THE

LIFE

OF

EDWARD JENNER, M.D.

VOL. I.


Berkeley, Dr Jenner's Hut in the Chantry Garden.

Sir T. Lawrence, P. R. A. W. H. Mote.

Edw. Jenner

M. D. F. R. S.

FISHER, SON & CO. LONDON & PARIS, 1838.

THE

LIFE

OF

EDWARD JENNER, M.D.

LL.D., F.R.S.

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY GEO. IV.

FOREIGN ASSOCIATE OF THE NATIONAL INSTITUTE OF FRANCE,

&c. &c. &c.

WITH

ILLUSTRATIONS OF HIS DOCTRINES,

AND

SELECTIONS FROM HIS CORRESPONDENCE.

BY

JOHN BARON, M.D., F.R.S.

LATE SENIOR PHYSICIAN TO THE GENERAL INFIRMARY, AND CONSULTING PHYSICIAN TO THE LUNATIC ASYLUM AT GLOUCESTER, FELLOW OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON, &c. &c

IN TWO VOLUMES.

VOL. I.

LONDON:

HENRY COLBURN, PUBLISHER,

GREAT MARLBOROUGH STREET.

1838.

JENNER, Edward [1749-1823]

CONTENTS.

CHAPTER XIII.

CHAPTER XIV.

INTRODUCTION.

THIS work has been composed from materials of the most authentic description, the whole of the notes and correspondence of Dr. Jenner having been put into my hands by his executors. My close and unreserved intercourse with him, and my intimate knowledge of his sentiments and habits of thinking on all subjects during the last fifteen years of his life, probably induced them to believe that I was not an unfit person to draw from such sources an accurate delineation of his character and opinions.

Many reasons, with which I need not trouble the public, would have induced me to shrink from the labours of such a work; and nothing certainly could have reconciled me to the attempt had I not been influenced by the most sincere veneration for the name of Jenner, and by the conviction that the confidence with which he honoured me *did* afford me facilities for acquiring an insight into his feelings

and motives, by which I have been enabled to speak without hesitation or doubt on all those points that most concerned either his conduct as a man, or the nature of his doctrines.

Notwithstanding these encouragements, I cannot but own that I have entered upon this undertaking with a degree of anxiety in which I can scarcely expect any to sympathize. I trust that I am not deceiving myself when I say that nothing of a personal nature prompts this avowal. It is of moment that a true and faithful portrait should be drawn of so distinguished an individual; that those, who have admired and extolled him as a great benefactor of our race, may know that on many other grounds he was worthy of their highest regard and warmest affection. It cannot be expected that there should be an uniformity of sentiment on momentous questions of a professional or scientific nature, but I shall ever have cause to lament if, through any defects of mine, the kindness, the rectitude, the consistency, and the unextinguishable ardour and devotedness of Jenner in a glorious cause do not shine conspicuous in every act of his long and laborious life.

On a knowledge of these things my pretensions as his biographer chiefly rest. If I have failed in imparting that knowledge I shall have a cause

for regret which no deficiency in any other part of my design could occasion. The world at large has felt and acknowledged the blessings of his great discovery; but few are aware how numerous were his claims to admiration. For these reasons I have been anxious in the early part of this work to disjoin, as much as possible, his private character, and his acquirements as a naturalist, from that important subject which has so extensively occupied the public mind and caused his other numerous titles to consideration to be overlooked.

It must, at the same time, be remembered that Doctor Jenner was nearly fifty years of age before he published his first work on the Variolæ Vaccinæ. The whole of the early part of his life having been spent in comparative seclusion, it cannot be expected that it should afford those materials which best suit the purposes of the biographer. His epistolary intercourse with Mr. Hunter has enabled me to fill up a space in his life that could not otherwise have been supplied. Unfortunately, all Jenner's replies to Mr. Hunter have been destroyed; and had it not been for his printed papers, we should have been left in total ignorance of the result of the inquiries to which his letters to Jenner refer. Notwithstanding this circum-

stance, I have not refrained from publishing many of those letters. Mr. Hunter was too remarkable a character in many respects, and his name is too intimately associated with the progress of natural history and physiology in this country, to permit me to doubt for a moment, that whatever fell from him in his correspondence with such a man as Jenner, will be favourably received by the public.

After thus endeavouring to trace Jenner's history in early life, I have brought together various incidents to illustrate the progress of his mind in effecting the discovery of Vaccination. This detail will, I trust, show alike the force and originality of his genius and the benevolence of his purpose. From the time of his first successful vaccination in 1796 to the last hour of his existence he laboured incessantly to disseminate the practice. In every instance where it was had recourse to; in whatever clime, or under whatsoever circumstances it was performed, his name and reputation were either directly or indirectly associated with it. This peculiarity has so much identified vaccination with Jenner that it is impossible to think of him or to speak of him, as he deserved, except in conjunction with its magnificent and animating course. In this respect he stands pre-eminent; and it cannot but be interesting to

those, who have reflected upon what has been brought about by his means, to be assured that his private demeanour well accorded with his public reputation; that he lived with the generosity of a good man, and the simplicity which befits a great one.

While thus delineating his personal qualities I have endeavoured to elucidate his doctrines relating to that subject in which all must feel so deep an interest. My duty on this point has led to a discussion that some may think foreign to the object of a biographical work. I am induced to hope, however, when all things are duly considered, that I shall stand excused not only for bestowing pains in placing Dr. Jenner's opinions in a proper light, but for collecting from different sources such scattered rays of knowledge as may tend to explain and confirm them. He drew his conclusions from the pathological facts which he had an opportunity of observing. These conclusions, it will be found, are verified in a remarkable manner by observations made in different ages, and in different countries.

Had I, therefore, been guided merely by what was due to him, I could not but attempt to explain and vindicate his views. In so doing, I trust it will be found that I am assisting that great cause in which his life was spent; that I am bring-

ing past experience and the unprejudiced testimony of impartial witnesses to confirm the decisions which his own investigations led him to; and that therefore, in rendering justice to him, I am giving greater force to his doctrines, and increased confidence in the practice founded on them.

Influenced by these considerations I have, after detailing the early history of vaccination, brought together much that seemed to bear upon the literary and medical history of cow-pox, as well as of small-pox. The nature of the former cannot be understood without well examining the properties of the latter. They agree in some very essential particulars; but the points in which they differ, so far as the welfare of the community is concerned, it is of more importance to insist upon. At present it may be sufficient to remark that the coincidences, as well as the peculiarities, of each affection are best elucidated by combining the examination of their pathological character with their literary history. Under this last head, I would hope that some information has been collected not uninteresting in itself, but possessing a higher value from its connection with the grand results of Dr. Jenner's investigation.

Great care has been bestowed in tracing this

history; and though many may be surprised at the conclusions to which it leads, I nevertheless trust it will be found that nothing has been lightly advanced. My own mind was quite unprejudiced, and the views which I am inclined to adopt have arisen entirely from a close examination of the evidence, and not from any preconceived opinions. They were first suggested on examining the description of Philo Judæus, as referred to in Dr. Willan's posthumous work on the antiquity of small-pox; and from meditating on the nature and properties of cow-pox. My own attention having been thus excited, the natural and medical history of the eruptive diseases of man, and of the inferior animals, necessarily became an object of inquiry. The number of instances in which it appears that a disease of this class affects different orders of animals, and is communicable to the human species, has given a degree of interest to this inquiry which I could scarcely have anticipated. That interest is infinitely enhanced when we consider how much the safety and happiness of mankind are connected with the great discovery which this discussion is meant to elucidate.

The whole subject is a curious and important one; and it may with truth be affirmed that in

no former instance did historical evidence and remarkable pathological phenomena so singularly and beneficially throw light on each other. In this part of my subject, more especially, I have to acknowledge the deepest sense of obligation to two kind friends, Richard Gamble, M. D. Oxon. and the Reverend John Webb, A.M. Oxon. who have aided me by their learning and research.

Throughout this discussion my first object has been to endeavour to throw some light on the nature of cow-pox itself. My next has been to prove the justness and accuracy of Dr. Jenner's main doctrines. As the benefits which might have resulted from his discovery have, manifestly, been circumscribed by erroneous views on both these points, I was solicitous to collect such a body of evidence as might tend to remove these errors. In executing this design I have been compelled to break in upon the chronological order of events, by deducing from the whole experience of vaccination such an accumulation of facts as ought to convince the most sceptical that nothing but the proper extension of the practice is necessary to accomplish all that its benevolent author promised.

Intimately as Jenner's name and character were connected, and always must be, with every instance

of vaccination, I wish it to be distinctly understood that I am not to be considered as the *historian* of *that practice.* The events which arose from its first promulgation were unspeakably interesting to him. These, therefore, have been recorded with great care and fidelity. I have felt this to be a delicate part of my duty, because it required me to bring forward many incidents which I would gladly have allowed to fall into oblivion. In placing his conduct in its true light I have studied to be equally just to that of others, as no statement has been delivered that is not corroborated by original and authentic documents.

I have abstained entirely from taking any part in the violent and discreditable controversy which arose out of the vaccine discovery. Although Dr. Jenner was the object of many harsh and unfounded aspersions, he never thought it necessary to weaken that strong position, which truth and knowledge had enabled him to take, by replying to them. The utmost vigilance of those who ignorantly assailed either his conduct or his doctrines, has left no stain upon his name. All, therefore, that is required of me is plainly and distinctly to describe his actions; and to leave them to speak both for his genius and his virtues.

In treating of the progress of vaccination I have confined myself to such incidents as were either immediately directed by Dr. Jenner himself, or were of a striking nature from their magnitude, or the station of those engaged in them. Had not my design been limited in this way, it would have been a sincere gratification to me to have made mention of many individuals who distinguished themselves by zealously promoting the practice. Their co-operation was gratefully felt by Dr. Jenner; and whenever the history of vaccination shall be fully recounted, their services will not be overlooked.

The private history of Jenner and of his labours could only be fully derived through those channels of information which have been open to me. I have selected such facts as are for the most part new, I believe, to the public. In order to authenticate the narrative, and to impart to it that spirit which original documents alone can give, I have embodied such as appeared to me most interesting, in the text. I have preferred this method either to that of printing them as an appendix, or in the form of notes. One of the chief reasons for this decision arose from the nature of the transactions that I was called on to record. Many of them regarded the conduct of

individuals; and I saw no method of escaping charges of partiality or unfairness except by bringing forward proofs that cannot be denied, and which will show that I have dealt honestly by all. In a question which has in a peculiar degree excited strong feelings, both with the public and in the profession, I can scarcely hope to have written, on all occasions, so as not to have called up recollections of an unpleasant kind in the minds of some. However this may be, I trust it will be apparent that truth and moderation have guided me throughout the whole work.

Many of Dr. Jenner's own letters are published from copies transcribed by himself into his note-books. He appears sometimes to have omitted the introductory and concluding sentences; and very frequently the precise dates. These circumstances will account for an abrupt termination of some; and likewise for any deviation that may be noticed between the manner of expression in the copy and the original.

For almost all his early letters I am indebted to his friend the late Edward Gardner, of Frampton-upon-Severn, who bequeathed them to me on his death-bed. These, together with those addressed to

myself, form a series which touches on almost every subject of interest, whether of a public or domestic nature, during the last forty years of his life.

I have also had letters and extracts of letters transmitted to me by Colonel Berkeley, Thomas Paytherus, Esq., Henry Hicks, Esq., James Carrick Moore, Esq., Charles Murray, Esq., and Henry Jones Shrapnell, Esq., to all of whom I beg to return my thanks.

Animated as I have been by the most ardent and devoted attachment to the memory of Jenner, it cannot be expected that I should either repress my feelings, or employ cold and measured language to mark my sense of the value of his labours, and the importance of their results. I can scarcely expect that my reader will go along with me on all such occasions, but I *do* indulge the hope that he will see reason to forgive that warmth in which he may not be able to participate. Jenner's nature was mild, unobtrusive, unambitious; and many who have done justice to his discovery have still to learn how beautifully the singleness of his heart and his genuine modesty graced and adorned that splendid reputation which the wonderful consequences of his labours had acquired for him. In every private affair, in every public transaction one principle guided

him. The purity of his motives and the disinterestedness of his actions have, by no means, yet been duly acknowledged: Had those who opposed him and Vaccination known how little of selfishness, of vanity, or of pride entered into his character, they would, I am persuaded, deeply lament the wounds which they inflicted; and in the place of bitterness and reproach would have found cause for unmixed esteem and approbation.

Before I conclude these prefatory remarks I must offer some explanation of the delay that has taken place in the publication of this work. Obstacles were at the very outset thrown in my way, which I need not here specify. The papers too were extremely voluminous, and in the greatest disorder. To bring them into a state capable of affording me any assistance in constructing the narrative with fidelity, required a degree of labour much greater than I could have anticipated. These difficulties not a little increased the really arduous duty that I had to perform. So seriously did I at one time feel this that I anxiously wished and, indeed, had determined, to relinquish my task altogether: in addition therefore to the exertion demanded by the subject itself I may be permitted to state that my professional avocations necessarily precluded me from

giving that unbroken and undivided attention indispensable to the rapid progress of a work of this nature.

The publication of the first part, without waiting for the completion of the second, seemed under such circumstances to be expedient, both to the executors of Dr. Jenner and to myself. Other reasons concurred to give strength to this decision. The recent prevalence of small-pox in different parts of Europe, and the corresponding diminution of confidence in the virtues of the Variolæ Vaccinæ, rendered it an object of no inconsiderable importance to endeavour to restore and increase that confidence, by showing that Dr. Jenner clearly foresaw the deviations which have been observed; that his doctrines, if properly understood, satisfactorily account for them; and that nothing, in fact, has occurred which does not strengthen and confirm his original opinions both with regard to the Variola and the Variolæ Vaccinæ. I would hope that something may have been done in these respects, that shall tend to promote the universal adoption of a practice capable of effecting so much good.

Nothing, I am persuaded, can ever accomplish this object except a real knowledge of the nature of that affection which might be made to take

place of small-pox. A very sincere wish to accelerate this event has led me to the discussions contained in the present volume, the publication of which, at this time, I would humbly hope may not be without its use.

As there is great reason to fear that Dr. Jenner's views are not sufficiently understood, so in like manner it is to be apprehended that his disinterested efforts, and the formidable difficulties which he overcame, are still very imperfectly appreciated. Due pains have been bestowed to represent both in their true colours. The picture cannot be finished until the subsequent events of his life are recorded: but as the principles which guided him in his early days retained their influence to the last, and as they are set forth in what is already written, the reader will be enabled to form a just estimate of his moral, as well as of his intellectual character.

I own that I have been chiefly solicitous that the true and genuine lineaments of his mind should stand forth in all their fair and just proportions. Had he merely coveted a wide-spread reputation, the voice of the world proclaiming a great epoch in the physical history of man, produced through his instrumentality, might have sa-

tisfied an ambition much more greedy of fame. Gratifying as such an acknowledgment must have been, Jenner's heart was too pure not to seek its enjoyment from a constant devotion to higher and better things than those which centre in mere human authority or approbation. Such, in truth, he was; as such it is my earnest desire that he should be remembered. "Ut vultus hominum, ita simulacra vultûs imbecilla ac mortalia sunt; FORMA MENTIS ÆTERNA."

LIFE

OF

DR. JENNER.

CHAPTER I.

HISTORY OF HIS EARLY LIFE.

EDWARD JENNER was born in the vicarage at Berkeley, in Gloucestershire, on the 17th of May, 1749. He was the third son of the Reverend Stephen Jenner, A. M. of the University of Oxford, Rector of Rockhampton, and Vicar of Berkeley. His mother was the daughter of the Rev. Henry Head, of an ancient and respectable family in Berkshire. This clergyman once held the living of Berkeley, and had, at the same time, a prebendal stall in the Cathedral of Bristol.

Besides his church-preferments, the father of Jenner possessed considerable landed property, the family being of great antiquity in Gloucestershire and the neighbouring county of Worcester. It has pro-

duced several eminent men, among whom may be mentioned Dr. Thomas Jenner, President of Magdalen College, Oxford, the immediate predecessor of the pious and learned Dr. George Horne. Jenner's father had been tutor to a former Earl of Berkeley; and the late earl, his brother the admiral, and, indeed, the whole of that noble house always evinced a very strong regard to him and to his family. This excellent and devout man was cut off not long after the birth of his son Edward, at the age of 52, in the year 1754. This heavy loss was as much as possible alleviated by the affectionate care and judicious guidance of his eldest brother, the Rev. Stephen Jenner,* who brought him up with paternal tenderness. He had another brother, the Rev. Henry Jenner, M. A., Oxon, Rector of Rockhampton, Gloucestershire, Vicar of Little Bedwin, Wiltshire; and domestic chaplain to the Earl of Aylesbury. From this gentleman are sprung the Rev. George C. Jenner, and Mr. Henry Jenner, who, as will hereafter be seen, assisted their uncle in his interesting pursuits and inquiries.

Dr. Jenner had three sisters, Mary; Sarah; and Ann, who was married to the Rev. Wm. Davies, Rector of Eastington, in the County of Gloucester.

* B. D. Fellow of Magdalen College, Oxford; and Rector of Fittleton, Wiltshire. For many years he was Rector of Rockhampton, and perpetual Curate of Stone, both in Gloucestershire.

He left three sons, the Rev. William Davies, D. D. Rector of Rockhampton; Robert Stephens Davies, Esq., of Stonehouse; and Edward Davies, Esq., of Ebley House, in the same county.

When about the age of eight years, Jenner was put to school at Wotton-under-Edge, under the Rev. Mr. Clissold. He was next placed under the tuition of the Rev. Dr. Washbourn, at Cirencester, where he made a respectable proficiency in the classics, and laid the foundation of some of those friendships which continued throughout life. His taste for natural history began to show itself at a very early period. Before he was nine years of age, he had made a collection of the nests of the dormouse; and when at Cirencester, he spent the hours devoted by the other boys to play or recreation, in searching for fossils, which abound in the oölitic formation in that neighbourhood. His scholastic education being finished, he was removed to Sodbury near Bristol, in order to be instructed in the elements of surgery and pharmacy by Mr. Ludlow, an eminent surgeon there. On the expiration of his term with this gentleman, he went to London to prosecute his professional studies under the direction and instruction of the celebrated John Hunter, in whose family he resided for two years, a favourite pupil.

The energy and originality of Mr. Hunter's character, had already commanded the respect of his professional brethren, and secured to him a large share

of public confidence and attention. He unquestionably belonged to that family of genius, whose works, whatever may be their nature, have not merely a temporary and local interest, but an abiding and universal one; because they are founded upon principles which regulate the progress of truth in all branches of knowledge, and they would not have failed to have rendered him a distinguished man in any situation in life. He was not less vigilant in his observation, than he was scrupulous and accurate in his examination, of the objects of his studies. He became thereby a penetrating and original thinker, and being at the same time gifted with much enterprise and perseverance, he mastered difficulties which for ever would have obstructed the progress of inferior minds.

When Jenner went to London, he was in the twenty-first year of his age, Mr. Hunter in the forty-second. He was not at that time a public lecturer, but he had been about two years Surgeon to St. George's Hospital, and for a considerably longer period he had established his menagerie at Brompton, where he so successfully and perseveringly carried on his inquiries respecting the habits and structure of animals.

