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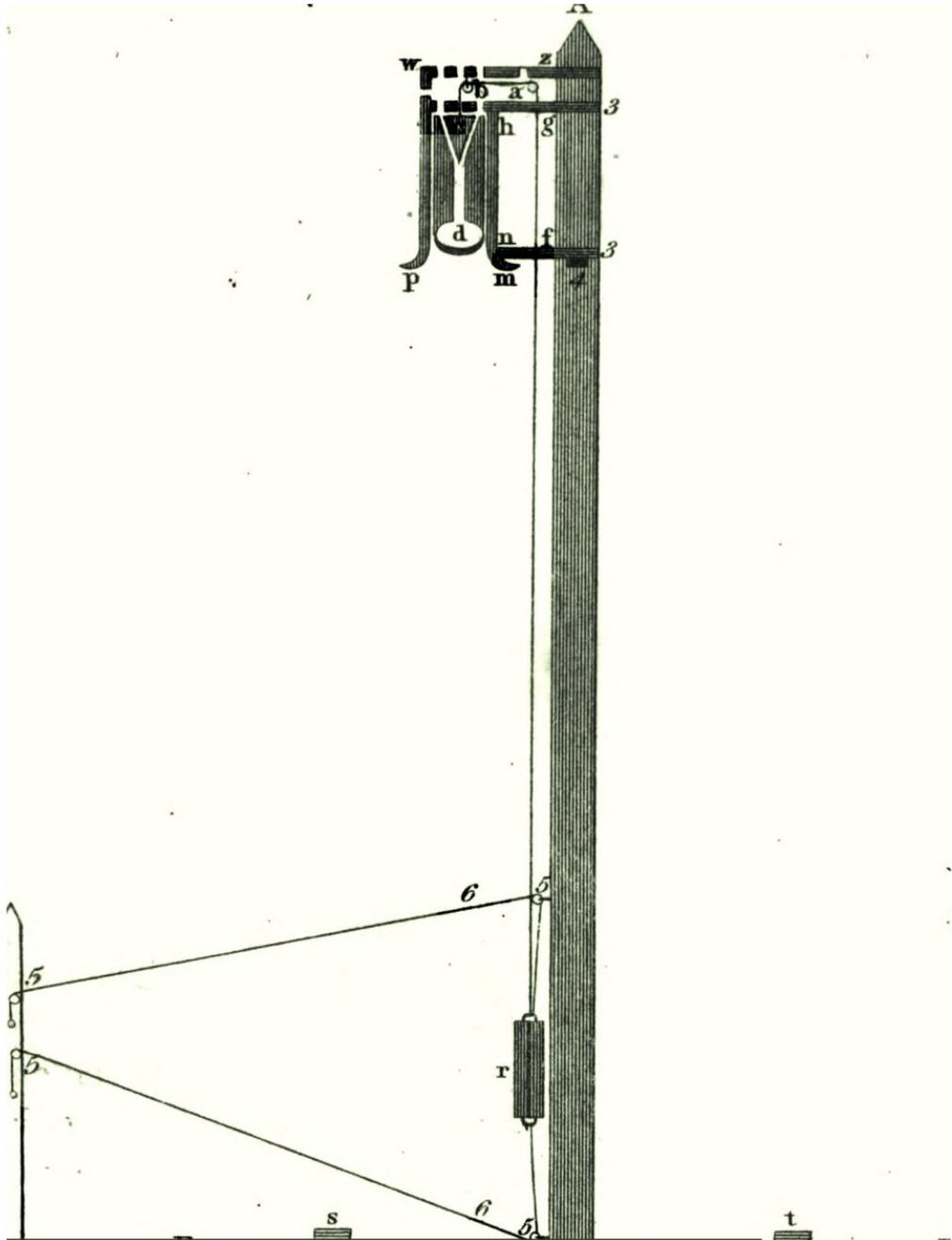
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A treatise on telegraphic communication, navel, military, ...

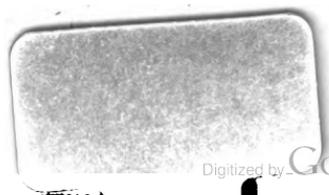
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A TREATISE
ON
TELEGRAPHIC COMMUNICATION,
Naval, Military, and Political :

IN WHICH
THE KNOWN DEFECTS OF THE PRESENT SYSTEM OF TELEGRAPHIC PRACTICE
BY SEA AND LAND ARE OBIATED

BY THE INTRODUCTION OF A
Numerical Portable Dictionary,

Calculated, when applied to various described Telegraphs, and to the Naval
Flag System, to be an accurate Medium of carrying on distant Conver-
sation, without any Liability to Confusion, Error, or Mistake :

WITH
SOME CONSIDERATIONS ON THE PRESENT STATE OF THE
MARINE CODE, AND OF NAVAL SIGNALS.

ILLUSTRATED BY LINEAR PLATES

Connected with the Detail of

THE NEW TELEGRAPHIC SYSTEM ;

Substituting, on very simple Principles,
A SPEAKING, IN LIEU OF A SPELLING POWER,

IN
Different Day and Night Maritime, Civil and Military
Telegraphs.

Dedicated, by Permission, to the Right Honourable
LORD HAWKESBURY.

By **JOHN MACDONALD, Esq. F.R.S. F.A.S.**
LATE LIEUT. COL. AND ENGINEER, &c. &c.

Frustra fit per plura, quod fieri potest per pauciora.

LONDON :
PRINTED FOR T. EGERTON,
MILITARY LIBRARY, NEAR WHITEHALL.
1808.



S. GOSNELL, Printer, Little Queen Street.

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TO THE
RIGHT HONOURABLE
LORD HAWKESBURY,

LORD WARDEN OF HIS MAJESTY'S CINQUE PORTS,
PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT,
&c. &c. &c.

MY LORD,

WHEN the first of statesmen, actuated by the purest motives, retired from the administration of affairs, surveying the ranks of political opponents, he stood up where his transcendent powers had so frequently fascinated his audience, and remarked, with all the warmth of friendship, that in pre-eminent talents, in distinguished abilities, and in the knowledge and extensive information constituting a great public character; Your Lordship was excelled by none in the opposite lists, powerful as they then were. The Sovereign on the throne, whose prosperous reign, in very arduous and critical times, history will proudly record, has always, with that sound judgment and

acute discernment which have ever marked the exalted mind of the best of kings and of men, selected Your Lordship as one of his most faithful, able, and trusty counsellors. The reign of false philosophy is past, and they who, misled by fallacious appearances, embraced its pernicious doctrines, have now abjured tenets which have led to military despotism, ignominious slavery, and the utter destruction of all happiness on the Continent of Europe. Among the wise and the virtuous of political weight and high acquirements, who stood forward to stem the torrent of innovation, to avert the ruin of social order, and to defend an unrivalled constitution, Your Lordship has acted a distinguished and interesting part. Whatever might have been the ardour of political struggles in a very turbulent era; to whatever pitch the effervescence of party spirit might have carried contests for power, or opposition to measures of indispensable strength, and whatever opinions might be entertained of great characters figuring at a most eventful period, all parties joined in one uniform sentiment of general approbation of the firm and patriotic tenour of Your Lordship's conduct. Having had the honour of being placed under your command, I can join my feeble tribute to the

universal admiration which Your Lordship's conciliating deportment, urbanity of manners, and engaging powers of conversation, excite in the minds of all who have an opportunity of estimating the philanthropy and benevolence that pervade your private character. It must be to me a high gratification to have an opportunity of dedicating to a Nobleman so well qualified to appreciate its utility, a Telegraphic system which I have been maturing for years. While at Dover, in command of a first rate (according to a Report on the table of the House of Commons) battalion, I laid before Your Lordship the general principles of my Telegraphic improvements; and you were then pleased to observe, that it was an interesting subject that highly merited the serious attention of any government. Judging from the few extracts, inserted in my Preface, from an important French military publication, recently received in this country, it is evident, that the inventive genius of that scientific nation does not rest satisfied with the present very unsatisfactory and imperfect state of Telegraphic practice. They see all the importance of so curious an art, and they are making rapid strides to bring it to perfection. They are laying a foundation for the construction of a Telegraphic Dictionary,

and from what appears stated relative to the introduction of the tenses of verbs, and the cases of nouns, it seems to be their intention to attempt to obviate the great difficulty of managing, telegraphically, the passive potential inflexions of verbs. The numerical plan must, in every country, be the grand basis on which a general structure can be reared. The system supposes not only the formation of a Telegraphic Dictionary including every requisite for practice, but of various Telegraphs, terrestrial, naval, and nocturnal, calculated on simple and obvious principles, to give a complete and ready efficacy to a direct application of the Dictionary to immediate practice. I trust the following work will be found to provide for all these conditions. It is my earnest wish that it should be minutely examined, and reported on by a board of scientific characters. I have endeavoured to unite the requisites of celerity and accuracy, combined with simplicity of machinery, and facility of operation. The trifling expense of carrying the plan into effect, cannot for a moment be put in competition with the vast resulting advantages.

It will be observed, from my Preface, that I, in the first instance, submitted my projected improvements to the consideration of the Board of Admiralty

under the late Administration. A gentleman *, now out of office, was directed to examine them, and report on them, with all due attention. This gentleman, it appears, has seemed quite contented with throwing out some of his own notions indefinitely

* The above gentleman, some years ago, published an ingenious compilation, or historical account of the island of Sumatra. It was mentioned there, that the camphor-tree did not contain the concrete camphor and the essential oil. I was engaged in carrying on extensive marine surveys (since published) on that part of the coast which produces this tree, and was informed by an officer, stationed in that remote quarter, that he had seen a tree, from which both the oil and solid camphor had been extracted. Having, afterwards, written a paper on the Sumatran camphor, which the late elegant Orientalist, Sir William Jones, directed to be printed in the fourth volume of the Transactions of the Asiatic Society, I stated the circumstance there, precisely as I heard it. On my return from India, in the year 1796, I met at St. Helena, on his return to Sumatra, the late Mr. John Crisp, who has written one of the best treatises extant on vision. He informed me that the author of the History of Sumatra had taken great umbrage at my remark, though made in a way complimentary to him. The matter was altogether trivial, and was an observation of mere botanical import. The evidence I adduced, might be supposed, at the best, not so decisive as to exclude all further inquiry. As the remark was of little consequence, and offended an author, I was sorry it had been made. It could not be recalled; and if the hostility directed against my work in the Report alluded to above, is not to be ascribed to camphorated irritability, it must, otherwise, remain quite unaccountable. I owe it to the importance and utility of the subject I have treated, to endeavour to account for its undoubted existence, which, under an official colouring, has been highly prejudicial to a progress that might, otherwise, have been made.

expressed, without the most distant reference to any part of my work. He despairs of ever seeing any mode of getting over what he deems insuperable difficulties, while it was the direct and professed object of the manuscript before him, to apply remedies which he thought unworthy of the slightest notice. He tells me the inflexions of verbs never can be provided for, though a most facile mode of giving the compound tenses of verbs, is the principal feature in my treatise. He concludes with the praises of the *l-e-t-t-e-r-i-n-g* Telegraph, and kindly informs me, upon the whole, that my labours have been to no purpose. One of two things must be supposed; either that he did not peruse the work, or that, if he did, he determined on hostilities. The Report compared with the Treatise, authorizes the belief of one or both of these suppositions. Conscious of the strength of the ground I stood on, and feeling indignant at this cavalier mode of treatment, I resolved, in justice to the public, to the interest of the subject, and to my own professional character, to have recourse to the Press, under the fullest conviction that the publication may tend to promote the public good as far as it may be connected with a very important science.

Permit me to congratulate Your Lordship, and the able Administration of which you form so efficient a member, on the brilliant success of a salutary measure, dictated by necessity, and conducted with a vigour and energy that saved much effusion of blood. History will mark it, as one of those prompt and decided actions, that with the least possible detriment, was calculated, in the end, to avert much impending evil. While the unprincipled Ruler of the Continent perseveres in threatening the annihilation of the naval superiority, through the destruction of the commercial preponderance of Britain, war must continue. Let those who pretend to think otherwise, be pleased to point out how this can be avoided. The advocates for peace are cautious of mentioning the terms that would be admissible, well knowing that none but inadmissible would be proposed by the enemy, in the present condition of Europe.

The name of the foreign adventurer who holds surrounding nations in chains, will not rank, in the page of history, with the Alexanders and Cæsars of antiquity. As an eminent destroyer of the human race, as the author of multiplied evils, and as the Phalaris of modern times, his atrocious deeds will be faithfully handed down to posterity. Unprecedented

events will be traced to their genuine sources, such as tactics highly scientific,—countless numbers forced into the field,—discipline made a primary study,—treachery in the cabinet and field,—political seduction systematically organized,—a methodized system of terror,—an utter contempt of all laws human and divine,—plunder, and unrestrained public and private robbery,—religion made use of to cloak iniquity,—promotion held out to successful depravity,—employment of talents independent of all principle,—a lavish sacrifice of life,—an illiberal system of public education controlled by tyranny, essentially vicious, and destructive of all freedom of opinion, and of the energies of the human mind,—and above all, an abject and debased state of the human mind, weighed down by excess of misery, without a prospect of relief. What a contrast between this and the steady bravery, sterling integrity, envied happiness, and the glorious independence of Britons!!

I have the honour to be,

With the utmost respect,

My Lord,

Your Lordship's very faithful,

And obedient, humble Servant,

London,

JOHN MACDONALD,

May 1, 1808.

PREFACE.

Parva sunt hæc, sed parva ista non contemnenda,

In every species of composition, some degree of amusement, information, or instruction, is justly expected. The proportion of gratification to be derived from works of a scientific description, will depend, not a little, on the acquirements, habits of thinking, and course of studies, pursued by the reader. If these do not render him an adequate judge of what is submitted to his consideration, and if the object of the writer be the amelioration of some useful art, or branch of knowledge, he will probably throw down the work, express a disapprobation of innovations, assert that the projected improvements, however desirable, are impracticable; and that the system stated to be imperfect, has hitherto proved sufficient for every useful purpose. In other instances, arbitrary and capricious decisions arise from prejudices, and not unfrequently from constitutional indolence, which leads to unfounded or hasty opinions productive of discussions that might have been avoided. The gentlemen whose province it is to report on works of science, and general literature,

are well calculated to decide with ability, candour, and a just discrimination. Their valuable labours tend to disseminate general knowledge, and we ourselves have to thank them for their approbation of military publications, which we should have wished to have seen animadverted on more at length, with a view of producing what is much wanted, a revision of British Tactics.

The subject treated in the following pages, is one by no means generally understood; though its great importance ought to have recommended it to public notice, long ere now. We have endeavoured to do it justice in all its branches, and it is hoped the tediousness of unavoidable technical description and requisite detail, will be excused in favour of the value of matter subservient to much national utility. Fortunately for the writer, perspicuity and precision were more wanted, than elegance of diction, and beauty of composition. To be clearly understood, was a primary consideration; and if obscurity has been avoided, the novel nature of the subject may, probably, attract a degree of attention, and create an interest that may lead to much beneficial consequence.

The work bears intimately on the naval and military professions, to which the changed state of human affairs has, necessarily, attached a very high and increased importance. The officers of these essential branches of national prosperity and safety, now, more than heretofore, study the sciences and prin-

ciples on which these noble professions are founded. A treatise like this will not escape their notice; and if their attention is excited to study its contents, farther improvement may result from their application. The science of *Telegraphic Communication* is not, however, confined to the naval and military departments. The well-informed merchant, the enlightened politician, and the man of general science, will perceive in it, the ready means of accelerated civil intercourse, commercial correspondence, and general propagation of knowledge*.

A Telegraphic system calculated to convey intelligence with accuracy and speed—which could be established and conducted on sure principles of

* We lament that the better half of the world will find few inducements to open this book. But as the science of conversation, by whatever means carried on, is one in which the ladies excel, the Telegraphic art might derive considerable advantage from the application of the various inventive and versatile talents of the sex, whose pursuits have of late become highly scientific, as evinced by their numerous and frequent attendance at Royal Institutions and Philosophic Lectures. We hail this as an auspicious omen of their attention to our treatise on secret and distant converse, which, excluding the depths of science, and pointing at invention, variety, and fancy, qualities almost peculiar to women, might be improved by their suggestions. When we inform them, that by means of three panes of glass in a window, a few simple symbols, and a telegraphic dictionary, distant conversation may be conducted, their curiosity might be stimulated to the practice of the art; but we will not hold ourselves responsible for any serious consequences that might result from such secret intercourse.

simple operation ;—and which would be, at the same time, attended with moderate expense, would be productive of national benefits not easy to estimate ; or rather, which could not be estimated too highly, If these kingdoms have been, hitherto, liable to invasion, recent events will not justify a supposition that such danger will in future be diminished. In the event of invasion, where it is necessary to act with energy and decision ; to assemble forces, quickly, on fixed points ; to direct their immediate movement from distant situations ; to provide speedily, for the multiplied contingencies connected with general movements ; to obviate mistakes which might happen ; to repair errors to which complicated arrangements are liable ; to make the best of unavoidable misfortunes that might not be quite irreparable ; to receive intelligence that might render a countermanding of prior orders indispensable ; and to conduct a dangerous service where the aid of common posts, and messengers, would be either useless, or of small avail, the prodigious aid of an eligible Teegraphic system would be of incalculable value.—To a Maritime Nation, the *timely* departure of a fleet, or the change of a naval force from one position to another, might be so essential at the moment, as to involve the salvation of the State. An opportunity of effecting a service of the most vital importance might be lost, from the want of a speedy mode of conveying orders. Could language be transmitted with precision and certainty, by a

Telegraphic system on the least exceptionable principles, foreign Kingdoms, States, and Capitals, might communicate by an universal Telegraphic establishment, superseding the uncertain services of couriers and messengers. Information requiring months, and days, might be had in as many days, and hours. Political disputes, serious misfortunes, national animosities, and not unfrequently war itself, could be prevented by *timely* intelligence procured at the commencement of evils, that, without an early remedy, might lead to the ultimate destruction of a nation. A chain of Telegraphic stations running from the metropolis to all the important sea-port towns, and branching off to capital cities, would add many facilities to commerce, and constitute vehicles of political intercourse. Independent of their ready services, a considerable revenue might be derived from their use. An answer to a letter might be received almost in the time required to write it. Such are the leading utilities of a Telegraphic establishment, which we trust to have made out in the following pages, to be perfectly practicable, by day and by night, and in our navy, equally as on shore. After an intense application of years to this most interesting study, it is presumed that what is here offered will prove the perfection to which the Telegraphic science may be carried. The more the subject was reflected on, the more facilities presented themselves of reducing it to a practicable shape. Various were the plans and schemes revolved, and rejected, in arriving

at the system recommended, and of which we will, now, proceed to give a brief prospectus.

In the *Introduction* to this work, a short account is given of the state of Telegraphic knowledge in ancient times, tracing its progress to the present age. It appears, that the only improvement effected by the moderns, consists in communicating each letter of the alphabet, by one movement of the Telegraph, in lieu of two made use of by the ancients. Impressed with a just sense of the manifest imperfections of the spelling Telegraph, now in use, and of the creeping process of communicating messages *letter by letter*, it has, at different times, occurred to many, to recommend the telegraphing of *words* instead of *letters*. The ancients, we find, communicated both words and sentences, by their Telegraphs; and yet we see men who have pretended to discuss this subject, ascribe the merit of suggesting the communication of words, to the present times. They may set themselves right, by looking into the works of Polybius, where they will find also, that the numerical plan is not modern, and was applied to the indication of letters inscribed on columns telegraphically arranged. Independent of the intolerable tediousness of the spelling Telegraph, it does not seem entitled to the character of even *slow and sure*; for, "*there are few messages entirely free from mistakes,*" as stated by a determined stickler for the present system; an explanation of which, and of its various defects, will be found in this work.

It is confessed, that expedition is desirable, could it be combined with accuracy. This is, precisely, the object which is presumed to have been accomplished, and this, principally, by means of a *Telegraphic Dictionary on a new principle*, combined with an *improved Telegraph adapted to the Dictionary*. To provide for the expression of the *compound tenses*, or the potential *inflexions of verbs*, has hitherto been deemed an insuperable impediment in the way of a much-wished-for improvement, that of giving a *speaking*, in lieu of a *spelling*, or rather *lettering* power to a Telegraph. The leading feature of the Dictionary, is that which, in the most simple manner, obviates this difficulty. It seems a matter of surprise, that so very facile an expedient had not occurred to such as have frequently discussed the subject, and despaired of accomplishing this indispensable object. The greatest potential inflexion of a verb is given by our system, by three, and in many instances by two movements of the Telegraph; as for instance, *might have been embarked*, is communicated by two movements, whereas this compound tense would require twenty-one movements of the present Telegraph. The Dictionary provides for proper names; and if spelling them is preferred, as often as they occur, this may be readily effected, without any previous spelling signal; without any detriment to the allowed simplicity of the numerical plan; and without any chance whatever, of confusion, error, or mistake. To suppose the mistaking of one tense,

inflexion, or word for another, is really a supererogating concern. It would be an inexcusable inattention, and neglect of duty, that repeated, would merit punishment. It must not be expected, that any improvement can ever be introduced into the Telegraphic system, independent of the numerical plan, which necessarily supposes the construction of a Telegraphic Dictionary, connected with an improved Telegraph. This is generally admitted; but the difficulty has been, its construction on principles the least objectionable possible; and to have it, at the same time, sufficiently copious for general purposes. We humbly presume that the Dictionary described in this work, will be found to combine the qualities of accuracy, simplicity, and ready effect. It is a gross mistake to imagine, that it must be necessary to turn over the pages at every Telegraphic station. The Dictionary is requisite *only* at the extreme stations. The numbers of the words, or the words corresponding to the numbers, are taken out for any message in a very short space of time: and the memory will soon afford a powerful aid in writing down, at once, without a reference to the Dictionary, numbers indicative of the words in the class of *small, and frequently occurring vocables*, given by a single movement of the improved Telegraph.

The present very imperfect system was adopted, merely, *for want of a better*. No comparison could lie between two systems, *for it appears*, from an

official Report, that the systems recommending the communication of words, did not provide for the inflexions of verbs, nor sufficiently for the occasional intermixed use of spelling ; and therefore were, according to the Report, quite inadmissible, or rather totally out of the question. There was no *utrum horum mavis accipe*. No choice, it seems, remained, but Hobson's, that of adopting the *spelling plan*, lame and imperfect as it must have appeared. It was *subsequent* to this period, that numberless plans have been offered to obviate its glaring defects. Experience continues to prove more and more, its inefficacy ; that celerity is an indispensable requisite ; and that a proper Telegraphic system is an object *highly desirable*.

The symbolical Telegraph described and delineated, is more simple, and would prove more durable than a boarded Telegraph. Its efficacy has been ascertained by a series of experiments, with a Telescope of medium power. But, as the present Telegraphs consist of boards, and as those along the line to Plymouth, have been lately erected, a serviceable boarded Telegraph has been recommended, and may be readily formed by additions to the present Telegraph ; for without this, no effectual improvement can be introduced. Enough has been urged to make it appear, that a small additional expense cannot, for a moment, be put in competition with an amelioration of the Telegraphic system. It would not cost more than the building and outfit of *one* of

our Gunbrigs, to print the Dictionary, and to establish *all* the projected improvements.

All the modes that might have been used for constructing the Dictionary, have been briefly stated, in order to establish the position, that the most eligible and advantageous formation has been adopted. It is deemed satisfactorily made out, that its bulk will be very moderate, on account of the mass of words to be rejected, as totally useless for Telegraphic purposes.

The groundwork of our boarded Telegraph lays no charge on the memory, being, as far as regards the expression of the nine numerals, and cipher or 0; only ten out of fifteen changes on four boards, four of which mutations are made with single boards. Each of these ten changes gives a number, or figure, so that in half an hour, any person will learn to work these four boards. The other two sets of four boards, only repeat the same operation.

In a dissertation of this nature, every possible mode of forming a Telegraph ought to be suggested, with a view of selecting, and recommending the most eligible. Under this consideration, a Telegraph consisting of eight boards, and one at the top, has been described. Inferior as this is to the *first* Board-telegraph, it is more powerful than that now in use, in the full proportion of 3 to 1.

A Nocturnal Terrestrial Telegraph on very simple principles, and which can be worked with much facility and accuracy, has been amply described. For

military purposes, such a Telegraph will be frequently called for ; and also, in situations connected with Naval Stations. This Nocturnal Telegraph consisting of wooden posts, and a very plain apparatus, will be unnecessary in time of peace, and may, therefore, be hid up, till the period of war recommences. Though it may not be erected, it is still highly expedient, that the *principle of its construction* should, at all times, be known on printed record.

To elucidate the simple Telegraphic system recommended as indispensable, the ready application of the Dictionary to practice, has been fully exemplified.

The concluding part of this treatise is occupied by a most important subject, the Naval Code, and the flag-system of signalling. We have endeavoured succinctly to trace the rise and progress of Naval Tactics, and their concomitant Code of signals, up to the present times. *Nine hundred and ninety-nine* mutations, or changes, being the total number which can be effected by means of *one set of flags* hoisted from one to three, on one mast, various modes of accomplishing this with *fewer flags* than constitute a set, have been detailed. It is a disputed point whether the *numerical plan* originated in this country, or in France. Both nations claim the invention. The evidence of its English origin, as stated, is very conclusive. It must be, however, confessed, that Monsieur de la Bourdonnais methodized and reduced it to a tangible form, and cur-

rent use. Our able Naval Officers have applied many ingenious remedies evidently wanting, and a wide field remains for farther improvements of the flag-system.

By means of the mutations of *four lights*, a Naval Nocturnal Telegraph of an extremely simple nature, has been described; and is very analogous to the terrestrial one for similar purposes. Those most essential branches of Marine service denominated *Night* and *Fog signals*, are still in a very imperfect state; and many ingenious Officers in the Sea line, have occupied themselves in projecting improvements. Having been many years at sea, and in habits of Naval intercourse, we have used the freedom to state various matters tending to the advancement of the most important of all possible services.

Many ingenious attempts have been made by sea, as well as by land, to communicate *words* in lieu of *letters*. These have proved abortive, or remain imperfect, on account, principally, of the difficulty of managing the *inflections of verbs* in a Dictionary which might be deemed adequate also in every other respect, to the object in view. To supply the defects of the Naval Code, the necessity of communicating language, or of *speaking* by means of flag-signals, is universally experienced. The construction of our Dictionary was particularly calculated to facilitate this object. It was a fortunate circumstance that the classification of words by successive series of 999, was the *best in every respect*, and, at the same time,

corresponded *precisely* with that number of signals made with one set of flags. This rendered the Dictionary, at once, directly applicable to convey language by flags constituting a ready prepared Telegraph capable, as explained, of indicating a word by *one movement*. This has been fully elucidated, and to say more here, would be only anticipating what will be found under its proper head.

The publication of this work betrays no secrets of public service; as the subject is one of general notoriety, and it is trusted, that much good will arise from the statements it contains. This was the principal motive for drawing it up in its present form.

It may be naturally asked, why it was not, in the first instance, submitted to the consideration of the Board of Admiralty?—During the time that the Writer commanded a Battalion of Cinque Ports Volunteers at Dover, this treatise was drawn up, nearly in its present shape, and was, when finished, to have been patronized by the late most eminent Statesman, Mr. Pitt, whose general knowledge qualified him to comprehend, and promote, every object of public utility. After his much-lamented death, the manuscript was forwarded, through a proper channel, to Lord Grenville, who transmitted it to Lord Howick, at that time First Lord of the Admiralty. In the course of a few days, an Official Report on the land division of the plans, was forwarded to Dover. It was without the signature, but in the hand-writing

of the then Secretary, now no longer in office. The following is a verbatim transcript of the Report.

“ *Admiralty Office, 19th August 1806.*

“ *Observations on Lieutenant Colonel Macdonald's Proposal for remedying the Defects of Telegraphs, by communicating Words instead of Letters.*

“ In the plan detailed by Colonel Macdonald, he has shewn considerable ingenuity and knowledge of the subject, and the words of his Vocabulary are selected with judgment; but there are material objections to adopting what he has proposed as a substitute for the system now in use.

