STUDIES IN TERRESTRIAL MAGNETISM

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Studies in terrestrial magnetism by C. Chree

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C. CHREE

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BY

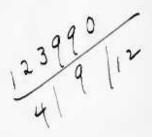
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PREFACE

A short statement seems desirable as to the object of the present book. The volume does not aim at being a text-book of Terrestrial Magnetism, or at summarising existing knowledge in those branches of Terrestrial Magnetism with which it deals, but is intended to give a connected account of my own original work in that subject, referring to the work of others only so far as is necessary for intelligibility. It is hoped that other investigators will understand that the absence of reference to their work implies no lack of appreciation of its value.

Again, while I have worked at several of the more important branches of Terrestrial Magnetism, there are other branches which I have scarcely touched on, if at all. The subject of Terrestrial Magnetism is very large and ever-increasing; and the contributions made to it by any one individual must form but a small fraction of the whole.

The book deals almost entirely with facts, or supposed facts. The absence of a definite theory as to the origin of the several magnetic changes is due to no lack of curiosity as to the causes of things, but to a belief that at the present stage theorising is less likely to be of substantial advantage than the extension of positive knowledge. It is sometimes claimed that a theory is essential as a guide in selecting the directions in which to

prosecute research. This is a very partial truth. When a man devotes himself to a subject, allowing free ingress to his mind to all the ideas which the results obtained by investigators naturally suggest, he must be a very unimaginative person if profitable lines of enquiry do not force themselves on his intelligence. The difficulty is not in thinking of something to do, but of deciding what to do next. In making a choice, some may prefer the guidance supplied by a definite theory, but others will prefer to rely on their natural instinct for detecting a weak spot in the defence offered by Nature to the discovery of her secrets.

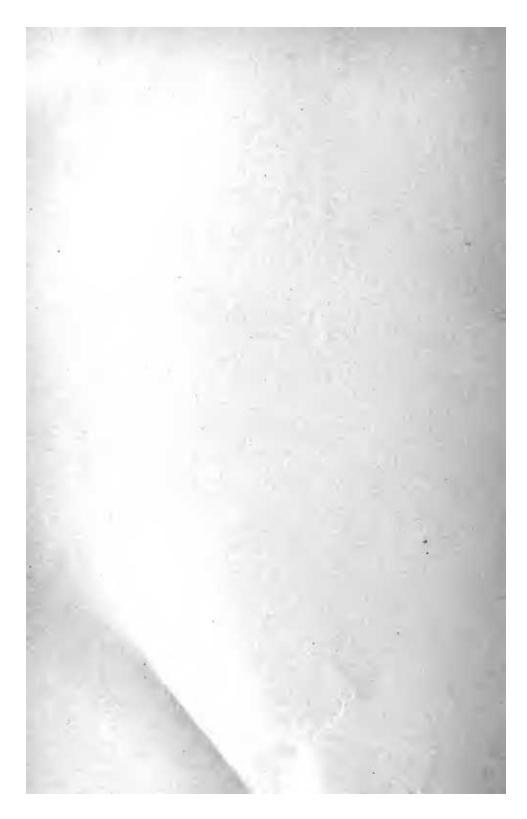
Those who are familiar with the additions made during recent years to our knowledge, by the discovery of ionisation and radioactive processes, and by investigations on electrical discharge in high vacua, will, I think, allow that speculations made even twenty years ago as to the origin of the phenomena of Terrestrial Magnetism laboured under great disadvantages. But to the average physicist twenty or even ten years hence, the ablest physicist of to-day may seem just as poorly equipped for theorising on Terrestrial Magnetism as the speculators of twenty years ago now seem to us.

Another consideration is that the phenomena of Terrestrial Magnetism are of a complicated nature. The so-called regular daily changes vary largely with the season of the year, and from one year to the next; the so-called irregular changes are multitudinous. We can scarcely hope that in our time any general theory will present a satisfactory explanation of all observed facts, or enable us completely to forecast the future. For, at least, a long time to come, it is to observation, not theory, that we must look for detailed knowledge, and it is in any case to observation that we must turn as the touchstone by which to try theory.

I am indebted to the President and Council of the Royal Society for permission to reproduce a variety of diagrams and curves which have appeared in the Philosophical Transactions, and in particular for permission to make and reproduce copies of a number of magnetic disturbances recorded in 1902–3, which were originally discussed in the volume of the National Antarctic Expedition 1901—1904: Magnetic Observations, published in 1909 by the Royal Society. I am also indebted to the Meteorological Committee and the Director of the Meteorological Office for permission to reproduce copies of Kew magnetic curves.

My thanks are due to Prof. R. A. Gregory, the Editor of this series, for valuable assistance in revising the proof sheets and for many useful suggestions, to the Printers for their care and the skill with which they accommodated the text to the numerous tables and illustrations, and finally to Mr. Emery Walker and his staff for the trouble which they took, especially in dealing with the curves of magnetic disturbance—many of them faint and difficult objects—and in reducing to a common time scale those forming the composite figures in Chapter XIII.

CHARLES CHREE.



CONTENTS

												30	PAGE
PREFACE	.20	20	*	7	1	ŧ:	20	11	159	ď	-	17	V
			C.	HAP	TEB	1							
MAGNETIC RECORDS		*:	٥.	7	***	98		325	25		951	*	1
			CI	AP	TER	п							
SECULAR CHANGE	10	100	W _{est}	50	88		100	3*	2	96			9
			СН	API	ER	ш							
NON-CYCLIC CHANGE	31	***	*:	63	070	53	4	18	7			140	23
			CH	APT	ER	IV							
DIURNAL INEQUALITY	ON	QUI	ET D	AYS		10		778				90	33
			Cl	IAP	TER	v							
DIURNAL INEQUALITY	ON	ORI	DINA	ty D,	AYS	.00	13	59	10			•	50
			C	HAP	TER	vi							
DIURNAL INEQUALITY	ON	DIS	TURE	ED D	AYS			. 4	4	(4)	£	¥.	55
-			CH	APT	ER	VII							
FOURIER COEFFICIEN	ru	*	80	68	(**)	130	13	÷	10	ű.	8	+3	66
			CH	PTE	ER '	viii							
ANNUAL VARIATION	**	•	*3		4		19	33	+		*		80
			СН	APT	ER	IX							
ABSOLUTE DAILY RAS	GE		534.5	574		74	74	-	192			41	85

CONTENTS

	CI	IAF	TER	X							PAGE
ANTARCTIC MAGNETIC RESULT	rs	ě	2		5.0	-	174	27	1%	14	93
	CE	IAP	TER	X	I	27					
MAGNETIC STORMS		Y	4	7	ř		9720	15	-	14	113
	CE	IAP	TER	X	II						
"SUDDEN COMMENCEMENTS"				Ē.	140	•	9		1	12	127
	СН	AP2	FER	ХI	п						
COMPARISON OF ARCTIC AND	ANT	ARC	TIC D	istu	RBA	NCES	•	j.	•	1/4	135
	СН	AP	rer	ХI	v						
SUNSPOTS AND TERRESTRIAL	MAG	NETI	вм	to	100		(5)			12	160
	CI	IAP	TER	X	V	2					
WOLF'S' SUNSPOT FORMULA	*:	80	**		•	65.		18		118	168
	СН	AP	rer	XV	71			-			
NATURE OF SUNSPOT RELATIO	ONSH	n	*0	1	10	35	(10)	339			177
	CH.	API	ER	xv	п						
GENERAL CONCLUSIONS .	60		*)		•3	10	((4))	110	34	()¥	191