

found or where it is said to occur. It contains references to nearly a hundred and fifty such places in one state alone, Kentucky.

The fact that cannel coal does yield large quantities of oil and gas is confirmed, but it is found that this oil, though suitable for ordinary burning, distills at a temperature so low that the percentage of gasoline, benzene, and other desired substances it contains is very small, and until some way has been discovered of distilling it at a higher temperature or of cracking or otherwise converting the oils found into the oils desired, the distillation of cannel coal will not furnish the large supply of gasoline, benzene, toluol, and other substances that are now so greatly needed.—[*U. S. Geological Survey Press Bulletin.*]

### A SUGGESTIVE APPROACH TO THE USE OF THE FUNCTIONAL NOTATION.

BY L. E. LUNN,  
*Heron Lake, Minn.*

In some of our newer texts there is an acknowledgment of the generally felt want for an earlier introduction to the notion of a function. This is rightly so as the use of the functional notation is one of the stumbling-blocks of the freshman in the collegiate courses in mathematics. The idea of function is the next great mathematical advance that the student makes after grasping the idea of general number.

In using Mr. Breslich's *Third Year of Mathematics*, I have been struck with the idea of using the functional idea in the solution of certain types of quadratic equations.

For instance, we have equations of the following nature:

1.  $(x+3)^2 - 5(x+3) - 24 = 0.$
2.  $x^2 + 5x - 3 + 8(x^2 + 5x - 3) \frac{1}{2} = 15.$
3.  $\tan^2 y + 3 \tan y = 4.$

These equations are all conveniently written,

1.  $f^2(x) - 5f(x) - 24 = 0.$
2.  $f^2(x) + 8f(x) - 15 = 0.$
3.  $f^2(y) + 3f(y) - 4 = 0.$

These are then solved for the function involved by rules of quadratic equations, and the function finally solved for the particular variable.

Of course these equations are readily handled by either mentally or actually making a literal substitution for the function involved. However, I believe that the above method is valuable to accustom students to the use of this form of notation.

### COAST AND GEODETIC SURVEY ESTABLISHES SUBOFFICE AT BOSTON.

To keep more directly in touch with the interests of shipping in the waters of Maine, New Hampshire, and Massachusetts, the United States Coast and Geodetic Survey, Department of Commerce, will establish a suboffice in the Customhouse at Boston about January 1, 1918. As inspector in charge of this office, Homer P. Ritter, a commissioned officer of the Survey, will be prepared to furnish information relative to the operations of this branch of the Government service.

It will be the endeavor of this suboffice to cooperate fully with steamship lines, yacht clubs, mariners, and others to the extent that dangers discovered, changes in channels, and various other kinds of information needed by the Survey for keeping its nautical publications up to date shall be made available to the public as promptly as possible.

A complete and up-to-date file of charts and publications relating to our coasts and surveys will be available for inspection by those interested, and the office will maintain a supply of the charts and other publications of the Survey for sale at catalogue prices.