“ Among the very numerous plans that have, from time to time, been laid before the Admiralty, for establishing Telegraphs on new principles, or for correcting the old, several have already recommended the employing *Words* instead of *Letters*, and even the ingenious mode of expressing these words by means of a *Numerical Index*, was suggested at a very early period (before the present machines were completed) by Mr. Charles Wilkins *, and afterwards by others; but upon full consideration of the comparative advantages and disadvantages of the two systems, the Lords Commissioners of the Admiralty gave a decided preference to the alphabetical mode, and the experience of many years has abundantly justified that preference.

* An eminent Oriental scholar, and a near relative of the Ex-secretary.

“ However desirable expedition may be, it is subordinate to precision and certainty ; and it must be obvious that when the signals express *words*, the smallest inaccuracy in working (and there are few messages entirely free from mistakes) must, by denoting a different word, convey a sense entirely distinct from, and perhaps opposite to that which was intended ; whereas the mistakes that occur in the alphabetical process produce no other bad effect than such as arises from incorrect spelling in epistolary correspondence. The sense is rarely, if ever, obscured by them.

“ When the weather is sufficiently clear to admit of the Telegraph’s working, there is seldom reason to complain of its tediousness ; and on the other hand it may be remarked that, as the Alphabetical Key is soon retained by heart, the person who writes and reads the messages can perform the operation with nearly as much celerity as in common writing ; whereas the turning for each signal, to the pages of an extensive Vocabulary, consisting of at least 9999 words, must ever be a tedious process, in which the memory can afford but little assistance.

“ No Vocabulary, it may be farther observed, can express the Proper Names of persons (and those of Officers, Naval, Military, and Civil, constantly present themselves), nor can it give the inflexions of verbs, upon which the construction and sense of any sentence so materially depend ; and though there may be ingenious contrivances for remedying these

defects (such as having occasional recourse to the Alphabetic system), yet they must destroy the simplicity of the Numerical plan, and become sources of confusion and error.

“The Alphabetic cipher, on the contrary, is equally applicable to every species of word that the Pen can express, and as well adapted to convey the sentence in any other language, as in English, if it should at any time be judged expedient to add to its secrecy by this additional cloak.

“With respect to the proposal for diminishing the number of flags used as signals at sea, the writer of this is not competent to speak to its merits. A plan for the same purpose has been submitted to the Board of Admiralty, by a Mr. Goodhew, and is now under trial in the Channel Fleet.

“Ingenious persons, who employ their talents in devising plans for the consideration of public Boards, labour, unavoidably, under the disadvantage of being in ignorance of what others before them have suggested, in consequence of which it is the fate of such Boards (and perhaps more than any other, of the Boards of Admiralty and Longitude) to be obliged to assign their reasons for rejecting schemes supposed to be original, that have been repeatedly rejected before.”

The Ex-secretary, in stating the above *mere opinions*, must have thought himself shielded against all future animadversion. That, indeed, would be

expecting too much, after such a Report. Our remarks will be few and moderate.

This Report, like all illiberal, arrogant, and superficial compositions, does not experience the exposition it amply merits. It bore sufficient evidence on the face of it, of being the production of an individual with whose style and manner we were, otherwise, well acquainted. To have this fact fully confirmed, a few lines were written to the Ex-secretary containing a question, whether his Report had been laid before the Board of Admiralty. His answer, dated the 23d of August, stated that what he wrote was at the desire of Lord Howick, who put the manuscript into his hands, and not of the Board of Admiralty, some individuals of which had read the paper; that time would not admit of his entering into a very minute examination of (what he was pleased to term) this excellent Treatise on Telegraphic Communication; that he was obliged, for want of time, to confine himself to an objection to the principle; that not fewer than a hundred plans had been given in; that he had discussed the subject about fifteen or twenty times;—and that in common, the receipt, merely, has been acknowledged.—The letter also mentioned, that the remarks were made in order to be transmitted to Lord Grenville. This Nobleman very properly directed the paper to be forwarded to the author of these pages, who was not altogether prepared for so very extraordinary a production.

It appears, then, that the Board had little, if any concern, in the whole transaction; and that the decision was the sole act of the Ex-secretary, without a reference to any man of science, Naval or Military Officer, to assist him in his conjectures. He felt much confidence, it must seem, in his own fitness for the task, from having, previously, decided on fifteen or twenty Plans for Telegraphic improvement. Independent of the alleged want of time as an excuse, probably for an inadequate and inconsiderate view of the subject, the Report, compared with the Work itself, carries a strong internal evidence, that he either did not peruse the manuscript, or that, if he did, the most material parts totally escaped his notice. The Report states, that the *great desideratum* towards improving the Telegraphic system is, a mode of providing for the *expression of the Inflections of Verbs*, and that no Vocabulary can ever accomplish this. We have submitted our mode of conquering this difficulty to men eminently conversant in this subject; and it has experienced their marked approbation, as unobjectionable. Now, had the Reporter looked into our Work with the requisite degree of attention, he must have found there, the effectual provision made for the *Inflections of Verbs*. Or, is it probable, that he despised the remedy so much as to deem it unworthy of even the slightest notice?— This could not be the case, after finding the Report paying compliments to some ingenuity and knowledge of the subject allowed to have been discovered. In short, this gentleman was embarrassed between

facts, and his wish to reject the whole plan. In discussing matters of this nature, it is usual to state the difficulties proposed to be obviated; and then to make it appear that the remedies applied are either inadequate, or fully calculated to remove them. Such was not the course pursued by the Reporter, who states some, but not all of the difficulties, leaving every account whatever of the projected improvements, totally out of the question. We find one sweeping condemnation of the principles and plans proposed, without stating *any part* of the described improvements. This may be a new method of reporting, and seems of a very *revolutionary* cast, but in former times, it would not have been thought either just or candid. His resolution was, to *knock the work on the head*; had he allowed it to speak for itself, he was fully aware that the consequence would have been, the loss of his object. He reckoned on his decision as final, and without farther reference or appeal. Had the Reporter been directed to pass a judgment on a Telegraphic plan *written at Kamps-katha* with a view to communicate *words* in lieu of *letters*, and without having such plan before him, the foregoing Report would have been equally applicable to it, and to that detailed in this volume.

One part of the Report we do not, though much used to the subject, clearly comprehend. Is it meant to say, that letters can be communicated by Telegraph, nearly with as much celerity as they can be written with the hand? The words used in the paragraph,

would seem to bear this import. It will be found, that from five, six, and seven seconds to more, according to the state of the weather, are consumed in conveying each letter of a word. This part of the Report, however, is particularly irrelevant; as whatever celerity the present mode is susceptible of, ours will possess the same advantage, increased in the ratio of quickness between conversation and spelling.

To have said less on this Report, would have been a *malus pudor*, and an absolute dereliction of the interests of science and of truth. We do not accuse the Ex-secretary of a wilful misrepresentation of facts; for his Report *does not state one* contained in the work, but we are very far from thinking that he has done any justice to it, or to the Public (at least in this instance), by an ex-parte exposition. The equitable rule of *audi alteram partem*, which should have been the sole standard of judgment in this, and every similar case, appears to have been overlooked.

Much anxiety seems to pervade the Report, that the idea of communicating *words* in lieu of *letters*, should not be ascribed to us: and the triumphant concluding paragraph, in stating what may sometimes happen for aught we know, throws out an insinuation, guardedly couched, that the present work (about whose contents the reader is sedulously kept in the dark) may be classed with those mentioned. It would not have been convenient to have asserted, in direct terms, that the manuscript contained nothing original, as its publication might prove the re-

verse. The Report seems to have taken its chance of closing the subject, and of the improbability of publicity, rendered absolutely necessary in justification of our professional character, independent of a sense of duty to the Public. Had the Report not been stated here, with such comments as it unavoidably called for, it would have been intimated through various channels, that the work had been rejected by the Board of Admiralty, after a proper investigation of its various branches. It remains *untouched*. The Lords of the Admiralty, at the time, have not decided on it. The Ex-secretary's production appears any thing but a review of it. It is little more than a laboured panegyric on the spelling Telegraph. This attempt to *condemn unheard*, and by broad assertion, excluding all evidence, we leave to the Public duly to appreciate. As far as concerns ourselves, we cordially forgive the Reporter. The mischief done, is the loss of valuable time, in establishing the improvements. If the work have any merit, or the contrary, it will, like water, soon sink, or find a just level.

From the commencement of the revolutionary war, to the present period, our inveterate enemy has made a powerful use of the Telegraph, in establishing an universal Empire on the Continent of Europe. Telegraphs erected in every direction, communicated intelligence with a mischievous and unprecedented celerity. By this means, troops marched, ammunition and supplies were received, auxiliary combinations were effected, and the instruments of subju-

gation and destruction multiplied beyond all former example. The slow operation of spelling has been reinforced by communicated sentences and phrases, on nearly a numerical principle. The highest refinement of Telegraphic modification, the enemy does not appear to have yet arrived at, viz. the expression of the Inflexions, or Compound Tenses; but the extracts made from a work, intitled, *Mémorial Topographique et Militaire*, published as far as six volumes, to be continued; seem to promise, that they will soon communicate words entirely, in lieu of letters. The gradation from the expression of syllables and words, to the complete communication of the Compound Tenses, must be short, as the connexion and analogy between these, is quite obvious and intimate. If this can be carried into immediate effect in this country, why should we wait to be obliged to be slavish copyists and imitators by and by, of our Gallic neighbours, who set us the example of erecting the first modern *Spelling Telegraph*? We are justly cautious of innovations that may deteriorate that noble fabric of human wisdom, the British Constitution; but we are too apt to carry this caution even into works of art and science; and the consequence is, that we are anticipated by our Gallic foes, by bringing forward at a late period, improvements, that might justly have originated in this country. A Telegraphic Dictionary, it is in contemplation to publish in France. It is immediately exceedingly wanted in our Navy, and ought to be

printed without any delay. Any defects in a first, may be corrected in a second edition. Let a beginning only be made, and the very important Science of Telegraphic Communication will rapidly arrive at a high degree of perfection, which will reflect as much credit on the Government, as it will prove of incalculable public utility.

We read in the French Work before us, the following passages :

“ Le Mémorial donnera plus tard (meaning in the successive volumes to be published), une description des Télégraphes applicables au service des armées. Mais il importe que les officiers puissent, en un besoin, fabriquer un Télégraphe avec ce qu'ils trouveront sous la main.” Here follow useful suggestions for the construction of Telegraphs, formed either of solid materials, or constituted by light and coloured objects.

“ Le nombre des objets et des situations qu'on peut leur donner étant déterminé, par la construction des Télégraphes, un calcul facile indique toutes les combinaisons possibles : et il ne s'agit que de s'arrêter au terme où ils deviennent trop compliquées. Mais il faut, de plus, dans le pratique, ordonner ces combinaisons, et rédiger les tables (meaning a Dictionary) télégraphiques.”

“ Ces tableaux rédigés, il ne s'agit plus que d'attacher à chaque signe, et à chaque combinaison de signes, telles ou telles valeurs. Ces valeurs sont, d'abord, les phrases les plus usuelles du service pour

lequel le Télégraphe est institué. Pour les phrases éventuelles, on attache un certain nombre de signes simples à designer *les cas ou les temps des noms ou des verbes*, la ponctuation, et les autres élémens de la phrase, tandis que le reste des signes simples ou combinés sert à indiquer les syllabes ou les lettres (*where it may be necessary, occasionally, to spell a proper name telegraphically*) des mots.”

“ Ces observations, faciles à vérifier, suffisent pour guider dans le choix des objets (*meaning Telegraphs on new principles, and of simple construction*), des assemblages qu'on peut en faire, des positions qu'on peut leur donner, &c. selon le terrain, les distances, les lunettes dont on est muni, &c.”

Vide Mémorial Topographique et Militaire,
No. 4, or vol. iv. pages 191, and 194.

The above quotations are in such unison with our ideas of Telegraphic improvement, that the reader might suppose some of them borrowed. In recording with much satisfaction (though making by an enemy), the outline of his plan, it must be remarked, that our manuscript was given in, a year, at least, before the volumes alluded to, arrived in this country.

When the manuscript was transmitted to the Admiralty, the symbolical Telegraph contained the common, or Arabic figures, in lieu of symbols representing these numerals. The series of experiments then recommended, and since made, has ascertained, that Arabic figures would not be distinctly perceived

at the usual distances of Telegraphs, and were, besides, liable to appear reversed, and to be mistaken for each other. The same experiments confirmed the eligibility of symbols, as described. The top-board has been added to the Board-telegraph, in place of the contrivance, originally stated, for indicating a word in the selection of *small, and frequently-occurring words*. The third person singular of the Present of the Indicative, has been added to the Verb. All this, however useful, made no alteration of the general principle and groundwork of the Treatise. The Figures in the manuscript were dotted. They were delineated, so as to be rendered capable of being engraved. The Naval division of the Work has been much extended. This is mentioned, with a view of meeting any remarks that may be made, that the Work appears different in its printed, from what it did in its manuscript form.

We offer this Work to the discerning Public, impressed with the fullest confidence, that whatever defects may be found in the style and descriptions, will, in no degree, derogate from the interest of the general subject.

N. B. We can see no objection, that can prevent the various useful classes of *Proper Names*, mentioned in the account of the construction of the Dictionary, from being subjoined to the volume. Most of these Serviceable Classes, would constitute a permanent small portion of the Telegraphic Dictionary. A few others, in which, casualties or promotion might oc-

casual alterations; might, at a trifling expense, be periodically reprinted, to replace the corresponding additional Class, or prototype in the Dictionary. For some time, the requisite corrections, arising from casualties, could be corrected with the pen alone. As our system provides for the ready spelling of any word in the middle, beginning, or end of a sentence, with the utmost accuracy and facility, no embarrassment in working, and no interruption of communication (as fully exemplified), can possibly happen. Whenever a word is to be spelt, Telegraphically, which can very seldom be required, we would recommend, that the mode of giving one letter by each movement be adhered to, as described on our improved Telegraph, till the practice by the numerical general plan, becomes thoroughly established; for established it must sooner or later certainly be, either by the introduction of this, or probably, of a better plan. The mode of signalling two letters, instead of one, by a single movement, as specified in the description and use of the improved boarded Telegraph, may, in due time, be substituted. If the few Classes of proper names, as suggested, are added to the Dictionary, the spelling of a word will occur so very seldom, that the extremely simple mode of single letters may suffice.

A
T R E A T I S E,
&c.

INTRODUCTION.

In tenui labori.

In the present state of Society, few sciences can be more interesting or important than that of *Telegraphic Communication*. To a nation which exists principally, by its Naval superiority, this truth is strictly applicable; as the fate of a war, or the subsequent conditions of a peace, might greatly depend on a more or less speedy departure of a Fleet in quest of an Enemy ascertained to be at sea. The celebrated victory obtained by Lord Durcan over the Dutch Fleet, in the year 1797, is said to have originated from a Telegraphic intimation, that the Fleet of the Enemy was *at Sea*. The swiftest *Express* would have proved inadequate; and without the valuable aid of the Telegraph, this splendid victory might not have been achieved. Useful as this curious art is, it remains, still, in its infancy, and has made but little or no progress from the state in which it was practised by the Ancients. The art was well known to the Greeks. A Play, written in the language of that refined Nation, opens by the descent

of a watchman from a tower, to give information that Troy had been taken.

Homer is the first who mentions the *Telegraphic art*. He compares the lambent flame which shone round the head of Achilles, and spread its lustre all around, to the signals made in besieged cities, by clouds of smoke in the daytime, and by bright fires at night, as certain signals calling on the neighbouring states for assistance, or to enable them to repel the powerful efforts of the enemy. What Homer has slightly mentioned in the way of an allusion to a known practice, Æschylus, in one of his tragedies, has distinctly stated. A slave introduced speaking a prologue, says, "May the Gods deliver me from this tiresome situation, in which I am placed, to watch for the agreed-on signal! Long have I looked for the display of torches announcing the final destruction of Troy. May these fiery signals, so long expected, at last appear, and permit me to leave my post! I hail thee, thou pleasing nocturnal light, agreeable as the appearance of the fairest day. Splendid will be the varied entertainments to which the glorious event I am about to report, will give rise." As soon as this slave has made his *Telegraphic Report* to *Chrysemestra* in the palace, her courtiers inquire of her by what possible means the intelligence she relates to them, could have been so quickly procured. She is made to reply at great length, attributing the invention to Vulcan, and describing the rapid manner in which vivid lights resembling the

splendour of the sun, and the clearness of the moon, were instantly repeated from mountain to mountain, in the manner agreed on, till the joyful news, at length, reached her palace.

Julius Africanus minutely details a mode of spelling words by a Telegraph. It appears, that fires of various substances, were the means made use of. He says the Roman Generals had recourse to such media of distant communication. In Livy, in Vegetius, and in the life of Sertorius, by Plutarch, it is mentioned, that these Generals frequently communicated by Telegraphs. The *Chevalier de Folard*, in the sixth volume of his Commentaries on Polybius, page 139, gives a very curious digression by that author, on Telegraphic signals made by means of lights or fires. M. Rollin has given the same digression in his *Ancient History*, page 162, of volume viii. of the duodecimo edition of that work.

In book iv. page 238, of *Brumoi's* account of the *Theatres of the Greeks*, it is stated that fire-signals were used to communicate the events of wars, and likewise, to direct the commencement of battles. This description of signals was anterior to the use of trumpets. A priest, crowned with laurels, preceded the army, and held a lighted torch in his hand. He was respected, and spared by the enemy, even in the heat of battle. Hence, the old proverbial expression for a complete defeat, that *even the very torch-bearer had not been spared*. Hence, also, it is highly pro-

table that the usage arose, of representing *Discord*, with inflamed torches.

The Chinese, like the ancient Scythians, communicate intelligence by lighting fires, or raising a cloud of smoke at different stations. Polybius gives the general appellation of *Pyrasia* to the Telegraphic modes then practised; indicating that *fires* were the principal means made use of. An ingenious, though limited species of Telegraph was invented by Æneas, who lived in the time of Aristotle, and who wrote on the duties of a General. Two oblong boards had various sentences written on their surfaces, as, "*The enemy have entered the country.*"—" *The invasion has been repelled.*"—" *The enemy are in motion, &c. &c.*" These boards were fixed, perpendicularly, in pieces of cork which fitted, very nearly, the mouth of two similar circular vessels filled with water, and having a cock adapted to each vessel. One of the vessels was stationed where the intelligence *originated*; and the second, at the place to which it was to be *conveyed*. A person, as at present, was *always* on the look-out; and when he perceived one or more torches raised up at the primary station, he understood that intelligence was about to be communicated. On observing a second torch raised, he *instantly* answered the signal, and opened or turned the cock of the vessel he was in charge of: the cock of the vessel at the primary station, having been turned immediately on raising up the second torch at that station, and on observing this signal answered. As the cocks

were opened *simultaneously* at both stations; the circular corks with the boards standing perpendicular to their respective centres, would descend in the vessels *equally*, as the water *subsided*. At the *instant* when the sentence to be communicated descended, or sank to the level of the edge of the vessel at the primary station, the person in charge there, raised a torch. The person at the second station, on observing this, *instantly* answered this signal, and turned the cock of his vessel, and thus stopped the flowing of the water, reading, at the same time, the sentence *then* level with the edge of the vessel; such sentence, on account of the equal flow of the water, corresponding to the similar one, similarly situated at the original station. In our Navy, at this moment, from one to five hundred written sentences of various import, are communicated by signals made by flags. Each Ship is furnished with a copy of these numbered sentences, to one of which the signal made refers. More of this hereafter.

Polybius writes, that he improved a mode of communicating ideas by the letters of the alphabet applied to a Telegraph invented by Cleoxenus; or, according to some authors, by Democlitus. The letters of the Greek alphabet were divided into five parts; and those in each division, were inscribed on a board fixed, perpendicularly, to an upright post for each of these divisions of the alphabet. These posts stood in an opening between two walls, about ten feet by six, and situated on each side of the posts.

Two long tubes were fixed in one position, or direction. The Telegraph-workers could readily perceive through these tubes, which excluded all lateral rays, the right or left of the station viewed, and what number of torches might be raised above the top of the wall, either on the right or left of the station looked to. Things being thus prepared, at the primary and second station, the person in charge at the primary station would raise up two torches, as a commencing signal, that intelligence was about to be conveyed. The looker-out at the other station would, on perceiving this, hold up a couple of torches, thus indicating that he was prepared. The ideas to be communicated were reduced, previously, to as few words as possible. The posts on which the letters were, being numbered 1, 2, 3, 4, and 5, one or more torches raised up above the left hand wall, would indicate to the person at the second station, on what post was situated the first letter of the sentence to be communicated. The person at the second station, on observing through one of his tubes, the torch or torches held up, would, immediately, raise a torch or torches, corresponding to the display exhibited. The person at the primary station seeing his signal taken up, would lower his torch or torches, which would, at once, disappear, on sinking under the level of the top of the wall. The column on which the letter was, being thus ascertained, the person at the primary station would hold up, from behind the right-hand wall, a torch, or torches, in-

dicating the position of the letter on the post already pointed out. For instance, if it was the first letter at the top of the column, he would hold up *one* torch, and if the second, *two* torches, and so on, to the fifth letter on the column. The person at the second station, would exhibit a corresponding number, to make it appear that he understood the signal. Every letter, in each word, would be communicated in this manner; and we are to suppose that an agreed-on signal, would be made to indicate the termination of a word, and of a sentence. It is farther evident, that information could be conveyed along *any number* of stations, on the principle of the modern Telegraph, of *keeping up* every signal, till *taken up* at the succeeding station. But in this case, two parallel walls would be requisite, on each side of the posts; in order that the torches, when depressed, might disappear to the two contiguous stations, at the same instant. This was a *Night Telegraph*; but it could obviously, and readily have been converted into a *Day Telegraph*, by substituting *flags*, in lieu of *torches*.

It does not appear that the modern nations made use of any species of Telegraph, excepting common alarm fire signals, till the *Marquis of Worcester*, in the year 1663, in few words described a species of Day and Night Telegraph, constituted by holding up letters, or lights in the openings of windows, as far as they could be distinctly perceived, necessarily, by the aid of glasses. The Noble Marquis mentions,

that by his Telegraphs, intelligence might be conveyed, "by night or by day, though as dark as pitch is black."

In a little more than forty years after this period, *Monsieur Amontons* made some public experiments before some French Noblemen, to prove that letters of a large magnitude, or unknown ciphers subject to a key, might be displayed to communicate information to any distance. He made use of Telescopes to view his letters and figures, and placed his stations at the greatest distance to which the powers of his glasses corresponded. The persons stationed at the Telescopes, made certain signals, on clearly ascertaining the letter, figure, or cipher displayed; and such signal was repeated from station to station, as fast as the thing indicated became understood at each, respectively.

In the year 1793, *Monsieur Chappe* must have founded the French Telegraph now in use, on the ideas of *M. Amontons*; as, in lieu of holding up letters, such were indicated by the various positions given to the transverse arms of a machine having these arms worked by cords passing along them, and down through the perpendicular pillar supporting the moveable arms. The letters of the alphabet he reduced to sixteen; and with these he made a tolerable shift to spell any word communicated to him by the Committee of Public Safety, and transmitted it, letter by letter, from the first station on the top of the *Louvre*, to the French army then at *Lisle*.

The position of the arms indicating a letter, was observed by a person stationed at a telescope, at each Telegraphic position, and every movement required from fifteen to twenty seconds of time. A model of this Telegraph was sent from the Continent, to His Royal Highness the Duke of York, by Professor Playfair. We have been informed, that after many experiments had been made in this country, Lord George Murray finally suggested the plan of the boarded Telegraph now in use. Though the substance of what has been written above, may be known to those acquainted with this subject, it was eligible to state it succinctly here, to shew the invention is not modern.

Some Account of the Telegraph now in use—of its Defects—and of Difficulties to be overcome.

Figure 1st shews this Telegraph. It consists of a double frame, equally divided off into three compartments, in each of which there is a board about five feet square, moving on two pivots. Each board, by means of a rope attached to an arm projecting from the middle of one of its sides, can be brought from a horizontal to a perpendicular position, so as to shut up the space or compartment it belongs to. A counterpoising weight brings the board again into the horizontal, when no longer required in the perpendicular attitude. The ropes lead down to a cabin situated under the machine, where they are

numbered, 1, 2, 3, 4, 5, and 6, corresponding to the boards above. The *Figure* exhibits boards 1, 2, 5, and 6, pulled down to the perpendicular position; and the two centre boards, 3 and 4, in the horizontal attitude. A person posted between two telescopes in the cabin, is, in clear weather, constantly observing the stations on each side of him, and repeats to another person stationed at the ropes, the *numbers* of the boards pulled down to a perpendicular position, at either of the stations in the direction in which the intelligence is coming. The boards are kept down till the next Telegraph takes up the same position of a board or boards, and this process goes on till a signal is made, that the sentence or word is terminated. The six boards are pulled down to point out, (or any other spare combination of the boards may indicate,) that intelligence is about to be communicated. When the weather is cloudy, a spare combination of the boards indicates that the Telegraph cannot work *at that place*. The six boards of the Telegraph are capable of giving 63 *combinations* or *mutations*. The first 24 combinations express, each, its letter of the alphabet. The next 10 combinations give the nine Arabic or common numbers, and the 0, or cipher. The remaining 29 combinations are used as signals, and to express words in very current use. The manner in which the total of the 63 combinations is, or may be applied, is as follows.

Combinations.	}	1	Alphabet.	}	1	Boards.
		2			2	
		3			3	
		4			4	
		5			5	
		6			6	
		7			1, 2	
		8			1, 3	
		9			1, 4	
		10			1, 5	
		11			1, 6	
		12			2, 3	
		13			2, 4	
		14			2, 5	
		15			2, 6	
		16			3, 4	
		17			3, 5	
		18			3, 6	
		19			4, 5	
		20			4, 6	
		21			5, 6	
		22			1, 2, 3	
		23			1, 2, 4	
		24			1, 2, 5	

		Boards.
Combinations.	Numerals.	1 1, 2, 6
		2 1, 3, 4
		3 1, 3, 5
		4 1, 3, 6
		5 1, 4, 5
		6 1, 4, 6
		7 1, 5, 6
		8 2, 3, 4
		9 2, 3, 5
		0 2, 3, 6

Spare Combinations.	35 To	2, 4, 5
	36 From	2, 4, 6
	37 Captain	2, 5, 6
	38 North	3, 4, 5
	39 South	3, 4, 6
	40 East	3, 5, 6
	41 West	4, 5, 6
	42 Fog	1, 2, 3, 4
	43 Arrived	1, 2, 3, 5
	44 Sailed	1, 2, 3, 6
	45 Convoy	1, 2, 4, 5
	46 Packet	1, 2, 4, 6
	47 Ship of the line	1, 2, 5, 6
	48 Court Martial	1, 3, 4, 5
	49 Fleet	1, 3, 4, 6
50 Sea	1, 3, 5, 6	
51 Put back	1, 4, 5, 6	

		Boards.
Spare Combinations continued.	{	52 Sail 2, 3, 4, 5
		53 Execution 2, 3, 4, 6
		54 First fair wind 2, 3, 5, 6
		55 Guns 2, 4, 5, 6
		56 Wind 3, 4, 5, 6
		57 Transports 1, 2, 3, 4, 5
		58 Commander 1, 2, 3, 4, 6
		59 Port-Admiral 1, 2, 3, 5, 6
		60 Vice-Admiral 1, 2, 4, 5, 6
		61 Rear-Admiral 1, 3, 4, 5, 6
		62 Admiral 2, 3, 4, 5, 6
		63 Commencing signal, or between words, &c. } 1, 2, 3, 4, 5, 6

In the above alphabet, the *j* and the *v* were originally omitted, but this has sometimes occasioned mistakes in Telegraphic spelling. It is evident, that to signal the letter *a*, board 1 must be pulled down from the horizontal, to the perpendicular position. To signal the letter *r*, first, let board 1 expressive of *a*, fall back to its original horizontal position, and let the boards 3 and 5 be pulled down to the perpendicular attitude. These boards, as above, constitute the 17th Combination. To give the letter *t*, first let boards 3 and 5 fall back to the horizontal position, and then, pull down boards 4 and 5 (the 19th Combination) to the perpendicular position. Let boards 4 and 5 now fall back to the horizontal atti-

tude, and make the signal indicating the termination of a word, and this signal may be one of the 29 spare Combinations, as may be agreed on. Now any person having the above *alphabet of Telegraphic key*, will find the word signalled to be *art*. If, again, it were necessary to signal the number 160, as part of a sentence, the boards 1, 2, 6—1, 4, 6—and 2, 3, 6—exhibited together, in succession, would give the 1, the 6, and the Cipher, in succession; the three signals giving the total number 160. This will appear evident, by inspecting the Combinations expressive of the numerals and Cipher, from the 25th to the 34th Combinations inclusive. Again, were it required as part of a sentence, to express the word *Admiral*, the 62d spare Combination would be made use of, by pulling down boards 2, 3, 4, 5, and 6. The person possessed of the Telegraphic list of spare Combinations would, immediately, understand that the word, *Admiral*, was meant. The words inserted opposite to the spare Combinations are sometimes changed, or may not always appear as we have inserted them; but this makes no difference in the principle, as explained. Sentences to be communicated are, previously, to be abbreviated or condensed as much as possible, in order to shorten the Telegraphic operation. For instance, *The French Fleet, consisting of twenty sail of the Line, and 4 Frigates, has been engaged, off Brest, by Admiral Sir John Duckworth, who has taken five Line of Battle Ships, and two Frigates.* This sentence may be reduced to

a Telegraphic smaller compass, viz. *Admiral Duckworth, off Brest, took five Ships of the Line, two Frigates.* Allowing that the words, *Admiral—Ships of the Line—five,* and *two,* can be signalled, each, by one Telegraphic movement, and allowing also a signal between each word, with the commencing and concluding signals, it would require 42 separate signals, to give this short sentence.

