

THE
TELEGRAPH MANUAL:

A COMPLETE

HISTORY AND DESCRIPTION

OF THE

Semaphoric, Electric and Magnetic Telegraphs

OF

EUROPE, ASIA, AFRICA, AND AMERICA,

ANCIENT AND MODERN.

WITH SIX HUNDRED AND TWENTY-FIVE ILLUSTRATIONS,

Et non "eripuit celo fulmen,"

Fulguri mentem fudit, et orbem lantine clavit.—PIETRE.

BY TAL: P. SHAFFNER,
OF KENTUCKY.



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P R E F A C E.

In the preparation of this volume, the author has not advanced theories, other than those which are founded upon demonstrated philosophy. It is to be understood, however, that many of the views expressed concerning questions in the sciences may, from time to time, be modified by new developments. In every instance, the opinions given are based upon the known sciences as manifested through the medium of the arts, and more particularly the electric telegraph.

I have reviewed the early semaphore telegraphs, and explained their respective modes of operation. These visual systems have, however, ceased to be employed by civilized nations, except for the marine service.

As preliminary to the consideration of the electric telegraph, I have introduced a few chapters explanatory of the sciences immediately blended in that art; such, for example, as static and voltaic electricities, magnetism, and electro-magnetism. These questions of philosophy the telegrapher should most carefully study. The data given are from the most reliable authorities.

In the collection of materials for this work I have spared neither labor nor expense. For nearly fifteen years I have made the subject-matter of this volume my most careful study. For the greater part of that time, practical telegraphing has been my sole vocation. I have instituted thousands of experiments, and have travelled over most of the civilized world "in search of light" upon this, the most important of all arts. The information herein imparted has cost me years of toil and

a heavy expenditure of money. Still, I cannot regret my devotion, either past or present, to the cause. In its study I have found new truths, serving to increase my admiration of that mysterious Providence who knoweth all things.

I have not written this book for gain. It has been to me a work of love. For several years I have been urged by friends to prepare a work on practical telegraphing, and I have in the present volume complied with that wish. I have not confined the work to the telegraph of any particular locality, but, on the contrary, I have grouped together the various systems of both hemispheres. Nearly every combination herein described I have witnessed in operation and most carefully studied. I may have failed to comprehend the full merits of each, and my descriptions of them, respectively, may be imperfect, though I have tried to make them clear and concise.

I have not attempted to arrange the various systems with regard to priority of invention, nor as to their relative efficiency. I have given dates wherever it was possible, and have refrained from exhibiting any preferences. I indulge the hope that the many inventors who have distinguished the age by the production of their respective contrivances, will not accuse me of an undue partiality. I have tried to be fair in the consideration of the merits of each discovery and each invention. If I have failed in accomplishing this desideratum, the fault lies, not with the heart, but with the judgment.

Notwithstanding that this volume has been greatly extended, I have been compelled to omit several important chapters; such, for example, as the organizations for generating magneto-electricity, the aurora-borealis, the fire-alarm and railway telegraphs, repeating apparatuses, &c. These will be duly considered in some subsequent edition, together with such emendations and additions to the present work as shall be found necessary.

To M. Blavier and his publishers in Paris, to the publishers of Noad's "Electricity," the "Illustrated London News," and others who have given me full permission to copy from their respective works, I am especially indebted. On the other

hand, some authors and publishers have refused me that permission; and although I could have copied whatever I might have wanted from any foreign work without legal liability, yet I have not done so, knowingly, in a single case where the privilege was refused me.

I cannot conclude this review of my labors, without expressing my most profound thanks to my very able and accomplished friend George Jaques, of Worcester, Massachusetts, for his aid in translating from the various languages of the Old World, and in searching for new light and authorities. For the services thus rendered, I cannot but feel the highest appreciation, and a sincere desire that his future life may be blessed with that which will enable him to fill the measure of his creation, and that his fireside may be surrounded with those jewels which are more brilliant than the pearls and gems that sparkle from and adorn the imperial crown.

In preparing this work I have made copious extracts from various publications, among which may be particularly mentioned, Noad's Manual of Electricity, Highton's History of the Electric Telegraph, Dr. O'Shaughnessy's Electric Telegraph, Bakewell's Manual of Electricity, Moigno's *Traité de Télégraphie Electrique*, Blavier's *Cours Théorique et Pratique de Télégraphie Electrique*, Davis's Manual of Magnetism, Walker's Electric Telegraph Manipulation, Shaffner's Telegraph Companion, Dr. Schellen's *Electro-magnetische Telegraph*, Vail's Electric Telegraph, Dr. Trumbull's Electric Telegraph, Shaffner's Telegraph Tariff Scale, Smithsonian Reports, American and European Patent Reports, &c., &c. I have not, in all cases, particularly marked the extracts taken, because, in many of them, I have blended new matter, and, to a greater or less extent, expressed their ideas in different language. In justice, however, to the respective authorities I make this general acknowledgment.

To the respective governments of Europe I feel deeply grateful, especially to the French, Belgian, Prussian, Danish, Swedish, Norwegian, and Russian. For the facilities given, and the vast amount of material placed at my command on

my visits to them respectively, and for the documents from time to time transmitted, I have been placed under lasting obligations. To M. Chauvin, director-general of the Royal Prussian Telegraphs, I have to express my sincere thanks for recent valuable documents; though their reception was too late for the present edition, they will serve a good end in the future.

It is my purpose to continue this work by subsequent editions, and embrace the improvements continually making in the art of telegraphing. Should the reader find any errors in this volume of either omission or commission, he will serve a good end by informing me of the fact. It is very desirable to promulgate truths well sustained by practical demonstrations; and if there be anything in this volume otherwise, it is for the weal of the enterprise that the false doctrines should be at the earliest moment suppressed.

In conclusion, I would add, that I have been compelled to write this volume piecemeal, on the steamboat, on the railway, at various hotels, and at places thousands of miles apart. All this I have had to do within the past six months. And while, in obedience to other duties, it has not been possible for me to give that personal attention to its passage through the press I should have wished, the novel and technical character of its contents rendered more difficult the labors of the correctors of the press, to whose care it was necessarily left.

With these explanations, I submit the "Telegraph Manual" to the generous and impartial consideration of the telegraphers throughout the world.

TAL. P. SHAFFNER.

NEW-YORK, *July*, 1859.

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