The boldness and independence of Mr. Hunter's character produced deep and permanent effects on the minds of all who witnessed them. Jenner, in particular, felt their power; he saw a master-spirit advancing steadily in that walk of knowledge to

which he himself was led by all the predilections of his taste, and all the influence of his early habits. He saw a kind, free, and manly nature devoted to the acquisition of science, and putting away from him entirely the selfish and personal considerations, which are too apt to encumber the researches, and to circumscribe the objects, of less enlightened minds. The heart of Jenner was peculiarly alive to virtues of this kind, and he had moreover an intellect fully capable of appreciating and admiring the other qualities of his master: it was a singular felicity which brought such men together. The pupil not only respected the teacher, but he loved the man; there was in both, a directness and plainness of conduct, an unquenchable desire of knowledge, and a congenial love of truth. An unfeigned and unchangeable regard to this life-giving principle, adds a peculiar dignity to all human researches, and its influence subsists long after our common occupations, and all the objects of worldly ambition, have passed away.

These remarks will receive full and pleasing confirmation, in the personal history of the eminent individual whose life we are considering. After completing his professional studies in London, he retired from his preceptor's house; but he did not retire from his good-will and affection, nor from his anxious guidance and direction in his scientific pursuits. An uninterrupted epistolary correspondence was kept up between them, till within a short period of Mr. Hunter's death. A very considerable

number of his letters have been preserved. The reader can scarcely fail to be interested in those which I mean to present to him, truly characteristic as they are of the writer's mind, as well as illustrative of the nature and progress of the inquiries of Jenner.

Dr. Jenner set a great value upon these letters. They were carefully preserved in a cover, which was inscribed in his own hand-writing "Letters from Mr. Hunter to E. Jenner;" an honour which he was not always in the habit of conferring on more dignified communications.

During the time of his residence with Mr. Hunter, in 1771, Captain Cook returned from his first voyage of discovery. The valuable specimens of Natural History which had been collected by Sir Joseph Banks, were in a great measure arranged and prepared * by Jenner, who was recommended by Mr. Hunter for that purpose. He evinced so much

* The knowledge which he thus acquired he always retained. In the dissection of tender and delicate organs, and in minute injections, he was almost unrivalled, and displayed the parts intended to be shown with the greatest accuracy and elegance. He had the kindness to bequeath to me a preparation which combines all these qualities. It represents the progress of the ovum in our common domestic fowl, from its first developement to its full and complete growth, when it is about to be dropped from the oviduct. The dissection is beautiful, and the vascularity of the membrane which invests the ova, as well as the internal state of the oviduct, where the shell is formed, are all exhibited with masterly skill.

dexterity and knowledge in executing this duty, that he was offered the appointment of Naturalist in the next expedition, which sailed in 1772. But neither this, nor other prospects of a more enticing nature, could draw him from his purpose of fixing his abode in the place of his birth. In this determination he was partly guided by the deep and grateful affection he felt for his eldest brother, who had been his guide and director when deprived of parental care; and partly by an attachment to the rural scenes and habits of his early youth. Possibly in this decision we may now be permitted to trace the agency of a higher power, which induced a young man frequently to reject most flattering prospects of wealth and distinction that he might be enabled to follow up the leading object of his mind in the seclusion of a country village. It was in this situation that the great purpose of his life was to be fulfilled. It was in such a combination of circumstances as was here presented, and in none other, that the discovery of vaccination could have been effected. In this respect it differed from most other investigations. The facts which have led to the knowledge of the principles of the different sciences, are scattered widely over the works of the creation, and may be found out by all who, with competent faculties, set themselves assiduously and patiently to read the volume that is spread out before them. It must be confessed that it is a rare gift among men, to be able to decipher, with profit to

themselves and advantage to others, this great book, which every where teems with wondrous instruction. It nevertheless is open to all, and all may peruse it freely; but the page upon which the virtues of vaccination were inscribed, could never have been seen by many individuals. The existence of such an affection as cow-pox was known only in a few districts; it therefore could not become a subject of common observation, nor challenge the keen scrutiny of inquiring intellects to its elucidation. Its reported prophylactic powers, it is true, had not altogether escaped popular notice; but no one had arisen to ascertain the correctness of this rumour, or to investigate the source and accuracy of the tradition, till Jenner was led to the pursuit; and to an almost unlooked-for, and unparalleled extent, rendered it available to the subjugation of the greatest scourge of mankind. It is manifest, therefore, that in the very essence of the inquiry itself, and in the character of the genius of him by whom it was conducted, there was a suitableness and an accommodation, without which it neither could have been begun nor accomplished. This peculiarity will be rendered still more apparent when we come to trace the progress of his mind in maturing the discovery. He mentioned the subject to Mr. Hunter while he was his pupil; and often attempted to arouse the attention of his professional brethren in the country to it, but without success. The merit of persevering in his labours, and the honour of his triumph,

rest therefore, in an exclusive manner, with himself.

In attempting to unfold character, it is not less instructive than it is interesting, to find in the private history of a distinguished individual, the successive links in the chain of events, by which it pleaseth Providence to conduct him to that eminence where shines the splendour of his genius and his intellect. This progress in the case of Jenner can luckily be delineated with much accuracy. While yet a youth, and just entering on his elementary studies, that impression was made upon his mind which laid the foundation of all his future researches respecting vaccination; and, with the constancy of a character fitted and fashioned for great achievements, it was never permitted to escape from his consideration till it terminated in that wonderful discovery, the effects of which all nations have enjoyed. It is probable, therefore, that the seed which was sown before his intercourse with Mr. Hunter commenced, would in some future time have germinated, even though he had never witnessed the animating and encouraging example afforded by his prolific and indefatigable genius.

While thus ascribing its natural influence to a fact which will be more fully elucidated in the course of this narrative, we must not underrate the effects of the culture of such a mind as Jenner's, when conducted by a spirit so inquisitive, so searching, and so skilful, as that of Mr. Hunter.

It was a truly interesting thing to hear Dr. Jenner, in the evening of his days, descanting, with all the fervour of youthful friendship and attachment, on the commanding and engaging peculiarities of Mr. Hunter's mind. He generally called him the "dear man," and when he described the honesty and warmth of his heart, and his never-ceasing energy in the pursuit of knowledge, it was impossible not to be animated by the recital, and to perceive that something more than esteem for high intellectual attainments, was required to form that bond of union which, to the last hour of his life, joined the affectionate recollections of the pupil with the memory of the master.

Immediately after his return from London, Jenner commenced the active duties of his profession. Those who know the painful and laborious exertions of a country surgeon, will see with interest and satisfaction that the love of knowledge can overcome all obstacles; that the daily demands of a toilsome and anxious calling, may be duly and vigilantly fulfilled, and buoyancy enough of character left, to enable a young man in a secluded situation, with little aid from books or society, to rise above every discouragement, to keep his mind constantly alive to every new source of information, to commence and carry on original investigations in many branches of physiology and natural history, and ultimately, by patience and humility of mind, to bring forward for the use and unspeakable advantage of his fellow crea-

tures, one of the most valuable discoveries that ever rewarded the exertions of man.

When Jenner returned to Berkeley, he took up his residence with his brother Stephen. His talents, distinguished as they had been by the favour and approbation of the best judges in London, soon gained him confidence and esteem in the country. His practice rapidly increased, and he acquired a degree of reputation, which, at so early an age, seldom attends the character of medical men. Addicted as he was to the study of natural history from his earliest years, it was not likely that his fondness for that pursuit should have been checked by what he had witnessed in London. On the contrary, he applied himself to the prosecution of it with redoubled ardour, and contrived, in a short time, to accumulate a series of specimens illustrative of comparative anatomy and natural history, which, had they been more ostentatiously displayed, would have formed a museum of no inconsiderable magnitude. Had not his mind in latter years, been necessarily drawn to objects of deeper and more universal interest, his researches in this most interesting field of knowledge could not have failed to have placed him in a very distinguished situation among those who have most successfully cultivated it in modern times.

About this period an incident occurred, which might have dissevered his connexion with his native country. He was dining with a large party at

Bath, when a question arose whether the temperature was highest in the centre of the flame of a candle, or at some small distance from its apex. Various opinions were delivered, but Jenner, with his usual ingenuity and readiness, soon settled the dispute. He placed the candle before him, and inserting his finger into the middle of the flame, he retained it in this situation for a short time. He then placed it a little above the flame, but was compelled immediately to withdraw it. "There, gentlemen," he observed, "the question is settled."

His manner on this occasion indicated so much talent and good sense, that a gentleman of considerable political influence, who happened to be of the party, was particularly struck with him. The next day he sought for Jenner, and offered to procure for him an appointment of emolument and distinction in the East Indies. This, however, like a former offer, was declined, as well as another of a still more enticing nature, which was shortly after made by his friend and preceptor, Mr. Hunter.

After what has been said, the reader will easily believe that Dr. Jenner, at this early period of his life, had given indications of genius, which all good judges of character did not fail to recognize as the harbingers of much future reputation. His knowledge and dexterity as a surgeon, his manners as a gentleman, and his general information as a man of science, rendered his company always acceptable in the families most distinguished by rank

or talent in the district where he lived. But there were other qualities, of a personal nature, which more peculiarly endeared him to his intimate associates. He not only commanded confidence by his skill, and respect and esteem by his acquirements, but also secured to himself good-will and affection, by the tenderness, and kindness, and benevolence of his nature, and the meekness with which he carried all his faculties in the sight of his fellow men. To much depth and accuracy of observation and uncommon delicacy of feeling, which at times cast a shade of pensiveness and sorrow over his mind, there was added a liveliness of disposition, which rendered him a friend capable alike of entering into the deepest and saddest emotions of the soul, or participating in all the joys of its gayest and happiest moments.

In following the calls of his profession through the "alleys brown" and shady lanes of the beautiful vale where he resided, he kept a constant eye to the varying scenes which were passing before him; he had the keenest relish for picturesque beauty, and in his excursions alike gratified his taste in this respect, and increased his knowledge by pursuing the details of natural history. He thus contrived to combine the labours of his profession with the truest pleasure and instruction. On such occasions he encouraged his friends to join him in his rides. I have known, and do now know, those who have been favoured with such happiness, who have accompanied him for twenty or thirty miles in a morning, and listened

with the highest interest at one time to the overflowing of his mind, while with a vivid and imaginative fervour he shadowed forth his own feelings, or with a painter's eye and poet's tongue delineated the beauties around them. He would then descend to less impassioned themes, and explain, with the most captivating simplicity and ingenuity, the economy of vegetables and animals, or the various productions that came within observation.

His manners in every respect corresponded with a mind so given to such objects. He never met with any one without endeavouring to gain or to impart instruction. In natural history, in particular, he wished from his earliest years to show how much information and amusement lie scattered around us, how bountifully the sublimest sources of gratification are supplied, and how desirable it is that all should be taught to taste them.

With some of his particular friends he often, at this period of his life, spent days in their houses, especially in cases of sickness of a serious nature. In this way he made their home for a season his head-quarters, and from thence went to visit his patients in the surrounding district. In a situation like the Vale of Gloucester, this temporary sojourning at a few miles distance from his own abode, was not attended with much inconvenience in a professional point of view, and it was often a source of recreation and amusement to himself,—and I may add of unmingled satisfaction to his friends.

The cottage is still standing, in the neighbourhood of his friend Henry Hicks's house at Eastington, where he, on one of these occasions, put together his remarks on the cuckoo, and prepared that paper for publication. But it was chiefly at Clapton, a farm belonging to his aunt Hooper,* near Berkeley, that his observations on that subject were made.

His appearance and manner during that portion of his life which we have just been surveying, has been described to me by one of his earliest friends. A delineation so characteristic it is not right to omit :—

" His height was rather under the middle size, his person was robust, but active, and well-formed. In his dress he was peculiarly neat, and every thing about him showed the man intent and serious, and well prepared to meet the duties of his calling.

" When I first saw him it was on Frampton Green. I was somewhat his junior in years, and had heard so much of Mr. Jenner of Berkeley, that I had no small curiosity to see him. He was dressed in a blue coat and yellow buttons, buckskins, well-polished jockey boots, with handsome silver spurs, and he carried a smart whip with a silver handle. His hair, after the fashion of the times,

* This lady was Deborah Jenner, youngest sister of Jenner's father, and married to Thomas Hooper, Gent. of Clapton. She was particularly attached to her nephew Edward : and he spent many of his boyish days at her house. She died at the age of 80, in the year 1784.

was done up in a club, and he wore a broad-brimmed hat.

"We were introduced on that occasion, and I was delighted and astonished. I was prepared to find an accomplished man, and all the country spoke of him as a skilful surgeon and a great naturalist; but I did not expect to find him so much at home on other matters. I, who had been spending my time in cultivating my judgment by abstract study, and smit from my boyhood with the love of song, had sought my amusement in the rosy fields of imagination, was not less surprised than gratified to find that the ancient affinity between Apollo and Esculapius was so well maintained in his person."

In words such as these did poor Edward Gardner, but a short time before his death, describe to me his first interview with Jenner. The acquaintance thus begun, soon ripened into a cordial friendship, which existed for more than forty years. During the whole of that time he enjoyed his confidence, and, as will hereafter appear, was intrusted with all his most secret and private affairs.

Such was the attachment of Jenner's friends to him at this time, so much did they covet and prize his society, and so highly did they value his amusing and interesting conversation, that when he, either as a visitor or in his professional capacity, had been at their houses, they would accompany him on horseback many miles on his way home, and this, too, often at midnight, that the pleasure

derived from his company might be prolonged. This arose from the singular and happy union of scientific and original observation, with the playfulness, and mirth, and wit, of familiar intercourse. Profound and inquisitive minds discovered in his society wherewithal to be pleased and instructed—the most superficial and gay wherewith to be amused. At one time he would be dealing out abstract propositions with a clearness and distinctness peculiarly his own, and with the precision of a Franklin, but with more imagination, he would render these propositions applicable to the common concerns of life. At another time the truest and most illustrative delineations of manners and character would flash from his mind. His practical humour, too, was often most enlivening and descriptive. It was the more engaging as it was alike free from all manner of impurity and malevolence. In these respects he was, as honest Izaak Walton says—neither beholden to the devil nor his own corruptions, but kept clear of both. Whether he was mirthful or grave, he could blend both his serious admonitions and his jocose remarks, so as to produce a most harmonious combination.

His recreations from his more severe studies consisted, at this time, in the cultivation of polite literature; and occasionally he sought an acquaintance with the Muses. His imagination, indeed, was always singularly vivid; and he had a peculiar

facility, even in common conversation, of clothing his remarks in the gay and lively colours of poetry. His knowledge of the economy of plants and animals, and his vigilant attention to all the varied forms and properties of surrounding objects, supplied him with an inexhaustible fund of analogies and imagery, which alike animated and adorned every subject that he touched upon.

His conceptions of this sort were frequently embodied in little fugitive pieces, which were sometimes read at convivial meetings, or passed between himself and his friends in the ordinary interchange of their correspondence. Gardner, who was no mean judge of matters of this kind, who had been the school-fellow of Chatterton, and who had with no inconsiderable success devoted himself to the study of poetry, often declared that Jenner in becoming a distinguished physician, had lost the opportunity of acquiring renown as a poet.

Without, by any means, wishing the reader to take this opinion in its literal sense, the present is not an unsuitable time to introduce a few of Jenner's poetical *jeux d'esprit*, merely to illustrate the character of his mind and the faithfulness of the preceding delineation. His own estimate of his powers and acquirements in this field may be gathered from what he says to his friend Gardner :—

Berkeley, Thursday Night.

DEAR GARDNER,

Enclosed is the medley and the song I sang to the gallant Bowmen; miserably scrawled; indeed you will hardly make it out. If your brain is not too much in a whirl, let me remind you of the Ranunculuses for Mr. Nelmes. Did not you promise me some, and some rose-trees? These are flowery subjects, and I hope, in harmony with your mind.

I have thrown in a few more stanzas to "Ladbroke's Entire:" it is my best song. I wish I could give up, or, at least, suspend the little acquaintance I have made with the Muses. Every time I begin a bagatelle, I almost swear it shall be the last; and hardly steer clear of perjury, you see. But when I see that the resolves of the greatest philosophers can be set aside by the most gentle means in the world, I, who am among the lowest of the order, should not repine at my lot. As I once told you, we are certainly puppets danced about by wires that reach the skies. For my own part, I rejoice at your thinking it wrong to dance without a partner, and shall be among the first to congratulate you on the great Master of the Ceremonies indulging you with the hand of a fair one.

Sincerely yours,

E. JENNER.

Instead of presenting either of the songs spoken of in this letter, I think the reader will be more gratified by perusing two addresses to a robin. Both the style and sentiments are in strong contrast, and show the versatility of his powers.

ADDRESS TO A ROBIN.

Come, sweetest of the feather'd throng!
And soothe me with thy plaintive song:
Come to my cot, devoid of fear,
No danger shall await thee here:
No prowling cat, with whisker'd face,
Approaches this sequester'd place:
No schoolboy with his willow-bow
Shall aim at thee a murd'rous blow:
No wily lim'd twig ere molest
Thy olive wing or crimson breast:
Thy cup, sweet bird! I'll daily fill
At yonder cressy, bubbling rill;
Thy board shall plenteously be spread
With crumblets of the nicest bread;
And when rude winter comes and shows
His icicles and shivering snows,
Hop o'er my cheering hearth and be
One of my peaceful family:
Then soothe me with thy plaintive song,
Thou sweetest of the feather'd throng!

ADDRESS TO A ROBIN.

IN ANSWER TO ONE BY CAPTAIN SNELL.

Begone this instant from my door!
Nor plague me with thy canting more.
Hop off! I say, nor in this place
Dare show thy hypocritic face.
Pray do'st thou think, ungrateful fellow,
Because thy voice is somewhat mellow,

Or that thou hither com'st assuming
A kind of modesty in pluming;
Wilt thou allure me, whining beggar?
Or my true notions of thee stagger?
Have I not seen thee, sturdy ruffian,
With impious claw thy father cuffing? *
Seen thee, thou vile impostor, blackguard,
With many a blow thy mother smack hard?
Strip from her back the downy feather,
Spite of inclemency of weather;
Nay, threaten her with instant killing,
If thy full platter she put bill in:
Why then how dar'st thou thus from me
To ask for hospitality?

Disdainful wretch! when smiling spring
Bids every bird tune up and sing,
Though the sweet orchestra should want ye
To take a part, a soft andante,
The lark, who leads the band, in vain
Solicits thy assisting strain,
For slily thou leav'st all their chanting,
Deep in the woods to go gallanting.

Long have I known thy ready knack 'tis
A thousand wily tricks to practise.
Did'st thou not use deception vile
A bard † to cozen and beguile,
Draw by a kind of *hocus pocus*
His rays poetic to a focus,
Then craftily divert the flame
To blaze upon thy worthless name?

* Unum arbustum non alit duos Erythacos."

† Captain Snell.

Think'st thou I know not, rogue ungrateful,
Of mischief thou hast got a pateful?
Do qualms of conscience ne'er molest thee?
No retrospective thoughts infest thee?
Hast thou not entered farmer's houses,
Annoying oft their lawful spouses?
Deform'd their butter, peck'd their cheese,
And robb'd them of their market fees?
Though ne'er did they deny thy asking,
(Villain, a hypocritic mask in!)
But ever ready were to pour
Around thy head the crumby show'r.
And pray another thing—but 'sdeath!
Why do I thus consume my breath?"—
Once more I say, Hop off!—hoh! hoh!
'Tis well thou thought'st it time to go:
And this I tell thee, little blade,
If ever on my palisade
Again I catch thee—by the law
Thy grave shall be Grimalkin's maw!

The "Signs of Rain" exhibits much of the minute painting of Cowper, or of Crabbe; and shows, in pleasing combination, the accuracy of the naturalist and the fancy of the poet.