By means of the new Telegraphic system contained in this work, it will be made to appear, from a detail of similar examples, that this sentence can be communicated in 13 *movements.*—Suppose the sentence were, —“*The Enemy’s Fleet was seen, on last Thursday, steering for the coast of Ireland.*”—This may be reduced to,—“*Enemy Fleet seen, last Thursday, steering for Ireland.*”—Allowing all requisites, as above, it would be necessary to make 49 *movements,* or signals, in order to convey this sentence. By the system we recommend, this sentence would be communicated by 11 *signals, or movements.*—“*Are the troops for India embarked?*”—This sentence would require 35 *movements.* By our new system, it is communicated in *nine movements.*—Again, “*The Van-division will break the enemy’s line, through the rear of their leading division.*”—This may be condensed to, “*Van-division break through rear of leading division.*” *Fifty-three movements* would be necessary for giving this sentence. By the new mode laid down, it can be communicated by *ten movements.* Again, “*The Army of the enemy has*

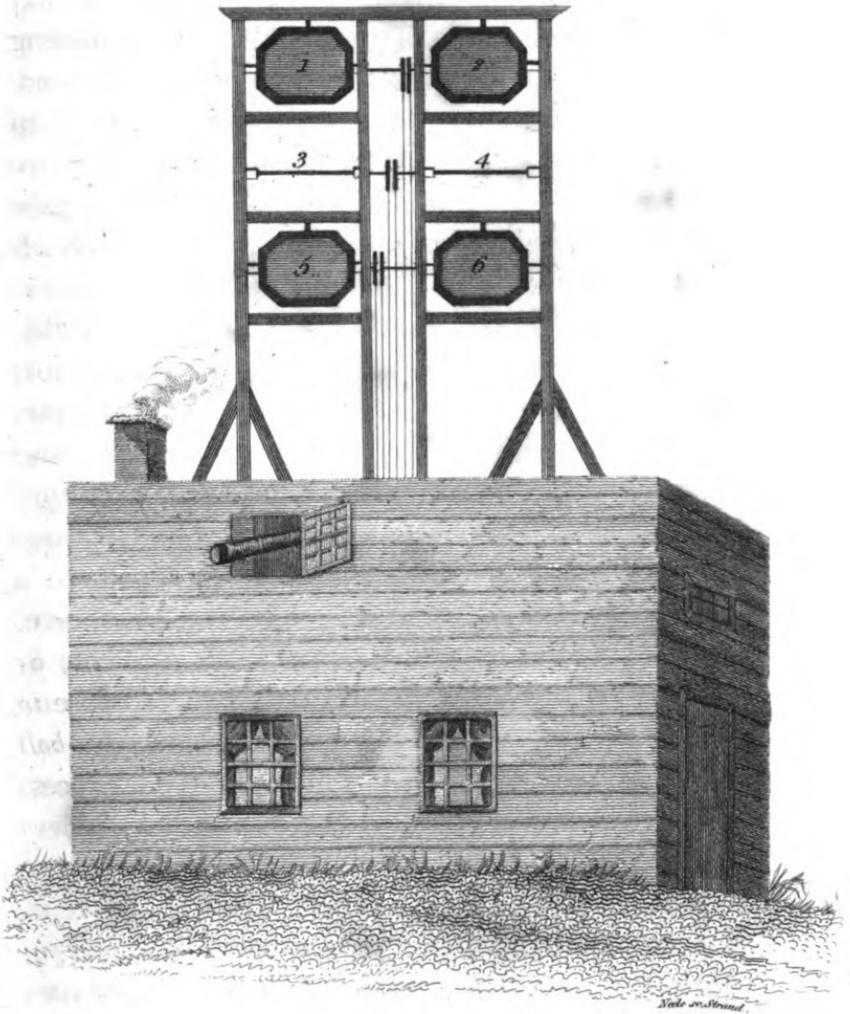
deployed into Line, and is advancing to the attack, by direct great echellons of Brigades from their Right.—This may be abbreviated to, “*Enemy deployed, advancing by Echellons of Brigades from their Right.*”—The present Telegraph would communicate this sentence by 68 *movements*. By the mode laid down, the sentence can be conveyed by 15 *movements*. Again, suppose the communication of a commercial description, as, “*Return the accounts sent yesterday, by the first Post.*” Allowing always a signal between every word, and the commencing, and concluding signals, it would require 54 *movements*, to convey this sentence; which by the new method, could be readily given by 13 *signals*. It appears, that the above six sentences cannot be clearly communicated by less than 301 Telegraphic movements such as are now practised; and it will be made out, that by the new system recommended, these sentences can be conveyed by 71 *movements*, being less than the *fourth part* of the number of signals now used. When, however, sentences abound with more long, than short words, it will be found, that the advantage will be in the proportion of 6 to 1, in favour of the new system; or that a message can be conveyed in the sixth part of the time at present required. Independent of the extreme tediousness of spelling messages, we have official authority for asserting, that *few messages* are entirely exempt from mistakes. It appears that the ancients communicated *sentences*, and consequently *words*, by certain Telegraphs. Sensible of the disadvantages of the

spelling-Telegraph, many have proposed conveying words, in lieu of single letters in succession. Three leading difficulties have hitherto opposed the adoption of so very eligible a change of system. The first is, that of arranging and classing words in the least exceptionable manner, so as to be very readily applicable, without any chance of confusion, or mistake, to a Telegraph adapted to such an arrangement, or *Telegraphic Dictionary*. The second difficulty is, that of managing the *Inflexions of Verbs* which principally constitute the construction and meaning of sentences. We see it asserted in a public official Report on a Telegraphic proposal, "*That no Vocabulary can give the Inflexions of Verbs;*" a proof of the sense entertained of this desideratum.—The third difficulty consists in the invention of a Telegraph similar to the present, but working on a different modification of the present principle, and applicable, without liability to error in working, to a simple and obviously advantageous Telegraphic Dictionary, *to be used only at the two extreme Stations communicating*. — Twenty-four movements, or mutations of the boards, must, on the present plan, always be retained by heart, to express the letters; and ten more, to express the nine numerals, and cipher. A Telegraph is wanting whose combinations used, may not exceed ten, or fifteen, in lieu of thirty-four, and excluding the present necessity of referring, occasionally, to the 29 remaining combinations in use. Another deside-

ratum is, the best and most simple mode of spelling the proper names that the Dictionary might not contain. It is also required, that the Dictionary should be adapted to the Naval system of Signal-Flags.—There may, probably, be a few who may deem the creeping and insufferably tedious spelling system sufficient. Such may be told, that were the difficulties stated obviated, the difference of effect would be as great, as if a conversation were carried on, first in the ordinary way, and the same immediately afterwards, by *spelling each word*. Such men who think all improvements useless innovations, may be told, that a dray horse will go over a Course with the same certainty as the fleetest Racer;—that a field may be cultivated by a spade, as well as by the best process of agriculture; and that a number of old women will spin a quantity of cotton, as effectually as a *Spinning-Jenny*. These *stationary men* may be told, that it would be a strange argument to support, that the dray horse, the spade, and the old women were sufficient, or preferable, because they could effect the purpose *in time*; or because the high-mettled Racer might *bolt* or break down, because the agricultural process might be mismanaged, or because the machinery of the *Spinning-Jenny* might become deranged.

The highest improvement of which a *Telegraphic system* is susceptible, consists in conveying *words* instead of *letters*, with the utmost possible expedition, and without being liable to errors, or mistakes attached (unless much care is bestowed in forming it)

Figure 1.^{re}



to the nature of the system, which should totally exclude all inaccuracy of this description. A Telegraph thus constituted, will possess a *conversing*, in lieu of a *spelling power*. The excellence of the improvement will arise from the accuracy, facility, simplicity, and celerity with which each word can be transmitted. When this can be effected with the least possible consumption of time, application of corporeal and mental labour, and with the least degree of Machinery, the Telegraphic science will have attained its maximum of perfection. The various methods proposed here, will be probably, little beyond an approximation to a perfection which future ages, only, may arrive at; but to leave so very valuable an art in its present most imperfect state, would be neither creditable to the enlightened age we live in, nor to the rapid progress of less important sciences.

It may here be very properly asked, why the *opposite and unscientific* mode of spelling, or rather lettering words along a Chain of Posts, has remained so long unimproved, while the least conversant on this interesting subject must have been convinced of the necessity of its amelioration?—The subject has attracted the attention of men eminently qualified to do it justice. We have it from *unquestionable authority*, that *not fewer than a hundred plans* have, at different times, been given in, proving the defects of the present Telegraph, and offering improvements of various natures. These plans

were transmitted to the Admiralty. The Lords of that Board, are Peers, or Commoners, whose liberal endowments, cultivated talents, and enlightened understandings were amply calculated to discuss the merits of these plans submitted to their individual and collective consideration. Unquestionably, few subjects of greater national importance, could claim their attention. Whether, however, the Lords of the Admiralty have had their time otherwise occupied, whether they have not been in habits of considering such matters, or to whatever cause it may be ascribed, the plans communicated have been generally left to the decision of the Secretary. It is impossible to avoid remarking here, that however respectable may have been the acquirements and official abilities of these subordinate persons, it cannot be fairly supposed, that on subjects intimately bearing on many Professions, Arts, and Sciences, their decision can be either adequate, or just, though it may be given (but not in every instance) with impartiality, and to the best of their knowledge, and abilities.—Independent of these weighty considerations, prejudices may warp their judgments, or (what we have seen not quite a hundred years back) an elevation to Offices which they never dreamed of filling, from the plodding labours of a desk, may, not unfrequently, render them utterly unfit for deciding on subjects of Science.—We have seen none of the plans proffered, but there is reason to conclude, that decisions have been given where it was after-

wards proved, that the plan had either been misunderstood, or inadequately considered. This is a matter of public injury, and serious grievance to scientific characters who gratuitously bestow much valuable time and labour on projects of national utility. What is the remedy for obviating this evil? It is quite obvious. Their Lordships collectively, assisted by Mathematicians, and proper Artists, should, after mature deliberation, pronounce their opinion on these Telegraphic proposals; and the Secretary will act in his proper capacity, in recording the minutes dictated by their Lordships.—We would here, in justice to the individuals who gave them in, seriously recommend a revisal of the *hundred plans* tendered; as it might, probably, appear, that some of them might be preferable to ours; or at least, that from this collection of dissertations, the present lame and imperfect mode of *signalling*, might be materially improved. It is, certainly, no small evidence of its imperfection, that *one hundred men*, who must necessarily be supposed to understand what they treated on, have all concurred in one uniform opinion. That their plans have been rejected generally, as stated, does not prove either that they were in their own nature inadequate to their object, or that the present system stood in no need of improvement, or could not be amended without falling into greater inaccuracies and mistakes in practice, than are now confessedly prevalent. This last opinion, we have seen in an Official Report.

and the Telegraphic ameliorations introduced in this work, amply demonstrate that it is unfounded.

In cases of the description before us, it is always eligible to have recourse to the public Press. This excludes disadvantages resulting (very probably unintentionally) from causes mentioned; and the public voice ultimately gives an unquestionable and valid decision. Here, the general stock of public knowledge, information, and experienced reflection, is applied with attention, impartiality, and candour; and if the propositions submitted, bear this fair test, it may be concluded that a case is made out, and that the pains bestowed have not been altogether thrown away. This may finally lead to the establishment of the object recommended, and be productive of lasting national benefit.

Construction of the Telegraphic Dictionary.

We shall now proceed to describe the *principle*, and mode of composition of the *Telegraphic Dictionary*; premising, that it will be required only at the extreme stations, such as Plymouth and the Admiralty, while the Telegraph workers at the intermediate stations, always remain in profound ignorance of what may be communicated.

The copious richness of the English language may be well calculated for inflated, florid, pompous, and learned composition, but into conversation even of a refined description, and into writing in general, a

very considerable portion does not enter. To exemplify this fact, it may be possible to produce an English composition of any length almost, and few would understand much of it beyond particles, articles *, signs of cases, prepositions and conjunc-

* In order to illustrate this, we shall in this note, collect a few words under the letters A and B only ; and endeavour to work them up into a subject, which it is supposed will not be very intelligible to many, unless they take the trouble of *translating* it by means of Glossaries which are annexed.

See Letter A of Johnson's Dictionary.

GLOSSARY.

Alderlevest—Well beloved.	Adjuvate—To assist.
Abbacy—The rights of an abbey.	Adminicular—Helping.
Abbey-lubber—A slothful loiterer.	Advoutry—Adultery.
Aberrant—Wandering.	Anthology—A collection of poems.
Adjument—Help.	Affabrous—Complete.
Accubation—The ancient posture at table.	Archaisms—Ancient phrases.
Abraded—Hurt.	Altisonant—High sounding.
Arenulous—Abounding with sand.	Altiloquence—Pompous language.
Aberuncating—Pulling up by the roots.	Ambages—Circuit of words.
Acclivous—Rising with a slope.	Affidation—Mutual contract.
Acme—The height of any thing.	Adustible—That can be burnt.
Adminicle—Comfort.	Aggerated—Piled up.
Agminal—Of the same corps.	Aniented—Dejected.
Adunque—Perverse.	To aread—To advise.
Acervated—In abundance.	Arrision—Consolation.
Allodial—Independent.	Aspernation—Neglect.
Allocaction—Putting together.	Asseculation—Concomitant.
	To avale—To sink.
	Auctive—Increasing.
	Aration—The art of ploughing.

tions. The introduction of such short specimens as are in the subjoined note, was intended to evince

Anfractuosity—Fulness of turnings.	Ablaqueation—Digging of ground about trees.
Ariolation—Foretelling.	Arundineous—Full of reeds.
Ascetic—Employed in devotion.	Acetose—Having acids.
Awebands—A check.	Absinthiated—Having worm-wood.
Aorist—Indefinite.	Anhelose—Out of breath.
Autopical—Self-perceptible.	Auxis—Increase.
Adunation—Union.	Acephalous—Without a head.
	Avolation—Flight.

The above Words worked up into a Species of Composition.

Alderlevest!

The deprivation of abbacy reduced the auld abbey-lubber to an aberrant state, devoid of adjunct; and sad reverse! from the soft indulgence of accubation, his feet were daily abraded, in arenulous situations, in aberuncating roots for his sustenance, on aeclivous mountains. This was the acme of misery, without consolation or adminicle. His agminal brethren of unfeeling and adanque minds, though possessed of acervated wealth, and allodial, by allocation of property, would not accite him, to adjuvate him with adminicular comfort. Advoutry was his crime. This, by the laws of affidavit of the abbey, subjected his person to be rendered adustible on an aggerated pile. Thus, aniented, without a friend to aread him, or to console him by soothing arrision, he was subject to contumely and aspernation, the usual asseculation of such as are avaled in auctive misfortunes. His occupations were anomalous, being sometimes engaged in aration (difficult in a country of anfractuosity,, and, at other times, in ariolation connected with his character of an ascetic. The aorist awebands of distress depressed his spirits. Devoid of autopical adunation, with his fellow-creatures, he followed abla-

how much of our language might be dispensed with for Telegraphic purposes: Reserving fully as much

question as an occasional employment, in an arundineous region abounding with acetose vapours. In this situation, his anthology, affabrous in its nature, from its elegant archaisms, afforded him amusement, though containing an altisonant altiloquence, in ampages. The adscititious part of an absinthiated preparation, rendered him so constantly anhelose, that his misery could sustain no farther auxis. The Axe of the Guillotine rendered his body acephalous, and his harassed soul took its final avolation to that place "from whose bourn no traveller returns."

See *Johnson's Dictionary*, Letter B.

GLOSSARY.

Baldrick—A girdle.	To bespawl—To daub over.
Baccated—Set with pearls.	To beleaguer—To besiege.
Babery—Finery.	Balneation—The act of washing.
Bawcock—A spruce fellow.	Bulimy—An enormous appetite.
To ban—To curse.	A butter-bump—A fowl.
To benet—To ensnare.	Bengal—Fine slight stuff.
Battailous—Warlike.	Bateful—Contentious.
Beached—Exposed to the waves.	Boscage—A wood.
Brooches—Jewels.	Bland—Soft.
Burly—Blustering.	Bassock—A mat.
To brangle—To wrangle.	Brait—Deceitful.
Bisort—A company.	Brigand—A robber.
To blench—To obstruct.	To bedaggle—To bemire.
To bemoil—To bemire.	
To besmirch—To soil.	

The preceding Words, formed into a Composition.

A baldrick baccated, is babery, that pleases an infant; whose principles, when a youth, are those of a bawcock, whom many a tender mother will ban, for benetting a darling child. In manhood, the bawcock reforms; and battailous and bateful, he be-

as might be necessary for naval, military, political, and commercial uses, a numerous list of words may

comes beached and bedaggled in the ardent pursuit of glory. He girds on his brindled armour, set with shining brooches, and burly, brangles, with a bisort of his friends, who seeing his dangerous ardour, endeavour to blench his design. Bemoiled, besmirched, and bespawled, he returns fatigued, from beleaguering, undergoes balneation, and having a bulimy, he devours a butter-bump. Arrayed in Bengal, he reposes in a boscage, on a bland bassock, and receives the congratulations of the braid brigands.

As a farther proof how much of our language is only calculated for erudite composition, which must refer the bulk of mankind to their Dictionaries, the following is a specimen of good English, which to many readers, will be almost as unintelligible as *Chinese*, or *Shanscreeet*: derived by the bye, from the Celtic adjective *Shaan* old, or ancient, and *Scrieūv*, scribe, writing, or language; though Orientalists deduce it from *Shanscreeet* radices.

Esurient, crapulous cuttles, or cuddens dapatical, are constipated on a consutile bassock. They are denudated, without dignotion. Erst, they dearticulate, captrid, dedal, enecated beeves depiloma, excocted, and erubescant. Without discriminous deray, they are catened in their location, till celsitude of cacophony and claudication, are the precursors of crapulence, concomitated by internecity, and extern caligation.

The *Translation* of the preceding English instance of hard composition, will run, thus, as per Johnson's Dictionary.

The hungry, ill-mannered Clowns, take their seats, without distinction, on well-wove mats, after having killed, disjoined, and dressed a hecatomb of red, hairless oxen of various kinds. Though inebriated in the extreme, still harmony prevailed amongst them. Indistinct articulation, and inability of walking, indicated drunkenness, usually attended with corporeal debility, and mental blindness.

be rejected, as quite unnecessary to be inserted in the Dictionary; such as, technical, biblical, philosophical, legal, logical, philological, botanical, anatomical, zoological, chemical, magnetic, pneumatic, musical, optical, architectural, mathematical, agricultural, and all abstract words of erudite signification. A great number of compound verbs, such as to *unchurch*, to *refrigerate*, to *obtemperate*, to *decorticate*, to *decompound*, &c. &c. may be omitted. Such verbs as, to *attinge*, to *boll*, to *brutify*, to *dehort*, to *enucleate*, to *gloze*, to *fizzle*, to *gaunch*, to *fudge*, to *unboy*, to *twattle*, to *refel*, to *king*, &c. &c. will be useless. A large proportion of adjectives may be rejected, as *ambidexter*, *apocryphal*, *boreal*, *debonaire*, *festivous*, *evened*, *facinorous*, *flavourous*, *laniginous*, *latrant*, *pharisaical*, *patronymical*, and so on. There is a multiplicity of substantives of little or no use in the English language, such as, *ambitude*, *arcuation*, *boutefeu*, *expugnation*, *foison*, *infendation*, *occursion*, *parasang*, and such like. The words in a common pocket Dictionary amount to about 28,000. Those in the single volume larger Dictionary may be about 60,000. All the words in the English language may amount to 70,000, or more. By rejecting all words quite unadapted to Telegraphic purposes, the number wanted might conveniently be reduced to 40,000. It is proposed, for reasons which will be stated under the description of the improved Telegraph, to divide these into Classes of 999 words in each Class. The words in each class are

numbered, near the margin, from 1 to 999, inclusive. The number of each class, as class 1, or class 20, &c. is put at the top of the page, where the letters indicating the words under them, are printed, as usual. To provide for the inflexions of the verbs, every infinitive is followed by the third person singular of the present of the indicative, preterite, and participle;— as *sail, sails, sailed, sailing*. When the participle past differs in orthography, from the preterite tense, it is inserted after the present participle; as *fall, falls, fell, falling, fallen*. The auxiliary and defective verbs, in all their Tenses, the prepositions, conjunctions, and *all the frequently occurring words*, are alphabetically numbered by themselves, from 1 to 999, inclusive; and the improved Telegraph will indicate by *one movement*, any word in this collection, as will be described hereafter. By this means, the *greatest inflexion of a verb*, may be given frequently by two movements, as when such verb is among this last collection; and in any other case, by three Telegraphic movements. For instance, the Potential of the Passive Voice, *would have been called*, will be indicated by two movements, viz. *would have been* from the selection of small words, is signalled by *one movement* pointing out its number opposite to these words; and *called*, will have its marginal number indicated by *one movement*. It would require 22 movements of the present Telegraph to give this compound tense. In its proper class in the Dictionary, every substantive is followed by its plural number,

(except collective nouns, such as people, &c.) as *ship, ships*; both words being successively numbered in their proper place. When the orthography of a substantive, and of a verb, happens to be similar, one of them only is inserted with the indicating numbers annexed; as, *order, orders*, omitted, being found under the verb, *order, orders, ordered, ordering*. When a substantive and an adjective are spelled in the same manner, one only is inserted, as *general, generals—secret, secrets*. When the comparative and superlative degrees of adjectives cannot be rendered by *more* and *most*, but by *er* and *est*, such will follow the positive degree, the three degrees of comparison being successively numbered: as *great* in the Dictionary, is to be followed by *greater*, and *greatest*. When an adjective and a verb are similarly spelled, one only is inserted, as *clear, clears—cleared, clearing*. When an *infinitive* and a *past time* are similar in orthography, one of them will be sufficient, as *beat, beats, beating*. The number of any word will appear on the right, opposite to such word. The alphabet is inserted at the beginning of the Class or collection of *small and frequently occurring words*; and the letters are numbered from 1 to 26 inclusive.

Under the description of the improved Telegraph, a very obvious mode of indicating *numerals* will be explained. It will be shewn, that six places of figures, as 973,409, will be *telegraphed* in three movements, without any previous or concluding numeral signal. *All this will appear manifest, by inspecting*

the specimen we have given of the class of *small and frequently occurring words*. At the end of the Telegraphic Dictionary, a few useful Classes will be added. The *Navy*, alphabetically arranged, will constitute a Class. The Admirals, Captains, Commanders, Lieutenants, Purser, and Surgeons, will form probably three Classes of 999 names in each Class. The names of the Officers of Marines, alphabetically arranged, will form a Class. Field-Mars-hals, Generals, Lieutenant-Generals, Major-Generals, Colonels, Lieutenant-Colonels, and Majors in the army, will be alphabetically disposed of in, probably, two Classes. Artillery and Engineer officers, as far as Captains, will form a Class. As casualties are liable to take place in these last four Classes, the sheets containing them may, annually, if necessary, be corrected, and easily replaced in the Dictionary. The names of oceans, seas, channels, harbours, bays, sea-ports, gulphs, islands, capes, streights, promontories, quarters of the world, remarkable sand-banks, navigable rivers, clusters of islands, anchorages, and rocks, will be alphabetically inserted in a very useful Class. Kingdoms, continents, provinces, states, counties, shires, departments, rivers, mountains, lakes, locks, passes, bridges, capital towns, towns, cities, duchies, fortresses, military or naval depots, and peoples, will afford, probably, two Classes alphabetically drawn up; and like all the others, regularly numbered. There should be two Classes, giving the *Marine*

terms and expressions, in alphabetical order. Christian names of men, will form a short Class. The usual naval movements, manœuvres, and procedures, are condensed into about six hundred sentences. When any one of these sentences is to be referred to, its *number* is signalled by means of Flags, as will be hereafter explained, in treating of *naval signals*. These *sentences*, and as many as will make up 999, will be inserted in a Class at the end of the Dictionary. A Class of sentences indicating military movements, and Field-procedure, may be found convenient. The vast number of words which can be rejected, will make ample room for the provision made for introducing the *inflections of verbs*, the *plurals of nouns*, and the Comparatives and Superlatives of adjectives. When all the useful Classes mentioned, are added to the Telegraphic Dictionary, it will still be of a very portable size. It may be objected that any person possessing the Dictionary, and understanding the Telegraphic movements, may obtain a knowledge of the matter communicated. In the first place, few would purchase a Dictionary which could be of no use to them. In the second place, it would not be for general sale. In the third place, there would be but one copy at each *extreme station*, on board of each Ship in *Commission*, and in possession of each General on *actual service*. And in the last place, supposing the Dictionary to be in every one's hands, and that they could, thus, discover the secrets passing, this could be completely

prevented by introducing a *key* changeable at pleasure. For instance, the *secret key* could be applied either to the Class of the word, or to the number of the word in its Class; and the key could be thrown either forward, or backward. If the *key* were thrown forward *one remove*, and the Class meant was 40, Class 41 would be signalled, and because the *key* is advanced *at the time, one remove*, Class 40 would be the *real one* indicated. Again, were the *key* put *two removes backward*, and applied to the number of a word in its Class, the word indicated would not be taken, but the *second word forward* from it. For instance, suppose the number 250, and its annexed word, were *really meant*, number 248 would be *telegraphed*, and because the *key* is placed *two removes backward*, number 250, and its attached word, would be those *meant*, and taken from the Dictionary. A *key* of this description might be always prepared, though not used, and when any very secret communication was to take place, a *Key-signal* might be made by means of a spare combination on the Telegraph, on which the *key*, as above, in readiness, would be applied to the communication about to be made. But generally, there would be no occasion for the application of any *secret key*, easily, however, used, if thought requisite.

From what has been written, it is evident that the Telegraphic Dictionary is as simple in its construction, as obvious in its use. We shall, by and by, make it appear, that this species of Dictionary was

the most eligible as to arrangement and plan, for being very readily applied to the working of a Telegraph calculated to correspond with it, and to exclude every chance of confusion, mistake, or error.

A Specimen of the Telegraphic Dictionary.

