Harmonic Analysis, due chiefly to Lord Kelvin and Sir George Darwin. The name "harmonic" shows that it is in a general way similar to music; and to follow out this comparison may be the most intelligible way to understand the matter. We know that musical notes are represented by very fine waved lines; and any given tone is a perfectly regular series of similar undulations. If we examine a phonograph record, or even a gramophone, we will see that the piece of music is represented by a very complicated wavy line, yet the special point to note at present is that after all it is a single continuous line. A whole orchestra is thus reduced to a zig-zag line which is made up of the individual tones of all the instruments; the simple undulations from the vibrations of each being all combined into one exceedingly complicated result. The larger variations on this resulting line correspond with the rhythm or beat of the music.

Now, when we turn to the tide, we have the reverse problem to solve. We have the final or resulting line before us, and the problem is to find out all the individual instruments that have contributed in making it up. This resulting line, as a tide curve shows, has a much wider and more uniform sweep than a phonograph record; but none the less, it has proved in just the same way to be made up of a whole series of individual tones which produce the result. Its majestic curve is more like some old Gregorian chant; but the time is slow in this music, and our ears are dull of hearing, and we do not catch the grand cadences.

In this great orchestra, it is the sun and the moon that take all the parts. We may say that the sun takes the bass and tenor, and moon the soprano and alto. The total number of instruments or primary tones in the orchestra amounts to twenty-eight. Some of these individual tones produce undulations as rapid as 6 or 8 to the day; others are so slow as to have a period of half a month, a whole month, or even a year in length.

It is thus no flight of fancy to compare these tide curves to music; very slow music if you will, but really the same in character. For every movement of the moon and the sun, is