SIGNS OF RAIN.

AN EXCUSE FOR NOT ACCEPTING THE INVITATION OF A FRIEND TO MAKE A COUNTRY EXCURSION.

The hollow winds begin to blow,
The clouds look black, the glass is low,

The soot falls down, the spaniels sleep,
And spiders from their cobwebs creep.
Last night the sun went pale to bed,
The moon in halos hid her head.
The boding shepherd heaves a sigh,
For see! a rainbow spans the sky.
The walls are damp, the ditches smell,
Clos'd is the pink-ey'd pimpernel.
Hark! how the chairs and tables crack;
Old Betty's joints are on the rack.
Loud quack the ducks, the peacocks cry,
The distant hills are looking nigh.
How restless are the snorting swine—
The busy flies disturb the kine.
Low o'er the grass the swallow wings;
The cricket too, how loud it sings.
Puss on the hearth, with velvet paws,
Sits smoothing o'er her whiskered jaws.
Thro' the clear stream the fishes rise,
And nimbly catch the incautious flies.
The sheep were seen at early light
Cropping the meads with eager bite.
Tho' June, the air is cold and chill;
The mellow black-bird's voice is still.
The glow-worms, numerous and bright,
Illumed the dewy dell last night.
At dusk the squalid toad was seen
Hopping, crawling, o'er the green.
The frog has lost his yellow vest,
And in a dingy suit is dress'd.
The leech, disturb'd, is newly risen
Quite to the summit of his prison.

The whirling winds the dust obeys,
And in the rapid eddy plays.
My dog, so altered is his taste,
Quits mutton bones on grass to feast;
And see yon rooks, how odd their flight,
They imitate the gliding kite,
Or seem precipitate to fall,
As if they felt the piercing ball.
'Twill surely rain—I see with sorrow,
Our jaunt must be put off to-morrow.

He frequently indulged his fondness for Epigram. His trifles in this way possess both point and humour.

DEATH AND MR. PEACH.

A SHORT DIALOGUE.—N. B. MR. P. DIED IN APRIL.

P.—Awhile forbear thy horrid gripe,
Do pray, dread Sir! remember
Peaches are never fairly ripe
'Till August or September.

D.—To gratify my longing taste,
And make thy flavour fine,
I had thee in a hot-house placed,
And moistened well with wine.

Mr. Peach shortened his life by the too free use of the bottle.

ON THE DEATH OF A SHERIFF'S BAILIFF.

Arrested by Death! cries John; I'll give bail;
No! no! replies Death, I must take you to gaol;
To gaol friend? quoth John, why sure there's a flaw,
Look in statute the —— Stuff! nonsense! pshaw, pshaw!
Rejoins the grim tyrant, you've done with your tricks:
Contention give o'er, and go headlong to Styx.

ON THE DEATH OF AN OLD WOMAN NAMED HEYWOOD,

NOT REMARKABLE FOR HAVING LED AN EXEMPLARY LIFE.

Tho' some may exclaim 'Twas strange, or 'twas cruel,
Yet 'tis said to be true; Old Nick wanting fuel,
Gave an order for faggots well-season'd and good;
So Death took his hatchet and cut down Hey-wood.

ON THE DEATH OF A MISER.

Tom at last has laid by his old niggardly forms,
And now gives good dinners; to whom pray?—the worms.

ON LORD BERKELEY'S HUNTSMAN, WHO DIED IN THE CHACE.

Determined much higher to hoist up his name,
Than Nimrod the hunter, in annals of fame,
Hark forward! cried Charles, and gallantly whirled
His high-mettled steed o'er the gates of the world.

Knowing that good company and good discourse were the sinews of virtue, he promoted them on all occasions. He was especially fond of music, and

was a member of a catch club that met at Cam. He could also play on the violin and flute; and he was in the habit of forming select musical parties, where he occasionally was a performer.

I have seen him in his latter years, after his renown had filled the world, and after the many cares attendant upon vaccination had often weighed heavy upon him, shake them entirely off, he would then take up a humorous strain, and sing one of his own ballads with all the mirth and gaiety of his youthful days.

He had a particular dislike to cards, both because they interfered with a much more instructive employment of time, and often led to evils of a much more serious nature.

CHAPTER II.

1773—1783.

INCLUDING LETTERS FROM JOHN HUNTER.

I SHALL now proceed to illustrate the foregoing sketch, by a reference to those facts and incidents which a knowledge of existing documents enables me to present. A great deal of the interest of his early professional life is naturally derived from his epistolary intercourse with Mr. Hunter. Unfortunately many of the letters are without date, and I have been under the necessity, therefore, of endeavouring to ascertain the periods at which they were sent, from collateral evidence. The first appears to have been written in 1773; it refers to some of Jenner's observations on the cuckoo. I may also mention that the picture alluded to became his property, and remained in his possession till his death. He bequeathed it to his friend Henry Hicks, in whose house at the Leaze it now remains.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received yours, and was extremely happy to hear of your success in business: I hope it will continue. I am obliged to you for thinking of me, especially in my Natural History. I shall be glad of your observations on the cuckoo, and upon the breeding of toads: be as particular as you possibly can. If you can pick me up any thing that is curious, and prepare it for me, do it, either in the flesh or fish way. Pictures have been very cheap, but the season is now over. There will be but one sale, viz. Fordyce's; but I believe all his pictures are exquisite, and will go beyond you or me. Since you wrote to me, I purchased up a small landscape of Barrett's, of cattle and herd; I gave five pounds seven shillings and sixpence: it is one of his eight guinea pictures. You shall have it or not as you please. I have one of the same size that I bought of him some time ago.

I saw the young lady, your patient. I do not know well what can be done. If it was possible to pass a bougie from the nose up the duct to the sack, it might be of service; but nothing but a solid can be of any use as a local application. Her general habit should be attended to, such as sea bathing, or cold bath; using a good deal of gentle exercise, such as getting up early in the morning, riding, &c.; she might take gentle mercurials with the bark and the cicuta. Let me hear from you soon.

Ever yours,

JOHN HUNTER.

The three subsequent letters appear to have been sent not long after the preceding. Mr. Hunter had

a short time before commenced lecturing to the pupils at St. George's Hospital. He afterwards extended his plan, and threw his class open to the public, and began steadfastly to execute that great scheme, for elucidating the structure and functions of organised bodies, which subsequently became the main object of his life. The ardent, energetic, and original character of the writer, is seen in every sentence. Although all Jenner's replies have been destroyed, the results of some of the experiments, to which the following letters refer, were published in 1778 in the "Philosophical Transactions," in Mr. Hunter's paper on the heat of animals and vegetables; and others will be found in "The Observations on some parts of the Animal Economy,"* which were published in 1792.

Among Dr. Jenner's papers I find a manuscript, detailing many of the experiments which he made at this time, at the instigation of Mr. Hunter, on hedge-hogs; but I deem it expedient to delay its publication till it is found convenient to collect and print all his medical and philosophical papers.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received yours, as also the cuckoo's stomach. I should like to have a few more of them, for I find they do not all show the same thing. If possible, I wish you could

* See pp. 112, 156, 195, 233.

remove the cuckoo's egg into another bird's nest, and tame the young one to see what note it has. There is employment for you, young man! If you collect eggs, you should also collect the nests; and I do not care how many you send. I wanted a crow's nest, as also a magpie's, in the branches of the tree where they are built; but I am afraid it is now too late.

This evening, looking into my book of patients, to scratch out the name of one who had just paid me, and whose name began with an M, I saw a Mr. Mathews of Berkeley, recommended by you. He did not pay me. I forget whether he was recommended by you as a friend, to serve him, or me: if it was to serve him, I scratch him out of my book. Do you keep an account of the observations of the cuckoo; or must I refer to your letters?—I want a nest with the egg in it; also a nest with a young cuckoo, and also an old cuckoo.

I hear you saying, there is no end to your wants.

Ever yours,

JOHN HUNTER.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I RECEIVED your salmon and very fresh, and just examined enough to want another, but will wait till another season. If I was to have another, it should be one that had just spawned; I will take a cock salmon when you please.

If you catch any bats let me have some of them; and those you try yourself, open a hole in the belly, just size enough to admit the ball; put the ball down towards the pelvis, and observe the heat there; then up towards the diaphragm, and observe the heat there; observe the fluidity of the blood; do all this in a cold place. Extraneous

fossils are all vegetable and animal productions, found in a fossil state. See if you can catch the number of pulsations and the frequency of breathing in the bat, without torture. If the frost is hard, see what vegetables freeze; bore holes in large trees, and see whether the sap runs out, which will show it is not frozen. I am afraid you have not a proper thermometer. I will send you one.

Your very much obliged servant,

J. HUNTER.

I have not seen Dr. H. but I dare say he will be glad to have the cases.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I do not know any one I would sooner write to than you: I do not know any body I am so much obliged to. I thank you for a fish, but I should thank you more if you had let me know who it comes from.

I beg for the future you will always write when you send me any thing. Somebody sent me a cheese with a fish upon it; it was perhaps you: you know I hate to be puzzled. Also let me know what things you have sent me lately. I have not received the cuckoo's nest yet. Now for your patient. I believe the best thing you can do, is to do little. I would not touch the fungus with an escharotic, for fear the brain should be near; I would also use but a very slight compression, as the fungus will be a bandage to the brain; and as to the fungus itself, you have nothing to fear; for whenever the parts underneath are sound, the fungus will subside of itself. Keep your patient rather low and quiet. Let me know how he goes on, and any thing else you can.

Ever yours,

JOHN HUNTER.

The next letter, I presume, was written in 1775. It refers to his design of establishing a school of natural history, on a scale till that time unknown in this country. He wished Jenner to join him in the undertaking.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I have received many things from you, and will thank you in the lump; but while I thank you, let me know what I owe you. I have a great scheme to communicate to you, and want you to take part in it; but remember it is as yet a most profound secret. My scheme is to teach natural history, in which will be included anatomy, both human and comparative. The labour of it is too much for one man, therefore I must have some person to assist; but who that person shall be is the difficulty. When running over a variety of people, you have come into my mind among the rest. Now if it is a scheme you would like, and a possibility of your leaving the country, at the same time able and willing to lay down one thousand guineas, I will send you the whole proposals: but if you cannot leave the country upon any terms, then it is unnecessary to go any farther: and all I have to beg is to keep it a secret. I would not have you mention it to Ludlow ——— &c. I proposed it to L——— before he left London; but his father objected, I believe, to the money. I know the scheme itself will be to your taste. Before you consult with any of your friends, just consult with yourself, and ask, can I go to London, and can I give one thousand guineas for any chance that can be worth it? Let me hear from you soon.

Yours,

London, May 24th. J. HUNTER.

Much as Jenner was attached to Mr. Hunter, and interested as he was in the pursuits to which the preceding letter refers, and flattered as he could not but be by taking a conspicuous station in the metropolis, under circumstances most promising to a young man, he nevertheless declined the proposal. I do not know the cause that was assigned for this determination. Mr. Hunter, from his knowledge of Jenner's character, seems to have anticipated it.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received yours in answer to mine, which I should have answered. I own I suspected it would not do; yet as I did intend such a scheme, I was inclinable to give you the offer.

I thank you for your experiment on the hedge-hog; but why do you ask me a question by the way of solving it? I think your solution is just; but why think,—why not try the experiment? Repeat all the experiments upon a hedge-hog as soon as you receive this, and they will give you the solution. Try the heat. Cut off a leg at the same place: cut off the head, and expose the heart, and let me know the result of the whole.

I am, dear Jenner,

Ever yours,

August 2nd. JOHN HUNTER.

There are a considerable number of letters written, I believe, between the last-mentioned period and that which I am now about to specify. They refer

to professional subjects, experiments on the heat of animals and vegetables, and the collection of fossils and other subjects of natural history for the Museum. Mr. Hunter kindly acknowledged Jenner's labours in his behalf, as may be seen by what he says on sending him a picture.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received yours by Dr. Hicks with the hedge-hog alive; I put it into my garden, but I want more. I will send you the picture, but by what conveyance or by what place? I have a picture of Barret and Stubbs. The landscape, by Barret; a horse frightened at the first seeing of a lion, by Stubbs. I got it for five guineas: will you have it? I have a dearer one, and no use for two of the same masters; but do not have it excepting you would like it, for I can get my money for it. I am glad you have got black-birds' nests. Let me know the expenses you are at, for I do not mean that the picture is to go for any of it, only for your trouble.

Ever yours,

JOHN HUNTER.

N. B. I should suppose hedge-hogs would come in a box, full of holes all round, filled with hay, and some fresh meat put into it.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received the box, also your letter. I am very much obliged to you for your kind attention to me, and how to reward you I do not know. Let that be as it will, I must still give you commissions. If you can get me easily salmon spawn I should like to have it, and out of dif-

ferent places, as it will be of different ages. It should be put into bottles immediately with spirits, each parcel separate from the other. The spirits should be proof, and there should be rather more spirit than spawn.

I will also take any specimens of fossils you may send me, or indeed any thing else. Did I send you any of my publications in the Philosophical Transactions? If I have not, let me know. I want to put you upon some experiments this winter. What do you think of examining eels? Their sexes have not yet been found out, nor their mode of propagation; it is a thing of consequence in Natural History. I began it, but I could not get eels immediately from the river, and to get them from fishmongers, who buy them in custom, does not do. My intention was to examine several pretty large eels on the first and fifteenth of every month in the year. If eels are in plenty with you, and if you like the proposal, let me know, and I will give you full instructions how to proceed; also next spring I would have you make experiments upon the growth of vegetables; and, if you have no objection, I will set you upon a set of experiments upon the heat of vegetables in the winter. If in any of these pursuits you discover any principle worthy the public, I will give it into the Royal Society for you. I must pick you up a picture this winter. I saw Mrs. Black * at Mr. Drummond's the other day. I suspect Mr. Black is dead, but I durst not inquire. Cannot you get me a large porpoise for either love or money? What is the bird you sent me, also the two young animals, which I imagine to be Guinea pigs?

Ever yours,

JOHN HUNTER.

* Jenner's eldest sister Mary, who was married to the Rev. Geo. Charles Black, LL.B. of Norwood, Middlesex.

On the eleventh of May, of this year, he gave Jenner the first intimation of his illness. He mentions it, as will be perceived, very casually, although it was of such a nature as to excite very serious apprehensions in the breasts of all his friends.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I have before me now two letters of yours, which I should have answered much sooner. Your friend Dr. Hicks I have not seen. I was not at home when he called, and I have had no time to wait upon him as he lived entirely out of my walk. I should have been glad to have seen him, but I suppose he stood upon ceremony. I received the fossils, and should be glad of any that you can get. If any bones of animals are found, be sure to get them for me. I should be glad to have some of the salmon fry. I had the pleasure of seeing your brother, but only for a short time. I received the bird; I am not acquainted with it: send me some more, if you can get them readily. I sent with Mr. Jenner the thermometer; if you do not understand it, let me know.

Not two hours after I saw your brother I was taken very ill with a swimming in my head, and could not raise it off the pillow for ten days: it is still not perfectly recovered. Have you begun the eels? No porpoises. No salmon spawn before it has hatched. You see I am very greedy. Be sure to keep an account of all the out-goings.

My compliments to Mrs. Black and to your brother, and let me hear from you.

Ever yours,

London, May 11th, 1777. J. HUNTER.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

Excuse me for not answering your letters so soon as I could wish: send me all the fossils you find. What I meant by bones, was all the bones that are found any depth under the surface of the earth: many are found in stones, &c. I suppose those skeletons are not complete, but send me some of them; and if any history can be given, send it also. The thermometer is a very useful one when understood. You will observe the scratch; upon the glass stalk; perhaps about two inches from the globe, which is the freezing point; put 0, or nought, which is upon the ivory scale, two degrees below the scratch, then 0 becomes the thirtieth degree, and the scratch being two degrees above it, stands at the freezing point; then from that count upwards; or if the cold is below 30, then put No. 1 or No. 2, or 3 at the scratch, and count down: every No. is 10 degrees. What the d—l becomes of your eels in the winter? but try them in the summer, and see what you can make of them.

I do not remember Dr. Fordyce's ever supposing a polypus vascular. I rather should believe that he supposed the contrary; you know it comes near my idea, viz. that the blood is alive, and is the bond of union everywhere. But I should very much suspect that a polypus formed after death is not of that kind. I am pretty certain that I have injected them in arteries after amputation. I have a preparation which shows it, and which supports my theory.

Yours,

JOHN HUNTER.

London, July 6th, 1777.

Mr. Hunter felt very much disposed to continue to treat his indisposition lightly. He found it necessary, however, to seek relief by retiring from his labours for a season. Bath was fixed upon for this purpose, and he arrived there in the end of August. Jenner visited him soon afterwards. He was most sensibly affected by his appearance, and concluded at this early period, that that very disease existed, which, in 1793, suddenly extinguished Mr. Hunter's most valuable life. This impression so much distressed Jenner, that he abstained from giving to the world his observations on the affection under which he believed Mr. Hunter to labour, lest his attention should be drawn to it, and his fears excited by its truly formidable nature. He could not, however, refrain from communicating his alarm to some of Mr. Hunter's friends. He wrote the following interesting letter to the late Dr. Heberden on the subject. From some cause or other it was not forwarded; but it finds a place here with much propriety, because it shows the delicacy of his feeling, and moreover establishes his accuracy as a pathologist; and contains the first account of a morbid affection, which had escaped the observation of former inquirers. In a subsequent page the reader will find a letter from Sir Everard Home, which fully confirms the justness and accuracy of Jenner's diagnosis. It will be seen, also, that the letter to Dr. Heberden contains the substance of the

communication which he made to his friend Dr. Parry of Bath, and which was published in his work in 1799.

E. Jenner, to Dr. Heberden.—1778.

Sir,

When you are acquainted with my motives, I presume you will pardon the liberty I take in addressing you. I am prompted to it from a knowledge of the mutual regard that subsists between you and my worthy friend Mr. Hunter. When I had the pleasure of seeing him at Bath last Autumn, I thought he was affected with many symptoms of the Angina Pectoris. The dissections (as far as I have seen) of those who have died of it, throw but little light upon the subject. Though in the course of my practice I have seen many fall victims to this dreadful disease, yet I have only had two opportunities of an examination after death. In the first of these I found no material disease of the heart, except that the coronary artery appeared thickened.

As no notice had been taken of such a circumstance by any body who had written on the subject, I concluded that we must still seek for other causes as productive of the disease: but about three weeks ago, Mr. Paytherus, a surgeon at Ross, in Herefordshire, desired me to examine with him the heart of a person who had died of the Angina Pectoris a few days before. Here we found the same appearance of the coronary arteries as in the former case. But what I had taken to be an ossification of the vessel itself, Mr. P. discovered to be a kind of firm fleshy tube, formed within the vessel, with a considerable quantity of ossific matter dispersed irregularly through it. This tube did not appear to have any vascular connection with the

coats of the artery, but seemed to lie merely in simple contact with it.

As the heart, I believe, in every subject that has died of the Angina Pectoris, has been found extremely loaded with fat; and as these vessels lie quite concealed in that substance, is it possible this appearance may have been overlooked? The importance of the coronary arteries, and how much the heart must suffer from their not being able duly to perform their functions, (we cannot be surprised at the painful spasms) is a subject I need not enlarge upon, therefore shall only just remark that it is possible that all the symptoms may arise from this one circumstance.