Previously to describing the intended improved Telegraph, it will be proper to give a specimen of the *Telegraphic Dictionary*. We ran over the common Dictionary, and selected the following words, as frequently recurring. The Positive, Comparative, and Superlative, of the irregular adjectives, *good*, *bad*, and *little* or *small*, are placed under their respective letters, in the following selection of *small*, and frequently occurring words. Substantives having in themselves the force of the *plural*, are not repeated; as, *justification*, *judgment*, *justness*, *knowledge*, *leave*, *assistance*, &c. &c.

Class of small and frequently occurring Words.

	A	k	11	v	22
a	1	l	12	w	23
b	2	m	13	x	24
c	3	n	14	y	25
d	4	o	15	z	26
e	5	p	16	Able	27
f	6	q	17	Above	28
g	7	r	18	About	29
h	8	s	19	Absence	30
i	9	t	20	Absent	31
j	10	u	21	Act	32

A		to	C		
Acts	33	Any	70	Being	105
Acted	34	Apply	71	Because	106
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Would	} 981	Yes	989	Zenith	999
have		Yesterday	990		
been					

N. B. The Telegraphic reader, and writer, will soon recollect what words are in this selection; and by the mere aid of the memory, he will also be enabled to recollect many of the most essential Index-numbers of these vocables. The small words—*with,—from,—in,—by,—to,—of,—and,—the,—that,—it,—not,—is,—are* not in the above selection. It will be seen that our improved Board-telegraph has four similar spare combinations of three boards, belonging to *each set of boards*. These twelve simple spare combinations are readily made use of to express the above twelve *small words*. In the course of a few days' practice, the Telegraphic writer will be able to telegraph any of these words, *at sight*. This will add to celerity of communication, as these words are perpetually presenting themselves.

The foregoing collection constitutes a list of the small words, and of words *constantly recurring* in practice. It will appear, that any of these words, or any inflexion, or Tense of the auxiliaries contained

in this selection, can be communicated by *one Telegraphic movement*. Should any one of the *rejected words* appear in practice, it may be spelled. The words *more*, and *most*, occur so very frequently in the *comparison of Adjectives*, that they will be indicated with obvious readiness and facility, by a relative spare movement, or combination of the boards of the improved Telegraph, as will be explained. The preceding collection of words begins with the alphabet, as the most eligible situation in which it could be placed. It will be *seldom* necessary to spell a word. When, however, any 'strange, or very uncommon vocable is found in a sentence, it can be readily spelled, without any previous, or concluding spelling-signal: and this operation, which can rarely happen (if the Classes pointed out, are added to the Dictionary) will not produce the smallest confusion or mistake, in communicating the previous, and subsequent words of the sentence. The effect will be precisely the same, as if a person conversing slowly, were to spell aloud, any word of a sentence he was uttering, in lieu of pronouncing such word like the others in the sentence it belonged to. In this collection, the article *a*, and the pronoun *I*, are not inserted, as the letters *a* and *i* will express them obviously. We will, now, proceed to give a specimen of two or three of the first Classes of the Dictionary, omitting such useless vocables as have been adverted to. It will be unnecessary to carry, here, every Class to its last word, which would be

numbered 999. The words under each letter in the selection of *small words*, are, of course, omitted in the common Classes; and the person in charge of the Telegraph at each extreme station, will soon be able to have a clear recollection of all the words in that collection.

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Abandoning	6	Abounds	32	Abstaining	58
Abate	7	Abounded	33	Abstemious	59
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Abating	10	Abroad	36	Abstruse	62
Abatement	11	Abrupt	37	Abstrusely	63
Abhor	12	Abruptly	38	Abstruse-	} 64
Abhors	13	Abscond	39	ness	
Abhorred	14	Absconds	40	Absurd	65
Abhorring	15	Absconded	41	Absurdity	66
Abhorrence	16	Absconding	42	Absurdly	67
Abide	17	Absentee	43	Abundant	68
Abides	18	Absentees	44	Abundantly	69
Abided	19	Absolve	45	Abuse	70
Abiding	20	Absolves	46	Abuses	71
Abject	21	Absolved	47	Abused	72
Ability	22	Absolving	48	Abusing	73
Abilities	23	Absolute	49	Abusive	74
Aboard	24	Absolutely	50	Accede	75
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Class I.

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Accelerate 79	Accom- } 109	trements }
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Accepted 86	Accomplished } 116	Accumu- } 143
Accepting 87	Accomplishing } 117	lated }
Acceptable 88	Accom- } 118	Accumu- } 144
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Acceptor 90	ment }	Accumu- } 145
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Acclama- } 101	Accords 127	Accustoms 155
tions }	Accorded 128	Accustomed 156
Accom- } 102	According 129	Accus- } 157
modate }	Accordingly 130	toming }
Accom- } 103	Accost 131	Achieve- } 158
modates }	Accosts 132	ment }
Accom- } 104	Accosted 133	Achieve- } 159
modated }	Accosting 134	ments }
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modating }	Accountants 136	Acidity 161
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modation }	Accoutre 138	ledge }
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tions }	Accouring 141	

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Baffled	12	Balking	46	Banners	80
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Baize	27	Baneful	61	Barbed	95
Bake	28	Bang	62	Barber	96
Bakes	29	Bangs	63	Barbers:	97
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Class II.

BAR		BAW		BED	
Bargains	102	Base	138	Bawled	174
Bargained	103	Basin	139	Bawling	175
Bargaining	104	Basins	140	Bayonet	176
Barge	105	Basis	141	Bayonets	177
Barges	106	Bask	142	Beach	178
Bark	107	Basks	143	Beacons	179
Barks	108	Basked	144	Beam	180
Barked	109	Basking	145	Beams	181
Barking	110	Basket	146	Bear	182
Barley	111	Baskets	147	Bears	183
Barm	112	Batch	148	Bore	184
Barn	113	Batches	149	Bearing	185
Barns	114	Bate	150	Bearer	186
Baron	115	Bates	151	Bearers	187
Barons	116	Bated	152	Beast	188
Baroness	117	Bating	153	Beasts	189
Baronet	118	Bath	54	Beastly	190
Barracks	119	Baths	155	Beat	191
Barrel	120	Bathe	156	Beats	192
Barrels	121	Bathes	157	Beating	193
Barrelled	122	Bathed	158	Beautifully	194
Barrelling	123	Bathing	159	Beauty	195
Barren	124	Battalion	160	Beauties	196
Barrenness	125	Battalions	161	Becalm	197
Barricado	126	Batten	162	Becalms	198
Barricades	127	Battens	163	Becalmed	199
Barricadoed	128	Battened	164	Becalming	200
Barricadoing	129	Battening	165	Beckon	201
Barrister	130	Batter	166	Beckons	202
Barristers	131	Batters	167	Beckoned	203
Barrow	132	Battered	168	Beckoning	204
Barrows	133	Battering	169	Become	205
Barter	134	Battery	170	Becomes	206
BarTERS	135	Batteries	171	Became	207
Bartered	136	Bawl	172	Becoming	208
Bartering	137	Bawls	173	Bed	209

Class II.

BEG		BEH		BEH	
Beds	210	Begged	224	Behaved	238
Beef	211	Begging	225	Behaving	239
Beer	212	Beggar	226	Behaviour	240
Befall	213	Beggars	227	Behead	241
Befalls	214	Beggared	228	Beheads	242
Befell	215	Beggaring	229	Beheaded	243
Befalling	216	Begin	230	Beheading	244
Beforehand	217	Begins	231	Behindhand	245
Befriend	218	Begun	232	&c.	&c.
Befriends	219	Beginning	233	To 999 inclusive	
Befriended	220	Begone	234	of all words	
Befriending	221	Behalf	235	requisite un-	
Beg	222	Behave	236	der this letter.	
Begs	223	Behaves	237		

Class III.

CAD		CAL		CAL	
Cabal	1	Cadets	17	Calculate	33
Cabals	2	Cag	18	Calculates	34
Caballed	3	Cags	19	Calculated	35
Caballing	4	Cage	20	Calculating	36
Caballer	5	Cages	21	Calculation	37
Caballers	6	Cajole	22	Calculations	38
Cabbage	7	Cajoles	23	Calculator	39
Cabbages	8	Cajoled	24	Calculators	40
Cabbaged	9	Cajoling	25	Calf	41
Cabbaging	10	Cajoler	26	Calves	42
Cabin	11	Cajolers	27	Calm	43
Cabins	12	Cake	28	Calms	44
Cabinet	13	Cakes	29	Calmed	4
Cable	14	Calamitous	30	Calming	46
Cables	15	Calamity	31	Calmly	47
Cadet	16	Calamities	32	Calomel	48

Class III.

CAN		CAP		CAR	
Calumniate	49	Canopies	85	Captivated	121
Calumniates	50	Cant	86	Captivating	122
Calumniated	51	Cants	87	Captive	123
Calumniating	52	Canted	88	Captivity	124
Calumniator	53	Canting	89	Captor	125
Calumniators	54	Canter	90	Captors	126
Calumny	55	Canterers	91	Capture	127
Calumnies	56	Cantered	92	Captures	128
Camp	57	Cantering	93	Captured	129
Camps	58	Canvass	94	Capturing	130
Campaign	59	Canvasses	95	Carbine	131
Campaigns	60	Canvassed	96	Carbines	132
Canal	61	Canvassed	97	Carcass	133
Canals	62	Canvassing	98	Carcasses	134
Cancel	63	Cap	99	Card	135
Cancel	64	Caps	100	Cards	136
Cancelled	65	Capped	101	Care	137
Cancelling	66	Capping	102	Cares	138
Candid	67	Capability	103	Cared	139
Candidate	68	Capable	104	Caring	140
Candidates	69	Capacious	105	Careen	141
Candle	70	Capacity	106	Careens	142
Candles	71	Capacities	107	Careened	143
Candour	72	Cape	108	Careening	144
Cane	73	Caper	109	Career	145
Canes	74	Capers	110	Careful	146
Caned	75	Capered	111	Carefulness	147
Caning	76	Capering	112	Careless	148
Cannon	77	Capital	113	Carelessness	149
Cannonade	78	Capitulate	114	Caress	150
Cannonades	79	Capitulates	115	Caresses	151
Cannonaded	80	Capitulated	116	Caressed	152
Cannonading	81	Capitulating	117	Caressing	153
Canoe	82	Capricious	118	Carnage	154
Canoes	83	Captious	119	Carousal	155
Canopy	84	Captivate	120	Carouse	156
		Captivates	120		

CAR		CAS		CAT	
Carouses	157	Cartouch	185	Castigates	211
Caroused	158	Cartridge	186	Castigated	212
Carousing	159	Cartridges	187	Castigating	213
Carp	160	Cartridge-	} 188	Castigation	214
Carps	161	box		Castle	215
Carped	162	Cartridge-	} 189	Castles	216
Carping	163	boxes		Casual	217
Carpenter	164	Carve	190	Casually	218
Carpenters	165	Carves	191	Casualty	219
Carpet	166	Carved	192	Casualties	220
Carpets	167	Carving	193	Cat	221
Carriage	168	Case	194	Cats	222
Carriages	169	Cases	195	Catalogue	223
Carrier	170	Cased	196	Catalogues	224
Carriers	171	Casing	197	Cataract	225
Carry	172	Casement	198	Cataracts	226
Carries	173	Casements	199	Catastrophe	227
Carried	174	Cash	200	Catch	228
Carrying	175	Cashier	201	Catches	229
Cart	176	Cashiers	202	Caught	230
Carts	177	Cask	203	Catching	231
Carted	178	Casks	204	To 999 inclu-	
Carting	179	Cast	205	sive.	
Carte	} 180	Casts	206	This letter	
blanche		Casting	207	will afford two	
Cartel	181	Cast away	208	Classes of the	
Cartels	182	Castover-	} 209	most requisite	
Carter	183	board		words.	
Carters	184	Castigate	210		

Description of the improved Telegraph, being a simple Modification of the Combination of four Boards, and applied to the Telegraphic Dictionary.

HAVING, thus, given a Specimen of the Class of *small and frequently occurring words*, and of the *three first Classes* of the proposed Dictionary, we will proceed to describe a Board-Telegraph calculated for, and adapted to this Telegraphic Dictionary.—It was made a particular study to avoid the necessity of taking down the Present Telegraph, and, at the same time, to make such improvements on it as the object in view required.—After a close attention to this important subject, there can be no hesitation in saying, that no satisfactory amelioration of the Telegraphic system can be effected, without increasing the number of the boards of the Telegraph; avoiding, at the same time, working by a general combination of the number of boards wanted; as such complex combinations would confound the best memory, and be productive of endless mistakes in practice. During three years' investigation of this *science*, various have been the plans discussed, and rejected, as inadequate to the proposed object of communicating *words in lieu of letters, without the chance of confusion, error, or mistake*. On mature, and repeated reflection, we venture to recommend the Telegraphic system here detailed, as fulfilling the proposed object of *conveying words*, and all Potential Inflexions, *with simplicity*

and celerity. Unless this plan, or one equally unobjectionable, is adopted, a science of the utmost national importance must remain in its present lame and imperfect state, with a strong probability, however, that foreign States may adopt what this enlightened Nation would be afterwards forced to imitate.—If this plan be submitted to the decision of a Board of scientific characters, we have no fears as to the result; but deprecate, strongly, the idea of determining its merits, or demerits, on the *ipse dixit* of such individuals, as have been mentioned. These may write a decent dispatch, or readily record proceedings, but are not quite the proper description of men for deciding, ultimately, on a scientific subject, whatever may have been the duration of their Official labours.

The improvement effected, requires that three boards should be added along one side (the left), and three more, along the top of the present Telegraph, with one board over the middle range. *Figure 2d* exhibits this arrangement of boards in three parallel rows; each row being numbered 1,—2,—3, and 4, from the top, downwards. The board over the centre row, is circular. Our improvement as far as it relates to the Telegraph, consists in the *repeated combinations of four boards only.*—Any one of the three rows of boards, will give *fifteen changes, or combinations.*

Board 1 pulled down, will give	1st	} Mutation, Combination, or Change.
Ditto 2 do.	2d	
Ditto 3 do.	3d	
Ditto 4 do.	4th	
Ditto 1 and 2 do.	5th	
Ditto 1 and 3 do.	6th	
Ditto 1 and 4 do.	7th	
Ditto 2 and 3 do.	8th	
Ditto 2 and 4 do.	9th	
Ditto 3 and 4 do.	10th	
Ditto 1, 2, and 3 do.	11th	
Ditto 1, 2, and 4 do.	12th	
Ditto 1, 3, and 4 do.	13th	
Ditto 2, 3, and 4 do.	14th	
Ditto 1, 2, 3, and 4 do.	15th	

The first nine of these combinations are made use of to express the *nine numerals* in their order: and the tenth combination, or boards 3 and 4 pulled down together, from a horizontal, to a perpendicular position, will always represent the *Cipher*, or *o*. Thus, we *very simply* procure a *set of numerals*, and a *cipher*, on each row, or set of boards. The perpendicular set, or row of boards on the left (supposing a person always looking towards the Admiralty, or the primary station), will give the place of *hundreds*. The centre row, or set, will, always, give the place of *tens*, and the set, or row on the right, will, al-

ways, give the place of *units*, in every case where three figures are to be expressed. Thus, the Telegraph will, with one movement, give *three places of figures*, which must be always read from the left of the first Station, the *reader* being uniformly supposed facing, or looking towards that primary station.

The example on *Figure 2d* (the new improved Boarded Telegraph), exhibits *three places of Figures*. On the left, or first set of Boards, the fourth board appears pulled down from a horizontal, to a perpendicular position, while the other three boards of that set remain up, or in their horizontal attitude, shewing their thickness, or one of their edges, only, as in *Figure 2d*.—On the second, or centre set of boards, the first and third boards appear pulled down.—On the third, or right-hand set of Boards, the third board is represented down, while the others on that set remain up.—Now, the fourth board down on the first set, expresses the numeral 4.—The first and third boards on the second, or centre set, express the numeral 6. The third board down, on the third, or right hand row, expresses the numeral 3; and consequently, these figures being read in their order, *from the left*, will denote the *number 463*.—When two places of figures are to be expressed, the set of boards on the left, or the first set, will, necessarily, give the place of *tens*, and the second, or centre set of boards, will give the place of *units*. Thus, suppose the third board on the right hand,

or third set, were returned to its horizontal position, and that board 4 remained down, on the first set, and boards 1 and 3, on the centre set, the figures, thus, exhibited, would be read, from the left, and found to be number 46.—When one figure, only, is to be expressed, it will be given on the first, or left-hand set. Thus, suppose all the boards, on all the three sets, are up, or in the horizontal position, and that the figure 4 were to be expressed; this would be done by pulling down the fourth board in the first set, to the perpendicular position, to denote the *number 4*.—Suppose, again, it were necessary to denote the number 999. All the boards being up, or in the horizontal position, let boards 2 and 4 be pulled down on *each of the three sets*, and each set, thus, giving the figures 9, the whole will be read from the left, 999.—After every Telegraphic movement, the boards used, must *always* be let back, by means of a counterpoising weight, to the horizontal attitude. Suppose it were required to express the number 201, pull down the board 2 on the first set; the boards 3 and 4 expressive of the *cipher*, on the centre set; and the first board on the third set. This display will give number 201.—To apply this explanation, or these *ready and simple Telegraphic powers* to the Dictionary, it must be recollected, that *two movements* indicate *any* word in its Class; and *one movement*, any word in the collection of *small, and frequently occurring words*. Thus, suppose the

word *begin*, were to be expressed. This word is found to be number 230 in Class II.—The first movement will give 2 the Class of the word: and the second movement will indicate 230, or the number attached to the word, *begin*, in its Class, II. Whenever the Telegraph is going to be worked, a commencing signal is *always* to be made along all the Stations, and when the sentence is concluded, the same signal is to intimate such conclusion. The commencing signal being made, board 2 will be pulled down on the first, or left-hand set. This would be rapidly repeated along all the stations, and the person, in charge of the Dictionary, or the *reader* at the extreme station, such as Portsmouth, would write down 2. As soon as it was observed from the Admiralty, or primary Station, that the figure 2 was *repeated*, or *taken up* at the next station, number 230 would be indicated, by pulling down board 2 on the first set, board 3, on the second set, and boards 3 and 4, for the cipher, on the third set; the whole read from the left, giving 230, the number of the word *begin*, in its Class, II. already telegraphed. The exhibition 230 on the Telegraph, would be rapidly taken up, or repeated, *successively*, by the different stations, till it arrived at Portsmouth, where the *reader* would under the former word 2, immediately write 230, thus 230. Suppose the next word in the sentence were, *embarking*. The *readers* in charge of the Telegraphic

Dictionary at the extreme stations, will easily possess at all times, a ready recollection of all such words as are in the selection of *small and frequently occurring words*. The reader at the Admiralty, or primary station, will know the word *embarking* to be in this selection, and will find its number there, to be 237. By means of the circular board over the centre set of the Telegraph, any word in this collection is denoted by a single movement.—The boards giving 230, as above, being let back, or up to their original horizontal position, pull down board 2, on the first set; board 3, on the centre set, and boards 1 and 4 on the third set, to indicate figure 7, pulling down, *at the same time*, the circular board, to shew that a word in the collection of *small and frequently occurring words*, is meant. This movement being rapidly repeated along all the stations, the reader at Portsmouth seeing the circular top board down, and knowing that it is *never used* but in giving a word in this collection, he will write down 237 following the former $\tau\tau\sigma$; as $\tau\tau\sigma$ 237.—Suppose the next word in the sentence were, *troops*. This word is readily recollected to be in the collection of *small and frequently occurring words*, and its number there, is found to be 777. Boards 1 and 4 being pulled down, on all the three sets, *along with the circular top board*, will indicate the figure 7, on each of them; and the whole will be read number 777, at Portsmouth, after being, of course,

telegraphed along all the intermediate stations. The part of the sentence so far telegraphed, will stand thus, $\frac{2}{3}^{\circ}$ —237—777. Let the last word in this sentence be, *to-morrow*. This word being re-collected to be in the collection of *small words*, its number there appears to be 771. The boards which gave the last number 777 being let back to their horizontal attitude, as soon as that number was taken up at the second station, the number 771 meaning *to-morrow*, is to be indicated. To effect this, pull down boards 1 and 4, to indicate 7 in the places of *tens*, and *hundreds*, and board 1 on the third, or right-hand set, pulling down the circular board, *at the same time*, to shew that the word is in the collection of *small words*. This being signalled throughout all the stations, the reader at the extreme one, will write down 771 after the preceding numbers. The usual signal for concluding a sentence being made, the reader will now, *and not till now*, compare the telegraphed numbers with his Dictionary, writing under each number, its implied word, thus, $\frac{2}{3}^{\circ}$ 237 777 771

Begin embarking Troops to-morrow.

Allowing, as must be the case, a movement between every one of these words, when spelled letter after letter, by the Telegraph now in use, and including the usual signal for commencement, and termination of the sentence, it would require 33 *movements* of the *spelling Telegraph*, to indicate the

above sentence, which by our improved system, as above, inclusive of the previous, and terminating signal, is given by *seven movements*.

As often as it may be necessary to express pure numbers, as part of a sentence, the improved Telegraph will indicate them, without any previous numeral signal. For this purpose, *whenever the second, or centre set of boards is used by itself, and whenever the centre and third sets are used together, a number is meant as a part of a sentence.* Thus, the centre set of boards having board 4 down, will mean number 4.—Let this board back to its horizontal attitude, and pull down board 3 of the centre set, and it will mean number 3, or unit 3.—To express 41, pull down board 4 of the centre set, and board 1 of the right hand set, and it will be read 41, from the centre, to the right-hand set. Suppose again, it were required to express 4001, pull down (*all the boards being in their horizontal positions*) board 4 in the centre set, and boards 3 and 4 in the right-hand set expressive of the Cipher. The reader at Portsmouth seeing the centre and right-hand, or third set of boards used together, and knowing that they are *never* used together, but in the case of expressing numbers, will write down 40. Let the boards fall back to the horizontal attitude, and to express the remaining two figures of 4001, or 01, pull down boards 3 and 4 on the centre set, to express 0, and board 1 on the third, or right-hand

set, to express 1, and the *reader* at the *extreme Station*, seeing the expression of numbers *continued*, will write down 01 after the former 40, and it will stand 4001. Suppose the word following this were *men*, number 472 in the Collection of *small words* would be telegraphed, as expressive of the word, *men*, and the reader at *Portsmouth* seeing the first set of boards used to express the 4 of 472, would know that the expression of *pure numbers* independent of words by means of *indicating numbers*, terminated with 4001. Suppose we add to the above sentence making it,—*Begin embarking Troops To-morrow as far as 4001 men*. Write out the telegraphed numbers as before, and for the words, *as, far, as*, add the numbers annexed to these words in the collection of *small words*, viz. 85,—263,—85: then write the telegraphed pure numbers as above 4001, and number 472 from the collection of *small words*, to express men, when the whole will stand in the following order: *videlicet*,

4001	472	237	777	771	85	263	85
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Begin embarking Troops To-morrow as far as
4001 472
4001 men.

Suppose it were necessary to express as part of any sentence, the pure number 444,444. Pull down the board 4 on the centre set, and at the same time, the board 4 on the third, or right-hand set. This read from the centre to the right, will indicate 44 as a

pure number unconnected with the Classes or the Dictionary in any respect. Repeat this, *three times*, and the result written in succession, will give the total sum 444,444. The rule is quite simple, and liable to no mistake, viz. *that whenever a board, or boards, are used in the centre-set by itself, or in the centre and third sets together, pure numbers are meant, without any reference to the Dictionary.* This mode of giving pure numerals in the body of a sentence, is extremely simple, and saves movements that would be otherwise required, as initial and concluding *numeral-signals*. The above sentence is given in thirteen movements. It could not, as it stands, be communicated by the Spelling-telegraph, in less than 52 *movements*.

The Classes of proper names which it is recommended to annex to the Dictionary, will put spelling words almost entirely out of the question. Should, however, some of these Classes be omitted, or should it rarely happen, that a word may occur which is not contained in the Dictionary, a provision is made to meet a case which can but seldom present itself. The collection of *small, and frequently occurring words*, begins with the 26 letters of the alphabet numbered, in succession, from 1, indicating a, to 26, denoting z. Suppose the Admiral of a Fleet were to telegraph the following sentence; *The Indefatigable Frigate will bear up for Jamaica.* Suppose it were necessary to spell the word *Jamaica*, in

this sentence. Let it also be supposed, that the Class of ships in the Navy alphabetically arranged, was 42, and the number of the *Indefatigable* in that Class, were 111. This sentence telegraphed will stand as follows, as will appear by comparing the words with their numbers in the Dictionary. The article *the*, and the substantive Frigate, may be omitted by the Admiral, in order to shorten still more the Telegraphic procedure.—

42 955 111 556 289 10.1.13.1.9.3.1.

Indefatigable will bear up for J-a-m-a-i-c-a.

The words, *will bear up for*, are all found, and readily recollected to be in the selection of small words, and are telegraphed as already amply described. On coming to the word Jamaica, it is spelled, letter by letter. For instance, the J is found opposite to number 10 in the *small Class*. Board 1 in the first set, and boards 3 and 4 for the cipher pulled down in the second, or centre set, with the top circular board down at the same time, will indicate J. Now, the *reader* at Portsmouth finding any number under 27, telegraphed in the *small words*, must, *to a moral certainty*, know that J is the first letter of a word in spelling. He will write down 10. The boards being let back to the horizontal attitude, board 1 in the first set, and the top circular board will be pulled down at the same time, to indicate the second letter of the word a, and the *reader* will after 10, write down the denoted number 1, thus, 10—1,

The process will go on rapidly, till the number corresponding to each letter, is, thus, telegraphed, and noted down. By afterwards quickly comparing these numbers with the Dictionary, the word will prove to be, *Jamaica*. Thus, *any word, in any situation in a sentence*, is readily spelled, without the smallest hazard of any error, or mistake. If required, it would be easy to give two letters, by means of one movement of the Telegraph. To explain this, it is to be observed, that the first and third sets of boards are *never used together*. Now, each of these sets affords 15 combinations. Let the first thirteen combinations on each set, mean the first 13 letters, from a, to m, inclusive. Let the same thirteen combinations on each set, also mean the other 13 letters from n, to z, inclusive. It would be necessary, in this case, to make an agreed-on *spelling-signal*. This being done along all the stations, and supposing the letter m were to be signalled, boards 1, 3, and 4, would be pulled down on the first set, to exhibit the 19th combination indicating m. Suppose the next letter were o. Now o is the second letter in the second division of 13 letters, and therefore, the second of the 13 movements used, would give o. But as this second letter of the second division might be mistaken for the second letter b, of the first division, the upper board 1, in the centre set of boards, would *always* be used when *any* of the 13 letters in the *second division* was

indicated. Therefore to give o, board 2 would be pulled down on the first set, and *at the same time*, board 1 on the centre set, to *shew* that the second letter of the second division was meant. To establish the same *clear distinction* in giving any letter by means of the third, or right-hand set of boards, the lower board, or board 4 on the centre set, would be used, when any letter in the second division was given by means of the right-hand, or third set of boards. On finishing the spelling of a word, the spelling-signal would again be made, to intimate conclusion. From this it is evident, that *two letters* might readily be given by *every movement*. To shorten this process still more, an additional board might be fixed under board 4 of the centre set. The previous and concluding *spelling-signal* might be saved by the use of this board, which might always be used to indicate *that letters in spelling were meant*. But as spelling words will be very seldom; or scarcely ever required, the first mode may be sufficient, on account of its extreme simplicity.

In the 15 changes, or mutations given by each of the three sets of boards, it is to be observed, that there are four mutations in which three boards are used, viz. in the 11th, 12th, 13th, and 14th changes. Now, it would be a pity not to make an useful application of each of these four changes on each set of boards. There are a few *very small words*, some of which are perpetually occurring in almost every sen-

tence. These words might certainly occupy their places among the collection of *small words*, but these spare combinations may *conveniently* be used to denote them. The memory of the *message-writer*, will very soon enable him to work them *at sight*, with the utmost readiness.



The combinations denoting these small words, and the above signs expressive of each of them, on its set of boards, will be easily remembered, and this table of them can be used till the memory acquires them in the course of a few days' Telegraphic practice. One example will be sufficient to illustrate the mode of using them.

