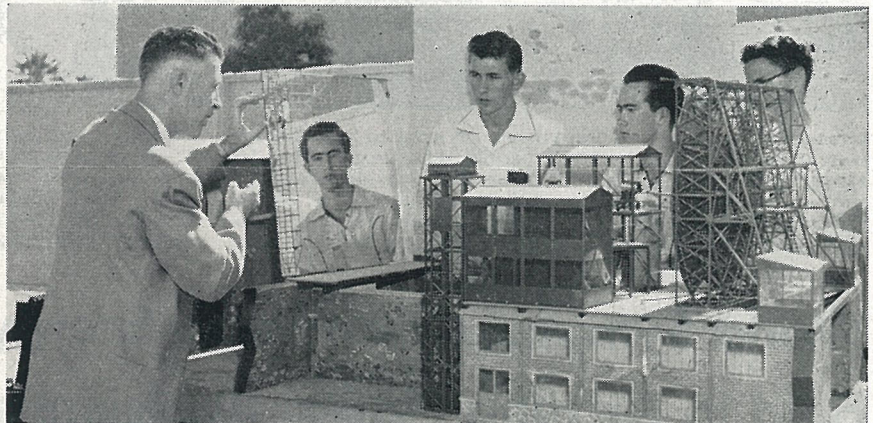
It is not surprising that the first co-ordinated



Cub Scout Troop of Tempe, Ariz., hears an explanation of the possible uses of solar energy. This display was prepared by the University of Arizona, Tucson.

Devices to Harness the Sun's PowerShown at Solar Engineering Exhibit, Phoenix, Ariz.

At right one sees a model of the 35-ft furnace exhibited by the Centre National de la Recherche Scientifique, Paris, France. It is an exact scale model of the solar furnace built by Dr. Felix Trombe in the old fort of Mont Louis, French Pyrenees. The parabolic reflecting surface consists of 3500 small curved mirrors.

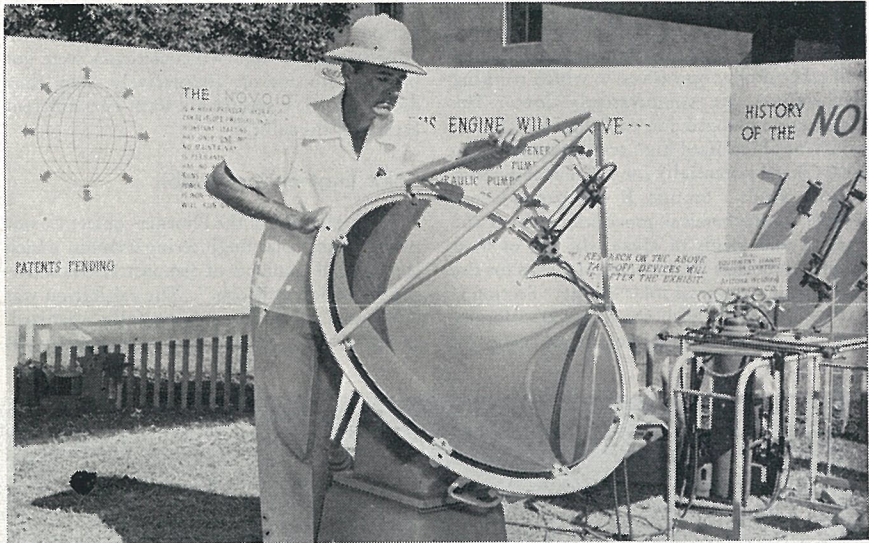


Selective-surface collectors developed and exhibited by H. Tabor, National Physical Laboratory of Israel, Jerusalem, demonstrated that a higher equilibrium temperature can be reached with this device. A selective-surface collector absorbs sunlight readily but does not re-radiate heat easily. Lieut. Clyde Edwards, left, Luke AFB, tests the intensity of radiated heat.

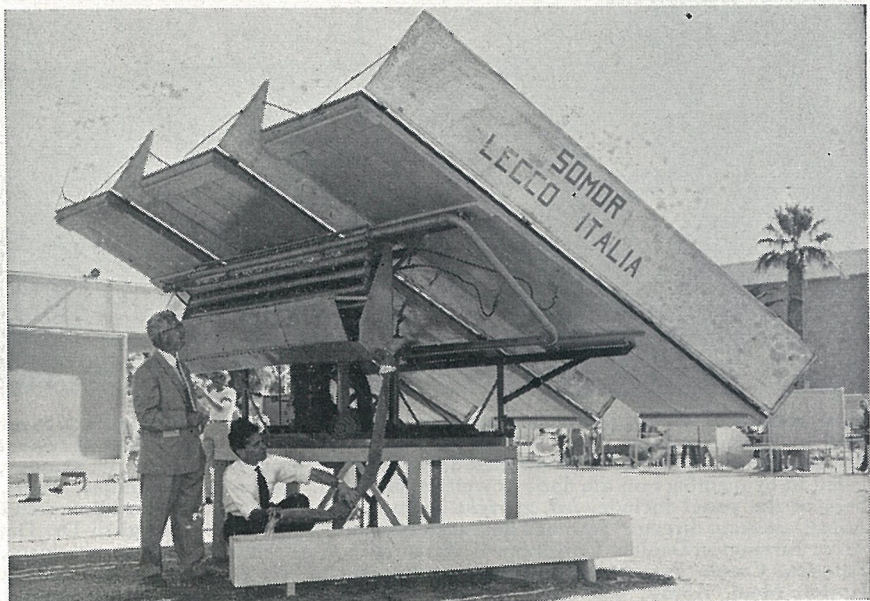
Gregorian Astronomical Telescope, displayed to illustrate the similarity between astronomical devices and high-temperature solar-energy collecting devices, was inspected by Sister Mary Joachim and Sister Ann Timothy of Most Holy Trinity Convent, Sisters of Notre Dame de Namur, Sunnyslope, Ariz. The telescope was designed, constructed, and exhibited by William A. Rhodes of QUEST Lab, Phoenix. Paraboloid reflectors and clock-operated tracking devices similar to those used in telescopes can be used in collecting solar radiation.



