the sun's path and the resulting temperature do not change suddenly. Where the line changes its direction it should do so by a curve. This is why such a temperature line is called a temperature "curve."

Does your equator temperature curve show one, or two, temperature hills (warmer times), and one, or two, temperature valleys (cooler times)? At what dates does the curve reach the highest and lowest points? Why? Should the hill, or hills, be high, or low? Why?

To sum up the results of your study of the heat seasons at the equator, imagine yourself to have spent a year—from Christmas to Christmas—visiting a friend living at Equatorville on the Kongo. Describe briefly the temperature changes you experienced, first, in the course of a day, and then, during the year. Account for the changes by reference to the sun's path.

A PHYSICS COURSE FOR GIRLS.*

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In spite of the fact that it is usually the pick of the class who offer themselves as candidates for college, in the last four years only one-half of the candidates in physics at the Board examinations have passed with a grade of 60%. This is often cited as evidence of poor teaching in the high school, but I contend that it is due to the fact that many teachers have already abandoned the practice of cramming pupils for examinations and are enriching the course with things of vital interest.

College preparatory physics has developed from a study which was chiefly a discussion and reasoning upon natural phenomena to a subject which is rigidly mathematical; from a subject of qualitative observations to one of exact measurements. The teaching of exact quantitative measurement in secondary schools, to give the pupil habits of accuracy and carefulness, is almost a failure.

A girl's world differs, in many ways, from a boy's. He brings to the physics class a fund of information, obtained from his world, which makes a large part of physics a real live subject to him. The girl has had some of the same experiences, but her

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world is smaller; she has had less opportunity to observe the commercial physical devices. She is less likely, in future years, to be called upon to run an automobile or a dynamo, than a boy is; and she, naturally, does not feel quite the interest of a boy in studying the mechanism of an automobile or the operation of a dynamo. The boy's mind is receiving constant stimulus from applications of physics, which fail to bring forth any activity in the mind of the girl.

Pupils with different aims, different abilities and different qualifications present themselves for a study of physics. What can be more absurd than to expect them all to profit from identical treatment of the subject. There should be, in part, a different selection of topics and there should be a different treatment of the other topics for different groups of pupils.

For the average girl, it would be better to cut down the time devoted to mechanics and increase the time given to heat. To indicate more clearly the kind of work, which it seems to me, would be of value to girls, I will roughly outline the subject of heat. This is not a final outline, but a suggested list of topics and the kind of experimental work to be made prominent in the study of heat.

Early and present theories of heat.

The sun, the great source of heat. Distribution of heat on the earth. Effects.

Other sources of heat. Heat of oxidation; combustion; kindling point.

Fuels in common use. Devices for burning different fuels; how used.

Pupils make comparative tests of kerosene, denatured alcohol and gas for heating a single room; consider heat produced, cost, gaseous products, moisture and carbon dioxide which are added to the air of the room.

Radiation; effect of kind of surface upon radiation and absorption of heat.

Conductivity of materials; applied to clothing for summer and for winter wear; various uses of non-conductors; fireless cookers, thermos bottles, double windows for winter.

Expansion; combined effect of expansion and non-conductivity upon a brittle substance, illustrated by the sudden heating or cooling of glass.

Relative volumes of the same weight of ice, water and steam; explaining the bursting of water pipes and pitchers of water by freezing, etc.

Boiling temperature of liquid depends upon pressure; increased by addition of salt. Pupils may prepare condensed milk or evaporated cream by evaporation of milk under reduced pressure.

Absorption of heat by freezing mixtures; determine how low a temperature may be produced by various mixtures.

Distillation; fractional distillation; different fractions obtained from crude oil; uses of these different products.

Melting point, vaporization point and flash point of lard. Dangers from using heat or flame near volatile liquids. How to extinguish fires.

Refrigeration and cold storage. How low temperatures are obtained. Value of low temperatures. Special study of the household refrigerator; considering amount of ice melted per day, heat absorbed, temperature of the refrigerator; does temperature vary when ice gets low? Melting point of butter; possibly determine the specific heat of some foods and find amount of heat they lose when cooled from room temperature to refrigerator temperature. The value of keeping food at a low temperature; illustrated by tests upon milk. Determine the acidity of milk kept at room temperature for 24 hours and of milk kept in refrigerator same time.

Use of heat for sterilizing, pasteurizing; canning fruit, etc.

Hot air, hot water and steam heating; fireplaces. Hot water supply. Ventilation.

Dew point and relative humidity. Clouds, fog, frost, snow. Relation of storms to atmospheric pressure. How climate is modified by large bodies of water. Relation of change of climate in geological history, to cooling.

General idea of heat for power. Hot air, gas, gasoline and steam engines.

The other divisions of physics, I would make less complete, but let the same idea guide in the selection of topics. Many of the girls in my classes, I must confess, have usually found the experiment of determining the acceleration due to gravity an uninteresting and irksome task; I decided not to repeat it this year, but instead to study about Galileo and his experiments upon gravity and acceleration. You may imagine my surprise, when one day, the girls asked if they might not be allowed to repeat Galileo's experiment to determine the acceleration due to gravity. They had acquired interest by this historical sketch. They did the experiment and although they are not apt in mathematics, they carried out the calculations with less trouble than any class I have ever had before. I believe it was the momentum of interest which overcame the friction and carried them through. This incident only goes to strengthen my belief that if we cannot enlist the interest of the girl in a subject we better not try to teach it.

I believe that a course in physics for girls should; enlist the interest of the girl; show the growth of the science, by a study of its historical development; inspire a regard for those who have developed the science and for the wonderful works they have accomplished; give information in regard to common and useful facts of the science; enable the girl to understand some of the common physical devices; prepare her to interpret the natural world about her, and thus add to her life of usefulness and happiness.