$\frac{2}{c} \frac{4}{c}$ 544 $\frac{4}{a} \frac{4}{b}$ 91 $\frac{2}{b} \frac{4}{b}$ 415 $\frac{1}{c}$

It is ordered by the authority of the king, that
 $\frac{4}{b}$ 115 894 642 $\frac{2}{a}$ 585 + $\frac{1}{a}$ 1
 the captured vessels remain in port, with a
 328 548 747
 guardship over them.

In communicating this sentence, the *reader* at the Admiralty, will see in the table, or will recollect, that the first word *it*, is denoted by the combination of boards 1, 2, 4 on the third set. The *reader* at Portsmouth, on seeing this combination arrive there, will write down its sign $\frac{2}{c}$. The same *reader* seeing the combination of boards 2, 3, 4 arrive, will from the table, or from his memory, write down its sign following the last, as $\frac{2}{c} - \frac{4}{c}$. This process of putting down the signs of the small words, and the numbers of the other words, will continue, till the sentence is concluded, when he will put down the word implied, under each sign, and number. With a very little practice, he will be able, on seeing any of these four combinations, on any of the three sets of boards, to write down, *at once*, the small word meant. In the above sentence a + is inserted by the *reader*, be,

tween number 585 and $\frac{1}{2}$. This means, that a comma has been telegraphed, by pulling down all the four boards of the centre set. The words *more*, and *most*, very frequently occur. The word *more* may be always indicated by pulling down, or closing all the shutters or boards of the first, or left-hand set of boards. The word, *most*, may be always given, by pulling down or closing all the boards or shutters of the third, or right-hand set of boards. All the four boards of the first and third sets may be shut, as a signal for commencing, and the same for terminating a sentence, or message. All the boards of the first and second sets down, may be a *fog-signal*. The last-mentioned sentence is given by the New Telegraphic system in 25 movements. The Telegraph now in use, would by its spelling process, require 112 movements to effect the same thing. The number of boards in the improved Telegraph is increased by seven; and it will require an additional man to the two now employed at each Telegraphic station. These are paltry objects of expense, when put in competition with the national utility arising from the projected improvements, amounting, nearly, to a total change of mode of communication.

The Telegraph-workers will be occupied as follows. One man is always stationed between the two Telescopes, watching the Telegraphs in front, and rear. The second man is in charge of the four ropes leading down to the Cabin below, from the four boards of the

first set, and also of the rope leading from the top circular board. The third man will be in charge of the four ropes leading from the centre set of boards, and of the four ropes leading from the right-hand, or third set of boards. The ropes belonging to each set of boards, are numbered from the left, 1,—2,—3, and 4. These men, respectively, will seldom have above three ropes to pull down. The Telescope-man, on observing a signal made in front, or rear, will call out, *attention*, on which the second, and third men will stand by their stations. Suppose board 3 appeared down on a Telegraph viewed, and at the same time, the top board appeared also down, he would call out *top*, and after a very short pause, 3. On this, the second man would seize the top rope, and the rope of the board 3, on the first set, calling out instantly, *done*. Suppose that, at the same time, board 4 appeared down on the centre set, and boards 1 and 4 on the right-hand, or third set, the Telescope-man would call out, *centre, 4*, and after a short pause, *right 1, 4*. On this, the third man, taking these indicated ropes, would call out, *done*, when the second and third men would, simultaneously, pull down the ropes named. The boards, thus, pulled down, would be held so, till the man at the Telescope, on seeing a similar display on the next Telegraph, called out, *up*, on which the second and third men would let go their ropes, and the counterpoising weights would bring the boards that were down, back again to their original hori-

zontal position. This process ensures accuracy, and takes very little time. By this accurate and simple mode of proceeding, any man may, with the slightest instruction, become an expert Telegraph-worker, at the shortest notice.

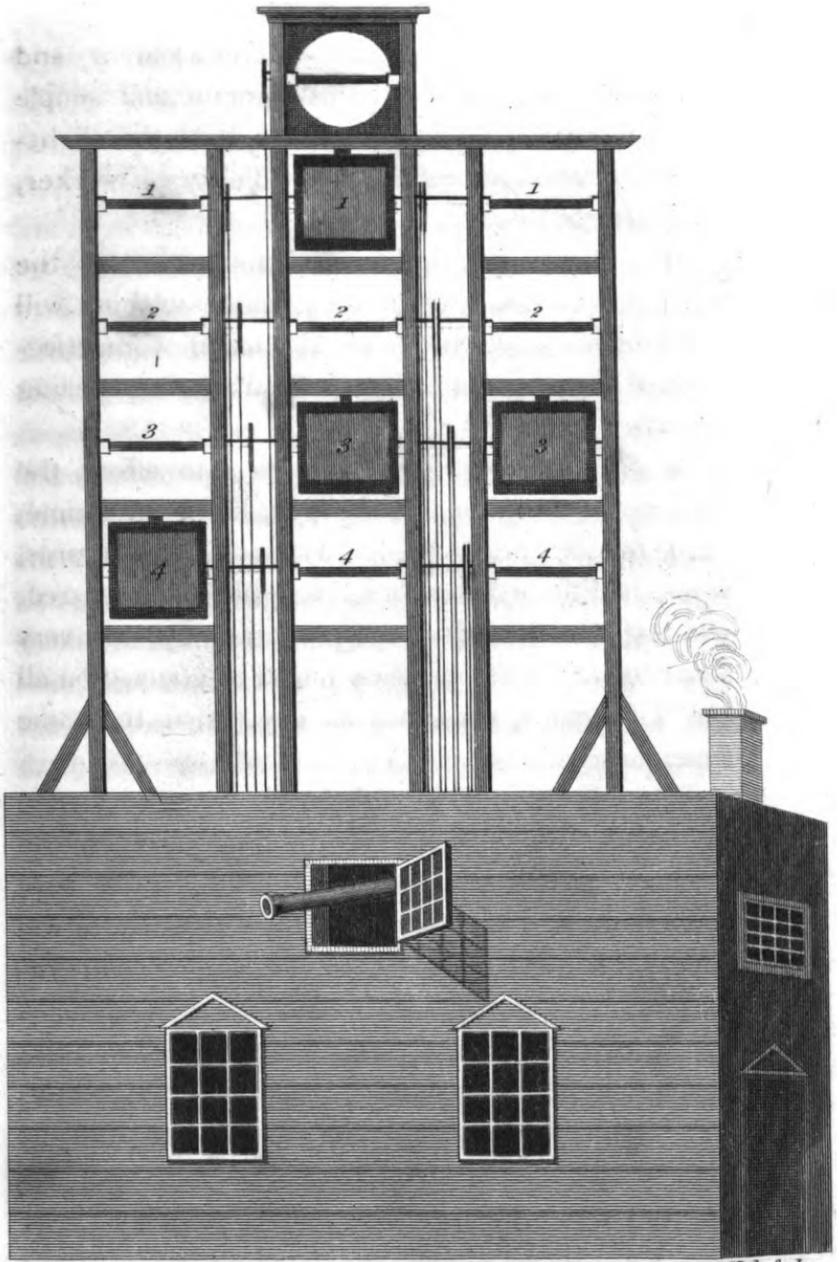
Such is the description, and application of the Telegraphic system which we presume to think will be found adequate to obviate the manifest imperfections of the present unscientific, and creeping spelling process.

In carrying the foregoing plan into effect, the working of the present Telegraph, in the mean time, need not be interrupted. The additional boards, irons, and timbers, could be brought ready prepared, and might be joined to the work now up, in a very short time. This operation might be effected on all the Telegraphs, on the same day, or at the same time, nearly.

When the new Telegraph is up, or rather, when the old one has been enlarged, the new method can be practised, till expertness is attained; and we have no hesitation in asserting, that a week's practice will render the mode of procedure, as detailed, *quite familiar*.

During this week of practice with the New Telegraph, should it be required to make any public Telegraphic communication, boards 1,—2, and 3 on the first set of boards, and boards 1, 2 and 3 on the centre set may be used as a Spelling-telegraph.

Figure 2.^d



S. Noole Sculp.



Comparative Advantages of the New Telegraphic System, deduced from objectionable Modes of constructing the Dictionary, otherwise than detailed; and of using general and complex Combinations of Boards.

Two other modes of arranging and constructing a Dictionary, it may be proper to notice here. The first is, the application of the numerical order to the pages and columns of a Dictionary of selected words. The second is, the enumerating of all requisite words from 1, to the end of the Dictionary. In the first instance, the first Telegraphic movement would give the page in which the required word was. The second movement would give the Column in that page which contained the word, and, at the same time, the number of the word in that column. In this case, the columns in each page, would be numbered 1,—2,—and 3; and the words in each of these columns, would be numbered from the top, to the bottom of each column. To exemplify this, suppose the page were 365, and that the word wanted was number 41, in column 2 of that page. To give the page 365, all the boards being horizontal, pull down board 3, on the first set; boards 1 and 3 on the centre set; and boards 1, and 2, on the third set; and the whole will be read from the left, 365. The number of the Column, and the number of the word in that column, would be given by one movement. The number of the column would be always

given by the figure indicated on the first set of boards, in the second movement; and the number of the word in that column, would, if an unit, be indicated on the centre set, and if consisting of two figures, on the centre, and left-hand sets of boards, pulled down at the same time with the board, or boards on the first set giving the number of the column. The number of the column in the above example being 2, and that of the word in that column 41, the number 241 would be signalled, and the *reader*, knowing that the second movement gave the column, and word, would, immediately, assume 2, the first figure given on the left, as the number of the column, and 41 as the number of the word in that column. The words in the selection of *small words*, and pure numerals constituting a sum, would be telegraphed as already described. By the mode by Classes, the first movement includes only two figures, and one only when the Class is under 10. By giving the page, the figures will almost always amount to three in number. In the second movement of the page-system, two things must be attended to, the number of the column, and of the word in the column: whereas in the simple Classification-system, the direct number of the word in its Class, is only required to be attended to. The Classing mode is, therefore, *decidedly preferable*.

The second mode of constructing the Dictionary, supposes all the words wanted, are numbered from 1, to the end of the Dictionary. This plan is ex-

tremely objectionable. Suppose the number of a word to be telegraphed were 13,423. The first movement would give 13, and the second movement would give the remaining figures 423. This plan is subject to *equivokes and mistakes*: for 13, in lieu of being reckoned the two first figures of the above number 13,423, may be taken to mean the 13th word in the Dictionary. Again, the last part of the number, or 423, may be supposed to mean the word under number 423. This might be obviated by numbering the first word, 1000, the second, 1001, and so on. Whenever the number of a word consisted of four figures, as 0871, the first movement would give 0, and the second 871. When the number consisted of five figures, as 13,471, the first movement would give 13, or the two first figures, and the second, 471, or the three remaining figures. The selection of *small words*, and the pure numerals, would be given as described. A Dictionary having so many figures as five attached to most words, would be troublesome to print, and look extremely heavy and awkward. But the main objection is, that taking out five figures, (in one continued sum) for a word, would be liable to mistakes, even in the hands of an expert reader. A System adopted *must not* be subject to errors, and, therefore, this mode is *highly objectionable*.

It is scarcely necessary to advert to a third remaining mode, as it would require *three movements* to give any word numbered above 1000. The mode

alluded to supposes all requisite words under every letter, numbered under that letter. The first movement would indicate the *letter*, and the second movement would give the word when under 1000, but if above 1000, as 1324, the second movement would indicate 1, and the third movement, the remaining figures 324, the two last movements giving the whole number 1324. As this mode requires so many movements of the Telegraph, we will avoid the trouble of pointing out the equivoques, it is liable to, and that four, and often five movements of the Spelling-telegraph would be necessary for each word.

The foregoing tends amply to prove, that we have adopted the most simple and eligible mode of constructing the Telegraphic Dictionary.

In constructing the improved Telegraph, we have taken four boards as the fewest that would afford *ten changes*, to furnish the *nine numerals* and *cipher*. The *principle* of the Telegraph is simply, the repetition of these ten changes, applied, respectively, to three sets of boards, in three ranges of 4 in each range. Making use of the combinations of at least ten boards, would have been productive of error, uncertainty, intricacy, and frequent confusion and misconception. In this case, there would be wanted not less than 999 combinations. Eight boards would afford only 255, and nine boards, 511 combinations. Ten boards would furnish 1023 combinations. Attached to each word in its Class, would appear one of these combinations from their lowest, to their

highest order ; so that annexed to some words would appear six figures, to others, seven, and to others, eight figures, expressive of the various combinations of the boards. The *reader* finding the word he wanted, would take out the figures expressive of the combination opposite to such word. In doing this, there would be no small chance of a mistake. It would require great care to pull down, frequently as many as eight boards corresponding to such figures, or combination. The second Telegraph would require much time in taking up the indicated combination, as would, also, all the other intermediate ones. The *reader*, at the extreme station, though his Telegraph might indicate the combination transmitted accurately, might read off such a high number erroneously, and might make a second mistake in taking a wrong combination, and consequently, a wrong word out of the Dictionary. Such considerations were, at once, a decided inducement to reject working by *general combinations*, giving figures attached to words. The mode we have adopted for the formation of the Telegraph, is clear, explicit, and simple, being only the selection of the numeral required out of *ten changes of 4 boards*, and even *four* of these ten changes are given by exhibiting *one board only*.

An Estimation of the weak Powers of the Spelling-Telegraph, now in use, applied to the Dictionary.

The Classes in the Dictionary will not amount to 60: therefore, the Spelling-telegraph would, in one movement, indicate the Class of any word. Out of the 63 mutations which it gives, it would be necessary to assign *one*, to express a cipher, and two more for requisite working signals. Sixty changes, therefore, would remain. When the number of the word in its Class was under 60, one movement would give such number; and consequently, two movements would give any word numbered under 60. The number of any word, in its Class, as far as 660 inclusive, would be given by two movements, as 599, where the first would give 59, and the second movement, the remaining 9. From 660, up to 710, three movements would be required to give the number of a word in its Class; as 709 would require one movement for the 7; one for the 0; and one for the 9. From 710 inclusive, to 760 inclusive, two movements would give the number of a word, as 755, where one movement would give 7, and the next 55, the two making 755. The same rule applies from 760, to 809, and so on, to 999. From this it appears, that three, and very frequently, *four* movements would necessarily be used, to give a *word in the Dictionary*. If, again, these 60 changes were applied to a Dictionary constructed according to any other of the plans mentioned, it will be found that

four movements would be still more frequently wanted to indicate a word. The conclusion, then, arises, that little or no advantage would be derived from the application of the slender powers of the Spelling-telegraph and Dictionary.

The practical Powers of a Telegraph with eight Boards, and one over the Centre.

It will, probably, be asked, whether a word can be indicated in two movements, and a *small word* in one movement, with fewer boards than are in the Telegraph recommended ; but still avoiding general combinations, and adhering to the *most simple of all principles*, that of using only *ten changes on four boards*, as detailed. The answer to such question would be, that a less number of boards would not possess a power of pointing out a word in its Class, in fewer, in general, than *three movements*. For suppose the right-hand set of four boards were taken away from the improved Telegraph recommended, there would remain two sets, having four boards in each set. In this case, the circular board on the top, would be put over the space between the two sets of boards. The first movement will point out the Class of the word, and when the Class is under ten, the set of boards on the left would give it *always*, for reasons to be mentioned. Whenever the number of the word in its Class was under 100, one movement would give such number : but two must

be gone through, to point out a number consisting of three figures. For instance, suppose the Class were 45, board 4 pulled down on the left set, and boards 1 and 2, on the second set, would express 45. Again, let the number of the word be 450. Let the boards last-mentioned be let back to their horizontal position; then, to express the first two figures 45, pull down the above boards as before. This being taken up at the next station, let back these boards to the horizontal attitude, and pull down boards 3 and 4, on the right-hand set to give the Cipher, and the amount of the two movements will be 450 for the number of the word. The last figure, in the place of units, when there are *three figures*, must, *always*, be given, on the right-hand set, because if given on the left set, it might be understood as some Class under ten, belonging to the next word. Thus, let the number of the word be 451 in Class 31. The first movement would give the Class 31. The next movement would give 45, and the last movement would give 1 on the right set of boards. Now, the reader at the extreme station, seeing the last figure 1, given on the right-hand set, has no hesitation in concluding, that the 1 belongs to the preceding number telegraphed: whereas, if the 1 were given on the left-hand set; he would immediately conclude, that 1 meant Class 1, as part of an indication for a succeeding word. By means of the circular board, or the top board, any *small word* (in the selection made) under 100 is given by one movement, and by

two, when exceeding 99. To indicate pure numbers, amounting to a sum, a numeral signal would be made, the number would be telegraphed, and the numeral signal would be again made, to shew that the number *was concluded*. The Cipher on the left-hand set being, of course, never used, it might mean a *comma*, that is, boards 3 and 4 pulled down on the left-hand set, would express a *comma*. Boards 1, 2, 3, and 4 pulled down on the right-hand set, will be a commencing, and concluding signal. Boards 1, 2, 3, and 4 pulled down on the left-hand set, might be a fog-signal. The *very frequently occurring* fourteen *very small words* provided for, as formerly detailed, may be put under their proper letters in the *selection*, or six of them only need be inserted there, as the four spare movements with three boards on the left, and right-hand sets, will indicate, relatively, the remaining eight most common. This Telegraph appears evidently inferior *in powers*, to the preceding one.

In drawing up a treatise of this description, it is expected that every possible, and practicable mode of ameliorating the present imperfect Telegraphic system, should be explained. It has, therefore, been detailed what defects every supposition of improvement is subject to, both with respect to the formation of an indispensable Dictionary, and to the construction of a Telegraph of corresponding powers. Though a Telegraph of eight boards, applied to our Dictionary, possesses less power, by *one third part*, than

the one recommended, still, even the one of eight boards would be in about the proportion of *three to one*, preferable to the *Spelling-telegraph*.

We shall, now, go on to the description of a terrestrial Telegraph on *another principle*; leaving it to those into whose hands this work may fall, duly to appreciate its merits.

Description of a Telegraph consisting of Symbols representing Figures, and shewing three Places of Figures, at one Display, by exhibiting a simple Emblem of each Numeral.

It must have occurred to many, that in lieu of exhibiting *changes* with a certain number of boards; it might be more eligible to shew *at once*, the very figures represented, by displaying a board, or boards shutting up an open space. The first doubt on this subject was, whether figures either painted on boards, or cut out of boards of large dimensions, could be distinctly discerned at the ordinary telegraphic distances of stations. To ascertain this essential and fundamental fact, we made a series of experiments with a telescope of a magnifying power of near 40; and found that power quite inadequate. A Dollond-refractor, $3\frac{1}{2}$ feet long, and of a power of 70, was found sufficient. On a supposition that the shapes of figures cut out of large boards, could be seen at the distance of six or seven miles, openings of various dimensions between darkened boards, were re-

peatedly examined with a magnifying power of 70, and the conclusion was, that at such distances, the shapes of figures cut out of boards, or painted on boards, unless these boards were of *enormous dimensions*, could not be distinctly perceived, even in clear weather; and that in cloudy weather, no distinct vision could be obtained. Were even the figure cut out, or painted, of a size that would be next to unmanageable, it appeared evident, that some of the Arabic figures might be mistaken for each other. For instance, that owing to distance, and want of clear vision, a 3 would be mistaken for an 8; a 6 for a 5; a 4, or a 2, for an 0; and *vice versa*. The next series of experiments, after abandoning every idea of distinguishing actual figures, went to ascertain whether *symbols, emblems, or representatives of figures*, could be found that would be distinctly visible at the ordinary distances of stations. For this purpose, pieces of timber put across openings five feet six inches square, were viewed in perpendicular, horizontal, and inclined positions, and were, in all these attitudes, *very clearly distinguished* even in very gloomy weather. The dimensions of the pieces of wood observed, and of a thin parallelogram form, did not exceed ten inches, and were frequently less. We, thus, arrived at the *certain conclusion*, that simple substitutes which could be readily perceived might be put *in lieu* of figures; and that too, with advantages of concealment arising from their own nature. The next consideration was, to adopt the most

simple and obvious representatives of figures. *Two modifications of the straight line*, will furnish the *nine numerals*, so as to be simple in appearance, and strikingly different from each other. The perpendicular straight line, as $|$, will represent number 1. The horizontal line, as $-$, will give number 2. The *left and right* of the Telegraph, or the place of *hundreds*, and *units*, is *always* marked; therefore, the straight line oblique, or slanting, diagonally, from right to left, will furnish numeral 3. The same oblique from left to right, will afford numeral 4. The 5 will be had by forming an acute angle, thus, \vee , with two straight lines. Numeral 6 is furnished by inverting the angle, thus, \wedge . Two straight lines perpendicular, and parallel, will furnish numeral 7, thus, Π . The same horizontal, and parallel, will afford numeral 8, thus \equiv . Numeral 9 will be represented by a right-angular cross, thus, \oplus . A cipher, or 0, will be procured by a circle, with the centre part cut out. These dispositions of the straight line, were very distinctly perceived, and uniformly, in whatever manner they were viewed.

Here, we obtain distinct representatives of the numerals, very perceivable at the usual Telegraphic distances. The last consideration was the formation of a Telegraph containing three sets of these representatives, so that *at one view*, any *three figures* could be displayed.

Figure 3d, shews a *Section*, serving also as an *Elevation of a Symbolical-Telegraph*, worked by

means of the foregoing very simple representatives of figures, which a magnifying power of 50, will readily distinguish. The reservoirs A, B, and C contain, each, one set of the new numerals, excepting that the 1st set on the left, need not have the cipher, or 0. These signs of figures may be made either of wood, or cast-iron, and may be one foot in breadth, by one inch in thickness, or half an inch, if of cast-iron. If made of wood, the lower edge may have a little lead run into it, merely to increase its gravity. These *signs of figures* are suspended close, and parallel to each other, in the reservoirs. A small cord attached to the top of each symbol, passes over two small pulleys, and leads down to the Cabin D, below. By means of these ropes, the sign, or signs required, may be readily lowered down from a reservoir, to the open space immediately under each reservoir. The weight of each sign is counterpoised by a cylindrical piece of lead b, moving up and down in the small wooden box, abc. As the weight below, and the sign above, counterpoise each other, the *smallest* application of the hand to the ropes, will work them up and down, when used. The *section* represents three of these ropes passing over their respective pulleys, with the sign belonging to each, lowered down in view. One rope from each reservoir, can only appear in the *section*, as the ropes of the other numerals in each reservoir, are suspended behind each other. The *signs* suspended in the reservoirs, do not touch each other with their respec-

tive superficies : and the extremities of the signs — , / , \ , V , ^ , = , and + , representing, respectively, figures 2, 3, 4, 5, 6, 8 and 9, touch against a groove. This groove keeps the signs *steady* in their position, and is represented by a heavy line on two sides of the space where each sign wanted, is exhibited. The signs I, and II, and also O, representing figures 1, 7, and the cipher, have a small bit of iron projecting three inches from the bottom of each. This iron enters a hole corresponding to the bottom of the sign when down, and is one of the means of keeping it *steady*. This bit of iron appears in the bottoms of I, and + shewn in Figure 3d. The signs of figures, in reservoirs A and C, when lowered into view, are arrested by the cross strengthening beam ef. The spaces where the pulleys are fixed, and where the cords work, are left white in the section, for distinction's sake. The sign + , lowered from the reservoir B, is stopt by a strengthening cross bar, as soon as the bottom of it arrives at the bar. In the centre of Figure 3d, there appears a circular board worked by the rope g. This board is used when a word from the *small and frequently occurring selection* is indicated. Figure 3d exhibits the number 193 ; for the *sign* of figure 1 is lowered down on the left side, the *sign* of figure 9 from the centre reservoir, and the sign of figure 3, from the right-hand reservoir. Because the circular board in the centre appears down, the figures 193, will mean the word under that number in the *small words*.

This Telegraph as corresponding with the Dictionary, expresses one, two, or three figures read off, always, from the *left*, or *place of hundreds*. Pure numerals would be expressed by lowering down the signs of the required figures, from the reservoirs B, and C. The figures, or rather signs of figures in the reservoirs A, and C, are never used together in indicating words. Therefore the fourteen *very common words*, formerly mentioned, such as *with*, *from*, *in*, *by*, &c. may be expressed by a figure from A, and C, at the same time: thus 1 let down from reservoir A, and 0 from reservoir C (the two together making 10,) may express the word *with*. The remaining thirteen *very small words* will be expressed by displaying a number corresponding to them, by means of a figure lowered from these two reservoirs. A figure from each of these will give numbers as far as 91; therefore, by means of these two reservoirs, any number of signals required, may be made, as these two reservoirs used conjoined, have no reference to the Dictionary. This remark applies likewise to our Board-telegraph: for there the first and third sets are never used together, and as they afford 91 movements, or numbers (the 1st set giving the place of tens, and the third set, the place of units), these 91 movements with the boards on each set, for each number from 10 to 91 inclusive, might be placed in successive order, after 999 in the *selection of small words*, and have a word in *common use*, printed opposite to each of these additional numbers. Thus, board 4

pulled down on the first set in our Board-telegraph, and board 3 on the third set, would be read 43, and this would mean the 43d word in the additional 91 words which may be subjoined to the *selection of small words*. There would be no occasion to use the circular board at the top in such instances, because a board, or two boards pulled down on the first set, and, *at the same time*, a board, or two boards pulled down on the third set, would *always* mean a number expressive of one of these 91 additional words which might be alphabetically arranged. The advantage of making this use of these 91 spare movements is, that *one movement*, thus, gives any of the additional 91 words.

But should the *first* and *third* sets of boards be converted *in due time*, to the purpose of giving two letters by *one movement*, in spelling any word not in the Dictionary; in such case, that particular use, *only*, could be made occasionally, of the *first* and *third sets of boards* acting conjointly, or indicating two letters by *one movement*.

In forming the Symbolical-telegraph, such signs only could be adopted, as would be of an uniform and simple appearance, in *whatever direction* they might be viewed. The signs of figures suspended in the reservoirs, are of this description; and when we viewed them at a telegraphic distance of stations, they appeared clear, striking, and distinct, at a momentary glance with the Telescope. The reader is not to expect it to be said, that these representatives of

figures can be distinguished better than boards; for nothing can be better perceived at a distance, than a black board shutting up an empty space. These signs compared with boards, are seen with much the same difference, as a man, and a grown-up boy would be, when observed with a Telescope. Both would be perceived very distinctly, but certainly the man would appear more striking than the boy; nevertheless, the boy would, at once, be distinguished as such. There is a great degree of simplicity in this species of Telegraph, which certainly could be constructed at a less expense than an adequate Boarded-telegraph, and the person stationed at the telescope, has *less to observe*; but glasses of a power of 50 at least, will be requisite to observe with. The ten ropes belonging to the set of numerals in each of the reservoirs B, and C, lead down to the Cabin, close to each other, in order that the second Telegraph-worker may manage both, which he can very readily effect. The first Telegraph-worker is in charge of the nine ropes leading from the reservoir A; and also of the rope belonging to the circular board. This Telegraph is as readily applicable to the Dictionary, as our Boarded-telegraph. The first movement gives the Class of a word, and the next, the number of the word in that Class. When a *small word* is telegraphed, the circular board pulled down, shews that such is meant.