Novoid engine, *right*, produces rapid pulsating mechanical energy directly from any source of heat (a solar collector in this case). The engine itself has only one moving part—a column of fluid, the heated end of which alternately explodes into high-pressure steam, then condenses again, producing a hydraulic thrust at the other end of the engine.



Somor 1½-hp engine, largest device exhibited, is sun-operated. Sulphur dioxide is vaporized in the flat-plate collector, which operates in a closed cycle. The generator is used to generate electricity, or the engine can drive a water pump or any other mechanical load. Somor, manufactured by Societa Motori Recuperi of Lecco, Italy, is shown pumping a steady stream of water from underground.



Britain and prominent industrialist. Financial support from the National Academy of Science, the National Science Foundation, the Ford Foundation, the Office of Naval Research, the United States Air Force, and UNESCO made the meeting possible and indicated the general appreciation of the potential importance of this source of energy.

The proceedings were generally in English but were translated simultaneously into three other languages. Approximately 117 papers were read during the week and there were also numerous informal discussions.

Solar Energy Conference—the Scientific Basis

The Scientific Basis of the Use of Solar Energy was discussed during the first two days at the University of Arizona, Tucson, and here most of the groundwork was laid, as 94 papers were read and debated in three different sections, which met simultaneously. Section A (44 papers) was concerned with Thermal Processes, notably the collection of solar radiation by means of flat plates or focusing collectors. The former are used mostly for house heating, hot-water supplies, distillation of salt water, and other similar operations in which working temperatures are comparatively low. The latter are employed for cooking, for the attainment of localized high temperatures (up to 4000 C) and potentially for thermal engines of various kinds. Section B (20 papers) considered photochemical processes, such as the growth and yields of algae, the use of food plants, and other photochemical means for the convenient storage of solar energy. Section C (14 papers) dealt with the direct transformation of solar radiation into electrical energy by

thermoelectric means and various kinds of battery. The basis of all these conversion devices is the amount and kind of solar radiation that is received in different parts of the world and therefore the various methods of measuring these quantities were described by astronomers and meteorologists from America, Europe, and South Africa, respectively.

World Symposium on Applied Solar Energy

The center of activity was then transferred to Phoenix, where the World Symposium was introduced by three papers which were of a general nature, and described respectively the formation and functions of the Association, the various ways in which the radiant energy might be usefully employed, and the economics of the various processes concerned. There followed a series of 23 papers and panel discussions, at which detailed applications were considered. The ground covered during these meetings was much the same as that traversed in Tucson and so there was a good deal of repetition in the material presented by the various speakers. In fact, it is difficult to understand why the two conferences were not merged into one or, alternatively, why they did not deal, respectively, with two different aspects of the subject.

Solar Engineering Exhibit

The high light of the Phoenix conference was probably the Solar Engineering Exhibit which consisted of a number of demonstrations showing "The Sun at Work." The exhibition was held out of doors and was beautifully organized. It was divided into ten sections comprising 94

exhibits, of which a large proportion were working models. There were nine engines and pumps, eight water stills, and nineteen heat collectors of the flat and focusing types. Also included were eight portable cookers and seven high-temperature furnaces, one of which was built from a converted 60-in. searchlight mirror. Water and house heating were illustrated by drawings, photographs, and models. Among the most interesting of the exhibits were the photovoltaic converters or solar batteries, of which six were shown. In the exhibition they were used to operate small motors and clocks and for communication purposes. Models and display panels were used to illustrate the growth of algae and the use of reflectors to warm the soil, to concentrate sunlight on growing crops, and generally to assist agricultural processes. Altogether, the exhibit was comprehensive and impressive and from it one gathered the impression that the first practical applications of solar energy were likely to be for heating purposes rather than for power generation. At the time of our visit the exhibit was thronged with school children and their teachers. This was particularly appropriate, as the next generation may possibly be vitally concerned with these matters.

The work of numerous individuals and research groups was shown at the exhibit, including contributions from the Massachusetts Institute of Technology research program led by Hoyt C. Hottel, Mem. ASME. Material also had been made available by the University of Wisconsin research group headed by Farrington Daniels. Also included in the exhibit was a series of eight dioramas depicting scenes of solar utilization in fancy and fact from the past and the future.



Final session of World Symposium on Applied Solar Energy held in Phoenix, Ariz., Nov. 1-5, 1955, was a round-table discussion on "The Future of Applied Solar Energy," participated in by members on the floor as well as the panel. Members of the panel include, left to right, John Yellott, Mem. ASME, assistant director, Stanford Research Institute, Phoenix, Ariz.; Farrington Daniels, University of Wisconsin; Guillermo Zuloaga, Creole Petroleum Corporation, Venezuela; H. C. Hottel, Mem. ASME, the Massachusetts Institute of Tech-

nology; Jack Myers, University of Texas; Irving Wolff, vice-president of research, Radio Corporation of America Laboratories; G. Dupouy, director, Centre National de la Recherche Scientifique, Paris, France; Guy Benveniste, Mem. ASME, Stanford Research Institute research economist who interpreted in English Dr. Dupouy's remarks made in French; Henry B. Sargent, president, American and Foreign Power Company, who moderated the panel discussions, at which detailed solar-energy applications were considered.