As I frequently write to Mr. H. I have been some time in hesitation respecting the propriety of communicating the matter to him, and should be exceedingly thankful to you, Sir, for your advice upon the subject. Should it be admitted that this is the cause of the disease, I fear the medical world may seek in vain for a remedy, and I am fearful, (if Mr. H. should admit this to be the cause of the disease) that it may deprive him of the hopes of a recovery.

Mr. Hunter remained in Bath till the middle of November. He continued to have frequent intercourse with Jenner. Some of his letters written at this time are of an unusually playful character, and show that his mind was not at all depressed by his illness, and that the spirit of inquiry was kept as much awake as when he was in perfect health.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

Till yesterday we did not know from whom the hare came, but the cook found it out; we thank you; it was a

very fine one. By your not taking any notice of my letter, I do suppose you did not receive it. Near three weeks ago, I wrote to you to meet us at the Hot Wells, Bristol. Some days after the date of the letter we went to the place appointed, by 10 o'clock in the morning, but no Jenner there; we breakfasted, we dined, we went to Kings-Weston, we drank tea, we supped, we staid all night, and set out for Bath next day. We would have come on to Berkeley, but we were afraid that you might not be there. I am afraid it will not be in my power to come to see you, although I wish it much. I shall be obliged to take Southampton in my way home. Are hedge-hogs so saucy as to refuse coming, without coming for them? See if you can coax them. We are all alive here. The Downs look like a bee-hive. Let me hear from you. Mrs. H. gives her compliments to you.

Yours,

J. HUNTER.

Bath, 18*th*.

My letter was sent to your friend in Bristol by the coach, but perhaps the coachman did not deliver it.

It has been already mentioned that Mr. Hunter published his paper on the heat of animals and vegetables in the "Transactions of the Royal Society" in 1778. Two letters written, one in March, another in November of that year, have a reference to that paper, as well as to other pursuits in which he was engaged. They, like all the others, afford very striking displays of the writer's character and mode of thinking and expression. The latter not always strictly grammatical, but nevertheless full of energy and meaning. His ideas, though distinguished by

their novelty, and obviously the result of his own unaided reflection, are often given in an abrupt and laconic manner; but there is a clearness of conception, which enabled him to compress into a small space what would have required from others tedious and minute detail.

The kindness also, with which he acknowledges Jenner's assistance, and the little pledges of respect which he from time to time offered to his friend, form incidents not unworthy of notice in the history of two such men.

The picture by Bassan, which is mentioned below, this instant hangs in the dining-room of the Chauntry (Dr. Jenner's house) at Berkeley. It has been often pointed out to me by Dr. Jenner as the gift of Mr. Hunter. It has been preserved with great care, and seems a genuine specimen of the painter whose name it bears.

Mr. Hunter to E. Jenner.

Dear Jenner,

Your letter of December has lain before me ever since I received it, to put me in mind that it was not answered. I am glad you liked the candlesticks; I thought them pretty. The fossils were none of the best; but I know you did not make them, therefore not your fault. The particular one you put the Q? upon is only a cast of a bivalve. I wish I had seen E——'s collection. I am matching my fossils as far as I can with the recent. Have

you made any experiments with hedge-hogs? and can you send me some this spring? for all those sent me died, so that I am hedge-hogless.

Mr. Luders sent me the bone; it is a very curious one; whether he will let me keep it or not I do not know.

I received yours by Mr. Jones, with the bird; I thank you for thinking of me. Frogs live an amazing while after they are dead, as also all animals of that tribe. The directions I gave you about black-birds were, when you have a black-bird's nest, viz. with four young ones, take one just hatched, and put it bodily into spirits by the head, extending the wings and legs. Observe when the feathers are beginning to sprout; then take another, and serve it the same way: then a third and a fourth, so as to get a series of the growth of the feather, but the last or fourth must not be so old as the feathers to cover the other parts where feathers do not grow. This you will better understand when you come to make the trial. I have a picture of Bassan's, that I lent a poor d——l three guineas upon: he died, and never redeemed the picture. I intend sending it to you; it is a good deal damaged, but some of the figures are very good. Get a frame for it, and hang it in a strong light. There are some experiments of mine publishing in the Philosophical Transactions, which I will also send you with the picture; accept of them as a remembrance of the trouble I put you to. Let me hear from you when convenient. Mrs. Hunter desires her compliments to you.

I am, dear Jenner, your

Most obedient and most

Humble Servant

JOHN HUNTER.

London, March 29th, 1778.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I thank you for all the trouble you have taken. I have interspersed your experiments among my works, and I wish I had more, but I do not know well what to set you about. If you could make some experiments upon the increased heat of inflammation, I should be obliged to you. I have made some, but I am so much hurried that they are but imperfect. To give you an idea of such experiments, I first introduced the thermometer into the anus of an ass; then I injected a solution of corrosive sublimate, above a pint, which it threw out very soon. Some hours after I threw in another, and about twelve hours after I again introduced the thermometer. The same experiment might be made upon a dog. I opened the thorax of a dog, between two ribs, and introduced the thermometer. Then I put some lint into the wound to keep it from healing by the first intention, that the thorax might inflame; but before I had time to try it again (from the hurry of business) my dog died, which was on the fourth day. A deep wound might be made into the thick of a dog's thigh; then introduce the thermometer and some extraneous matter; put in the whole depth, large enough to allow the thermometer to enter when the plug was taken out, which should be taken out in the time of inflammation, and see the difference. If these experiments will amuse you, I should be glad they were made; but take care you do not break your thermometer in the dog's chest, &c.

I am, dear Jenner,

Your much obliged

and most obedient Servant,

London, Nov. 21st. JOHN HUNTER.

About the period we are now considering, Dr. Jenner was instrumental in forming a society which had for its object the improvement of medical science. It was also intended to promote conviviality and good fellowship. The following were among the members: Dr. Parry, of Bath; Dr. Hicks, of Bristol; Dr. Ludlow, of Corsham; Dr. Mathews, of Hereford; Mr. Paytherus, and Jenner. The meetings were chiefly held at the Fleece Inn, at Rodborough, but it was customary to appoint them in other parts of the country, as it suited the convenience of the members.

These meetings were often truly interesting. After the more serious business was finished, the members dined together. They occasionally permitted visitors, who were not medical men, to join them, at this part of their entertainment. No one more frequently enjoyed this indulgence than Jenner's faithful friend Henry Hicks. This gentleman's house lay in the direct road from Berkeley to the place of meeting, and it was often Jenner's custom to call as he passed and carry him with him to Rodborough.

Jenner added largely to the mirth of the party, but he never appeared without contributing his full share to the intellectual banquet also. His paper on the Angina Pectoris, which forms the ground-work of his friend Dr. Parry's book on that subject, was read at the meeting. He also communicated others on many points of physiology and pathology. These

papers fell into the hands of some of the members, and he could never recover them: I have often heard him lament the loss of one of them in particular. It contained observations respecting a disease of the heart, which frequently comes on during attacks of acute rheumatism, and leads to enlargement and disorganization of the part. This formidable disorder had very much escaped the notice of medical men. Jenner's observations were original, and had they been published at the time they were first communicated to the society, his claims to priority could not have been set aside as they have been since that time by other writers.

He also wrote a treatise on opthalmia, which was read to the society, and was intended for publication. It is drawn up in a systematic form, and was meant to point out a method of treatment which he had found successful in certain stages of the disease. This branch of surgery has been, since the period referred to, cultivated with so much scientific precision as to deprive less perfect observations of much of their value. The essay, however, of Jenner, bears unquestionable marks of close and accurate discrimination both of the symptoms and varieties of the disease; and with his other writings on professional subjects, could not have failed to have secured to him a sound reputation as a medical philosopher, had not the splendour of his other discoveries cast all inferior objects into obscurity. This letter I

presume refers to the society I have just been describing.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I received your account of your experiments on the hedge-hog, also the dog-fish, for which I thank you. I have now received your account of the aneurismal vein with the cast, and showed it to my pupils this evening with the description.

I hope you will be able to procure the arm when the man dies. If you would choose to have it published, I would either give it to the Medical Society here, or send it to Edinburgh to be published in their commentaries. Let me know your inclination, and I will add whatever I may think wanting, and give it your name. I am very happy to hear that some of you have wished to communicate your ideas to one another. If I can give you any assistance, command me: I shall always be glad to hear from you as an individual, or as from the society. Mrs. H. desires her compliments to you. Have you left off fossilizing?

I am, dear Jenner,

Your much obliged and humble servant,

London, April 28th. JOHN HUNTER.

Jenner was also a member of another society which assembled chiefly at the Ship, at Alveston, a village about ten miles from Bristol. This society he denominated Convivio-Medical, in opposition to the one that met at Rodborough, which he called Medico-Convivial. Among the members of the

former were the Ludlows, (E. and D.) of Sodbury, Shute of Winterbourne, Bradford of Frenchay, Fewster of Thornbury, Pountney of Hensbury, Davies of Bristol, and Richardson and Taylor of Wotton-under-edge. I am indebted to the last-named gentleman for the preceding list, and he, with Dr. Bradford, are now, I believe, the only survivors of their former associates.

Dr. Jenner has frequently told me that at the meetings of this society he was accustomed to bring forward the reported prophylactic virtues of cow-pox, and earnestly to recommend his medical friends to prosecute the inquiry. All his efforts were, however, ineffectual; his brethren were acquainted with the rumour, but they looked upon it as one of those vague notions from which no accurate or valuable information could be gathered, especially as most of them had met with cases in which those who were supposed to have had cow-pox, had subsequently been affected with small-pox. These discouragements, as will be seen more at large hereafter, did not suppress the ardour of Jenner's mind. He often recurred to the subject in these meetings; at length it became so distasteful to his companions, that I have many times heard him declare that they threatened to expel him if he continued to harass them with so unprofitable a subject. This society was in existence so late as 1789.

As it has often been asserted that the late Mr. Fewster of Thornbury, has a claim to be considered

as the inventor of vaccination, I take this opportunity of saying a few words on that subject.

That gentleman in his early days was associated with Sutton in the practice of small-pox inoculation, and had frequent opportunities of hearing the popular notion that those who had had cow-pox could not be infected with small-pox. He, as has just been said, was one of the members of the medical society which met at Alveston. The subject was often brought before the meetings, but neither this circumstance, nor his own previous acquaintance with the reports of the country, and his experience that they were not altogether without foundation, could induce him to prosecute the investigation further, or to countenance Jenner's efforts. On the contrary, he certainly undervalued them, and continued to do so even after the Inquiry was published. In a letter to Mr. Rolph, surgeon, in Peckham, dated at Thornbury on the 11th of October 1798, and published in Dr. Pearson's inquiry concerning the history of the cow-pox, he has the following words:—"I think it (*i. e.* the cow-pox in the natural way) is a much more severe disease in general than the inoculated small-pox. I do not see any great advantage from inoculation for the cow-pox: inoculation for the small-pox seems so well understood, that there is very little need of a substitute. It is curious, however, and may lead to improvements."

I am the more induced to record the above statement, because I have recently witnessed attempts to

assert this gentleman's claim to merit as an investigator and discoverer in the field where Jenner acquired that reputation to which Mr. Fewster unquestionably had no just claims. His own opinion, as given in the preceding extract, is quite conclusive upon this point, and must for ever silence all further doubts respecting it. If other evidence were wanting, it may be mentioned that there are letters from Mr. Fewster to Dr. Jenner, now in existence, which clearly assign all the merit to Dr. Jenner, without in the most remote degree alluding to any pretensions of his own. I may also state, that after Dr. Jenner's death, I wrote to Mr. Fewster for some information concerning the Alveston meeting and the early history of vaccination, and that I received a very civil letter, in his name, from his son, dated Thornbury, Sept. 3d, 1823,; but not the most distant insinuation of any claims, such as I have been considering, was advanced.

I cannot refer to these meetings, but especially to the one at Rodborough, without more particularly mentioning one of its members, the late Dr. Parry, of Bath. His acquaintance with Jenner commenced when they were at school together at Cirencester. Early intimacy and corresponding studies and tastes, laid the basis of a friendship which endured through every vicissitude of life. By means of letters, and as frequent personal intercourse as the nature of their occupations would permit, they stimulated each other in the pursuit of knowledge whether it respected professional or other subjects; and it was

in furtherance of this design that the little society at Rodborough was instituted.

Not long after this period Jenner appears to have experienced some disappointment in his affections, which for a considerable time materially impaired his happiness. Mr. Hunter alludes to this occurrence in one of his letters in a manner rather more playful and jocular, than was quite in unison with the deep and tender emotion, which for a time filled the heart of his correspondent.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I own I was at a loss to account for your silence, and I was sorry at the cause. I can easily conceive how you must feel, for you have two passions to cope with, viz. that of being disappointed in love, and that of being defeated; but both will wear out, perhaps the first soonest. I own I was glad, when I heard that you was married to a woman of fortune; but let her go, never mind her. I shall employ you with hedge-hogs, for I do not know how far I may trust mine. I want you to get a hedge-hog in the beginning of winter and weigh him; put him in your garden, and let him have some leaves, hay, or straw, to cover himself with, which he will do: then weigh him in the spring, and see what he has lost. Secondly, I want you to kill one at the beginning of winter to see how fat he is, and another in the spring, to see what he has lost of his fat. Thirdly, when the weather is very cold, and about the month of January, I could wish you would make a hole in one of their bellies, and put the thermometer down into the pelvis, and see the height of the mercury; then turn it

up towards the diaphragm and observe the heat there. So much at present for hedge-hogs. I beg pardon, examine the stomach and intestines. If Hewson's things go cheap, I will purchase some that I think proper for you; those you mention I am afraid will be every body's money, and go dear.

Ever yours,

JOHN HUNTER.

London, Sept. 25th, 1778.

I am afraid that the hedge-hogs in this case had not quite the power ascribed to them by Mr. Hunter. For several years afterwards Jenner certainly continued to feel the mortification which he had experienced. Two of his letters to his friend Gardner, written in 1783, seem to refer to this subject, and paint very strongly the intensity of his feelings. In one he says, "I am jaded almost to death, my dear Gardner, by constant fatigue: that of the body I must endure; but how long I shall be able to bear that of the mind, I know not. Still the same dead weight hangs upon my heart. Would to God it would drag it from its unhappy mansion! then with what pleasure could I see an end of this silly dream of life."

Again, on the 8th of April of this year, he writes thus to the same friend: "As for myself, the same stream of unhappiness is still flowing in upon me; its source seems inexhaustible; but there is a soothing consolation in it; all little disquietudes are sunk or washed away. I feel their influence no more."

Though he thus occasionally indulged his melancholy feelings, and poured them into the bosom of a very kind and attached friend, it is a satisfaction to know that they did not materially interfere with his usefulness as a professional man, or retard his scientific pursuits. He alludes, in one of the preceding extracts, to the fatigue occasioned by his labours. An incident which occurred about this time, affords a pleasing proof of the extent of his reputation as a surgeon, and will easily account for the avidity with which his assistance was sought for in the surrounding district. A patient in the Infirmary at Gloucester was afflicted with a disorder which required immediate relief, by an operation of a delicate nature. Both the surgeons of the institution were so circumstanced as to be unable to lend their assistance. In this perplexity Mr. Jenner, of Berkeley, was sent for. He performed the operation, and saved the man's life.

To judge of an occurrence of this kind properly, it must be remembered that Berkeley is sixteen miles distant from Gloucester, and that surgeons were then less skilled than they are now; and that though at the present time there are few, or none who are not prepared to undertake the most hazardous operations, such knowledge, when Jenner was called upon from his native village, was chiefly confined to hospital surgeons.

His intercourse with Mr. Hunter was kept up as usual; and I introduce a few more letters written

about this period, which, though they do not differ much from others that have been presented to the reader, will nevertheless, I trust, be found to possess sufficient interest to justify their insertion.

Mr. Hunter to E. Jenner.

Dear Jenner,

I received yours with the eel. The spawn of the salmon was lost. I shall send you back the eel again, with the liver, stomach, and gut removed; and nothing left but a fringe, which passes down the sides of the back-bone, which I took and still take to be the spawn; but I never saw any difference in it at any time of the year, and this one you have sent is similar to all I have yet seen. I think your stopping the eels is a good scheme, if you can; but I should suspect that they would be more slippery than hedge-hogs. I do not know if hedge-hogs burrow. About a month hence examine another, and compare him with your notes, and memory also. Examine his heat in the pelvis, diaphragm, &c.; a month after that, another, &c. I like your experiment on the toad and snake, but bury them rather deeper, and let the ground be kept moist about them, especially in the summer. I shall keep your letters, but I expect in the end all your notes. I like your friend Ludlow; he is a lively sensible fellow. I have got a few preparations for you; I am getting them put into a little order for you before I send them. Are there no bats in the old castle of Berkeley? I should like similar experiments to be made upon them to those of the hedge-hog. Mrs. H. desires her compliments to you. Believe me to be most sincerely,

Yours,

John Hunter.

London, Nov. 9th, 1778.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

What are you doing? how do hedge-hogs go on? do they fall off in their weight? how cold are they in winter? &c. &c. Let me hear from you. I have not yet sent the preparations for you: I have added an eye to them of my own making.

Yours,

JOHN HUNTER.

London, Jan. 16th, 1779.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I thank you for the trouble you have taken. I do not see another experiment to be made with hedge-hogs but one: get a piece of meat into the stomach of one in the very cold weather, and kill him twenty-four hours after, to see if it is digested, which I have done with lizards. This may be difficult; but suppose he was made lively in a warm room, and then fed and put out into the cold immediately, with a little hay over him. If this does, two or three may be served in the same way, and kill them at different distances respecting time; observe their breathing when in the cold; if possible, the quickness of the pulse, and the fluidity of the blood. If you should chance to get more than you can use, I would take a few to put into my garden to walk about in the evenings.

Is there no chance to see you in London, this winter?—do come and see us. I shall send you a paper of mine upon the free martin; also one to Ludlow. I wrote to him in answer to his letter. I hope he received it. If a good

deal of that air of the hog's guts could be collected, see if a candle will burn in it as large as in common air. I had a letter from Mr. Cheston of an ossified thoracic duct. I wish he would let me have it; you see how greedy I am. You will hear from me soon.

Ever yours,
JOHN HUNTER.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I have not troubled you with any letter this long time, nor have I heard from you. This moment I do not know if I sent you the butter-jugs; if they are not sent, they shall this week. I want you to pursue the experiments upon the heat of the hedge-hog this winter, and if you could send me a colony of them, I should be glad, as I have expended all I had, excepting two: one an eagle eat, and a ferret caught the other. Mrs. Hunter and I were at Bath the other day, and came home by the way of Gloucester; wished much we could have stayed a day to have waited upon you. Let me hear from you soon.

I am, dear Jenner,
Yours,
JOHN HUNTER.

London, Nov. 8th, 1779.

Many of the preceding letters refer to organic remains. The situation in which Jenner lived in the vale of Gloucester was particularly favourable to the study of these bodies: he was within reach of the principal oölitic series, and, as will presently appear,

he was contiguous to another formation, which is closely allied to the former, and is not less rich in fossils.

Geologists have arranged the oölitic formations into three grand divisions, called upper, middle, and lower. Each is characterized by certain properties, and by peculiar organic remains. These remains consist of many extinct genera of oviparous quadrupeds, and various vertebral fishes—testacea, corolloid zoophytes, &c. &c. The oölitic formations divide the island from north-east, to south-west. They bound the vale of Gloucester, and constitute the Cotswold range of hills.

The Lias formation, on which reposes the whole series of oölitic hills, accompanies the latter across the island from the Humber to St. George's Channel in Dorsetshire.