This Symbol-telegraph is well calculated for military purposes. In this case, the three Reservoirs

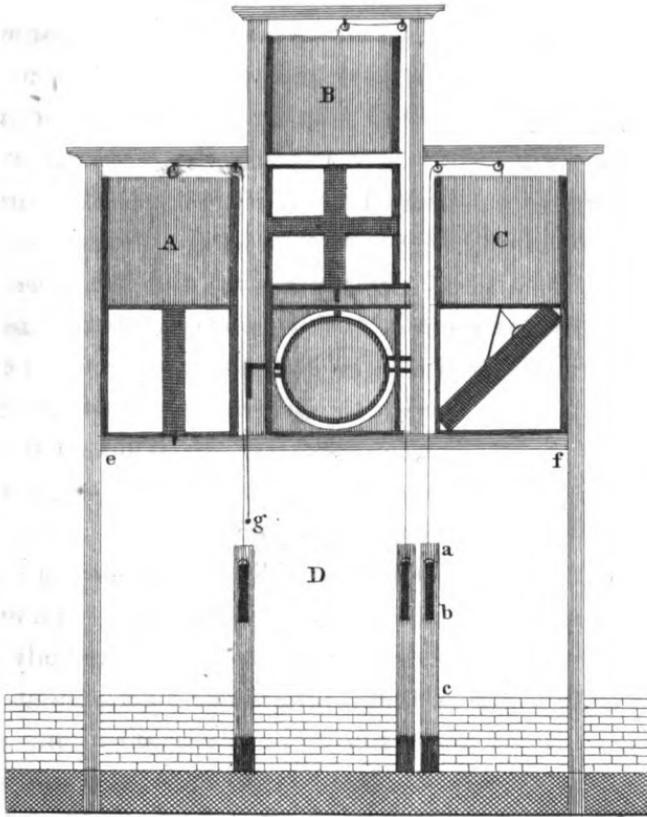
would be carried, and put up, when wanted, separately, but close to each other. The Centre reservoir would, if separate, require two distinct upright timbers of small dimensions, to support it ; and the circular board under it, and the reservoirs A, and C, must have similar supports. In a few minutes, the whole machine might be set up prepared for working. From the lightness of the materials, and construction, this Telegraph could be conveniently transported from place to place, in accompanying the movements of an army. Flags, on land, are not found very manageable, as it is an operation of time to hoist, and take them down ; and still more difficult and troublesome to display them, more especially in blowing weather, in such a manner as to be perceived at a distance. It would be easy to give a sketch of a Symbolical-telegraph which would, at once, indicate the Class, and number of a word, under one simultaneous movement ; but as the *small words* constitute, in general, almost the half of all sentences, and as these *small words* are given by one movement, by our system, the mode already fully detailed, will be found productive of sufficient celerity, and certain accuracy of communication.

A Nocturnal Terrestrial Telegraph adapted to the Dictionary.

Figure 4th.

The use of a Night-telegraph at sea, cannot be dispensed with : but on shore, excepting in commu-

Figure 3.rd





nicating with ships at sea, it may not be so frequently called for. It would, however, appear an evident omission in a Work like this, not to treat on a species of Telegraph essentially connected with Military and Naval operations. To a maritime power, during a period of war, a nocturnal Telegraph might prove of material advantage, either in cases of actual invasion, or with a view to the expeditious dispatch of fleets, for specific purposes. The following Lamp-telegraph is of easy construction, of a very portable nature, and may be set up in a quarter of an hour, in any situation. Let there be an oak post AB, ten feet high, and four inches square. This post when set up, passes into the ground, through a piece of wood six inches square, and six feet long, represented in the following *section*, by EF. This piece of wood is fastened to the ground when used, by the two pickets, s and t. The part of the post AB, in the ground, as uv, may be one foot. The obscurer fgzwp is, when to be used, attached to the post AB, by means of the square braces f 3, and g 3, slipt over the top of the post, and prevented from sliding downwards, by a small piece of wood 4, nailed on each side of the post. The obscurer, by means of its projecting arms fn, and gh, is detached about eight inches from the post. In the hollow part of the upper end of the obscurer, appear two small pulleys a and b, fixed to the inside of the top. Over these pulleys the small cord ba passes, and leads down to the lead weight, r. Within the obscurer; appears the

patent reflector *d*, fixed in a cylindrical piece of wood *c*, which very nearly fits the inside of the obscurer. A branched metal smoke-tube appears passing from the burner, through the cylinder, and the smoke is emitted through holes in the double top of the fixed obscurer. The weight of the obscurer and the cylinder of wood attached to it, exactly counterpoises that of the lead below, *r*, so that the least application of the hand to the line above *r*, will lower the lamp into view, or raise it up to be hid within the obscurer. The lower extremities *m*, and *p*, of the obscurer, are rounded outwards, like a trumpet, in order that in preparing the Telegraph for working, the top of the wooden cylinder may readily enter the concavity of the obscurer. In situations where the Telegraphic posts remained always fixed, the line *a r* would be cased in. The reflector attached to the wooden cylinder, must exhibit a light, or burner, on both sides. In using the reflector, it need only be lowered so as to clear the orifice *mp*, of the obscurer. As in this case, the half of the cylinder will remain within the obscurer, the lamp will be always displayed without being subject to any lateral, or unsteady motion. Such is the principle of the Nocturnal-telegraph. Four of these posts placed in a line, at the distance of twelve feet from each other, will furnish the nine numerals, and the cipher, precisely in the same manner as the sets of boards in our Boarded-telegraph afford a set of numerals and a cipher, on each set. For instance, suppose four posts with the

above apparatus attached to each, placed in a line, and reckoned, 1, 2, 3 and 4 from the left. Suppose the four burners displayed all together. The lamps drawn up in succession, and shewing three at a time, remaining down, will give relatively, the figures 1, 2, 3, and 4. Lamps 1 and 2 obscured together will give figure 5. Lamps 1 and 3 obscured together will give 6. Lamps 1 and 4 will give 7. Lamps 2 and 3 drawn up together will give figure 8. Lamps 2 and 4 obscured together will give figure 9; and lamps 3 and 4 obscured together, will give the 0, or cipher. The Telegraph-worker may be seated in a covered place nearly between the two centre posts. In this situation, he can work the four lamps as required. The *section* shews two lines 5, 6, each of which passes over a small pulley 5. By a gentle pull of the upper line, the lead is raised, and the light is, consequently, displayed, lowered. By a small pull of the under line, the lead is lowered, and the light, of course, hid. To have a Nocturnal-telegraph capable of giving three places of figures, as 871, it will be necessary to have three sets of posts, each set fifteen feet from the next. The left set would give the 8, the centre set would give the 7, and the right-hand set would give the 1; the display reading 871, from the left. In military stations, where people could be spared, men numbered 1, 2, 3 and 4, might be stationed, respectively, at each post of each set of posts; and these addressed by their numbers, would work the cords. At fixed standing stations,

one man will be sufficient for each set of posts. When the Telegraph was required to work, this man would attach his cords to the leaden weights, and would work as described. Were it judged eligible to have a chain of Night-telegraphs from London, to the principal Naval ports, a set of the above Posts would be placed on each side of the present Telegraphs. The centre set might be dispensed with along a chain where communications by night, would very seldom occur. With two sets of posts, the Class of a word would be given by the first movement, and the number of the word, when under 100, by the next. When the number of the word exceeded 99, as 834, the first movement would give the Class, the next movement would give 83, and the third movement (in such cases always by the right-hand posts) would give the 4; the two last movements making out the number of the word 834. The reason of giving the unit 4, on the right-hand set is, lest the 4, if given on the left-hand set, might be supposed to mean Class 4 of the next word of the sentence. A Class when under 10, is always indicated by the left-hand set; and also, the number of a word in its Class, whenever it may be under 10. Pure numerals are indicated by making a numeral signal, and then giving the sum, or number, concluding, by repeating the numeral signal. A post double the height of those of the sets, must be erected between the two centre-posts of each set. Attached to the post in the centre of the left set, there must be two

Lamps over each other, and 8 feet asunder. On the post in the centre of the right-hand set, there must be one Lamp. The use of these lamps, is to prevent *mistaking* the lights obscured in either set. For instance,—the obscuration of number 1, or the first light on the left of a set, might be mistaken for the obscuration of the fourth light expressive, when obscured, of figure 4. Now, the light over the centre, prevents the *possibility* of such an *equivoque*; for if number 1 were obscured, the centre light would appear having two lights to the right of the observer, and one nearest to it on the left of him; consequently, it would appear to a moral, or rather physical certainty, that number, or light *one* was eclipsed under its obscurer. Again, suppose lights 1 and 3 indicating figure 6, were obscured, it might appear dubious whether the lights 1 and 3, meaning figure 6, or lights 2 and 4, meaning figure 9, were those eclipsed. Now as in this instance, number 1, the farthest from the centre light, appeared obscured on the left of the observer; and as number 3, the nearest to the centre light, appeared eclipsed on the right, it must be evident that numbers 1 and 3 were obscured, and consequently, that figure 6 was meant. The same explanation applies to lights 1 and 2 (meaning figure 5), and to lights 3 and 4, meaning when obscured, the 0, or cipher; the light over the centre *clearly pointing out* the observer's right and left, in regard to the lights, and thus, removing every doubt of obscuration. When a *small word* is meant,

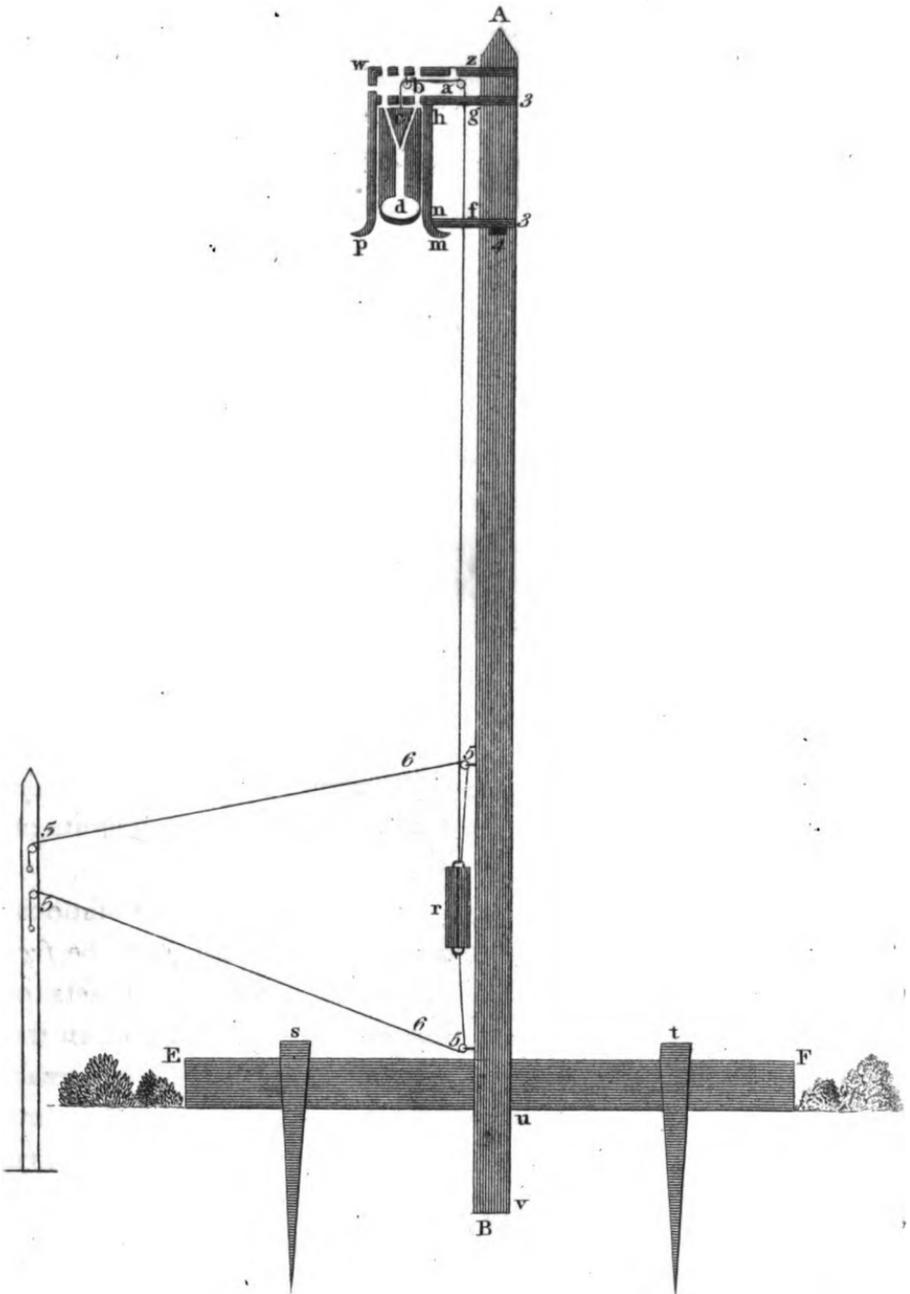
one of the two lights on the post in the centre of the left set must be obscured. When a small word is under 100, it is given by one movement. When above 99, by two movements; always taking care to indicate the unit of three figures, (as the 7 of 397) on the right-hand set of Posts. These two sets of four lights in each set (exclusive of the elevated centre lights) are worked precisely on the same principle, as the Telegraph of eight boards, and one at the top; substituting, only, a light, or lights obscured, for a board or boards shut, or pulled down. The few working signals required, and the telegraphic expression of the 14 *very small* words, are provided for, as described under the *Eight-board-telegraph*.

Eight of these fourteen small words, might be readily expressed by the four spare combinations of three lights on each set of Posts. To express the remaining six very small words, six of the same spare combinations might be used with the distinction of obscuring, at the same time, one of the high lights on the Post in the centre of the left set.

For military purposes, at fixed Sea-port-stations, and where night-communication was liable to be *frequent*, it would be eligible to have three sets of Posts, with the two upper lights on the Post in the centre of the *centre set* of Posts. This Nocturnal-telegraph would be worked precisely like our improved Board-telegraph, putting lights, only, in lieu of boards.

Two, or three sets of lights with their obscurers,

Figure 4.th



Made in Sweden.



might be arranged from left to right, along two, or three yards at right angles to a Mast, near the top of which, at some distance from each other, two lights would be placed for the use mentioned. These sets of lights, fifteen feet from each other, would be worked by cords passing along the yards, and down the Mast, to a Cabin below. The mode by Posts is less expensive, and better calculated for Military purposes.

Some Account of the Rise and Progress of the Naval Code, up to the present Times; with collateral Military and Maritime Reflections; and shewing that the 'Telegraphic' Dictionary has been particularly calculated for the numerical System of Signals now prevalent in the Navy.

Without explanation, it might be deemed rather presumptuous in a Military man, to write on any branch of maritime affairs. The writer of these sheets has no other apology to offer, than that he had been at sea, during five years, at various periods, engaged in extensive marine surveys, and other Duties; and that he had been in habits of much intercourse with Naval officers, with whom he amply discussed such subjects as are here introduced. Independent of all this, the similarity between the land and sea Telegraphic systems is so near, as to general principle, that persons conversant in the one, cannot well be ignorant of the other. A wish to be useful was, however, the leading motive for drawing

up, and publishing a small treatise, in which it is trusted every man who understands the general subject in all its bearings, will, at least, find sufficient inducement to its farther pursuit. We shall be happy to see the whole of what has been written, minutely examined, and should objections founded on a competent knowledge of the subject, be advanced, and of such we are not at present aware, we shall endeavour either to remove them, or to acquiesce in their justness, according to our impression of their validity, or the reverse.

We have no positive information that any methodized code of signals was made use of in the fleets of the Ancients. Such celebrated naval Commanders, as Themistocles, and Conon, must have directed their marine manœuvres by so obvious a mode as signals made by flags, or lights. That flags were used is evident; for it is written that if the ship which carried Ægeus to Crete, returned in safety, a white flag was to be hoisted. Polybius, in his history of the Punic Wars, makes indirect mention of naval signals. The *speculatores*, and *vexillarii* mentioned by Ammianus Marcellinus, must have been persons whose duty it was to observe, and report signals made. The coins of the Greeks, and Romans, have on them, both flags and something resembling pendants. As the Telegraphic art appears to have been practised on shore, the conclusion must follow, that it was also prevalent at sea. In the reign of Elizabeth we meet with the first regular

set of signals and orders to the Commanders of fleets, and which were to be opened, and acted on, when a certain latitude was attained. James II. *, when

* The misguided and ill-advised son of the Chevalier de St. George, and Grandson of James, was, from mere motives of compassion and humanity characterizing the softer sex, saved by the Mother of the writer of these pages, the celebrated *Flora Macdonald*. Hemmed in by his pursuers within the confined limits of a small island, every hope of escape seemed utterly cut off; when the heroism of a young female emulating the finest instances of resolute adventure, recorded in history, rescued the devoted youth, from impending destruction. She directed the unfortunate *Charles Edward* to be clothed in female attire, passed him off as her domestic, and conducted him through a multiplied variety of imminent dangers, and hairbreadth escapes, to a situation ultimately leading to his safety. This distinguished woman by her loyalty to the Family now on the Throne, has fully evinced that she was actuated by feelings and sentiments which reflect honour on her sex. She had, at one period, her husband (a Captain) and five sons Officers, in His Majesty's service. He who is proud of giving this testimony of female worth, is now the only surviving son. It is in contemplation to inscribe the following lines from Johnson, on the Tomb of the immortal Flora. "*We were entertained with the usual hospitality by Mr. Macdonald and his Lady Flora Macdonald, a name that will be mentioned in history, and if courage and fidelity be virtues, mentioned with honour. She is a woman of middle stature, soft features, gentle manners, and elegant presence.*" The Father of the future husband of Flora, was imprisoned twelve months, for affording a single night's lodging and shelter to the distressed descendant of James. He was sent on his parole to Fort Augustus, and was thence escorted to Edinburgh Castle, by a Guard of Dragoons. He was liberated by the interest of his Relative, Sir Alexander Macdonald. When at Fort Augustus, it was remarked to him, what an opportunity he had lost of elevating

Admiral of England, was the first who introduced a system of methodized signals by means of which divisions of Fleets, as well as single ships, could be

his Family to splendid rank and honours, had he delivered up the fugitive of the House of Stuart, who sought an asylum in his house of Kingsburgh. On this, he pointed significantly to a neighbouring Hill, one of the highest in the Highlands, and said; "Behold yonder lofty mountain; had I been offered heaped-up wealth exceeding its height, neither that, nor any other temptation could have made me swerve from the sacred laws of hospitality, by basely betraying into the hands of his enemies, a miserable human being, reduced to the lowest ebb of distress, and seeking temporary protection under my roof!"—The latter part of the life of Flora Macdonald was marked by pecuniary embarrassments which her son felt it his inclination, as well as his duty, to relieve at least, in proportion to his then very slender means. To the honour of His Royal Highness the Prince of Wales, be it mentioned, that on hearing this, accidentally, he, with that noble generosity, and Princely liberality eminently distinguishing him, was graciously pleased to order a handsome Pension to be settled on her: but, alas! she did not survive long enough to be able to express her thanks to the illustrious donory. That upright and benevolent character, Sir John Macpherson, who has rendered such essential services to the Public, as Governor General of India, mentioned the name of Flora, to *Cardinal York*, at a period when that continued scourge of humanity, the French Revolution, had not reduced his splendid fortunes so far as to call for the munificent beneficence of our good Sovereign. The Cardinal passed a high eulogium on the character of Flora, and unequivocally hinted, that could she be induced to change her religious tenets, he would grant her a splendid pension. Flora died, as she lived, one of the best of Christians, of Mothers, and of women; and a zealous member of the Church of England.

directed to act in any specific manner. Previous to his time, the principles of co-operation, connected procedure, and changes of position adapted to circumstances, were very imperfectly, if at all understood. When once the action commenced, every idea of regulating its farther progress, was abandoned; the degree of naval science then practised, became useless; and daring resolution, and the physical power of grappling with the enemy, decided the fortune of the day.—The Duke of York (afterwards James II.) certainly first adopted a scientific formation of Line, and an order of battle calculated for various situations, in respect to the enemy, their number, and the state of wind and weather. The Duke of York's *fighting and sailing instructions* classed according to their obvious heads, were referred to by a specific signal pointing to each movement, or manœuvre in

James II. deservedly lost his Throne. An infamous Chancellor, a Jesuitical Priest, and an ambitious Mistress, led him into political cruelty, religious bigotry, and daring encroachments on liberty. He arbitrarily tried how far the absurd doctrines of the indefeasible right of Kings, and of unlimited passive obedience in Church and State, could be carried: He made the vain attempt of converting a whole Nation. The experiment happily failed him, and the *Revolution* intervened, to save Britain from all the horrors of civil and religious anarchy. With all this, we are not an advocate, in times like the present, for a too limited prerogative. The epoch we live in requires a *strong Executive*. History will do ample justice to the reigning Monarch, and point him out as the model of a *Patriot-King*.

its Class. This groundwork resting on unchangeable general principles, though it may have received many additions, and may have been much simplified by the introduction of the *numerical order of signals*, remains to this hour, as the basis of evolutions, and the germ from which has sprung the British Naval Code. The French, unquestionably a brave, and ingenious people, have claimed what only belongs to the inventive talents of the Duke of York. *Le P. Hôte* in his *Art des Armées Navales*, printed at Lyons, in 1727, has given a system of signals with sails, varying flags, and guns fired in slow and quick order, at night. Some of his signals were of a clumsy description, such as suspending a water-cask from the yard-arm, to indicate *want of water*; and a large hatchet, to shew a want of *wood or fuel*. To express a *numeral*, he recommended hoisting, and lowering, a certain flag, till the number meant by the numeral was indicated. On account of the difficulty of observing other colours at a certain distance, he adhered to the red, and white colours. He states that with forty variegated flags, and as many pendants, differently displayed, ten thousand distinct signals might be made. The Duke of York acted with the French in the capacity of a Commander, and Flag-officer, and they derived from him the first rudiments of Naval movements, and signals. It is unquestionable; that this volatile nation availed themselves of James's residence among them; to improve their then slender knowledge of this subject.

The effect of this was evident to some of our Commanders who particularly remarked English evolutions in the memorable battle of *La Hogue*. After this period, many French Officers, Naval and Military, have written on Naval Tactics. The work of the Chevalier de Morogues, in point of perspicuity, arrangement, and composition, is without doubt, the most valuable. The most essential improvement in Naval Signals, has arisen from the invention and application of the *numerical order*. This simple, but luminous improvement, is generally ascribed to Monsieur de la Bourdonnais; but those who have looked closer into the subject, know that Bishop Wilkins, in his *Secret and Swift Messenger*, not only recommends the method of signalling by *notation*, but describes the mode of execution. Doctor Hooke, who is the inventor of the principle of the Land-Telegraph, a species of which he mentions, recommended a numerical plan to the Royal Society. Kircher very nearly hit on the same invention, and Gaspar Schottus, in his *Technica curiosa*, expressly mentions it. With all this, it must be confessed, that M. de la Bourdonnais brought this plan to considerable perfection. In the English Navy, it has been, since, carried to nearly its acmé. To explain this, it is to be observed, that the principal evolutions, manœuvres, movements, and other operations of the Navy, are described in concise sentences which are classed under their different heads, and specific characters, by which means any

article to be signalled may be found in an Index containing the divisions of the sentences alphabetically arranged. The aggregate of these sentences may amount to near 600, constituting the Naval Code of Signals. Now, previously to the application of the *Numerical Mode*, it was necessary to have a specific flag-signal corresponding to the sentence under its proper head; and for this purpose, a multiplied variety of flags, pendants, and other means of signals, was requisite. Independent of the exertion of memory wanted, there was a constant chance of making a mistake among a multiplicity of signals, many of which resembled each other, producing, thus, a second liability to error. The person observing the signal made, and comparing it with the copy of the Code in his possession, was in danger of taking an erroneous sentence, on account of the complicated and various description of a multitude of signals. The hurry, smoke, and noise incident to action, increased this embarrassment, and hazard of error. The *numerical mode* was happily invented to obviate all these difficulties, by the principle of simplification which is its distinguishing characteristic. The nine numerals, and Cipher, are represented, each, by a different flag. To repeat any figure, there is a substitute flag, and to repeat the same figure in the place of units, a pendant is used.—Thus, to express the number 9, hoist the flag composed of different colours, and representing the figure 9. To express 99, hoist the same flag, with the substitute flag under

it; and the expression read downwards, will be 99. To express 999, hoist the two flags as before, and the pendant under the substitute, will repeat the 9 at the top, and give the whole number 999, read from the topgallantmast-head downwards. To express any number composed of different figures, as far as three figures, for instance 781, hoist the flag expressive of 7 uppermost, the flag expressive of 8 under it, and that expressive of 1 lowermost, and the whole will be read downwards, 781. The substitute flag also repeats a Cipher immediately over it; as 60C, where the 6 flag is hoisted above the cipher-flag under it, and the substitute flag lowermost, will, together give, 600. To express any number above 999, there must be *two sets* of flags; for to express 5555, the two left-hand figures 55, would be given on the Mainmast, and the other two, with the other set of flags on the Foremast, and the whole would be read from the Main, to the Foremast, making together 5555. It is *not required*, in a Code of signals, to rise above 999, and, therefore, *one set* of flags is sufficient. Whenever it may be necessary to give a number above three figures, a pendant or pendants over the highest figure, would give the thousand, or thousands, and the set of flags will indicate the rest of the sum: as 2210 would be given by hoisting two pendants uppermost, to express two thousand. Immediately under the two pendants, hoist in succession downwards, the flag expressive of 2, the flag expressive of 1, and lowermost, the cipher flag; and

the whole will indicate 2210.—To apply the *numerical mode* to the naval Code, all the sentences there, are numbered from 1, to the total number of sentences. Whenever it may be necessary to telegraph any sentence, it is found under its relative head in the Code, with a *number* attached to it. To communicate such sentence, its number is indicated, and, thus, without a possibility of mistake, the number turned up in a Copy of the Code in another ship, directly intimates the sentence, or order alluded to. Such is, nearly, the present numerical system applied to Naval purposes, than which nothing can be more explicit, clear, and distinct. Secrecy is preserved by the simple expedient of altering the numbers of the flags; for instance, by making number 1, number, or figure 0; and so on in changing all the other numeral flags relatively. This is generally done by signal to that effect, after which the flags are to be exhibited in the order in which the Commander may choose them to run. Doctor Hooke first suggested this ingenious expedient. A few flags, besides the numeral ones, are on board of all ships of war: for they are wanted to make a preparatory signal, or signal of advertisement; an annulling signal; a signal of address to a particular ship, or division; a signal of acknowledgment; a signal of not understanding a signal; an executive signal; a directive signal; a signal of distress; and a signal of danger, &c. Spare combinations, however, of the numeral flags; might prove sufficient for any of these pur-

poses. As Armies are divided into Right, Left, and Centre, whether in Column, or in Line, and whether Right or Left be in front; so a Fleet is distinguished by the Van, Centre, and Rear Divisions, which always retain these appellations, whether the van, or rear Division be leading. This *standing order* evidently has the effect of diminishing the number of signals; as often as it may be requisite to address an order by signal, to any Division, or to any particular ship in that Division. One third part of the number of signals of address which would be otherwise necessary, is saved by this constant arrangement of a Fleet.

It is the fate of all human systems to be approximating to a perfection which they never attain. Ingenious and reflecting characters in every age, contribute their mite of improvement, and scientific amelioration goes on progressively, without ever arriving at a maximum of which, after all, the utmost sagacity of man can form but a very inadequate conception. This is aptly illustrated by the present state of arts and sciences imperfectly, if at all, known to the ancients. If this be a fact that few will feel disposed to deny, it will follow, that our Naval and Military Tactics are but in a relative state of perfection.

