tional Bureau of Standards states that the amount of fuel required to evaporate water to obtain a feeling of warmth is probably greater than that required to achieve the same results by maintaining a slightly higher temperature.

Moreover, the American Society of Heating and Ventilating Engineers states that all tests as to the bad effects of dry air on health have been negative or indecisive.

See that your fireplaces have dampers. Otherwise tremendous quantities of heat flit up their chimneys.

Will you save heat by cutting off an unused room? If it's an isolated room, you certainly will, but if it is surrounded by heated rooms, you don't. You'll simply be heating it inefficiently—i. e., expensively—through walls and floor. Sometimes housewives, distressed by ugly steam radiators, hide them with pretty covers. They might as well put the radiators in a clothes closet and shut the door.

Keeping a house at much above 70° is expensive. In the latitude of Washington, D. C., it takes one-fifth more fuel to hold a house at 75° than at 70°.

Free circulation of air from room to room is important in conserving fuel, especially with hot air systems. It is almost impossible to heat a cold room unless its doors are open to the other parts of the house, so that circulation is set up in the room.

If you follow such of these suggestions as apply to your home, you'll be doing your part in conserving fuel for national defense, with no sacrifice of comfort or danger to health.

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ASTRONOMY

Stars Have Atmospheric Shells Like the Sun's Corona

Two Groups of Extended Atmosphere Described; One At Rest on Star, the Other Expanding Rapidly

THE ATMOSPHERES of the distant stars may have regions similar to those of our sun, which itself is a star.

Dr. Otto Struve, director of Yerkes Observatory, uses the terms "reversing layers," "chromosphere," and "corona," in describing the outer portions of stars which appear to have shells of gas surrounding them, although their atmospheres are probably not exactly the same as the sun's.

The picture of a star as a spherical mass of gas with an opaque surface radiating most of its light is no longer one which tells the whole story. During the past two years, Dr. P. Swings and Dr. Struve have secured a large number of peculiar stellar spectra at the new McDonald Observatory in Texas. These, and observations from Mt. Wilson and Victoria, formed the basis for Dr. Struve's recent discussion before the American Astronomical Society.

There are two groups of extended atmospheres. The first kind remain at rest with respect to the star itself, while the second expand, with more or less rapid motion. Novae, or new stars, are characterized by expanding shells which are eventually observed visually as well as spectroscopically, and appear to form what are called "planetary" nebulae.

Dr. Struve advances the hypothesis that fundamentally all stars which exhibit shells are alike, and that the tendency of a star to produce a shell results either from rapid rotation of the reversing layer (portion of its atmosphere which produces the dark lines in the star's spectrum) or from a tendency of the star to become double. This latter case is observed in the star Beta Lyrae, which is shaped like an hour glass, and has a tail of matter streaming from it and forming a shell around it.

In stars with shells, three layers are distinguished. The first is the stationary reversing layer, but it is in rapid rotation; then comes an inner stationary shell which shows little or no rotation, and which Dr. Struve calls the chromosphere; finally the outer, expanding shell, which he calls the corona. In some stars the outer shells are one or the other or both opaque, while in others they are transparent, and these differences produce important observed differences in their spectra.

However, Dr. Struve pointed out that there are stars which are known to be in rapid axial rotation, but which show no shell around them. No explanation for this is given at present.

Closely related to Dr. Struve's researches are those of Dr. Paul W. Merrill, of Mt. Wilson Observatory. He classifies the lines observed in a star's spectrum into three groups: "stellar" lines are produced in the reversing layers of the stars themselves; "semi-detached" lines come from extended stellar atmospheres or shells, and from the so-called planetary nebulae; "interstellar" lines originate in clouds of sodium, calcium and other elements in the tremendous spaces between the stars. The interstellar lines are recognized because they do not shift their positions according to the star's motion, as do stellar lines. The semi-detached lines show similar characteristics, but do not increase in intensity with increasing distance of the stars.

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