

# Solar Batteries

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Turning the sun's energy directly into electricity has long been a goal of scientists. In Washington last week, the Bell Telephone Laboratories demonstrated a solar battery which can convert sunlight into usable electric current without costly intermediate steps.

The Bell Solar Battery resembles a miniature xylophone. It is made of wafer-thin strips of specially treated silicon, linked in series. Silicon is a semiconductor, i.e., under certain conditions it can be made to carry electricity.

The silicon in the battery is first grown in pure crystals, cut into strips, and then impregnated to a depth of only one ten-thousandth of an inch with minor impurities. The top surface is treated with boron, whose atom has one less electron in its outer shell than silicon has; the bottom layer is treated with arsenic, whose atom has one more electron in its outer shell than silicon has. When light strikes near the junction of the two layers, it pushes electrons to the bottom surface, pulls "holes" (electronless gaps) to the top surface, creating a difference in voltage. The current formed is channeled off through wires.

The battery is far more efficient than other photoelectric devices (e.g., the cells used in light meters), produces enough electricity—50 watts per square yard of exposed surface—to power small radio transmitters, record players, etc.