Its range from its northern extremity to a few miles south of Gloucester is very regular, presenting an average breadth of about six miles. It is bounded on the south-west by the oölites, and on the north-west by the red marl. Its eastern extremity, after passing Gloucester, continues to accompany the oölitic ranges through Somersetshire, to the coast in Dorsetshire. Its western limit is more irregular. It feathers in and out among the coal fields which occur towards the estuary of the Severn, and the upper part of the Bristol Channel, in the counties of Gloucester, Somerset, Monmouth, and Glamorgan. The coal formation alluded to occupies three great

basins. The edges of these basins consist of nearly vertical strata, composed of mountain lime-stone and old red sand-stone, and form bold and precipitous ranges of hills. Among the valleys are deposited the horizontal strata of lias, with subjacent beds of red marl, and magnesian lime-stone. The manner in which the lias is cut through by the strata of mountain lime and old red sand-stone, above-mentioned, gives its outline in this district a very irregular character.

It is not necessary here to dwell with much greater minuteness on the geological peculiarities of this part of England. In order, however, to connect this subject with the pursuits of Dr. Jenner, it is proper to specify a little more minutely some of the formations in his neighbourhood. With this intention I refer to one of the coal basins already noticed. It occupies part of the south of Gloucester, and of the north of Somerset. It is bounded on the south by the Mendip hills, on the west by the range which forms the defile of the Avon, and on the north-east by a continuation of the same chain. All these chains exhibit inclined strata of mountain lime, and old red sand-stone. The lias and subjacent horizontal beds fill up the interior of this basin in the neighbourhood of Bath and Bristol, and throughout the Somersetshire collieries. On the north-west of the ridge which forms the edge of the coal basin, they are to be seen at Pyrton, at Aust, at the Hock-crib, and on

other points along the banks of the Severn. Without pursuing further the various ramifications of the lias, I will merely mention that at the places last enumerated, Dr. Jenner spent a great deal of time in investigating the mineral contents, as well as the organic remains, with which this formation so remarkably abounds. When he began his labours in this part of natural history, geology was in its infancy, and the study of organic remains had scarcely been freed from the absurd conjectures which in the preceding century were adopted by the best naturalists. It is true, that it was not believed at that time that fossil shells were *lapides sui generis*, and that they were formed by a *vis formativa*, peculiarly inherent in certain parts of the earth. But all the important information which has been derived from the study of this subject, whether as it regards the geological relations of rocks that contain organic remains, their connection with the genera and species of animals and vegetables which now inhabit our globe, or the proofs of the existence at some remote period of organic bodies, no traces of which are now to be found in a recent state, was utterly unknown.

The remains of this description, which exist in the lias, are peculiarly interesting, and belong to a greater number of the higher order of animals than are to be found in almost any other formation. It contains two very remarkable extinct genera of oviparous quadrupeds. Besides other remains of this

class, large quantities of the testaceous molluscæ, &c. are found. For further information on these subjects, the reader may consult Conybeare and Phillips' Outlines of Geology.

The trap rock in Mickle-wood, and the great variety in its structure, together with the changes produced in the organic remains found in the transition lime-stone, where it comes in contact with the trap, also particularly occupied the attention of Dr. Jenner. Specimens, illustrating these changes, were the ornaments of his study and of his garden.

A large collection of specimens from the oölite and the lias was also made by Jenner. He sent many of them to Mr. Hunter, and to his friend Dr. Parry at Bath, who sometimes came to Pyrton to ransack the treasures which are found in the lias at that place. There was another haunt on the opposite side of the river at Westbury, where Jenner was wont to carry on his pursuit. A section of this cliff is given by Mr. Conybeare to illustrate the lower beds of the lias formation. The following is the order of stratification. White lias, blue shale, black shale, green siliceous grit, containing *black bones*, and known here, and at Aust, by the name of the *bone bed;* black shale, green grit, greenish marl-stone, red marl-stone, of the new red sand-stone formation. A letter from Dr. Parry points to these favourite pursuits.

DR. PARRY TO E. JENNER.

Bath, October 20, 1781.

MY GOOD FRIEND,

I should have written to you before, had I not waited to announce to you the sending off of a small cargo of fossils and insects. But I have been altogether unable to procure any thing, or any number of things, from the neighbourhood, of the former kind, which could at all deserve your notice. Of the latter, I shall send you about a hundred specimens, as soon as I can get them properly disposed in a box, so as to bear the carriage. Have you made any additions to any of your collections? I wish it was it my power to visit you and Pyrton at a season when I could take advantage of the dashing tides. However, I must learn to be content with such things as I have.

* * * * *

CHAPTER III.

LIFE FROM 1783, TO THE PUBLICATION OF THE "INQUIRY."

MANY of the early letters of Mr. Hunter, as well as some of those that are to follow, regard the singular phenomena connected with the torpidity of animals. When they pass into this state, a material change is observable in all their most important functions. The temperature is diminished: the circulation of the blood becomes slower; while respiration, digestion, and the irritability and sensibility of the muscular and nervous system, are either suspended or much diminished. Mr. Hunter's experiments, as well as those which were performed by Dr. Jenner, throw considerable light on these points of physiology. It was found, for instance, that the temperature of the hedge-hog at the diaphragm, in summer, was 97° Fahrenheit, while the thermometer in the shade was 78°. When the temperature of the air fell to 44°, the animal became torpid and its temperature was re-

duced to 48° 5″. That of the air having fallen to 26°, the heat of the animal was found to be 30°. Facts of this kind satisfactorily prove that there is a great reduction of temperature in the animal during the state of torpidity. The reduction in the velocity of the pulse is, perhaps, still more remarkable; animals whose heart beats more than 100 strokes in the minute, having them lowered to 14 or 15; and in some the circulation is not at all to be discovered. It is, nevertheless, a remarkable fact that the blood, though apparently devoid of motion, never coagulates, nor is it prone to do so, even when the animal is exposed to a degree of cold lower than zero. Spallanzani proved this with regard to the marmot. He likewise proved that the blood drawn from the same animal was very readily frozen when exposed to a temperature higher than that of the lungs. It thus appears that there is even in this living death a principal of vitality which resists the ordinary laws of matter.

The function of respiration in some animals seems to cease altogether. They can exist in the exhausted receiver of an air-pump, or in a medium, which in a very short time would extinguish life if they were not in a state of torpidity. To ascertain whether digestion was carried on under such circumstances, both Mr. Hunter and Dr. Jenner introduced food into the stomach of lizards and hedge-hogs, as they were about to become torpid, and on subsequent examination it was found unchanged. As the ordi-

nary internal stimuli do not affect torpid animals, so they are alike insensible to most of the external agencies. They may be wounded, thrown about with violence, and even be subjected to the penetrating influence of the electric fluid, and yet remain insensible; but what these powerful agents could not effect, may be accomplished by the vivifying energy of heat. It gradually unlocks the secret springs of life, and when the animal is, at the same time, exposed to light and air, all the suspended functions are speedily restored.

Besides carrying on experiments illustrative of these points, in conjunction with Mr. Hunter, he let no opportunity slip of prosecuting other branches of Natural History, and of procuring subjects for Mr. Hunter's Museum. Mr. Hunter was particularly desirous of obtaining a bustard; this is the largest of the British birds: it is likewise, the rarest. Two letters refer to subjects of this kind, as well as to Jenner's inquiries respecting the natural history of the cuckoo.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I am very much obliged to you for your attention to me. I will very readily give three guineas for the Bustard, therefore give such orders as you think fit. I request the whole history of cuckoos this summer from you. I have bought a house in Leicester Fields, and shall move this summer, when I shall be able to pick out some things for you. Give my compliments to Clinch, and I hope to

see him before he sets out for Newfoundland; if I do not, let him think of the white hares, to tame a buck and doe, and send them to me. Let me know in your next what you are doing. I hope to see you in London about two years hence, when I shall be able to show you something.

I am, dear Jenner,

Ever yours,

JOHN HUNTER.

When the bustard arrives I will write to you.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I have received the bustard safe, as also the bones. Your friend Mr. Hazeland has been very kind, for which I have wrote to him and thanked him; but when you see him, or write to him, express the same to him, as an indirect thank is better than a thousand direct ones. Are hedge-hogs in great plenty? I should like to have a few. You must pursue the cuckoo this summer.

I am employed building, moving, &c. I wish this summer was well over. When I am fitted up I hope you will come and see me.

Ever yours,

April 22d. JOHN HUNTER.

Their correspondence sometimes took a different turn, and questions of an abstract nature were discussed between them. Whoever has read any of Mr. Hunter's works must have discerned, amid the plain and straightforward information which they contain, a considerable tendency to abstruse, or even metaphysical reasoning. This is the usual bias of

minds gifted with powers like his; and had his early education enabled him to draw from collateral sciences such proofs and illustrations of his conceptions as they might have afforded, his genius, great as it was, would have acquired a solidity and an extension which would have raised him still higher as a medical philosopher.

I do not know on what occasion the subsequent letter was written. From the context I should infer that it was suggested by one of those interesting occurrences which are now and then met with, where an individual, who was born blind, has by some means been restored to sight, and is just beginning to acquire ideas of colours; or of an individual who laboured under some extraordinary peculiarity of vision; but, however the case may be, the letter is written with great power and energy.

Mr. Hunter to E. Jenner.

Dear Jenner,

I thank you for your last letter. I want you to pursue the inquiry considerably further; and to give you an idea of what I mean, I will first premise, that there are in nature but three colours, viz. *red*, *blue*, and *yellow*, all the others being combinations of these three.

First, present him with these three colours singly, and see what he calls them; then altogether, (not mixed) and see how far they correspond with his first ideas of them: when that is ascertained, then begin to mix them; for instance, a blue and yellow, (which makes a green,) see

what he calls that; then a yellow and red, (which makes a scarlet,) next a blue and red, (which make a purple.)

Now to explain the intention of these experiments. Suppose he has a perfect idea only of one colour, and although you mix that colour ever so much, yet he sees none of the other, but only that colour in the mixture. Suppose all the three colours when seen singly, or unmixed, (with him) are blue; mix blue with red, (making a purple,) he will only see the blue, the red not being visible to him: and so on of the others, according as he sees them. Suppose that a simple colour makes no impression; but a compound one does, viz. green, (which is composed of blue and yellow:) then mix blue and red in all proportions, to see what the colour is. Then mix yellow and blue in all proportions, and see what colour these are: if he sees no green in any of them, then mix all the three colours in various proportions, and see what colours those make. When all the colours are mixed in various proportions, and the whole is a green, perhaps, of different shades, according to the quantity of blue and yellow, then you may fairly conclude, that it is the mixture of the blue and the yellow which produces it; the red never making any impression. If there is any other simple compound that he sees, as scarlet, which is yellow and the Modena red; or a purple, which is blue and red; see if when those two are predominent in the mixture, (although there are all the three colours in the mixture) that the compound becomes the visible colour.

The drawing of the scull has been made ever since you desired it; but I had forgot it. I have a cast for you of the aneurismal varix described by Dr. Hunter. How shall I send both? Let me know.

Ever your much obliged

 J. HUNTER.

While Jenner was obeying the injunctions of Mr. Hunter, by performing the experiments which he pointed out to him, he continued to busy himself with ardour in forwarding useful knowledge on all professional subjects. We have already seen how wide a range his mind had taken, but it extended also to objects which are with difficulty followed in a situation such as his. Among these may be mentioned pharmaceutical chemistry. Some of the processes recommended for the preparation of several of the most powerful medicines, he found to be less perfect than could have been desired. This was particularly the case with the emetic tartar then commonly used. He had been often foiled and disappointed in practice, by the uncertainty of the action of this very useful medicine, arising from the imperfection of its preparation. He therefore instituted some experiments for the purpose of obtaining one more regular in its strength, and consequently more uniform in its operation. The process which he ultimately adopted for this purpose is contained in a letter addressed to Mr. Hunter, which was read before the Society for the Improvement of Medical Knowledge, and is published in the first volume of their Transactions. Much intercourse had, however, previously taken place between him and Mr. Hunter on the subject. The *facetiæ* of the following induce me to print it.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I am puffing off your tartar, as the tartar of all tartars, and have given it to several physicians to make trial, but have had no account yet of the success. Had you not better let a bookseller have it to sell, as Glass of Oxford did his magnesia? Let it be called Jenner's Tartar Emetic, or any body's else you please. If that mode would do, I will speak to some, viz. Newbery, &c. You are very sly, although you think I cannot see it: you very modestly ask for a thermometer; I will send one, but take care that those d——d clumsy fingers do not break it also. I should be glad to have a true and particular account of the cuckoo, and as far as possible under your own eye. To put all matters out of dispute, if the cuckoo's eggs were taken out of the hedge-sparrow's nest in which they were laid, and put into another by human hands, there could be no supposition that the parent cuckoos would feed, or take any care of them. I also want some young ones. I had a series from you, but a moth got in among them, and plucked them.

Let me hear from you when you can.

Yours,

J. HUNTER.

In the year 1783, Montgolfier attracted the attention of scientific men, by announcing the result of his first experiment in aerostation. The mind of Jenner was excited by the event, and he resolved to exhibit to his gazing neighbours in the vale an illustration of this new species of aerial navigation, as it

was then called. He accordingly constructed a balloon: it was filled with hydrogen gas, according to the plan of M. Charles, in the hall of the castle at Berkeley. It rose majestically, and winged its flight over the hilly barrier which bounds the vale, and descended near a place called Symond's Hall.

It was filled again at Kingscote, and a second time let loose to take its flight "through fields of ether."—Affixed to it were the following lines by his friend Gardner.

LINES AFFIXED TO AN AIR-BALLOON.

Stranger, whoe'er thou art, whose gazing eye
Is fixed with wonder on this novel scene,
Ignoble on the ground behold me lie,
And kiss, indignant kiss, the level green.

From Chloe's hand launched forth in fields of air,
Swift as the bolt of Heav'n I took my flight;
Child of the wind, I flutter'd here and there,
Till clouds obscur'd me from the gazer's sight.

Long while held on my daring rapid course,
I travers'd worlds where eagles never flew,
With strengthen'd wing, and undiminish'd force,
Far from the keenest ken of mortal view.

But fate, alas! to check my tow'ring pride,
At length has laid me at thy feet thus low;
Let not thy pity be to me denied,
But on my fate one tender sigh bestow.

Art thou to mad ambition now a slave;
Or dost thou hope in higher walks to shine?
Tutor'd by me, thy dear contentment save,
Or prophesy thy future fate by mine.

If yet a youth, the moral lesson hear;
For, oh! believe thou canst not know too soon
A truth (which added years will make more clear)
"That vain ambition is—an Air-Balloon!"

Hurt not my form; 'twere sacrilege to wound
A form by Chloe's hand so sacred made;
Let not that cruel wretch on earth be found,
That dares, that impious dares, my sides invade.

My flight I took from Kingscote's happy plain,
A daring wand'rer through the ethereal sky;
Then, gentle friend, pray take me back again,
Perhaps, once more, another course to try.

The history of this invention affords one among the many proofs of the near approaches that may be made by different individuals to the truth, without reaching it. The possibility of floating heavy bodies in the atmosphere had been very well ascertained, but no one till the time of Montgolfier had hit upon the right method of doing it. Mr. Cavallo, of London, seems to have fully comprehended the principle, and nothing but the absence of one little precaution in conducting his experiments, prevented him from acquiring the credit of the discovery. He attempted to fill bags of paper with inflammable air,

but he forgot that this substance was permeable to the gas. Had he employed varnished silk of sufficient dimensions, or any composition of a similar nature, he could not have failed of success.

In the commencement of the year 1786, Jenner's life was put to extreme hazard by exposure to a great degree of cold. I shall give the recital in his own words.

"January 3d, 1786.—I was under the necessity of going from hence (Berkeley) to Kingscote. The air felt more intensely cold than I ever remember to have experienced it. The ground was deeply covered with snow, and it blew quite a hurricane, accompanied with continual snow. Being well clothed, I did not find the cold make much impression upon me till I ascended the hills, and then I began to feel myself benumbed. There was no possibility of keeping the snow from driving under my hat, so that half my face and my neck was, for a long time, wrapt in ice. There was no retreating, and I had still two miles to go, the greatest part of the way over the highest downs in the country. As the sense of external cold increased, the heat about the stomach seemed to increase. I had the same sensation as if I had drank a considerable quantity of wine or brandy; and my spirits rose in proportion to this sensation.

"I felt, as if it were, like one intoxicated, and could not forbear singing, &c. My hands at last grew extremely painful, and this distressed my spirits in

some degree. When I came to the house I was unable to dismount without assistance. I was almost senseless; but I had just recollection and power enough left to prevent the servants from bringing me to a fire. I was carried to the stable first, and from thence was gradually introduced to a warmer atmosphere. I could bear no greater heat than that of the stable for some time. Rubbing my hands in snow took off the pain very quickly. The parts which had been most benumbed, felt for some time afterwards as if they had been slightly burnt. My horse lost part of the cuticle and hair at the upper part of the neck, and also from his ears. I had not the least inclination to take wine, or any kind of refreshment."

"One man perished a few miles from Kingscote, at the same time, and from the same cause."

In the spring of 1787, he was in London. A letter to Sir Joseph Banks relates to a promise which he made at that time, and contains also an account of some experiments on the effect of animal manure on vegetation.

E. JENNER TO SIR JOSEPH BANKS.

SIR, *Berkeley*, 1787.

When I had the honour of waiting on you in London, in the spring, I promised to send you an account of the dog and fox; but the gentleman from whom I received it not sending it so soon as I expected, occasioned this long delay. His account is as follows:

"I could not before this day get such intelligence as could be relied on, respecting the dog-fox and terrier bitch, which I have taken the first opportunity of transmitting to you. The bitch did not seem very desirous of receiving the fox at his first approaching her; but after a little amorous dalliance she soon came to. They copulated three times in the course of the day, and each time continued together between ten minutes and a quarter of an hour. This happened sometime in the month of July. It did not appear in consequence of this union that the bitch showed any signs of pregnancy."

Notwithstanding the above, almost every sportsman asserts that foxes and dogs will produce an offspring. But I shall use every endeavour to set the matters clear, by experiments with these animals.

I recollect that I promised to send you an account of some experiments made on vegetables with animal manure. I wish they were more worthy your observation. A person engaged in business cannot conduct these matters as he would wish; his pursuits are too often interrupted. But though they do not go far enough to determine whether animal manure will produce lasting good effects on vegetables, they prove that a superabundance of this substance is destructive to vegetable life. I shall copy the notes as they stand on my journal.

February 10th, 1780.—A small quantity of the serum of human blood was poured over about a square foot of grass on a grass-plat. Three sprinklings were given at the distance of a fortnight each, and the whole of the quantity applied was the serum contained in forty ounces of blood.

April 1st.—The effects it has produced on the vegetation of the grass is astonishing. It is beautifully green and thick, and has sprung up several inches, while the sur-

rounding grass has but just begun to shoot, and looks of a yellowish green.

May, 1781.—Some mustard seed was strewed over thin layers of wool, in three different tea saucers.

The wool in No. 1 was moistened with water.

No. 2, with the serum of blood.

No. 3, with the coagulated part of the blood mixed with the serum.

The seeds in No. 1 sprang up soon.

In No. 2 and 3, they swelled a little, but did not push out their radicle, grew mouldy and died.

This experiment was repeated with equal parts of serum and water. A few of the seeds just showed the radicle and then died.

It was again repeated with one part serum and two parts water; these shot and flourished very well.

