

A Statistical Approach to Nagaoka's Research in Spectroscopy

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As we have pointed out in our previous work, Nagaoka started to make experimental research in spectroscopy in 1908. The reason he had to do such a study has been discussed from the view-point of the internal history of physics.¹

In this report we would like to discuss Nagaoka's position on the international development of spectroscopy from the view-point of external history, namely from a statistical approach.

Fig. 1 (mentioned in one of our papers²) indicates the chronological changes in the number of Nagaoka's papers which are classified into the following fields: magnetostriction, atomic model and structure, coil, optics, and geophysics. Nagaoka's papers on spectroscopy began to be published in 1908, showed their peak in 1927, and continued till 1938. These papers constitute quite a large percentage (42.5%), within all his papers; and this suggests possibilities for a statistical approach.

Fig. 2 indicates chronological changes in the number of papers whose copies were sent to Nagaoka by Japanese physicists. These papers are classified according to the fields of spectroscopy, theoretical physics, and geophysics. We have found that there is a close connection between the number of Nagaoka's own papers and that of the Japanese physicists in spectroscopy. With 2 year retardation time the relative coefficient shows 0.68 (as calculated by Mr. K. Tanabe in 1968).

Fig. 3 again indicates the chronological changes in the number of Nagaoka's papers on spectroscopy, together with that of papers sent to Nagaoka by Japanese physicists, and that of papers by foreign physicists who sent copies to Nagaoka. The last one, which was investigated by Mr. Ushigome and Mr. Imaizumi in 1969, shows a similar kind of connection with that of Nagaoka's own papers although the relative coefficient has not been calculated.

Fig. 4 indicates the chronological changes in the percentage of papers on

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¹ E. Yagi, *Jap. Stud. Hist. Sci.*, No. 11, 73-99 (1972).

² T. Kimura, *ibid.*, No. 11, 90-95 (1972).