In a work in two volumes, which was published last year, and is minutely descriptive of the duties systematically arranged, of all ranks of the French army in the Field, Garrison, and Quarters, we endeavoured to point out, what our officers feel con-

vinced of, the imperfect state of Military Tactics, and the necessity of a *revisal* that may lead to their improvement. At a period when the British army, the finest, unquestionably, in the world, possessed no regular standard for its movements, a Work termed *Rules and Regulations*, was published by General Sir David Dundas, and sanctioned by authority, on the just grounds of creating an uniformity of Discipline till then wanting. This work constitutes the *Military Code*, and forms the rudiments, and as it were, Grammar of Military Tactics. It is generally acknowledged to have been made out in the above work, that however meritorious the *Rules and Regulations* may have been, and actually are, they are deficient in many *material respects*. The arrangement and concordance of the compilation is objected to, on very just grounds. It is proved that many essential articles are omitted, or do not appear in each of the four parts of which it is composed. A want of farther detail and elucidation is pointed out. It is stated that much might be struck out, that is little better than a repetition of what is to be found in other parts of the work. The Plates, which are allowed to be extremely defective in expression, and just representation, are shewn to be quite inadequate. A general comparison is drawn between the French and English systems, from which it appears manifest, that it would be highly eligible to introduce considerable alterations in many parts of our Tactics. It is strongly recommended, in the event of a *revisal*,

so very indispensable, to subjoin a few useful Chapters to the work; such as, among others specified, one on Grand Tactics, or the Theory of combined operations; one on the duties of Light Troops now so decidedly made use of; and one giving practical Evolutions illustrative of the combined movements of various descriptions of Troops. The means of effecting all this, have been adverted to, as *only to be found* in the institution of a *Board of Tactics with salaries*, and acting under the control of the illustrious Commander in Chief. The appointment of old officers, as Professors of Tactics, in each of our Universities, has been glanced at, as tending in the changed state of human affairs, to maintain, at all times, the general and salutary military spirit now pervading the nation. It may be proper here, just to remark, that our Military Tactics are literally borrowed from the Prussian system. Now, as this system has recently been brought into fair trial, competition, and contact, with that of the French, and proved so lamentably deficient, it may be fully allowed, after assigning a due proportion of effect to collateral causes, that the former is very inferior to the latter. That this is the fact, in point of science, any military man who considers both *attentively*, can have no hesitation in concluding. Our officers are intelligent and enterprising; and our Troops are brave in the extreme. There ought not to exist any defect in the means of elementary instruction, to aid courage and intellect. The French, in addition to

more scientific Tactics, will always pour their countless numbers to oppress their opponents in the field. This consideration affords another argument for a *revisal* of our Tactics, with a view of rendering them, what they now are not, as complete as those of our implacable enemy.

While on other less important sciences and arts, we daily see much, and well written, it has been matter of surprise to many, that on military Tactics, little is produced, and that (with few exceptions) merely of either a trite or trivial nature, and for the instruction of very beginners. It may be possible to account for this. To write on a subject, the science on which it is founded, must be well understood; and there must be, besides, a general acquaintance with the most eminent authors who may have handled it. Add to this, that a writer must be a thorough Master of the Tactics of his own Country. These requisites in a writer, can hardly all be found, unless he is, at the same time, conversant in the French language, and has some knowledge of German, which, however, is not so essential as the other. The science connected with Tactics, is, principally, that of Mathematics, including the branches of plain Trigonometry, and practical Geometry, and a thorough readiness in every species of arithmetical calculation. We fear, however, that the major part of our officers, are not so well grounded in all these acquirements, as to enable them to write professionally, independent of the incessant labour, and intense

study, which must be previously bestowed. It is highly expedient that authorized *Rules and Regulations* should be strictly adhered to; but officers of every rank should be encouraged to write in detail, proving by scientific reasoning, where these *Rules* may be either erroneous, or susceptible of improvement. Allowing that their writings might experience a favourable reception, and not be treated as innovations, a weighty impediment lies in the way of publication. This is the expense of printing and engraving, and after that, the precarious chance of a sale, a failure in which might involve the writer in difficulties that might deter him, and others, from similar attempts. In France, under the old Regime, the military writers were both able, and numerous; because their original education qualified them to understand the subject, and the moderate prices of materials and labour, enabled them to write with little or no risk. The remedy for the evil we have stated, will, at once, be found in the establishment of a *Board of Tactics*. It is well known, that in this Country, few useful and general branches of knowledge have attained to much perfection, till a *Board* presiding over them has been instituted. Here we have a demonstration of the fact. A *Board of Tactics* would produce able and useful writers, as every work of merit would be examined, and meet with an adequate encouragement, or even a reward. Improvements which are now started, and lost in their respective *Regiments*, would be communicated to

the Board ; undergo a discussion there ; and be, probably, made an efficient source of amelioration of some essential military branch. Genius, which, for want of excitement, at present lies dormant, would be roused into exertion. The value of acquirements now by no means general, would be forcibly felt, and a general avidity of useful professional study, would become prevalent. Able writers would start up in numbers ; the military science would advance, the state would be benefited, and all this would be the *certain result* of the institution of a *Board of Tactics* for ameliorating the art military.

It is impossible to mention the Navy, without an association of feelings of gratitude and admiration. Were Invasion to attain to our shores, the bravery of our troops joined with the patriotic multitude in arms, would, under Providence, *effectually* prevent a repetition of the experiment. The persevering vigilance and activity of the Maritime force, forms a barrier of safety, protects commerce, and saves the effusion of blood, and the general embarrassment and temporary shock incident even to unsuccessful invasion. If the Navy be of this most vital importance, it must follow, that the scientific instruction of this inestimable bulwark, is a consideration of the highest moment. It is feared that what has been said relative to the dearth of military, is equally applicable to that of naval writers. While in France, able Naval Tacticians have written much to the purpose, in this Country we have seen few original compositions on

Maritime Evolutions. We have good Translations of the whole, or the essential parts of some scientific French Works, as of *L'Art des Armées Navales, ou Traité des Evolutions Navales*;—*Tactique Navale, ou Traité des Evolutions et des Signaux*;—*Le Manœuvrier*;—*L'Art de Guerre, en Mer, ou Tactique Navale*;—*Pitot's Theory and Practice of working Ships*. There are some other excellent Treatises on the subject, such as, *Théorie de la Manœuvre des Vaisseaux*;—*Traité Mécanique et de Dynamique*;—*Cours élémentaire de Tactique Navale, par Audibert Ramatuelle*. 2 vol. 4to. one of which is Plates. 1804, Paris.—*Examen Maritime, ou Traité de Mécanique appliqué à la Construction et à la Manœuvre des Vaisseaux et autres Bâtimens, par Levêque*, 2 vol. 4to. 1783, Nantes *, &c. *The British Mars*;—*A Sea Manual*; and, *A View of the Naval Force of Great Britain*; may be perused by the naval officer with much advantage, after studying the above Works. But the most luminous and scientific work which has hitherto appeared on Naval Tactics, and that too, in a very great measure, on entire new

* *Traité élémentaire de la Construction des Vaisseaux à l'Usage des Elèves de la Marine, composé par Ordre du Ministre de la Marine, par Vial Duclairbois*, 1 vol. in-4. avec planches.—The first volume of this most scientific Work is published; and a second is in the Press, according to our last accounts of new publications at Paris.

Traité élémentaire de la Mâture des Vaisseaux, à l'Usage des Elèves de la Marine, composé par Ordre du Ministre de la Marine, par Forfait, in-4. avec planches.

principles, has been written by John Clerk, Esq. of Eden, in the vicinity of Edinburgh. This Work, is intitled, *An Essay on Naval Tactics*, and is to be continued. It has met with the most general approbation, and has, we believe, been acted on, repeatedly, in breaking the Enemy's Line, on the very accurate, and *saving principle laid down* with so much perspicuity, in this most valuable Essay. The *five orders* of sailing, the formation of Columns, Lines of Battle, Chasing in its various modes, and the conducting of Retreats (at present unheard of), with the multiplied variations, and combinations of these, according to the position of the Enemy, and the nature of the wind, with a reference, at the same time, to the peculiar object in view, are points of Naval Science well known to Commanders of Ships of War. We believe it, however, to be very generally admitted, that a *methodized Digest* of this mass of useful knowledge, with the addition of some very essential Chapters drawn from the Work of Mr. Clerk, and, probably, from other sources, would establish on a permanent basis, in the Navy, a system of *Evolutions, Discipline, and Movements*, subject only to occasional revisal, and improvements arising from new discoveries in Naval Science. The Work, established by authority, might open with a short account of the rise and progress of Naval Tactics, and of the Naval Code. *Part first*, might detail all the duties of the Sailors, and Officers of all descriptions, in the general and common situations.

incident to their stations. *Part second*, might describe the *principles of movement* applicable to a single Ship in every possible situation of sailing, engaging, chasing, conducting a convoy, &c. &c. *Part third*, would detail the various evolutions, movements, and general and particular modes of acting of two, or more ships, together, forming a part of a Division, or forming a Division of a Fleet, as Centre, Van, or Rear. This part might conclude with the mode of anchoring, and weighing, when in a Division, and when in a Division constituting a part of a Fleet. Part the *fourth* and last, would detail all the complicated Evolutions; orders of sailing; orders of battle; changes of position; various modes of Chasing; general attacks and retreats under every supposed circumstance; Night, and Fog movements; manœuvring to gain the weather gage; change from one order of sailing to another; formation and reduction of Columns; various modes of attack; various modes of breaking the Line in reference to Van, Centre, or Rear; changes of Lines and Columns, to produce a similar effect to a Countermarch in Military Tactics; Covering landings; landing a body of Troops; co-operating with a siege; attacking a fortified place; engaging an inferior, or superior force; general rules for the conduct of a Fleet previous to, in, and after an action; the duties of Frigates attached to a Division, and, generally, to a Fleet; and a variety of other minor considerations relative to a Fleet. The Naval Code of

Day and Night Signals, as far as they may be generally known without detriment to the Service, might be annexed to the Work. The Private contents of the Code would always remain in the possession of each Captain, in each Division. We are far from pretending to say, that this is the whole of what such a valuable work ought to contain; or that the most advantageous arrangement of the general and subordinate parts, has been suggested. We only presume to state the nature of a compilation *unquestionably wanting*; and able Naval Officers *only*, can fill up the outline sketched, and supply what may be deficient. The necessity and eligibility of the projected work being admitted, the next consideration will relate to the means of its execution. This leads us most strongly to recommend the institution of a *Board of Naval Tactics, with attached salaries*, and having its members selected for their acknowledged abilities and science. This Board communicating with the Sovereign, through the First Lord of the Admiralty, would be completely calculated for drawing up the grand Work of Naval Tactics. The Establishment of this Board, would have a similar effect in the Navy, to that which would result from a *Military Board of Tactics*, viz. the progressive improvement of the two primary branches of National defence, and Colonial prosperity. What is left to an individual, is subject to error, defects, and the operation of prejudices seen in numberless instances. The operations of a collective body of skilful and

scientific characters, must be as perfect as can be expected from the best combinations of the human intellect.—*Much good* has hitherto resulted from the *institution of Boards*. Those we mention will do lasting honour to, and reflect perpetual credit on any administration under which they may originate. We can only add, that the Admirals, Generals, and most intelligent, and best informed Officers in the Navy and Army, who have weighed these important matters with due attention, decidedly coincide with us in all the opinions we have used the freedom of stating: and it would have been a dereliction of that duty which every subject owes to his King and Country, to have refrained from urging points of the highest national utility.

Reverting from the foregoing interesting digression to the Naval Code of requisite sentences signalled numerically, we find them as far as they extend, indispensable, as a ready medium of conducting the various operations of fleets. Their merit, however, has its fixed limits, and where their services terminate, imperfection commences. If the evolution, movement, or operation which an Admiral has occasion to order by a numerical signal, is found among the five, or six hundred sentences written in the Code, the intended purpose is immediately effected, in consequence of signalling the number attached to the sentence, or sentences, indicative of the order given, to the Fleet in general, to a Division of the Fleet, or to a ship, or ships of

a Division pointed out by a distinctive attendant signal. If, again, the Commander has occasion to intimate some very important order, and that such order is not to be found among the sentences of the Code, no resource remains, but either to spell the order by signals of letters, or to order a boat from each ship to receive instructions. The first mode is extremely tedious, even allowing that a letter of a word might be signalled, at the same time, on each Mast, by means (at considerable expense) of multiplied duplicates of numeral flags, or pendants. The second mode is frequently impracticable, from the state of the weather, and other circumstances. Thus, while an Admiral was *hammering out a meaning* by the inefficient and lingering process of spelling; or while boats were rowing to receive his orders, a glorious opportunity might be lost of adding another victory to the Naval records of the country; or an Enemy might effect his escape who might, otherwise, be intercepted. If, again, the Naval Code extended to even some thousands of sentences, independent of the difficulty of finding a specific sentence among so multiplied an aggregate, even ten times that number would not, under a proportionate increase of difficulty, provide for every essential case that might occur.—It was a sense of this *glaring defect* in the Naval Code, and of the tediousness of the *snail-paced* system of spelling with an imperfect Telegraph on shore, that first suggested to us, the formation and construction

of a *Telegraphic Dictionary on a new principle*. It has been already demonstrated, that the numerical arrangement adopted there, is the most advantageous as deduced from a comparative view of the other modes which presented themselves. In drawing up the plan of the Dictionary, it was a particular study to adapt it to the 999 numerical signals made in the Navy, by means of eleven flags and a pendant, giving any three figures at one movement. It would be quite practicable on *terra firma*, to indicate any word in its Class, by a single Telegraphic movement. This would be done by, as it were, a double Telegraph, or joining the *symbolic* to the *improved Board Telegraph*. Were this the case, the symbolic part of the Telegraph would indicate the Class of any word, and, at the same time, the attached Board Telegraph, would point out the number of that word in its Class. Supposing also (what we would not recommend) that the very useful Classes adjoined to the Dictionary, were omitted, and rendered spelling a proper name *sometimes* necessary, this compound Telegraph being capable of exhibiting six figures in *one movement*, it is evident that three letters (each being sometimes expressed by two figures) may be given by the general movement. But, as in all machinery worked by hand, what would be here gained in power, would be counterbalanced by time and labour, either the symbolical, or Board Telegraph will be quite sufficient for all land purposes, as has, already, been amply described. The Masts

of Ships being in their own nature, a *perpetual basis of Telegraphs*, an additional advantage is derived from so serviceable a means. That is to say, any word in its Class, will, uniformly, be given in the Navy, at one movement, or display of flags: for the Class of the word will be indicated on the Foretopgallant-Masthead, and the number, *at the same time*, on the Mainmast. When a *small, and frequently occurring word* is meant, a pendant shewn over a display on the Mainmast, will indicate this. When pure numerals meaning a sum, are to be shewn, such will be given, as a constant distinction, on the Foremast only. In using the Telegraphic Dictionary for Naval Communications, there is no need for changing the order of the numerals, as a *secret key* may, by signal, be applied to the Class, or to the number of a word; which key may, if necessary, be altered at the shortest notice. For instance, the *secret key-signal* would be made over a certain flag meaning *Class*. This would mean that the key was to be applied, till farther orders, to the *Classes*, respectively, when telegraphed. The next certain flag signal would intimate what number of removes the *key* was to be placed either *forward*, or *backward*. For instance, suppose the key were to be placed two removes forward, hoist the flag expressive of 2, and under it, a certain flag or pendant always meaning *forward*. The Commanders would understand from this, that the Class indicated was not the real one, but that the second backward

from it was to be taken: that is, instead, in this case, of taking 42, the Class actually signalled, the second back from it would be taken, as 40. The same applies, *mutatis mutandis*, to the secret key placed *backwards*. There would rarely be occasion for this, as an Enemy could hardly be supposed to follow a Telegraphic process by means of a Dictionary not in his possession. At all events, this would be a shorter process than changing the numeral flags from their usual order of expressing the units. One example will shew how both masts operate *Telegraphically*.

England expects every Man will do his Duty.

Suppose England to be number 123, in Class 49, being one of the adjoined Classes of proper names. On the Foremast, hoist the flag expressive of 4, over that expressive of 9, and it will be read downwards 49. On the Mainmast hoist the flags 1, 2, and 3, in their order downwards, and, thus, the Class, and number meaning England, will be given by *one movement*. The ships signalled, having hoisted the *acknowledging flag*, the above display will be hauled down. The next word, *expects*, will be similarly indicated. The next five *small words* being recollected to be in that collection, their numbers will be given, successively, on the Mainmast, with a pendant at top, to shew that such words are, respectively, in that collection. Suppose the concluding word, *Duty*,

was found to be number 896 of Class 5; hoist flag 5 on the Foremast, and flags 8, 9, and 6, under each other, on the Mainmast, as expressive of the number 896; and, thus, the word, *Duty*, would be found. The signal of *termination*, would *conclude* the Telegraphic communication. The 14 very common words provided for under the boarded Telegraph, may be always expressed, by hoisting the Cipher-flag over numbers, as far as 14, relatively. The thirty-two points of the Marine Compass, may be expressed, respectively, by numbers from 1 to 32 inclusive, beginning at *North*, and proceeding by *East*, round the Circle. When any point of the Compass is to be signalled, a certain Pendant, to be termed the *Compass-Pendant*, may be displayed over the number corresponding to the *point of the Compass* telegraphed, as a clause of a sentence.

Our Ships of War are, always, furnished with sufficient flags and pendants to make out two sets of numerals; but supposing they were not, the *Class* on the Foremast, may be given by *two flags and two pendants*.

Let there be two flags A, and B, (*Figure 5th*). Let flag A be half blue, half white. This flag hoisted *four different ways*, as in the *figure*, will give the numerals, 1, 2, 3, and 4. Let flag B be half red, half yellow. This flag hoisted in *four different manners*, as per *figure*, will furnish the four numerals, 5, 6, 7, and 8.—Let there be a Pendant, as C, half red, half white. This Pendant with the

red uppermost will indicate the figure 9: and the same Pendant having the *white uppermost*, will represent the Cipher, or 0.—The *numerals* are repeated, by means of the other plain white Pendant. For instance, to express 15, hoist flag A, over flag B, with the colours as in the *Figure*. If in this state of things, the white pendant is put over the 5, it will be, thus, converted into a repetition of 1, and the expression will be 11. Again, suppose the 5 were hoisted uppermost, with the 1 under it (*see Figure 5th, a*), the expression would be 51. In this state, let the white pendant be hoisted over the 1, thus, turned into a 5 (*see Figure 5th, b*), and the expression will be 55.—In short, the white pendant displayed over the 1, the 2, the 3, or the 4, converts these figures, respectively, into a 5, a 6, a 7, and an 8. Again, the white pendant hoisted over the 5, the 6, the 7, or the 8, will change these numbers, relatively, into a 1, a 2, a 3, and a 4.—By this *simple contrivance*, duplicates of the flags A, and B, are saved. To express 99, hoist the C pendant with red uppermost, and the white pendant below. To express 90, hoist the broad pendant as 9, and the white pendant over it.—Thus, with two Flags and two Pendants, any number under 100, is readily expressed, and the Classes in the Dictionary, will not exceed sixty. Eight or nine Flags are, thus, saved, in ships of war having occasion for two sets of numerals. Allowing our armed ships to amount to 800, and that eight flags are saved in each, at

wenty shillings per flag, the number of flags saved would be 6400, amounting to £ 6400. Having, thus, shewn how ships may literally speak to each other *à la distance*, we shall proceed to state various modes of giving numbers as far as 999, by one movement, by means of a few flags, aided by a pendant or two, variously disposed.

Any Number as far as 999, expressed by means of six Flags, and one Pendant.

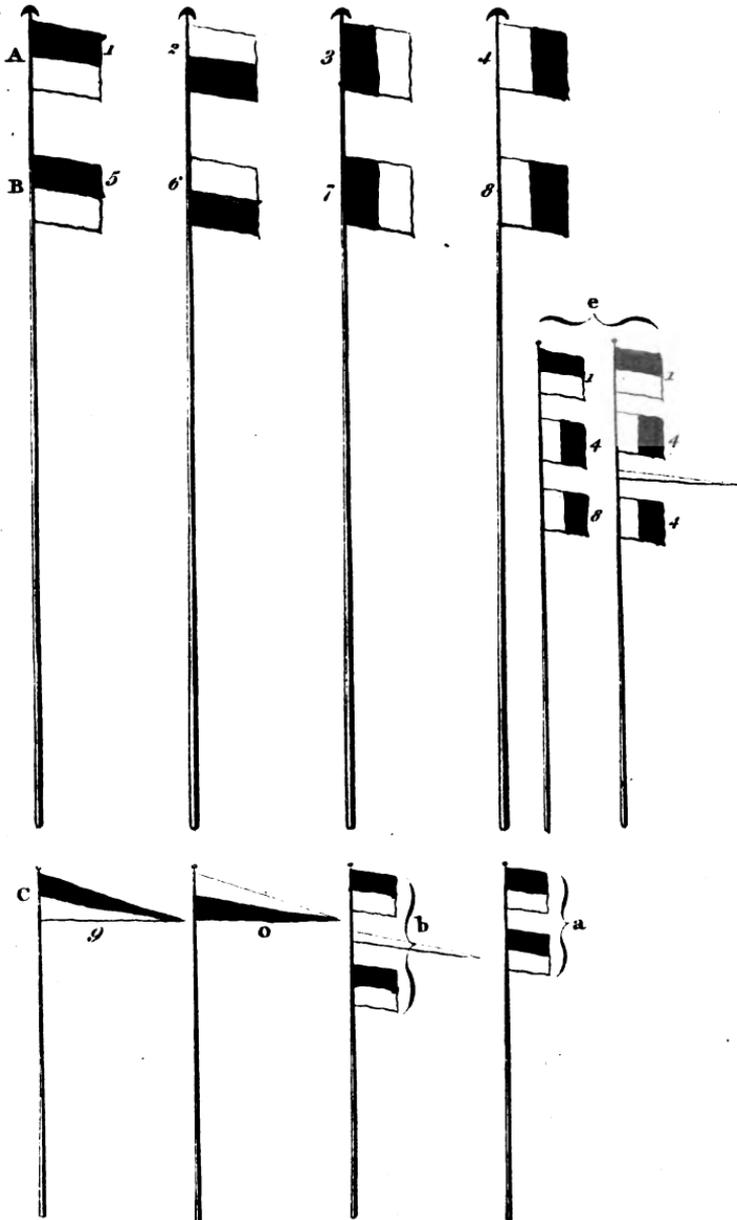
Let there be two flags similar to A, *Figure 5th*; and two flags similar to B. Let there be a blue flag which will always express the numeral 9. Let there be a plain flag to express the Cipher, or 0; and one white pendant. Here, any number under 100, may be expressed without the preceding converting power of the pendant; because there is a duplicate of the flag A, and of the flag B. For instance, to give 14, hoist flag A uppermost, with blue horizontal, and *uppermost*; and under it, the other flag A having the white colour perpendicular, and *nearest to the Mast*. This will give 14, being read downwards. If, in this state of things (see *Figure 5th, e*), flag B, as expressing 8 (yellow, perpendicular and *nearest to the Mast*) is hoisted lowermost, the expression read downwards will be 148. Suppose with all remaining in this state, that the pendant is hoisted over the lowest of the three flags, the pendant will be the means of converting the 8 into a 4, as formerly explained, and then the expression will be

144. In general, whenever any three of the figures 1, 2, 3, and 4, come together as a number, such as 144, or 441, &c. it will be necessary to hoist a B flag lowermost, with the pendant over it, so as to convert the 5, the 6, the 7, or the 8, which the B flag can express, into a 1, a 2, a 3, or a 4, according as any of these four figures may be wanted in the place of units lowermost. Again, whenever it may be required to repeat a 5, a 6, a 7, or an 8 under any of the figures, 5, 6, 7, or 8, in the place of *tens*, and *hundreds*, as 567 or 765, &c. a flag A, is to be displayed lowermost, with the pendant over it, and the pendant will convert the 1, the 2, the 3, or the 4, expressed by the flag A, into a 5, a 6, a 7, or an 8, according as any of these numbers may be required in the place of units. This is very obvious, and the contrivance saves having a triplicate of each flag A, and B. To express 50, hoist B flag expressive of 5, or red and yellow horizontal, and *red uppermost*, and the cipher flag below. To express 500, hoist the Cipher flag *over* the B flag expressive of 5, and this contrivance will give 500 in a very simple manner, as the cipher uppermost will *always* shew that some hundred, from one hundred, to nine hundred inclusive, is meant; and the flag below the cipher, *according to its expression*, will shew *what* hundred is meant.—The Pendant under the 9 flag, will repeat the figure 9; as for instance, the flag 9 with the pendant under it will be read 99. To express 909, hoist the 9 flag

uppermost, the cipher flag under it, and the pendant lowermost in the place of units, and it will be a display expressive of 999.—It remains to express 999. To do this, hoist the 9 flag, with the pendant over it, and this will *constantly* mean the odd number 999. The rule of using the flags A and B, is very simple, and easily retained by a Signal-Officer's memory. Let it *always* be remembered, that the flag B, when the lowest of three flags, expresses any of the numbers, 5, 6, 7, or 8, according as the red and yellow may be either horizontal, or perpendicular, as per *figure 5th*, and that if a pendant be put over that flag, such pendant will have the power of converting these numbers, respectively, into the opposite numbers 1, 2, 3, and 4.—The same applies, *vice versa*, to flag A lowermost of three flags, *without*, and *with* the pendant over it.—It is evident, that five flags are saved in every ship, by the above mode of giving the numerals. A set of flags, of this description, accompanied by the simple variegated set for giving the *Class of a word on the Foremast*, would be sufficient for every thing under a Frigate, producing a considerable saving, with equal perspicuity of effect, as by using two *full numeral sets*, making 22 flags, and two pendants.

Numbers as far as 999, might be given with one A flag, and two B flags, (or with one B flag, and two A flags), a Cipher, and a 9 flag; but in that case, *two* pendants would be wanted to convert the expression of the *two lower flags, occasionally*, into the opposite expression. The mode described is more eligible.

Figure 5.th





The very useful art of communicating numbers by means of coloured flags displayed as numerals; by means of variegated flags reduced by the aid of pendants; or by means of the combinations of masts, flags, and pendants, remains still, a subject for the exercise of ingenuity. A separate flag representing each numeral, seems to be deemed indispensable. The two foregoing articles evince the contrary. As farther instances of this, the following cases will shew how much may be effected with a few flags and pendants; and may induce those who have turned their minds to this curious subject, to prove, still more, the facility of signalling with *equal effect*, with *fewer Flags*.

A Mode of making 999 Signals, with three plain Flags, a Cipher-Flag, and three Pendants.

Let there be three flags, as a *white*, a *red*, and a *blue* flag: and three pendants, one *white*, the second *red*, and the third *blue*.