A considerable quantity of blood mixed with a little wood ashes and powdered chalk, was applied round the roots of some polyanthus plants. The plants soon assumed a different appearance from their neighbours. The leaves were more luxuriant and green. But about the time when the flower-stems (which were uncommonly vigorous) were pushed up to half their usual height, they suddenly withered away and died.

April 21st, 1782.—Two young peach trees were manured with animal substances. About eight pounds, or perhaps more, as it was not weighed, were applied to the roots of each tree. They were in a sickly state, and had a very small number of blossoms. Two trees adjoining were very similar in appearance. The manured trees are distinguished thus, No. 1—2. The unmanured, No. 3—4.

May 30th.—From the unusual inclemency of the weather during the whole spring, the peach trees in general are greatly injured, and many of them appear to be destroyed.

Yet the manure above-mentioned has produced a wonderful effect.

No. 1 and 2 appear vigorous, and seem to have regained their health, while No. 3 and 4 look sickly, and have pushed out only weak and tender shoots.

With a view of ascertaining in some measure what quantity of animal substance might be applied to a plant with woody roots to its advantage or disadvantage, the following experiments were made.

April 20th, 1782.—I took four young currant trees of the same age, and nearly as possible of an equal growth and appearance. They were planted in large garden pots of an equal size, in the following different substances.

No. 1. was planted in the coagulated part of fresh blood, the surface of the pot only being covered with garden mould.

No. 2. was planted in equal parts of blood and common garden mould mixed together, and the surface being covered with plain mould.

No. 3. was planted in common garden mould, without a mixture of any other substance; but this plant will, from time to time, be moistened with the serum of blood, marking the quantity made use of each time.

No. 4. was planted in garden mould, and is to remain as a standard without the addition of any animal substance, to point out the difference of vegetation.

The four pots were placed under an east wall in the open air.

April 26.—A pint of serum was poured on No. 3.

May 3.—The serum in the same quantity applied again.

June 6.—No. 1. dead.

No. 2. nearly so.

No. 3. sickly—though it vegetates in a small degree.

No. 4. healthy.

July 20.—No. 3. recovered—shoots, and looks healthy.

By a letter from Mr. Blagden, I am informed my letter to Mr. Hunter on the Natural History of the cuckoo is ordered for publication in the Philosophical Transactions. I shall pursue the subject during the summer, and hope to have the honour of presenting you with another paper in the autumn, and also on the exciting cause of emigration in birds.

I am, Sir, &c.

E. Jenner.

The reply of Sir Joseph proves that at this time the paper on the cuckoo had been before the Royal Society, but it was returned to Jenner in order to enable him to record some additional facts which he had ascertained.

Sir Joseph Banks to E. Jenner.

Soho Square, July 7th, 1787.

Sir,

I beg you to accept my thanks for your obliging favour, respecting the fox and bitch, and the experiments on the effect of manure upon plants, which interest me a good deal.

In consequence of your having discovered that the young cuckoo, and not the parent bird, removes the eggs and young from the nest in which it is deposited, the council thought it best to give you a full scope for altering it as you shall choose. Another year we shall be glad to receive it again, and print it. Your other papers I hope you will proceed with when your leisure allows you opportunity.

Mr. Hunter has given us a most excellent paper on the genus of whales. I have no doubt that he will send you a copy, when it is printed, which will soon happen. That genus so difficult to naturalists, because so seldom to be met with, remained to Hunter as a rich field, which he was almost the first to cultivate, and indeed it has produced him a valuable harvest, and I have no doubt but that the migrations of birds will attend the same to you, as no author has yet treated it to advantage.

I am, Sir,
Your most obedient and
Very humble Servant,
Joseph Banks.

The paper on the cuckoo was finally read on the 13th of March, 1788, and printed in the *Transactions* of that year.

Mr. Hunter to E. Jenner, 1788.

Dear Jenner,

I have been going to write to you some time past, but business and a very severe indisposition for these three weeks past has prevented me.

Your paper has been read, passed the council and is in print, for I had a proof sheet this day, and I have ordered 50 copies, 25 for you and 25 for myself, to give to friends. I spoke to both Sir Joseph Banks and Dr. Blagden about your wish: Sir Joseph has not the least objection, and will give us all his assistance; but he thinks the paper had better be first printed and delivered, and let the people rest a little upon it,—for he says there are many who can hardly

believe it wholly: this will put off the certificate till the beginning of the next winter, when we shall hang you up. I have received a box with a Wapping landlady and two lizards. Mrs. Hunter's and my own compliments to Mrs. Jenner.

I am dear Sir,
Your most obedient servant,
JOHN HUNTER.

The result of the investigations respecting the cuckoo, begun at the request of Mr. Hunter, was presented through him to the Royal Society. As the *Transactions* are not in every one's hands, and the paper itself appears not to be very generally known, I think that some account of it may not be unacceptable in this place. A great deal of care was bestowed both in collecting the facts, and in reporting them with fidelity and accuracy. From one copy of the paper, which I have found in MS. it appears that a scrupulousness was observed in both these respects, which does the greatest honour to the observer.

The peculiar economy of the cuckoo in committing her offspring to the care of a foster-parent, had long excited the attention and wonder of ornithologists, and many reasons had, at different times, been assigned for the signal departure from the common impulses which prompt the feathered tribe to watch over the developement of their offspring and provide for their nourishment and support. The cuckoo in these points is peculiarly unnatural. She does

not prepare a place where her young may be brought forth, nor does she regard them when they come into being. There is a double evil involved in her neglect; she is not only an improvident mother herself, but she renders others so likewise. When she furtively deposits her egg in the nest of another bird, it is done not that her offspring may be a sharer of the care of the foster-parent, but that it may engross it entirely to the total destruction of its own natural offspring. A perversion of all the maternal instincts is a most remarkable result of this vicarious incubation.

The hedge-sparrow, or other birds whose nests have been visited by the cuckoo, actually sometimes eject their own eggs to make room for the new guest: but it occasionally happens that this is not done; the eggs are not disturbed, and the process of hatching is allowed to go on regularly, and the young sparrows and the cuckoo emerge from the shell about the same time. This event, when it is permitted to happen, does not at all improve the condition of the former; on the contrary, it only exposes them to greater sufferings. The size of the egg of the cuckoo does not vary much from that of the bird in whose nest it is deposited. When the young sparrow, therefore, and the intruder first come to life, they are pretty much on an equality; but unhappily for the foster-brethren, this equality does not last long: the cuckoo's growth rapidly outstrips that of his companions, and he immediately exer-

cises his new powers with abundant selfishness and cruelty. By a singular configuration of his own body he contrives to lodge his companions, one by one, upon his back, and then scrambling up the sides of the nest, he suddenly throws them from their seat, and completely ejects them from their own home to become food for worms. There is reason to believe that the unnatural parent is often an unmoved witness of this atrocity. Her whole care and affection are absorbed by the intruder, and her own flesh and blood literally turned out to perish. It sometimes, though very rarely happens, that two cuckoos' eggs are deposited in the same nest. When this occurs, and they are both hatched together, a bitter feud soon arises. These animals, it seems, show no more regard to their own kindred than they do to the stranger. A battle of this kind is here described.

"June 27, 1787.—Two cuckoos and a hedge-sparrow were hatched in the same nest this morning; one hedge-sparrow's egg remained unhatched. In a few hours afterwards a contest began between the cuckoos for the possession of the nest, which continued undetermined till the next afternoon; when one of them, which was somewhat superior in size, turned out the other, together with the young hedge-sparrow, and the unhatched egg. This contest was very remarkable. The combatants alternately appeared to have the advantage, as each carried the other several times nearly to the top of the nest, and

then sunk down again oppressed by the weight of its burden, till at length, after various efforts, the strongest prevailed, and was afterwards brought up by the hedge-sparrows."

The reasons of these strange doings next arrested Jenner's attention. How happened it, he inquired, that the cuckoo neither builds a nest, incubates, nor rears its young?

The Honourable Daines Barrington and Dr. Darwin have both mentioned an instance in which the cuckoo did perform these functions. The first was witnessed by the Rev. W. Stafford, in Blossopdale, Derbyshire; the second by Mr. Wilmot, at Morley, in the same county.

These examples seem to be well authenticated, but they certainly are extremely rare and still leave the questions, enumerated above, fit subjects of curiosity.

There is nothing in the structure of the cuckoo which incapacitates it either from building a nest, or incubating, or procuring food for its young. All naturalists previous to Jenner were inclined to ascribe the peculiarity in the economy of the cuckoo to causes of this kind. It was imagined that the large stomach, which is only protected by a thin covering, rendered the pressure attendant upon this office incompatible with its health. This theory was adopted without due examination. There are many birds that incubate, whose stomachs are quite as capacious and as little protected as that of the cuckoo; and moreover, the stomach of all nestlings, which

is always much distended with food, is the point on which the weight of the body is mainly supported while it continues in the nest. It sometimes happens too that the young cuckoo, from an accidental circumstance, performs the office of a sitting bird. Jenner saw an example of this kind in 1786. He found a hedge-sparrow's nest containing a cuckoo, apparently about a fortnight old; on lifting up the bird, he observed under it two unhatched eggs. On breaking one it was found to contain a living fœtus. These eggs must have been laid some time after the cuckoo was hatched. It completely filled the nest, and by reason of this peculiar incident, it was, in fact, sitting on the eggs of the hedge-sparrow.

Facts, such as these just enumerated, satisfied Jenner that the causes usually assigned were not adequate to explain the peculiarities in the habits of the cuckoo. He therefore, with his characteristic modesty, proposes this solution. May they not, he observes, be owing to the following circumstances? namely, the short residence this bird is allowed to make in this country, where it is destined to propagate its species, and the call that nature has upon it, during that short residence, to produce a numerous progeny. The cuckoo's first appearance here is about the middle of April. Its egg is not ready for incubation till some weeks after its arrival. A fortnight is taken up by the sitting bird in hatching the egg. The young bird generally continues three weeks in the nest before it flies, and the foster-

parents feed it more than five weeks after this period; so that if a cuckoo should be ready with an egg much sooner than the time pointed out, not a single nestling, even one of the oldest, would be fit to provide for itself, before its parent would be instinctively directed to seek a new residence, and be thus compelled to abandon its young; for the old cuckoos take their final leave of this country the first week in July.

Had they remained as long as other migrating birds, (such as the swift and the nightingale,) which produce, and rear a single set of young ones, foster-parents evidently would have been unnecessary. It is not known how many eggs the cuckoo generally lays, but that they do lay a great number is very probable, as appears by dissection of the ovaries.

There is no precise time for the disappearance of the young cuckoos. They seem to go off in succession, as soon as they are capable of taking care of themselves. But this is by no means so early as their growth and the fulness of their plumage would seem to indicate. Dr. Jenner has frequently seen a young one so large that the little fostering hedge-sparrow has found it necessary to perch itself upon its back on half extended wing, in order to obtain elevation enough to put the food into its mouth.

The same impulse which prompts the cuckoo to deposit her egg in the nest of another bird, directs the young one also to secure the entire possession of it to herself. There would be neither room nor food

for any other inhabitant, and she is quite as rigorous in enforcing this law in regard to her own kindred, as she is in respect to those of a different species.

This very elegant and satisfactory paper, of which a brief account is now presented to the reader, has ever been looked upon as a specimen of accurate and successful investigation. It explained the habits of the cuckoo with much clearness, and has afforded to every subsequent naturalist a plain, convincing, and instructive account of a subject which, till that time, had been involved in the greatest obscurity.

His nephew Henry became his apprentice in 1783. Jenner was then in extensive practice, and the former tells me his situation was no sinecure. Besides attending to the numberless duties of a strictly professional nature he found in the other pursuits of his uncle many calls upon his time which he was obliged to answer. One of his occupations was to pay a daily morning visit to the nests which contained the young cuckoos. This generally required a ramble of four or five miles in the neighbourhood, and, although Henry had a most inquisitive mind, and was himself particularly given to the study of natural history, he often found his task somewhat tiresome, and would have been perfectly satisfied now and then to permit the hedge-sparrow and the cuckoos to adjust their affairs without any interference on his part. He had at last, however, the happiness to see the object of his journeys successfully accomplished. The reports which he daily brought to

his uncle were duly examined, and their accuracy ascertained. The points of chief moment having been elucidated, the time came for arranging the observations and preparing the paper for the Royal Society, for which it was intended.

"Come, Henry, our work is coming to a close," he said, "I have now drawn up the paper, read it, and find all the faults you can." In such kind and familiar language did he encourage his pupil in his studies, and showed him that his humble efforts in promoting the object of the inquiry were justly felt, and duly acknowledged.

The cuckoos' nests were chiefly at Clapton, a small estate belonging to Mrs. Hooper, Jenner's aunt, where, as has been said, he spent much of his time when he was a boy. But he laid all his friends under contribution to him while carrying on his pursuits. Some he employed in adding articles to his museum; others in watching the habits of plants and animals when he himself could not attend.

It was chiefly at Sannighar, a property belonging to Lord Berkeley, but in the occupation of Mr. Pearce, that he carried on his inquiries respecting the migration of birds. There he marked the swallows and the swifts, and Mr. Pearce watched for their re-appearance and communicated with Jenner.

On the sixth of March, 1788, an event of great moment to him took place. He was on that day united in marriage to Miss Catharine Kingscote, a

lady on whom his affections had been long fixed, and in whose counsel and sympathy he found his surest solace in many of the most trying scenes of his future life. She was elegant in her manners, accomplished in her mind, and possessed an understanding of great vigour. She had been an invalid for a considerable time before her marriage, and she never at any time, after her early years, enjoyed robust health. The family of the Kingscotes is one of the most ancient and respectable in this county; and it has received additional distinction from their personal merits as well as from their alliances with eminent individuals. Anthony Kingscote, Esq. was a kinsman of the great Sir Matthew Hale, and became his guardian after the death of his parents; and the affinity contracted by the union with Jenner will not reflect less lustre on their name.

His eldest son Edward was born on the 24th of January, 1789.* This is alluded to in a letter which I subjoin as a specimen of his style of correspondence with one of his earliest and best beloved friends.

It is long; but it contains so much interesting domestic intelligence, and exhibits such a picture of the kindness and benevolence of the writer's mind, that I will not withhold from others what has afforded me so much gratification in the perusal.

* Mr. John Hunter was this child's godfather.

E. JENNER TO THE REV. JOHN CLINCH, NEWFOUNDLAND.

Berkeley, 7th February, 1789.

MY DEAREST FRIEND,

Your rebuke on account of my not answering the long and affectionate letter I received from you in the autumn is far milder than I deserve; you whip me with a feather when the severest lash might with all justice be applied as a punishment due to me. Not a single excuse have I to offer, and I must beg you to accept my best thanks for your extreme lenity. It is a maxim universally admitted that of all the ill habits a man may fall into, indolence is the most difficult to get rid of. I for one am a sad example of the truth of this position, and this very sin, (for I will not call it by a milder name) has got me into more scrapes than all the rest put together. You, my dear Clinch, may bless your stars that you have not an atom of it in your composition. It was this spiteful demon that bid me defer, and defer it till every ship was sailed that could give one a chance of conveying a letter: a thousand and a thousand times my heart smote me for it, and I seem at this time as if I never should do the like again; yet conscious that I am still under the dominion of indolence, it would be imprudent in me to make a rash vow. I should not think of troubling you with a preface of such a length, but it is my intention to let the letter bear an equal proportion. You will find it disjointed and *uncon-catenated*, containing a variety of subjects; and you must not be surprised to find me pass hastily from one to another, as I shall at my leisure take up the paper and set down matters as they occur to my recollection. As it is uppermost in my thoughts I must in the first place tell you that I have a son. My dear Catharine has lain in about a

fortnight. The child, though small, appears to be remarkably healthy; and I ardently hope there may as much affection subsist between the young Edward Jenners as between their fathers: there will be no room for more. Do not you think one of these days to send him to England for his education? I should be happy in taking him entirely under my own inspection, and would do by him exactly the same as if he were my own. I hear by the captain, you and Mrs. Clinch keep him under no kind of restraint, but indulge him with a full gratification of all his wants and wishes. Let me intreat you both to take care what you are about:—remember the path of life is full of *thorns*, and if you keep him upon *velvet* till the day arrives when he must begin to feel their points, think how much more poignant must be his feelings. On this subject one might enlarge, but what I have said I trust will be sufficient to awaken every proper sentiment. I shall only just add that severity to children I utterly abhor, and my observation leads me to consider it as being more injurious to them than the contrary extreme; but either one or the other is so hurtful to the mind that we feel its baneful effects to the very latest period of our lives.

I sincerely lament your having been again beset by that dreadful fever the typhus, and as sincerely congratulate you on your recovery. There is no laying down, I believe, any general mode of treatment in this disease. A man must be guided by his own genius; indeed, without a good portion of this, a physician must ever cut a poor figure; and if he should be a man of fine feelings, he must often be subject to unpleasant sensations within himself. Something new is for ever presenting itself—neither books, lectures, nor the longest experience are sufficient to store his mind with the undescribable something a man of our profession should possess. It not unfrequently happens that at the onset of

typhus, the patient becomes affected with extreme nausea, and oftentimes vomiting; this was my own case in the dreadful fever I suffered in the year —86. Taking up the common idea that nature was wishing to throw something off the stomach I took emetic tartar, and increased by this means the malady; for I did not cease vomiting ten minutes for several days. Last April, after taking cold, I felt exactly the same symptoms coming on; the same confusion in my head, and the same distressful prostration of strength. Being pre-determined, if ever the like should happen, to treat it in a very different way, instead of increasing the nausea, I took something immediately to give a check to it. First, I swallowed a glass of wine, and at once felt all the symptoms give way. I then got on horse-back, but before I had gone two miles the effects of the wine were at an end, and I was forced to support myself by leaning on my horse's neck. I then got a glass of brandy, and in five minutes was quite well; my head, stomach, and muscles, all acting or ready for acting very properly. I had five miles to ride home, and by the time I could reach it, the debility was as great as ever. I constantly observed that my headache, sickness, and weakened muscular action, all came on and went off (after the use of the cordials) at the same time. I went at once to bed, and took a pretty large dose of laudanum with some *spiritus vitrioli dulcis:* this, like the brandy, gave immediate ease. I went to sleep, and awoke quite well. I am particular in reciting this case to you, knowing that your constitution subjects you to fevers of this kind; but I am well aware that the attack is so different in different habits that the mode of treatment here mentioned cannot be *generally* adopted. I wish the term *putrid* applied to this fever could be discarded, for I really think it leads the practitioner into errors. I do not recollect ever seeing a case that arose from the vapour of putrid animal sub-

stances, nor do I think that putrefaction, in the worst of cases, ever takes place before death, either in the fluids or solids.—If mortifications come on in consequence of too languid a circulation, or any thing else, these may be the effect and not the cause. The giving antiseptics, as they are called, with a view of preventing one's carcase from becoming putrid while alive, is too ridiculous. The worst of it is, that these fevers, at first, often commence with symptoms evidently inflammatory, and for a long time before extreme debility comes on, the disease appears to be of a mixed nature. It is at this period that I find *spiritus vitrioli dulcis* so useful; that is, when on the one hand the antimonial plan cannot be admitted, and, on the other hand, the bark plan. And I may add, that I have seen good effects arise from the use of antimony and *spiritus vitrioli dulcis* given together at a time when inflammatory symptoms seem to preclude the use of the latter given by itself.

