MAGNETIC SURVEY OF THE DUTCH EAST INDIES.

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[First Communication].

It is obvious that the degree of detail of a magnetic survey, as determined by dividing the total area by the number of stations, should be in accordance with the general aims of the survey.

If the observer intends to investigate the relations between geological structure and distribution of the magnetic force, a dense network of stations is required. On the other hand, if he aims at a contribution to the knowledge of the general course of the iso-magnetic curves over the globe, necessary for the derivations of characteristic functions, as for instance the potential function, a much smaller number of stations will suffice.

A detailed survey of the extensive Malay Archipelago crowded with volcanoes, which often are built up by magnetic material, is an undertaking not specially required by the magnetic science of to-day.

A general magnetic survey being within the power of the Batavia Observatory, the Government has granted the necessary means during the years 1904-'07. A grant, however, from the "Koninklyke Natuurkundige Vereeniging in Nederlandsch-Indië" enabled me to commence observations during the year 1903. With the aid of the observations of Captain Eliot and of Dr. van Ryckevorsel made respectively, during the years 1845-'49 and 1874-'77, the data will be obtained for determining the secular variation of the magnetic elements during the latter half of the past century.

The observations are taken with a new Kew theodolite magnetometer (Elliott No. 94) and a dip circle (Barrow No. 36) with three needles. An apparatus which I have had constructed at Batavia has proved of great value for the observations. A storage battery of two cells (4 volts) and a coil were placed in a box $24 \times 16 \times 14$ c. m. A wooden drawer in which the dip needle is put, is shoved inside the coil from the outside of the box; a closing of the current for a short time suffices to change the polarity of the needle. This quick, easy, and safe manner of reversing the magnetism of the dip needles has improved in a high degree, the reliability of field observations with the dip circle. A wooden disk, bearing a double coil, wound in opposite directions and two press-contacts, are attached to the battery by long elastic wires. With it, the oscillating magnet may be easily and quickly brought to rest. Finally a small electric lamp (4 volts) also with a press-contact is attached to another elastic wire. Combined with one or two ordinary lamps, it enables the observer to continue his observations at nightfall. When, as in our case, he is obliged to take his observations during the stay of the steamer at some port, it is of the utmost importance that he should be

independent of day and night time. As the consumption of electric energy is very small, the battery may be in use for an observing trip lasting a couple of months before requiring replenishing. The box weighs only 6 kilograms and is wholly non-magnetic.

The survey of 1903 has extended over Java and neighboring islands. The values of the magnetic elements, tabulated below, have been reduced according to the Batavia-Buitenzorg registrations to the epoch 1903-5. The corrections to the field instruments were determined by comparison with the Observatory instruments. This comparison gave the following figures:

Observatory	Field.
Declination,	-1'.7 E.
Inclination,	+1.3 S.
Horizontal Intensity,	-40 γ

EPOCH, 1903. 5.

Station.	Latitude South	Longitude E. of Greenw.	East Declination	South Inclination	Hor. Intens.
	° / ' / "	° / ' / "	° / ' / "	° / ' / "	γ
Kata Chyung	5 29 0	104 36 30	0 50. 7	29 59. 0	36651
Telok Betong	5 27 20	105 15 54	0 40. 2	29 41. 2	673
Kalianda	5 44 0	105 36 0	—	30 9. 1	679
Ondiepwater Island	3 19 10	107 12 15	1 6. 2	24 53. 7	763
Tandjong Pandan	2 44 20	107 37 5	1 22. 0	23 35. 8	771
Dendang	3 5 25	107 53 55	1 22. 1	24 20. 6	760
Buding	2 42 0	107 59 20	1 23. 2	23 31. 0	775
Gantung	2 58 30	108 9 30	1 20. 9	24 1. 0	767
Manggar	2 52 20	108 15 40	1 24. 8	23 47. 4	770
Kebatu	3 47 30	108 3 50	1 18. 5	25 47. 3	743
Welteureden	6 11 0	106 50 20	1 0. 0	30 23. 8	670
Buitenzorg	6 34 44	106 47 15	0 37. 3	30 10. 4	661
Garut	7 13 1	107 54 15	0 47. 1	32 20. 6	658
Tjibatu	7 5 46	107 59 15	1 2. 9	32 11. 7	646
Boompjes Island	5 56 0	108 22 35	1 4. 6	29 33. 8	696
Karimon Djawa	5 52 50	110 26 15	1 25. 8	29 18. 9	701
Japara	6 35 10	110 40 10	1 9. 1	30 39. 0	687
Pulu Pandjang	6 34 27	110 38 12	1 16. 6	30 32. 0	690
Maos	7 37 0	109 8 4	1 4. 9	32 45. 4	661
Ngupit	7 39 40	110 35 45	1 1. 6	32 14. 1	650 }
Surabaya-Udjong	7 12 0	112 44 11	1 31. 0	31 8. 2	675 }
Puspo	7 50 40	112 53 0	—	32 31. 6	695
Tosari	7 53 50	112 55 0	—	33 4. 4	—
Branta	7 12 54	113 32 20	1 41. 2	31 5. 8	707
Banjuwangi	8 12 28	114 23 3	1 33. 3	33 0. 0	660
Buleleng	8 5 40	115 5 30	1 44. 2	32 27. 7	686
Ampenan	8 34 17	116 4 9	2 5. 1	32 23. 7	682
Labuan Hadji	8 40 23	116 34 16	1 38. 9	33 56. 6	652