

PHYSICS

To Harness Sun's Heat To Make Steam Engine Power

Efficiency of "Sun-Fired" Boiler Will Be About Fifteen Per Cent With Advantage of Zero Fuel Cost

SUN POWER will be translated into steam engine power in the near future at the Smithsonian Institution. Dr. Charles G. Abbot, the Institution's secretary, is now engaged in putting the finishing touches on an apparatus in which 36 square feet of aluminum mirror surface will capture enough of the poured-out energy of the world's central heating plant to run a one-half horsepower engine.

Dr. Abbot's new apparatus represents an improving evolution from earlier experimental models. Every part has been carefully planned to achieve a higher thermal efficiency than has ever been attained with solar boilers and other types of sun-heating apparatus.

The initial capture of the sun's rays is effected by means of three trough-shaped mirrors, which can be turned so that they will constantly face the sun. They are surfaced with a highly polished, non-tarnishing aluminum alloy. Instead of being flat, as were most of the mirrors used by earlier experimenters, they are carefully figured to the same type of curve as that used in the great reflecting telescopes in the West, so that their focus is far more accurate and they therefore utilize a much larger percentage of the sun's rays. Their total reflecting area is 36 square feet.

Each mirror will focus the sun's rays on a long, double-walled tube of pyrex glass. Between the two walls a high vacuum is maintained. This permits radiation to pass in freely, but reduces the loss from re-radiation to a very low figure.

Heat-Absorbing Liquid

The inner tube contains a specially compounded black heat-absorbing liquid, of very high boiling point. If it were left stationary in the tubes, it would be raised to a calculated temperature of 700 degrees Centigrade. But it is kept flowing slowly by means of small electric pumps, so that it passes its heat on to water in a boiler, and maintains a more moderate temperature—from 175 to 200 degrees Centigrade above that of the surrounding air. This heat of course converts the water in the boiler into

steam, at about 175 pounds pressure, and the steam will be used to drive the small engine.

Dr. Abbot states that the efficiency of his "sun-fired" boiler will be about 15 per cent, which compares favorably with the efficiency of a coal- or oil-fired boiler—with the advantage that its fuel cost is zero.

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METEOROLOGY

Lightning Slight Hazard To Person Playing Golf

GOLF is classed as one of the more mild outdoor recreations but to others, especially the golf novice who has just tramped between three and four miles over hill and dale, golf sometimes appears to be hard work. And from the widespread publicity which is aroused when a golfer is struck by lightning, the ancient Scotch sport may seem to be one of the "hazardous occupations."

Actually the golfer caught in a thunderstorm with its accompanying lightning is no more in danger than are farmers and other persons who make their living in rural communities. Although death by lightning is one of the rarer forms of accident death, the city dwellers of the nation are, as a rule, safer than their agricultural brethren in this respect. For the nation as a whole, lightning kills less than 400 people a year, based on figures for a ten-year average. The chances of being killed by lightning are only a few parts in a million at the worst. On the Pacific Coast they are as low as two in ten million.

Habits in part account for a slightly increased hazard from lightning in the open and the golfer suffers from the common tendency to get out of the rain when a thunderstorm comes. His first impulse is to seek protection from the rain under the nearest large tree. And if the tree is isolated, as it may very well be on a golf course, he is standing under a favored spot for a lightning stroke. If the tree is in a fairly dense woods, the chances of its being hit are much less.



ONE-PIECE TAILORING IN IRON

This horn-shaped structure, spreading out from 8 inches diameter at the bottom to 8 feet at the top, was once a single flat piece of 3/16 inch ingot iron. The structure is still a single piece of metal—only the shape is different. It was made by cutting out 26 pieces, then fusing them all together into one integral unit.

If the golf course is fairly level and the golfer is caught in the open without protection, he himself forms a possible isolated target for lightning. If he continues to play in the rain and persists in swinging his steel-shafted golf clubs over his head, he is adding still more to his chances of being struck.

Without protection, the golfer would do well to stay in the small depressions on the course.

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