George has at length left us, to take leave of his friends elsewhere before he departs for your snowy shores. Your offer was in every respect so liberal that it would have been unjust in me to have said any thing to have damped his ardour for catching at so good an opportunity of improving his fortune. It was only in my power to improve his education; and the progress he made during the time he staid here was extremely rapid. You will find him a youth of extraordinary talents: his penetration and discernment not limited to his profession only, but general. As a medical character we shall one day or another see him shine;—as a natural historian he already ranks extremely high; and, as he is extremely industrious and active, he will doubtless bring to light many things that have lain hid in darkness about your island from the beginning of time. During his absence, Henry and myself must fag on as

well as we can. I am sorry to say Henry's health is not in so good a state as I could wish it; nor do I know what his complaint arises from. But before I say any thing of Henry let me just tell you that what I have said of George is according to my judgment, the just outline of his character, and not an eulogy made up of falsehood. Henry is much as you left him, the same simple, inoffensive lad, and indeed, I think as boyish almost as ever; and though his mind is stored with ideas that do him the greatest credit, yet his general appearance and manner is so very *fifteenish*, that a poor mortal on the bed of sickness will hardly look up to him with that eye of confidence and hope that might safely be placed in him. For it is by appearances, my dear friend, not from a real knowledge of things, that the world (at least the major part of them) form a judgment. A look of significance, a peculiar habit, and a very scanty acquaintance with the human machine, will make a man pass current for a great physician. This you and I know to be an unfortunate fact; while, without these auxiliaries, a man with the knowledge of the *hall* and *college* concentrated will be looked upon as a mere pretender. 'Tis almost midnight; and from the confused manner in which I write, it is certainly time to give my thoughts a respite till "Nature's great restorer sleep" shall give them fresh vigour.

To return, How is your head? I fear but so so. I am still of opinion that the complaint you have so long experienced arises from the blood-vessels, carrying blood to the head, overacting their part; you should certainly try every means to lessen this morbid determination. Your feet and legs should be kept as warm as conveniently may be, for when the vessels of the head are too full,

the vessels of other parts are generally too empty; and this occasions coldness. I don't see how heat can arise from any other cause than increased flow of blood upon a part. For example, the degree of heat in the highest state of inflammation is never more than the heat of the blood about the heart. This I have repeatedly ascertained by experiment. I fear you are too free with the use of tobacco; can't you have resolution enough to give it up? Spirits, even diluted as you drink them, I think, are bad; and so are liquors containing much fixed air, and consequently spruce beer. 'Tis hard to say what you can substitute if you relinquish those things; but you should make a thousand *innocent* experiments on your constitution, and see if this distressing complaint is owing to any error in your mode of living. How far the state of your stomach is connected with it should be studiously made out. You know it has long been my creed that *stomach* is the governor of the whole machine, the mind as well as the body. The seat of action is certainly in the brain; but the stomach gives the word of command, and tells it how it shall act. I have taken up a notion, that every one of the large arteries may, in consequence of the stomach being affected in a peculiar way, take upon itself an action quite independent of the heart, except in its number of pulsations. This subject is too wide for the confined plan of a letter; and I shall therefore touch it very briefly. The blood-vessels are, you know, all connected with nerves; and consequently, irritable. You will think it odd in me to assert such a thing; but I really believe that most of the diseases human nature is liable to arise from these nerves being affected, and consequently subjecting the blood-vessels to a diseased action. The skin may be affected by certain applications, and these may produce the same

effects as if they were applied to the stomach: cold, for example. I mention this because I have called the stomach the ruling principle: but the skin and stomach have a peculiar connection one with the other. If you will turn your thoughts to the subject a multitude of illustrations will arise, to make you sensible of the truth of the observation respecting diseases arising from improper action in the blood-vessels; or, to simplify the idea, from too large a quantity being thrown upon one part, while another part is deprived of its due quantity. Don't you find that when one part is too hot (remember I have said that heat depends entirely upon an increased quantity of blood in a part) that another part is too cold? When the face is flushed with heat, the feet and hands are generally freezing with cold; and what does this flushing arise from but from the arteries of the face feeling a stimulus? and this quite independent of the heart itself being acted upon; for we often find that while this appearance exists, the heart is beating slowly. I have selected this appearance because it is one of the most familiar.

But in a word, what disease is there, either acute or chronic, that does not arise from these irregular *dashes* (if I may use the expression) of blood upon different parts of the body? This question I shall leave you to answer; and at the same time quit the subject, which I fear is here spoken of with too little perspicuity for you to comprehend.

One little hint arising from it I must not omit; and that is, if your feet are in the least disposed to be cold, that you use a tepid bath (about 100 degrees) for ten minutes every night. Plunge in both legs as well as your feet. This reminds me of the thermometer, which I hope you have received long ago; for though I did not write to you I

was not so bad as not to write to London about it: this I did immediately on receiving your letter.

Mrs. Jenner begs Mrs. Clinch to accept her thanks for her civilities, to which I beg leave to add mine. The cranberries are, as usual, excellent and I paint my mouth with them frequently. But, alas! the Parson's fish! George will tell you all about it. I have been week after week waiting to go to town, where I thought to have picked up something worth sending to you; but I now begin to fear that the ship will sail ere I shall be able to go. But you know you are too often in my thoughts to be forgotten. Pray send me the catalogue of your books that I may know what medical works may at any time be useful to you. But must this monstrous piece of water for ever stand betwixt us? are we to have no intercourse but with pens and ink? Among your numerous callings is there not one that would enable you to find ample succour for your family, breathing at the same time the balmy air of your native Isle?

With an earnest request that you would seriously ponder over these questions I shall conclude this long epistle: I don't urge your speedily relinquishing the situation you are placed in; but only to have it in contemplation to be, one day or another, my companion as well as friend.

Till this hour arrives, and to the latest period of your existence, may every earthly comfort be your portion. No one more ardently wishes happiness to you and yours, than your ever

Faithful and affectionate friend,

EDWARD JENNER.

To the Rev. John Clinch,
Newfoundland.

The gentleman to whom this was addressed had been Jenner's schoolfellow: they afterwards studied together under Mr. Hunter's eye, and contracted for each other the warmest and most sincere friendship. Clinch, being destined for a distant colony, took orders as a clergyman, and when he settled at Trinity in Newfoundland, he combined the practice of medicine with the exercise of his sacred functions.

A pleasing account of Jenner's domestic happiness, and of his contentment in his sequestered situation, is found in a communication to his friend Gardner. To explain the latter part of it, I may remark that Gardner, during the early portion of his life was a wine and spirit merchant; and Jenner's cellar was usually supplied from his store.

E. Jenner to E. Gardner.

Dear Gardner,

When I consider what miserable weather we have had for some time past, I can readily forgive your not coming to see me. You know I sat half an hour with your father to-day in his closet. It was (if I mistake not) the third time of my calling at your house without the pleasure of finding you at home. I thought your father seemed to be quite forsaken by his usual vivacity, and that the infirmities of our nature were beginning to squeeze him too hard.

My place of residence, though unfinished, is extremely comfortable; and I can with truth assure you the last year of my life, dating it from the month of March, has been the happiest beyond all comparison I ever experienced: and

I will take upon me to aver (nay I would swear it) that if you could be lucky enough to connect yourself with a woman of such a disposition as kind fortune has, at last, given to me, you will find a vast addition to your stock of happiness.

You have rallied me lately on a change of sentiment with regard to a rural life. There were no fair grounds for it, for I feel my mind as *cottagish* as ever; and when you see my habitation finished, you will allow me to be quite as retired and countryfied as yourself. Whether a man sits on a sofa or a bench, dines off a plate or a trencher, it does not, according to my ideas, make much difference. Still I think his mind may delight in the very opposite to that which mankind in general run after.

My chain of philosophy is hastily broken by the intrusion of a busy thought; and indeed it is rather lucky, as I took up my pen for that purpose. It was to tell you that my brandy is out, and my cellar getting dry. I must still trespass upon your patience in sending me such small quantities of malt, but as yet I have no materials for brewing put up. Send the brandy according to quality. If it is *apt* (as we say) send a large hamper; if not, send some for present use only. Where is my bill? If you don't send it soon, it may be worse for you. I expect to go through your turnpike to-morrow, where I shall probably drop this scrawl; for I fear my time will be so taken up that I can't see you.

Mrs. J. jogs my elbow to say she wishes to hear a duet; and to give her compliments to you.

Adieu! Yours ever very sincerely,

E. Jenner.

The correspondence with Mr. Hunter was maintained, but the declining health of that gentleman

rendered his communications less frequent. One of them regards a curious pathological fact, which Jenner had observed concerning the dislodgement of hydatids from the kidneys. Dr. Jenner continued, notwithstanding Mr. Hunter's scepticism, to believe that the oil of turpentine was the agent of their removal.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I have just received the favour of yours. I have just now forgot the case of the hydatids; but if there was any thing that struck me, I dare say it was laid by. They are frequently in the kidneys, but I should doubt your oil of turpentine having any merit in bringing them away. My reason for supposing them animals is because they move after they have been extracted. I have taken them out of the head or brain of a sheep, and they have contracted in different parts of them when put into warm water. I should be glad to employ you if I knew in what; but if any thing comes across my imagination, I will think of you. The measly pork are hydatids.

I am afraid of your friend Mrs. L. There is a hard tumour that almost fills the pelvis, most probably the uterus. How does Mrs. Jenner do? do you bring her to London? What family have you got? My compliments to Mrs. Jenner, and believe me to be, dear Sir,

Your most obedient, and
Most humble servant,

December 8th, 1790. JOHN HUNTER.

This letter is interesting on two accounts. It alludes to the care with which all documents of any

moment were 'laid by,' and preserved by Mr. Hunter. It was his habit to have such portions of the communications of his correspondents transcribed as contained any new information. His collections of this kind must, therefore, have been highly interesting and very voluminous, but I have some reason to fear that they have all perished. The other point to which I refer, concerns Dr. Jenner's inquiries on the subject of hydatids. The natural history of these bodies, and their influence in producing disorganizations of the most formidable kind, began about this period to attract much of his attention. It led him likewise to investigate with great care the healthy functions and diseased conditions of the lymphatic system. To gain information on these points, he had recourse to comparative anatomy and pathology; and derived from the inferior animals most satisfactory evidence of the accuracy of the opinions he had been led to adopt.

The important illustrations of the origin and progress of diseases to be drawn from these sources continued to occupy his mind at different intervals throughout all the remaining years of his life. Some of his early opinions were communicated to Dr. Beddoes, in order to explain the formation of tubercles in the lungs: and were published by that physician in his work on factitious airs. At a subsequent period they became the subject of much intercourse and correspondence between Dr. Jenner and myself. This is not the place to dwell at large on the doctrines

connected with it. His opinions will be found in two works which I published in the years 1819 and 1822. Some of the views disclosed in these works were taken by the best physiologists and pathologists of former days, but in consequence of the overwhelming interest which was attached to other parts of the animal economy, they were permitted to fall into neglect. They will doubtless, however, revive, and Dr. Jenner's claims as a pathologist will be admitted, for though he was not the *first*, he certainly was an *original* inquirer in this field; he having been quite unacquainted with the writings of which I speak. Like his great master, Hunter, he was more given to trust to observation than to literary research. Besides, the publications were in some measure of a fugitive nature, consisting chiefly of short dissertations: and had not Haller deemed them worthy of a place in his collections, they would probably have sunk into oblivion.

The successful experiments of Ruysch on the sanguiferous system led physiologists to pay almost exclusive attention to that part of the animal economy. Thus the excitement which had arisen from the discovery of the lymphatics was allowed to subside, and all the functions of the body, whether in a healthy or diseased state, were entirely ascribed to some modification of sanguiferous action, to the almost total exclusion of other agents. At a subsequent period Mr. Hunter's own writings contributed not a little to produce a similar result. It is, never-

theless, certain that he attempted to guard against an error of this kind, though his followers did not always perceive it, and have employed the authority of his name to support opinions which he has explicitly disowned.

The origin of the many changes of structure that affect organized beings, has ever been a subject of interest, because it, in truth, includes many of the most serious "ills that the flesh is heir to." Tuberculous disorganizations, in one shape or other, destroy an immense proportion of the inhabitants of these islands: and the number of kindred changes of structure that appear in the shape of tumours of various denominations, producing either deformity or death, invest this branch of pathology with a degree of importance second to none. This was the opinion of Jenner, and he laboured with unceasing perseverance to throw light upon the subject, earnestly hoping that accurate knowledge on the origin and progress of this class of diseases would lead to more successful means of treating them.

It has been the custom to ascribe them all to inflammatory action. There is great reason to fear that this general term has been too indiscriminately used, and that the ideas attached to it are very far from being precise. The opinion seems to have arisen from examining changes of structure in an advanced period, when the original distinction of parts is lost, instead of watching them throughout their progressive stages, when the real condition of

the structures can be traced. Errors of this kind can scarcely be avoided if we confine our researches to human pathology. There we only see the disease in its last stage, and, it may be, invert the order of the phenomena, putting down for a cause what possibly was a consequence.

This conviction induced Dr. Jenner to seek information elsewhere. He examined very carefully the diseases of the inferior animals, and was enabled to prove that the usual course assigned to them was by no means correct. He found, especially in that class of diseases of which we are speaking, that the primary state did not denote any thing akin to inflammation; that the changes were in the first instance obviously connected not so much with the blood-vessels, as with another part of the system.

The Hydatids, of which naturalists now enumerate several species, afforded to him the means of explaining many morbid phenomena. These bodies are generated in almost every texture, and are themselves liable to changes which totally alter their original character, and give rise to diseases most formidable in appearance and fatal in their nature. By far the greater number of encysted tumours, whether found within the abdomen or elsewhere, have had an origin of this kind. The demonstration of this fact can only be obtained by tracing the progress of these bodies in different animals through all their stages. The information derived from examinations of this kind casts a bright and steady light over some of

the most obscure parts of human pathology; and has enabled us to explain the formation and growth of morbid masses, which could not be accounted for, rationally, in any other way.

The kindly intercourse which had so long subsisted between Jenner and Mr. Hunter was now soon to cease for ever; and I believe not more than three or four letters were interchanged subsequently to this time. One of them playfully upbraids Jenner for not coming to town. The reason of it is detected in another.—

MR. HUNTER TO E. JENNER.

DEAR JENNER,

What are your about? I have not heard of you, nor from you for this long time. You must certainly be about some mischief that keeps you so quiet. Let me know what you are doing, or else I will blow you, and have you brought to town as a criminal.

Yours, &c.

JOHN HUNTER.

MR. HUNTER TO E. JENNER.

DEAR JENNER,

I was in hopes of having seen you in London long before now; but I have been informed that Mrs. Jenner has been extremely ill. When you come I hope you will bring her with you: we will take all the care we can of her.

Now that the hedge-hogs are gone to sleep, I could wish you would get some of them for me; and put them in a

box with very loose and coarse straw, so that they might have air, and not tumble about on each other. I want to open a few. When you catch them, do not put them into a warm place to make them lively: the more stupid the better they will carry and live.

Ever yours,

JOHN HUNTER.

December 10*th*, 1791.

Mr. Hunter's last letter to Jenner was dated on the 12th of August, 1793, a little more than two months before he suddenly expired in St. George's hospital. As it refers entirely to a private consultation, I forbear to print it; and shall only observe, that it is written with his usual power and vigour.

It will easily be believed that Jenner was deeply affected by the loss of such a friend, although his knowledge of the disease under which he believed Mr. Hunter to have long laboured had too well prepared him for such an event. An account of the appearances found on examining the body was transmitted by Sir Everard Home to Dr. Jenner.

SIR EVERARD HOME TO DR. JENNER.

Leicester Square, February 18*th*, 1794.

MY DEAR SIR,

I have sent you by the Major the numbers due to you from the Royal Society. I am well assured that you were sincerely afflicted at the death of your old and most valua-

ble friend, whose death, although we all looked for it, was more sudden than could have been imagined. It is singular that the circumstance you mentioned to me, and was always afraid to touch upon with Mr. Hunter, should have been a particular part of his own complaints, as the coronary arteries of the heart were considerably ossified.

As I am about to publish a life of Mr. Hunter, which will contain both the symptoms of the disease, and the dissection, I shall not say more about it at present; it will be prefixed to the work on inflammation, and we hope to have it printed by the end of next month.

I cannot say that I have met with the ossification of these arteries so frequently as other alterations of structure in the heart, but this case is very much in favour of your theory.

* * * * * * *

The fatigues of general practice having become irksome to Jenner he resolved to abandon one branch of it, and to confine himself to medicine. With that view he obtained in 1792 a degree of Doctor of Physic from St. Andrew's. I cordially wish that all the honours of that ancient University had been as well bestowed.

Towards the conclusion of 1794, he was attacked with typhus fever, which nearly proved fatal. He was visited by Dr. Parry from Bath, and Dr. Hicks from Bristol; but his constant attendant was his nephew George C. Jenner.

He has himself left a very striking picture of his own sufferings, as well as those of his family, at this time.

DOCTOR JENNER TO W. F. SHRAPNELL, ESQ.

DEAR SHRAPNELL,

Having no further use for the small remnant of brain the grim-visaged typhus has left me than to employ it in this way among my friends, it would be highly improper in me to withhold an answer to your obliging favour, for a single post.

Indeed, my good friend, I have been a terrible sufferer since you were at Berkeley, at which time I never experienced such health, my stomach and skin being in such a state from late autumnal bathing, that I scarcely felt the cold you were all complaining of. But who in the front of the battle shall say his breast shall not be pierced by the sword of the enemy? I little thought there was so much malignancy in the disease that cut off the poor dear boy; as it was clearly generated in his constitution, and not communicated.

You shall hear the history of our calamities. First fell Henry's wife and sister. From the early use of bark, they both appeared to recover; but the former, after going about her ordinary business for some days, had a dreadful relapse, which nearly destroyed her. It was during my attendance on this case that the venomed arrow wounded me: I felt it in the form of a nausea, as if I had eaten some indigestible substance, for several days, without the system being in the least affected; and had it not been for a dreary, wearisome ride over mountains of ice, without being able to come at succour, no mischief might have ensued; for I have long been assured that infection may be received and again expelled from the constitution, if no debilitating power should arise to call it into action. Like

Mrs. Jenner's fever, at an early period there was a clear intermission for four days; but, doctor-like, not a single grain of bark, or any thing else, did I take during this period. On the 8th day after the first seizure it again set in, in good earnest, and continued one-and-twenty days! Great were the efforts of those who kindly and humanely attended me. Dr. Parry was with me from Bath five times, Dr. Hicks and Dr. Ludlow as many, and my friend George was never absent from my bed-side. Thank Heaven! these efforts were crowned with success, and I am now enjoying that happy state, an uninterrupted convalescence; yet still so feeble that I think a great matter has been achieved when I quit my bed for an hour or two, and hobble across my chamber. My medicine is the Cascarilla bark; all other barks disordering me much. I sleep well, and my appetite is good, too good! for what is human reason, when opposed to the fury of an empty stomach? But to return to that mansion of melancholy, Henry's. His infant girl has now the fever; a servant maid in the house is dying with it; and, to complete this tragical narrative, about five days ago fell poor Henry himself. His symptoms, at present, are such as one might expect; violent pain in the head, vertigo, debility, transient shiverings, &c.

George is the only person among us that keeps his legs. His report of his brother is rather pleasant this evening; his pulse being sunk from 125 to 100. The stench from the poor girl is so great as to fill the house with putrid vapour; and I shall remove him this morning by means of a sedan-chair to a cottage near my own house. Happier hours are, I hope, on the wing for us; and that you will, ere long, receive from me more agreeable communications. Poor Cooks! I sincerely lament his fate. You have lost

such a friend as will not be easily found again. Do you recollect a pithy line in Young on the subject of making friends?

