as might be shown, for example by immense streams of stars circling about the centre of the visible universe.

As the measurement of the positions, the motions, the brightness, and the distances of all the stars within the reach of the most powerful telescope would be a truly Utopian task, Professor Kapteyn wisely limited his efforts, and at the same time provided a means of obtaining the uniformly distributed observations essential to the discussion of his great problem. His simple plan was to divide the entire sky into a series of 206 Selected Areas, thus providing sample regions, uniformly spaced and regularly distributed over the entire celestial sphere. Conclusions based upon the observation of stars in these Areas are almost as reliable, so far as large general questions of structure and motion are concerned, as though data were available for all the stars of the visible sidereal universe.

As already remarked, Professor Kapteyn depends entirely upon the volunteer efforts of co-operating astronomers in various parts of the world. One of these astronomers assumes such a task as the determination of the brightness of the stars of a certain range of magnitude, in the Selected Areas. Another deals with their positions and motions, another with their velocities measured with the spectroscope, etc. Each observer is able to take a large number of Selected Areas, covering so much of the sky that he may separately discuss the bearing of his results on some important problem, such as the distribution of the stars of each magnitude with reference to the plane of the Galaxy, the motions in space of stars of different spectral types, the velocity and direction of the sun's motion in space, the dependence of a star's velocity upon its mass. Moreover, each observer is free to use his utmost ingenuity in devising and applying new methods and instruments, in increasing the accuracy of his measures, and in adopting improved means of reducing and discussing his observations. He also enjoys the advantage of observing stars for which many data, necessary for his own purposes, have been obtained by other members of the co-operating group. Outside the Selected Areas, such data are usually lacking, because so small a proportion of the total number of stars has been accurately observed.

In physics, as well as in astronomy, there are innumerable opportunities for co-operative research. A good illustration is afforded by the determination of the exact wave-lengths of lines in the spectra of various elements, for use as standards in measuring the relative positions of lines in the spectra of celestial and terrestrial light-sources. This work was initiated in 1904 by the International Union for Co-operation in Solar Research, and is now being continued by the International