The white flag hoisted on the Foremast, will express 1

do. do. do. Mainmast, do. 2

do. do. do. Mizzenmast, do. 3

The red flag hoisted on the Foremast, will express 4

do. do. do. Mainmast, do. 5

do. do. do. Mizzenmast, do. 6

The blue flag hoisted on the Foremast, will express 7

do. do. do. Mainmast, do. 8

do. do. do. Mizzenmast, do. 9

The white flag, therefore, possesses three powers, 1, 2, and 3. The red flag possesses three powers, 4, 5, and 6. The blue flag has three powers, as 7, 8, and 9.—The white pendant hoisted under the white flag, shall express the *first power* of that flag; thus, hoist the white flag on the Fore, Main, and Mizzen Masts in succession, with the white pendant under it in these different situations, and the expressions will be, on the Foremast 11, on the Mainmast 21, and on the Mizzenmast 31. The red pendant under the white flag in any of these three situations shall express the *second power* 2 of the white flag; for instance, the red pendant under the white flag on the Foremast will express 12; the same on the Mainmast, 22; and the same removed to the Mizzenmast, 32.—The blue pendant under the white flag on any of the three masts, will express the *third power* of that flag, as 3; for instance, the blue pendant under the white flag on the Foremast, will indicate 13, the same on the Mainmast, 23; and the same removed to the Mizzenmast, will express 33.—The three pendants used, respectively, with the red flag, will express the *first, second, and third power* of that flag, as 4, 5, and 6. Thus, hoist the red flag on the Foremast with the white pendant under it, and the expression will be 44. Remove the same to the Mainmast, and the expression will be 54.—Remove the same to the Mizzenmast, and the expression will be 64. In lieu of the white, use the red pendant with the red flag on the three

masts, successively, and the expressions will be 45, —55,—and 65. In lieu of the red pendant use the blue one, and the expressions will be, 46,—56,—and 66.— These pendants, in the same manner, give the three powers, 7, 8, and 9, of the blue flag. Hoist the blue flag on the Foremast, Main, and Mizzen in succession, with the white pendant under it, in each of these situations, and the expression will be 77,—87,—and 97.—Put the red pendant in place of the white one, and the *second power* 8, of the blue flag will be denoted; as 78, 88, and 98. Make use of the blue pendant under the blue flag on the Fore, Main, and Mizzen, and the third power 9, of the blue flag will be denoted; as 79,—89,—and 99. Thus, in general, the rule arises, that the *white pendant* under any of the three flags, denotes the *first power of that flag*; that the *red pendant* denotes the *second power*, and the *blue pendant* the *third power* of any of the three flags. To express 10, 20, or 30, hoist the white flag on the Fore, the Main, and the Mizzen in succession, with the cipher flag under it.—To express 14, hoist the white flag on the Foremast, with the red flag under it. The same on the Main, would denote 25, and on the Mizzen 36.—To express 15, hoist the white flag on the Foremast, and the red flag on the Mainmast; and to denote that the reckoning *begins* on the Foremast, hoist any of the three pendants over the white flag. This rule will be general where two flags appear, *one, on each Mast*, in order to know which of the

two flags is in the place of *tens*, and consequently first reckoned, or counted from. To express 100, hoist the white flag on the Foremast, and the Cipher flag *over it*. This rule will be general, to give any of the *even hundreds*; as for instance 900, hoist the blue flag on the Mizzen expressive of the numeral 9, and the Cipher flag *over it*, will shew that 900 are meant. It might be expressed by hoisting the 9, the cipher next, and two pendants undermost to repeat the cipher, but the other mode is readier. To express 101, hoist the white flag on the Foremast, the cipher under it, and the white pendant lowermost, to express 1, the first power of the white flag. To express 102, in lieu of the white pendant, use the red. To express 103, instead of the red pendant, hoist the blue, which will, in the place of *units*, express 3, the third power of the white flag above, or uppermost. To express 104, hoist the white flag uppermost on the Foremast, the cipher next to it, and the red flag lowermost. To express 105, the white flag and cipher remain on the Foremast, and the red is removed to the Mainmast, where it expresses 5; and to *shew* that the reckoning *begins* on the Foremast, hoist a pendant over the white flag here, and the expression, beginning on the Fore, and terminating on the Main, will be 105. To express 110, hoist the white flag on the Fore, the white pendant expressive of its first power 1, under it, and the cipher flag lowermost. To indicate 111, hoist the white flag on the Fore, and the three pen-

dants under it without any attention to arrangement, and this will shew that the 1, expressed by the white flag, is *twice repeated*. This rule equally applies to any other figure twice repeated; as 444, hoist the red flag on the Fore to express 4, and the *three pendants below*, and it will readily be understood to mean 444. To express 112, hoist the white on the Fore, the white pendant under it to give its first power, 1, and the red pendant lowermost, to give its second power, 2. To denote 113, take away the red pendant, and put the blue pendant in its place, and the blue will express 3, or the third power of the white flag uppermost. To give 114, hoist the white flag uppermost on the Fore, the white pendant next to it, and the red flag undermost. To express 115, hoist the white flag on the Fore, the white pendant under it, and the red flag on the Mainmast as 5. To shew that the reckoning *begins* on the Foremast, hoist a pendant over the white flag. To express 120, hoist the white flag on the Fore, the red pendant under it, and the cipher lowermost. To denote 121, remove the cipher in the last instance, and substitute the white pendant. To express 122, hoist the white flag on the Fore, and the red pendant under it to express 2, the second power of the white flag, and one of the remaining two pendants hoisted *over* the white flag will shew that the 2 expressed by the red pendant, is *repeated*; the whole display giving 122. The constant rule arises, that a pendant *over* a flag on any mast, causes the figure denoted by the other pendant

under such flag, to be repeated. In such cases, as 133, 122, the pendant over the flag acts as a substitute to repeat the import of the one under the flag. To give 127, hoist the white on the Fore, the red pendant below it, and the blue flag lowermost, or giving 7 on the Foremast. To denote 140, hoist the white uppermost, the red flag next, and the cipher under, all being on the Foremast. Whenever a pendant appears under *two* flags, such pendant expresses the first, second, or third power of the *highest*, or upper flag, as 141 is denoted by the white flag, the red flag, and the white pendant on the Foremast, where the white pendant refers to the white flag *uppermost*. But when two pendants appear on any Mast, under two flags on that Mast, it is *always* to be understood, that the upper pendant expresses, according to the colour of such pendant, one of the three powers of the flag *immediately over it*. Thus, to express 144, hoist the white flag on the Fore, the red flag under it, and the white pendant under the red flag, with one of the two spare pendants lowermost, *merely to shew* that the white pendant refers to the lower, or red flag, and expresses 4, being the first power of the red flag. Hoist the white flag over the red flag, with the blue flag lowermost, all on the Foremast, and the number will be 147. In this last case, remove the blue flag to the Mainmast, and the expression will be 148, a pendant put over the white flag *shewing* that the reading *commences* there. To express 150, hoist the

white flag on the Fore, with a pendant over it; hoist the red flag on the Main, with the cipher under it, and it will be read 150, from the Fore to the Main-mast; the pendant over the white flag indicating *where* the reading *begins*. To express 151, hoist the white flag on the Fore, with the white pendant under it, and the red flag on the Main to indicate 5. Now, to shew that the 5 is to be read as the *second figure*, or in the *place of tens*, hoist *two pendants* over it. The two pendants over the 5 shew that it is to be read as the second figure next to the 1, given by the white flag, and before the 1 indicated by the pendant. This is very simple, for when two pendants appear over a flag, the number denoted by such flag is to be read in *after* the number given by the upper flag on the other Mast. To express 154, hoist the white on the Fore, with a pendant over it, the red on the Main to express 5, and the white pendant under it, to express 4 the first power of the red flag. To express 157, hoist the white flag on the Fore, with the blue flag under it, and the red flag on the Main with two pendants over it. The white flag will be *first* read, and the red *next*, on account of the pendants shewing it to be the *second figure* in the *place of tens*, and *lastly*, the blue flag will be reckoned in the *place of units* on the Fore; the whole making 157. To express 158 hoist the white flag on the Fore, with a pendant over it, the red flag on the Main, with the blue flag under it there to denote 8; and the whole will express 158, beginning with the white,

because a single pendant shews it to be in the place of *hundreds*. To indicate 159, a flag will appear on *each Mast*. The white flag on the Fore will give 1. The red flag on the Main, will give 5, and the blue flag on the Mizzen will indicate numeral 9. Here, a pendant is hoisted over the white flag, to shew that the reading *commences there*. The other two spare pendants are put over the red flag on the Main, to shew that this flag is read *next*, and the blue flag on the Mizzen will, of course, be the last figure in order; the whole making 159. The white flag on the Fore, with a pendant over it, and the red flag on the Mizzen with the white pendant under it, will denote 164; because the red flag on the Mizzen is number 6, and the white pendant under it, gives 4, the first power of the red flag. To express 168, hoist the white flag on the Fore, with a pendant over it, to shew the reading commences there: hoist the red flag on the Mizzen, to express 6, with two pendants over it, to shew it is to be read as the *second figure* in the *place of tens*: hoist the blue flag on the Main expressive of number 8, and the whole will be read from the Fore, to the Mizzen and Main, 168. To denote 199, hoist the white flag on the Fore, with a pendant over it, and the blue flag expressive of 9, on the Mizzen, with the blue pendant under it, to express the other 9; the blue pendant giving 9, the *third power* of the blue flag. When ships have only two Masts, the Mizzen Peak will be used as a Mizzen Mast. We have *copiously* exemplified this beautiful

system of signalling, and the instances specified under the white flag on the Foremast, shew in what manner any number as far as 999, is denoted, when any of the other two flags appear uppermost on any Mast. A person trying this amusing process, should have before him, three bits of stick representing three Masts; three square rags, representing a white, a red, and a blue flag; and three triangular long rags, representing the white, red, and blue pendants.

By having three portable masts, this system may be useful for Military purposes.

Even the Cipher flag might be dispensed with, by having a *coloured compartment* in the corner of each flag. When a cipher is expressed, one of the three flags is *always* out of use. This flag with the *corner compartment downwards, or inverted*, would *distinctly* represent the cipher when wanted.

To make 999 Signals with three Flags, three Pendants, and a Cipher Flag, by indicating the intended Number, on one Mast.

Let there be three Flags, the first, half blue, half red; the second, half red, half white; and the third, half blue, half yellow. It is evident that each of these flags can be hoisted four different ways. Three of these modes of hoisting, will answer the present purpose; for instance, the first flag hoisted with stripes horizontal, and blue uppermost, will indicate number 1. The same with the red stripe uppermost will indicate number 2. The same with the stripes

perpendicular (it being unnecessary to attend to having the blue, or red stripe next the Mast) will denote number 3. In a similar manner, the second flag displayed in three different manners, will give the numerals, 4, 5, and 6. The third flag hoisted in three different manners, will give numerals, 7, 8, and 9. The three pendants, white, red, and blue, will, as before, express the *first*, *second*, and *third* power of each flag. The pendants act, precisely, as in the last detailed case; and as the figures are all exhibited on *one mast*, a pendant hoisted over a flag to shew it to be in the *place of hundreds*, or two pendants put over a flag, to mark such flag to be in the *place of tens*, are things here, not required to be attended to. With this exception, all the other variations exemplified in the last case, are here applicable. This will appear, if the reader will run over the cases as far as 200, by means of variegated rags representing three flags, and three pendants. This mode of signalling is extremely simple, and will be found useful in Merchant-vessels. Such vessels, on meeting a Man of War, would display the three flags, and three pendants, to indicate that by *their means*, it was intended to communicate. The Signal Officer being supposed conversant in *all modes* of numerical communication, would be competent to understand the signals made. It may be proper to observe here, that when signals are made on three Masts, at a Signal-house, or on two Yardarms, and a Masthead, the person making the signal at the *fixed station*, is supposed standing

with his back to his station, and looking towards the ship telegraphed. Thus situated, the Mast, or Yard-arm on his right, is to be reckoned the Foremast, and the one, or the other, on his left, the Mizzenmast. The person, again, on board the ship, and watching the Signal-post, will always reckon, from his own left, which corresponds to the right hand at the Signal-house. It is a most material matter that those respective situations should be clearly understood, relative to Land, or Sea Telegraphs, and to these, respectively, communicating with each other.

To make 999 Signals with three broad Pendants, and a long Pendant, only.

Let there be three large pendants, as *white*, *red*, and *blue*. The first is to be termed the *hundreds pendant*; the second, the *tens pendant*; and the third, or blue, the *units pendant*. The Nine numerals, and cipher will have a relative *fixed situation* assigned to each, is follows, viz.

The Foretopgallantmast-head	will be numeral	1
The Maintopgallant	do.	do. 2
The Mizzentopgallant	do.	do. 3
The Foretopgallant-Yardarm	do.	4
The Maintopgallant	do.	do. 5
The Mizzentopgallant	do.	do. 6
The Foretopsail-Yardarm	do.	7
The Maintopsail-Yardarm	do.	8
The Mizzentopsail-Yardarm	do.	9
The Mizzen Peak	will be the place of the	0

The Starboard, or Larboard Yardarms will be the *invariable situations of their respective numerals*, according as the Ship, Ships, or Signal-house telegraphed, may be situated. If the studding, or steering sails-booms are run out, the signals will be distinctly perceived, even though the sails may be hoisted at the time. Two, or three examples, will be sufficient to explain the manner of denoting numbers by means of *fixed and invariable points*. Suppose number 1 were to be expressed; hoist the blue, or *units-pendant* on the Foremast, being the *fixed point* expressive of 1. Suppose 10 were to be signalled, hoist the *tens pendant* on the Fore, and the *units pendant* on the Peak, and it will be read 10. If in this case, the white, or the *hundreds pendant* is put instead of the *tens pendant*, the expression would be 100. The long pendant may be hoisted at the Peak along with, and under the *units pendant*, in expressing the even hundreds, as 100, 200, &c. To denote the number 698, hoist the blue, or *units pendant* on the Maintopsail-yardarm being the *fixed point* expressive of 8; hoist the *tens pendant*, or the red, on the Mizzen-top-sail-yardarm, being the *fixed point* expressive of 9; hoist the *hundreds pendant* on the white, on the Mizzen-top-gallant-yardarm being the *fixed point* expressive of 6, and the whole would be read 698, beginning, of course, with the *hundreds-pendant*, taking the *tens-pendant* next, and concluding with the *units-pendant*. When a figure is to be repeated, as for instance 11, hoist the *tens-pendant* on the

Foremast, and the long pendant immediately *under* it, will shew it is to be repeated. Where a figure is to be twice repeated, as 111 for instance, hoist the *hundreds-pendant*, or the white, on the Foremast, and the long pendant hoisted *over* it, will indicate that 1 is to be taken three times. To express 123, hoist the white, or *hundreds-pendant* on the Fore; the red, or *tens-pendant* on the Main; and the blue, or *units-pendants* on the Mizzen, and it will be read (attending to what each Mast means) from the place of *hundreds* to *tens*, and ending with *units*, 123.

If a ship has only two Masts, the Fore, Main, and Peak will give numbers 1, 2, and 3. The Six Yard-arms will give the other fixed points for numerals 4, 5, 6, 7, 8, and 9. The cipher may be indicated half way down the Mizzenpeak-haulyards.

To make 999 Signals with one broad Pendant.

Let the situations of the nine numerals and cipher be *fixed*, as described. A number is indicated by displaying this solitary pendant in the situation *fixed* for the figure, allowing not less than one minute of time, between each display. For instance, to express 123, first hoist the *solitary pendant* on the Fore, to express 1. By a rope-messenger let it be transmitted to, and hoisted on the Main, to denote 2; and in the same manner, let it be conveyed to, and hoisted on the Mizzen, to express 3; the three figures indicated

in succession, making 123. To give the same figure repeated, as 22, hoist the pendant twice on the Main, with an interval of a minute between each display. With one variegated flag, any number may be given on the three Masts *without having recourse to the Yardarms*. Let there be one flag, half blue, half red. This flag hoisted with the blue horizontal, and uppermost, on the Fore, Main, and Mizzen, in succession, would indicate numerals 1, 2, and 3. The same flag with red uppermost, would indicate numerals 4, 5, and 6. The same flag with stripes perpendicular, and blue nearest to the Mast, would indicate numerals 7, 8, and 9. With stripes perpendicular, and red next to the Foremast, the cipher would be given. For example, to express 123, hoist this flag with blue uppermost, and horizontal, successively, on the Fore, Main, and Mizzen Masts, and the numbers, thus, denoted will be, collectively, 123. The same process is applicable to any other number; attending to the colour uppermost, or next to the Mast, and in reference to the Mast on which the *lonely flag* appears, indicative of some single number, or of the cipher; the process when terminated, giving the number meant to be communicated.

*To make 999 Signals by means of three variegated
Flags, and three fixed Points.*

It may be said, that the sails of a Ship may shade the Yardarms so much, that a broad pendant dis-

played in these situations, might not be readily perceived, more especially at the distance at which colours can be distinguished with good Glasses only. Though this objection may not be very valid, it is obviated by making the signals on the *three masts only*; and in Gun-brigs, on the two Masts, and Mizzen-peak. Let there be three flags, the first, or *hundreds-flag*, half blue, half yellow; the second, or *tens-flag*, half red, half blue; and the third, or *units-flag*, half red, half white. Now, with each of these flags, in reference to the *three Masts*, nine numerals, and the cipher, are readily furnished by each flag. Hoist the first, or *hundreds flag* on the Foremast with blue horizontal and uppermost, to represent number 1. The same on the Mainmast, will give number 2. The same on the Mizzen, will give number 3. Hoist this flag, with yellow uppermost, and horizontal, on the Foremast, to express number 4. The same on the Main, will give number 5. The same on the Mizzen will give numeral 6. Hoist on the Foremast, the same flag with the stripes perpendicular, and blue *next* the Mast, to express numeral 7. The same on the Main, will give numeral 8. The same on the Mizzen will give numeral 9. To obtain the 0, or cipher, hoist this flag on any of the Masts, with stripes perpendicular, and with the yellow nearest to the Mast. It is evident, that the nine numerals and cipher, will be obtained similarly, with *each* of the other two va-

riegated flags. Thus, we have three sets of numerals. In reading any number, the figure indicated by the *hundreds-flag* is *first* reckoned. The number expressed by the *tens-flag* is next read; and lastly, the number indicated by the *units-flag*. Thus, to express 123, hoist the *hundreds-flag* on the Foremast with blue uppermost, and horizontal, to denote 1. Hoist the *tens-flag* on the Mainmast, with stripes horizontal, and red uppermost, to denote number 2. Hoist the *units-flag* or the Mizzen, with stripes horizontal, and red uppermost, to denote number 3. These flags considered with regard to the *Mast* they are respectively on, and with regard to the *colour* uppermost, will be read, according to their order of *hundreds, tens, and units, 123*. Sometimes, the three flags will appear (in about a third part of the cases) on the same Mast, as 999, &c. where they all appear on the Mizzenmast. All this is readily exemplified with a few variegated rags and sticks representing flags, and Masts. It is never required to express a cipher with the *hundreds-flag*, as no number can begin with a cipher. When two figures are expressed, the *tens* and *units-flags* are used. When a single figure is to be expressed, the *units-flag*, of course, is used alone. If each flag were hoisted three different ways on the Foremast, to give numerals 1, 2, and 3; three different ways on the Mainmast, to give numbers 4, 5, and 6; and three different ways on the Mizzen, to give numerals 7,

8, and 9, the effect would be exactly the same, as by the mode specified. This method of making 999 signals by means of three flags only, may prove very serviceable for Military purposes, in the Merchant Service, and at fixed Signal-house Stations. A Vessel intending to signal with these flags only, would hoist them, the *hundreds-flag* uppermost, the *tens-flag* next, and the *units-flag* lowermost, and the three at *some distance* from each other. The Ship addressed would hoist an *acknowledging-flag*, intimating that the display was understood to be the means of signalling.

We could here, in many various manners, have united with a flag and pendant-system, different combinations of flags, balls, and pendants, in order to express numbers; but on sufficient grounds we disapprove of balls, where colours can be distinguished. Balls, besides, are found to be of rather an unmanageable bulk and volume, and without a troublesome *repetition*, afford no variety in comparison to the simplicity of colours.

A Mode of signalling when the Colours of Flags cannot be distinguished, on account of Distance.

Any two flags, and two board pendants, will be sufficient to afford the nine numerals, and the cipher on each Mast, the Mizzen-peak being used, where there is no Mizzenmast.

x

Any One flag will express	- - - - -	1
Two flags will express	- - - - -	2
One flag with a broad pendant over it, will express	- - - - -	3
One flag with a broad pendant under it, will express	- - - - -	4
One flag with a pendant above and below it, will express	- - - - -	5
One flag with two pendants over it, will express	- - - - -	6
One flag with two pendants under it, will express	- - - - -	7
Two flags with a broad pendant over them, will express	- - - - -	8
Two flags with a broad pendant under them, will express	- - - - -	9
Two flags with a pendant between them, will express	- - - - -	0

N.B. Where a pendant, or pendants cannot be distinguished, a ball, or balls may be substituted.

The display on the Foremast, will express the figure in the place of *hundreds*. The display on the Mainmast will denote the figure in the place of *tens*. The display on the Mizzen will express the figure in the place of *units*. When *units* and *tens*, or two places of figures only, are to be exhibited, no display, of course, is required on the Foremast. When a simple unit is to be expressed by itself, such will appear on the Mizzen. Requisite preparatory, executive, acknowledging signals, &c. may be made,

by hoisting the cipher-combination on the Foremast, with any numbers, as far as 99, on the Main and Mizzen together. When a *small*, and frequently occurring word is meant, any flag at the Mizzen-peak, will intimate this, in cases where the *Dictionary* is made use of. This is all so extremely simple, that there is no occasion to enter into the detail of this *distant mode of signalling*.

Description of a Nocturnal Naval Telegraph for Ships of War, or others.

The common lights used at sea, may be adapted to an *obscurer* on the principle described under the *Terrestrial Nocturnal Telegraph*. The Marine Telegraph for night purposes, will consist of two sets of lights, having four lights in each set. The four lights belonging to the set giving *tens*, will be hoisted, number 1 at the Foretopgallant-mast-head; number 2 at the Maintopgallant-mast-head; number 3, at the Mizzentopgallant-mast-head; and number 4, below the Mizzen-peak. Two lights will be hoisted lower down, near the Mainmast, as *distinguishing centre-lights*. Numbers 1, 2, 3, and 4, obscured in succession, and leaving the other three lights in view, or displayed, will give, respectively, numerals 1, 2, 3, and 4. Lights 1 and 2 obscured, will give numeral 5. Lights 1 and 3 obscured, will give numeral 6. Lights 1 and 4 obscured, will give

numeral 7. Lights 2 and 3 obscured, will give numeral 8. Lights 2 and 4 obscured, will give numeral 9. Lights 3 and 4 obscured, will give the cipher, or 0. The two *distinguishing lights* suspended near the Mainmast, under the second light at that mast head, will prevent the possibility of mistaking the relative obscuration of the lights. Let the second set of four lights be suspended perpendicularly, between the Fore and Mainmasts, and at the distance of twelve feet from each other. These lights will be reckoned 1, 2, 3, and 4 downwards; and will afford a set of numerals and a cipher, precisely similar to the set along the Mast-heads. The lower *distinguishing light* near the Mainmast, will be suspended as high as, or on a level with the second light of the *perpendicular set*. This lower *distinguishing light* will exclude the possibility of mistaking the obscurations expressive of numerals on the perpendicular set of lights. One person holding the four numbered cords leading down from the perpendicular lights, will be sufficient to work this set. The Masthead lights will require a person to work each light. These workers will be numbered, and addressed, as numbers 1, 2, 3, and 4. The sets of lights, like the four boards, afford 15 combinations, or changes: and by displaying the cipher on the higher set, with any of these combinations on the lower set, fifteen preparatory, and other signals, are obtained. The expression of the 14 very common

words, may be provided for, as described under the Nocturnal Land Telegraph. It is superfluous to give examples here, as numbers are indicated, precisely, in the same manner, as on the *Terrestrial Nocturnal Telegraph*; the higher set of lights corresponding to the Left-hand set of Posts, and the lower set, to the Right-hand set of Posts. It is to be remarked, that two movements are necessary to give three places of figures; and that the last figure in the place of *units* (as often as three figures are to be indicated) must *always* be telegraphed on the lower set, for the reasons mentioned in describing the Land Nocturnal Telegraph. For instance, suppose the number of a word in its Class, or the number of a Sentence in the Naval Code, were 124. Obscure (after making the preparatory Signal, and receiving the signal of acknowledgment) light 1 on the Foremast, and light 2 on the lower set. These two figures will be 12. Shew all the lights clear, as originally, and then obscure light 4 on the lower set. The 4 written after the 12, will make the whole number 124, consisting of three figures. Were the last figure 4 given on the *higher set*, it might be mistaken for Class 4 belonging to the next word, or it might mean (if sentences in the Code were in communication) Sentence 4 in that Code. By giving the last of three figures on the lower set, such *equivocal* is completely avoided, because any single figure indicated there, *must, necessarily*, belong to two figures antecedently given. When a *small, and fre-*

evently occurring word is meant, the *higher of the two distinguishing lights*, would be obscured. Where vessels have no Mizzenmast, light 3 of the higher set, may be displayed at the peak, and light 4 low down the peak-haulyards.

It is always found eligible to avoid a multiplied number of lights; but three sets of lights, and consequently, three sets of numerals, might be had, by suspending the third set, perpendicularly, between the Main, and Mizzen Masts, and the *unit* would always be indicated on this set of lights. But as communication by Dictionary, may be carried on by means of two sets, and as such communication is rarely wanted at Night, two sets of lights, or even the one Set at the Mastheads may well suffice for communicating Sentences in the Naval Code. It is not adviseable to blend the firing of Guns with signals made by lights, excepting in the making of preparatory, and other after and preceding signals, by means of Guns. When numerals are given by combinations of sounds, there is always a chance, more especially in quick discharges, and when the object is distant, that the sounds may coalesce, or run into each other. When lights can be distinctly seen, they always speak best for themselves.—*N. B. Ships signalling will fall off a few points, in order to display the lights.*

On Fog Signals.

When lights cannot be seen, no resource remains excepting that of indicating Numerals by the sound

of Cannon. This is done by establishing longer and shorter intervals between each sound. Nine seconds may be taken as a proper interval between guns fired slowly; and between the number of guns fired in the slow and quick manners. Five seconds may be a proper interval between guns fired in quick succession. On this principle, the Nine Numerals, and Cipher, may be denoted by Guns, and such means differently used, may now probably be in practice.

1 Gun will express number	- - - - -	1
2 Guns with the slow interval do.	- - - - -	2
3 do. do. do.	- - - - -	3
4 do. do. do.	- - - - -	4
1 Gun, a slow interval, and 2, with a quick interval will indicate numeral	- - - - -	5
1 Gun, a slow interval, and 3 Guns with quick intervals,	- - - - -	6
2 Guns with a quick interval,	- - - - -	7
3 do. do. do.	- - - - -	8
4 do. do. do.	- - - - -	9
2 Guns with a slow interval, and 2 Guns with a quick interval, will give	- - - - -	0

It must, always, be understood, that a slow interval is to be allowed *before* the quick guns commence. Between giving any numeral, and the succeeding one, it will be eligible to reckon a *double long interval*, or 18 seconds. These long and short intervals, may be accurately reckoned by means of sand-glasses.

The most essential Night evolutions might be extracted from the Code, and numbered, distinctly, by themselves. A preparatory Gun-signal would indicate reference to this select nocturnal code. The number of any Sentence in this Night Code, would then be denoted by Gun-signals similar to the above. If the Guns are fired with a *strict attention* to the established intervals, ascertained by corresponding sand-glasses, mistakes which might otherwise happen, may be obviated. If a Gun-signal of *not understanding* is made, the process must be repeated till the acknowledging Gun-signal is heard; as, without this, much confusion and danger might ensue.

The number of Signals which it may be necessary to have recourse to, in order to effect any indispensable movement during a fog, will not exceed 99; consequently, the telegraphing of *two numerals* to point out a sentence in the Night Code, will answer that purpose. The numerals are indicated by means of four guns fired variously, as described; but to establish a clear distinction between the expression of the numerals, and that of preparatory, directive, executive, acknowledging, and other signals, we would recommend that these signals be always made with not less than five guns combined in slow and quick time.

The various suggestions on the subject of making the usual number of 999 signals, with fewer flags

than are now in use, were forwarded by Lord Grenville's directions, to the Board of Admiralty, in case some of the methods proposed; might be found serviceable in any respect, in the Navy, or in Merchantmen. The following polite answer was returned.

“ SIR, *Admiralty Office, 22d Dec. 1806.*

“ Having laid before my Lords Commissioners of the Admiralty your plan of Naval Signals, I have their Lordships' commands to acquaint you, that they are much obliged by the communication you have made to them; but as the Signals now in use, have been circulated at a great expense to all the Ships in His Majesty's Service, and answer every purpose required of them, their Lordships do not think it advisable to make any alteration therein.

“ I am, Sir,

“ Your very humble Servant,

(Signed)

“ B. TUCKER.”

Mr. John Macdonald.

In some ships in the Navy, the communication of words, by signalling the letters, and in some cases, the syllables composing them, is sometimes practised. A methodized numerical plan solving the standing difficulty of managing the Inflexions of Verbs, has been long a great desideratum in the Navy. We trust our *Telegraphic Dictionary* so readily applicable to the Flag-system, completely provides for this essential want. We have shewn that, by one

flag-movement, *any inflexion, or word*, may be, at once, communicated. In entering on this interesting subject, it was necessary to take a short view of the rise and progress of the Naval Code, and of the flag-numeral-plan. We have stated, there, a variety of useful combinations of flags and pendants giving numerals by different methods, to induce others to try how far the subject has been exhausted. The Navy is the principal source of the glory and safety of the Empire. We contemplate its exalted fame with pride and exultation. The gallant men who reflect honour on a glorious profession, will appreciate justly what is offered, with all deference, for their consideration.

FINIS.



ERRATA.

- Page 72, top line, for L to N, read L to P.
 73, Parts ought to be numbered 557, and Parted 558.
 83, after number 153, read number 154, and not 54.
 84, after number 44, read 45, and not 4.
 108, line 5, for left-hand, read right-hand.
 lines 6 and 7, the words or boards should be omitted.
 119, line 8, for half an inch, read an eighth of an inch.
 164, line 25, for here, read there.

Directions to the Binder for placing the Plates.

- Plate I. to face Page 52.
 II. to face Page 106.
 III. to face Page 124.
 IV. to face Page 130.
 V. to face Page 160.