"But friends how mortal! dangerous the desire!"

I heartily wish you well through the ensuing campaign. If your swords are ever to be unsheathed, it will be now. H—— is, and ever was, a vain hypocritical——. I have lived, Sir, in this wicked world, man and boy, these five-and-forty years, and no act of mine during that space ever pleased me more than that of driving the monster from this place; but alas! the immoralities he inculcated have taken too deep a root for even the arm of an Hercules ever to pluck up. To dissipate sadness, and fill up my leisure hours, I have been collecting my scattered thoughts on the subject of the migration of birds, having long promised a paper to the Royal Society. Can you furnish me with any facts respecting this matter that I do not possess? Make my respects to Mrs. Shrapnell, Colonel Wall, and any officer of the battalion I have the honour of being acquainted with, and

Believe me yours, most sincerely,

E. Jenner.

The effects of this illness continued for a considerable time. The feelings of the neighbourhood may be gathered from some expressions of one of his old associates, the Rev. Nathaniel Thornbury, of Avening, a village about fifteen miles distant from Berkeley. He was a learned and somewhat eccentric man, fond of natural history, and a shrewd observer. He makes mention of a fact which Jenner

has employed in elucidating his doctrine of the cause of the migration of birds.

THE REV. NATHANIEL THORNBURY, TO DR. JENNER.

Avening, March 22, 1795.

DEAR SIR,

I sincerely congratulate you on your recovery, and let me add, the surrounding neighbourhood also. When such an individual as you migrates to a better planet, (for surely this, as friend Yorick says, is a very scurvy and disastrous one,) the languishing invalid, whose existence you have lengthened, or whose pangs you have alleviated, drops a mournful tear.

Nonentities, like myself, steal from the world, and not a stone tells where we lie. Horace's " in seipso totus teres atque rotundus," is a brief compendium of my present system, which I hereby reduce to the small compass of a ring posy. As I find it improves my aversion to the race to see the yahoos now and then in large groups, I am at this moment setting out for the great Hyrcanian forest, namely Town, to speculate and growl for a few days, and then return to my own den.

I write all this in pure simplicity of heart, well knowing your discretion, as being also one of us, a cynick *in cuore* with the *il volto sciolto.*

The thieves were Dutch ones. I have in your last week's journal been pushing quart and tierce with one of your English ones, for " he that robs me," &c.—not but that the yahoo had literally robbed me by conveying away at different times certain ratios of hay, in which he was detected. The anecdote you inquire after is briefly as follows. Scheveling is a fishing village, on the coast of Holland, about two miles from the Hague. An individual of the

place, on whose veracity I think I can rely, informed me that he observed his pigeons, in a morning when the weather was fine, stretch across the ocean in a direction due west, and return in the evening. In the craws or crops of several, on killing them, vetches were found. As to their picking up vetches in Holland, the thing is wholly impossible. Quia, because there are none to pick up. The opposite coasts indeed of Norfolk and Suffolk afford a plentiful supply. You will make the necessary inferences, and conclude accordingly; but, no conclusion you can possibly make, were you to range the whole field of Scibile and Ens, can be more undoubted and certain, than the conclusion of the present, that

I am, dear Sir,
Very truly, very sincerely, yours,
NATHANIEL THORNBURY.

I am not aware of any incident worth recording that befel him or his family, till towards the end of the year 1795, when a fleet of transports under Admiral Christian, destined for the West Indies, was wrecked on the coast near Weymouth. Dr. Jenner's nephew, Stephen, was on board the Catherine. This young officer was on the staff of General Abercromby. A most lively, yet appalling account of this disaster is given in two letters by Mr. Shrapnell, who on the melancholy occasion exerted himself in collecting the stiffened corpses of many of his friends and companions, that lay scattered in terrific confusion along the beach; but he shall speak for himself.

W. F. Shrapnell, Esq. to Dr. Jenner.

Weymouth, November 22, 1795.

My Dear Friend,

Although heartily exhausted with fatigue, I cannot avoid telling you that I have every reason to believe my friend Stephen was unfortunately lost in the Catherine transport. I volunteered the command of a party of forty men of our regiment, to bury the dead, in hopes of finding his body. I have been three days officiating in the melancholy ceremony. I could not distinguish his features, but from size and some resemblance I have lodged in coffins two bodies which I thought resembled him. I will faithfully see them interred, with the bodies of fourteen other officers, with all military honours. Our officers have exerted themselves very much. The labour I and my party have gone through, I look back upon with astonishment, but almost think it miraculous. The cause supported us. We had every day six miles to walk on the bank of pebbles, one mile an hour before we could reach the bodies, and then they lay scattered on the same bank for two miles further. I believe we have buried about 230, but cannot immediately say, as I am much wearied, and have a good way to send to my sergeants for the account. Forgive me if I do not say any thing particular this time. To-morrow I shall again go to the spot with carriages to bring the officers here in coffins to be buried, and on Tuesday the melancholy ceremony will be performed with all military honours.

Mrs. Burns is very well, and in better spirits than we

could have imagined. I have now in my pocket some of her husband's hair for her. I will save some off the body I have taken for Stephen's for you, but it is cropped short.

Adieu,

Your ever sincere

W. F. Shrapnell.

W. F. Shrapnell, Esq. to Dr. Jenner.

Weymouth, November 26, 1795.

My dear Friend,

I this evening received your answer to my first letter, by which I find my first suggestion was too true, and that my friend Stephen is in reality no more. I persevered at the head of forty men for four days, searching for his body, and interring the soldiers and seamen cast on shore. It would fill your susceptible mind with too much anxiety, was I to attempt a description of a small view of the horrid scene. I selected the bodies of seventeen officers and nine women, who were all interred yesterday in the churchyard of Wyke Regis, with military honours; a solemn and awful sight to survivors.

I selected a body much like my friend in size, height, and, as I thought, features, and preserved it with the bodies of two others, which I thought resembled him also. They were brought to the Wyke yesterday as above. I gave poor Mrs. Burns the satisfaction that I had identified the body of her husband. His marks were so particular that nobody could be deceived.

I also found the body of Captain Creighton, Lieutenant Sutherland, and Lieutenant Kerr. These we are all sure of. I have now been sitting an hour with Mrs. Burns,

and making what inquiry I could to satisfy your request. She says that none were sensible of their danger until within five minutes of the ship's striking; that lieutenant Jenner was that morning dressed earlier than usual, and provided (in his turn) breakfast for the mess of officers: that he did not seem to be alarmed, but went on deck to see which point the wind lay, and immediately came down into the cabin and said in a joking manner, it is now all over with us, for we have not an inch of canvass left. His cot and sleeping place were so much disturbed by the rocking of the ship, that he retired to put his things to rights, or to lie down. Soon after this the mate of the ship looked down into the cabin, and cried out, "gentlemen, save yourselves if you can." Mr. and Mrs. Burns were not dressed, but on the alarm, went on deck with Lieutenant Jenner and Staines, the captain, &c. The ship rocked a good deal, and an immense wave immediately separated Mrs. B. from her husband, and knocked her and the ship's captain down again into the cabin. The captain recovered himself immediately, and went on deck. In about a minute she attempted to follow him, and with difficulty got up and looked on the deck, where no person remained. The ship then struck, and she was hurried a second time into the cabin, surrounded with cracking timbers, and completely enclosed. She imagined her husband and Mr. Jenner had leaped on shore, and attempted a third time in vain to save herself.

She then resigned herself to the will of Heaven, expecting no other than immediate death, and on her knees, half covered with water, and the ship momentarily breaking to pieces, awaited the fatal event. How she was preserved she cannot account. She supposes the wreck must have broken the cabin open, and left a breach wide enough to let her through. A wave threw her some way from the

ship, and being perceived by a man at a distance, he saved her at the hazard of his life. She could not be made sensible but her husband must have been saved before her. The fact is that the first time the ship struck every person on deck was washed overboard, and no more seen alive. At this time my unfortunate friend shared the fate of his companions.

I have no doubt but a better chance would have been presented if the unfortunate sufferers had been able to remain with the ship, as she was driven very far on the land. I saw the next day the whole stern windows of the Catherine, but in a few hours they were broken up for the iron, by the inhuman plunderers in the neighbourhood. The other parts of the ship were dashed to atoms.

I am,

Your very sincere friend and humble servant,

W. F. Shrapnell.

An account of this calamity was published by Mrs. Charlotte Smith, a lady well known in the literary world. Dr. Jenner, in allusion to her then intended work, observes in a letter to Mr. Shrapnell, "Her pathetic pen will do every thing one could wish with respect to the narrative. Mr. Gardner has been so much engaged with a pamphlet of his own that I did not intend to interrupt him till that was finished; so that no one can feel hurt at Mrs. Smith's taking the matter up; and for my own part I am much consoled at the idea."

It will be seen by another part of this work how much Dr. Jenner's mind was, in the course of this

year, occupied with that great subject which engaged so much of his time and attention during the rest of his life. He had in the spring performed his first inoculation of the *variolæ vaccinæ* and was preparing to bring the astonishing result of his investigations before the public.

It was in this year, likewise, that he commenced his occasional visits to Cheltenham. A letter from his friend Clinch notices this circumstance, as well as his discovery of vaccination.

THE REV. J. CLINCH TO DR. JENNER.

Trinity, Dec. 1, 1796.

MY DEAR FRIEND,

Your kind, friendly, and much-esteemed favours of the 5th and 11th of August last, acknowledging the receipt of my draft on the Society, I have the pleasure to inform you, came safe to hand. I rejoice to hear that your good lady, my worthy and reverend friend, and Mr. Davies were in a better state of health than they had for some time past enjoyed, and I hope your next will announce a perfect re-establishment of that blessing to those much-esteemed friends. As you said nothing of the Rev. Wm. Jenner I flatter myself he was likewise on the mending hand. I was happy to hear that your situation at Cheltenham was both agreeable and salutary to you and your good lady in point of health, and I sincerely trust that your other inducements for making that spot your summer resort are in some degree answerable to your expectations.

I remark what you say of my dear, dear boy; and although I cannot at present form any notions, or give im-

plicit credit to all that philosophers may say, (probably owing to my not having a single spark of philosophy in my composition) respecting the early education of youth, I shall nevertheless, from a full conviction that my Berkeley friends will do every thing for him for the best, always agree with them in the measures most proper to be pursued for his present and future advantage.—You never have, and I trust, my dearest friend, you never will, experience a similar separation. Whenever (and the idea often recurs to my mind) I take a retrospect of the length of time that has already elapsed, and the unavoidable occurrences which have for so long a period as nearly ten years prevented me from visiting those whom I love and esteem on the other side the wide Atlantic—you will readily suppose that my sensations are, at those times, the most poignant and distressing. Could I behold even the smallest glimmer of hope, that a change for the better in the present convulsed state of Europe was likely soon to take place, I should be particularly happy; but as I see no grounds for cherishing so forlorn a hope, the only alternative I have remaining is, that of relinquishing my wished-for intentions of visiting my native shores during the present posture of public affairs.

I am obliged to you for what you say respecting your late discovery. Why not send me a sketch of your idea in print? I wish you could think of something that would repair the organs of my sensorium, as they still continue in a very impaired state.

I have not had an opportunity of seeing any new publication in the medical way since I left England.

As I conceive you have long ere this received the particulars of our late sudden and unexpected alarm, occasioned by the arrival of Citizen Richery, and the powerful squadron under his command having visited this country in

the month of September last; and as I would not wish to hurt your feelings on that occasion I shall decline giving you a particular account of our distressed situation during the time they continued to lord it over us. I was twice obliged to remove my family and part of my effects to places of greater safety, that the whole, had they been disposed to pay us a visit, might not have fallen a sacrifice to the fury of the enemy; but I am happy to say we came off much better than could be expected, and have now the pleasure to inform you that we are once more in the possession of peace and tranquillity; but it will be some time before order and regularity is again restored at our deserted cottage. I cannot divest myself of the disagreeable apprehension that as the spring approaches we shall have to experience a renewal of our former troubles. However, we must hope for the best.

Just before the French made their appearance on this coast, my friend George and self had agreed to meet at St. John's; but our plan was soon disconcerted: and indeed the whole of my family have been greatly disappointed in the pleasure of his company at Trinity, by those unwelcome visitors. I heard from him some time ago, at which time I have the pleasure to inform you he was in good health. Your several requests I have sent to him, and from him you will receive a circumstantial account of his situation.

* * * * * * * * *

In the course of the year 1797 Jenner had nearly arranged every thing for the publication of his Inquiry. An incident connected with that event is recorded in the following extract from a letter from his venerable friend and preceptor the late Dr. Hard-

wicke, of Sodbury. The sentiments expressed are alike honourable to the master and the pupil. "Retired as I have long since been from the arduous task of my profession, and as it were from the world, and full of years, I cannot be ambitious of being brought forward to the public eye; at the same time I confess that I shall feel myself flattered to be noted by a man of your professional character, who was formerly (I am proud to say) my pupil.

That every undertaking of your life may be attended with the success to which you are justly entitled by your indefatigable labours to serve mankind is my ardent wish."

It may be well, before entering on the next great event to which this extract refers, and which so deeply concerned Jenner himself and his fellow-creatures, to take a brief retrospect of the period which has passed in review before us.

We have seen him in circumstances not the most congenial to intellectual efforts, not only actively fulfilling his duty as a professional man, but with great success and perseverance cultivating collateral branches of knowledge, and pushing his inquiries into regions which had formerly been but little explored.

In conjunction with Mr. Hunter he carried on experiments illustrative of the structure and functions of animals. With much industry and ingenuity he explained one of the most unaccountable problems in ornithology; he ascertained the laws

which regulate the migration of birds; he made considerable advances in geology, and in the knowledge of organic remains; he amended several pharmaceutical processes; he was an accurate anatomist, and pathologist; he explained the cause of one of the most painful affections of the heart, and advanced far in his investigations respecting the diseases of the lymphatic system, and the most numerous and extensive disorganizations to which animals are liable.

This sketch regards chiefly his character as a medical philosopher. It touches not those other qualities which entitle him to distinction. Had he done no more than what has just been specified he might justly have claimed an elevated station among his professional brethren; and had he been permitted to pursue to their full extent the various researches which he had commenced I am persuaded that there are few of our profession, in any age, who would have surpassed him as a promoter of useful knowledge. Many of his physiological and pathological views are still very imperfectly understood. When their full import is felt it will doubtless be acknowledged that he possessed a genius than which few more enlightened, or yet more humble, ever adorned the science of medicine.

It is time that justice should be rendered to him in this matter: he had acquired the most substantial title to respect as a medical philosopher, and to affection and veneration as a man, on grounds quite

distinct from those which will carry his loved and honoured name to the latest age.

He did not labour for personal objects; he was careless, therefore, of his intellectual offspring, and often permitted others to appropriate what belonged to himself. He never ostentatiously put forth his claims to public distinction, and it has on that account been supposed by many that he had none to advance. Sir Isaac Newton was well nigh deprived of the merit of his discovery of fluxions by a corresponding state of mind: his friends stepped forward and secured to him the renown which was his due. Those who knew Dr. Jenner have a similar duty to perform; and to prove that, all important as have been the results of vaccination, he had other pretensions which ought not to be overlooked in any just estimate of his character.

CHAPTER IV.

EARLY HISTORY OF VACCINATION.

In order fully to unfold the progress of this discovery, and to develope the history of Dr. Jenner's mind, whilst meditating upon the probable issue of his investigations and carrying them on to their final accomplishment, we must cast our eye back for a season over that part of his life which has been already recorded. Little has been said about vaccination, because it seemed desirable that the various facts and incidents respecting it should be collected together in the shape of a continuous narrative, unbroken by details which do not immediately relate to that interesting subject. It has been stated that his attention was drawn forcibly to the nature of cow-pox whilst he was yet a youth. This event was brought about in the following manner.—He was pursuing his professional education in the house of his master at Sodbury: a young country-woman came to seek advice; the subject of small-pox was mentioned in her presence; she imme-

diately observed, "I cannot take that disease, for I have had cow-pox." This incident* rivetted the attention of Jenner. It was the first time that the popular notion, which was not at all uncommon in the district, had been brought home to him with force and influence. Most happily the impression which was then made was never effaced. Young as he was, and insufficiently acquainted with any of the laws of physiology or pathology, he dwelt with deep interest on the communication which had been casually made known to him by a peasant, and partly foresaw the vast consequences which were involved in so remarkable a phenomenon. He was the more stimulated to meditations of this sort by frequent opportunities of witnessing the ravages of small-pox; and by retaining the most vivid and painful recollections of the severe discipline which he himself had not long be-

* An incident analogous to that above recorded is mentioned in one of Dr. Jenner's note-books of 1799, in the following words:—

"I know of no direct allusion to the disease in any ancient author, yet the following seems not very distantly to bear upon it. When the Duchess of Cleveland was taunted by her companions, Moll Davis (Lady Mary Davis) and others, that she might soon have to deplore the loss of that beauty which was then her boast, the small-pox at that time raging in London, she made a reply to this effect; that she had no fear about the matter, for she had had a disorder which would prevent her from ever catching the small-pox. This was lately communicated by a gentleman in this county, but unfortunately he could not recollect from what author he gained this intelligence."

fore passed through, preparatory to his inoculation for that disease. "There was," to use his own words, "bleeding till the blood was thin; purging till the body was wasted to a skeleton; and starving on vegetable diet to keep it so." The possibility of averting such evils could not arise in a mind like Jenner's without possessing it fully; and he resolved to let no opportunity escape of acquiring knowledge on so important a subject. How judiciously, how perseveringly, how successfully, he fulfilled this early resolution will be seen as we follow him through his various examinations and experiments.

The suggestions of inexperienced minds are sometimes treated with less respect than they merit. Probably, considering the average distribution of intellect and talent among mankind, this caution is becoming and prudent. But we have examples enough in many different departments of knowledge to prove that wisdom and genius in their purest and best estate do, at times, consent to dwell in youthful breasts.

Newton had unfolded his doctrine of light and colours before he was twenty: Bacon wrote his "Temporis Partus Maximus" before he attained that age: Montesquieu had sketched his "Spirit of Laws" at an equally early period of life; and Jenner, when he was still younger, contemplated the possibility of removing from among the list of human diseases one of the most mortal that ever

scourged our race. The hope of doing this great good never deserted him, though he met with many discouragements; his notions having been treated with scorn and ridicule by some, and with indifference by almost all.

As has already been stated, Jenner went, in 1770, to prosecute his studies under Mr. Hunter. Among other subjects of interest which he carried with him from the country, and which he repeatedly mentioned to his teacher, was that of cow-pox. Mr. Hunter never damped the ardour of a pupil, by suggesting doubts or difficulties: on the contrary, as was usual with him on all occasions when the matter in hand admitted of being brought to the test of experiment, he advised that *trial* should be made, and that accuracy and faithfulness should guide the investigation. In cases of this kind he would say "Don't *think*, but *try*; be patient, be accurate." In language such as this he incited all who came within the sphere of his influence to cultivate their art; and his own example most fully accorded with his precept. It does not appear that his mind was ever so fully impressed with the probable consequences of the successful elucidation of the subject of cow-pox as Jenner's was. This, perhaps, is not to be wondered at, considering the extent of his occupations, and the great number of original and important pursuits which fully engrossed his attention. He certainly, however, made known Jenner's opinions, and the traditions in Gloucestershire, both in his lectures,

and to his friends in conversation; and other lecturers, on his authority, mentioned them to their pupils.

It was constantly Jenner's habit, from the time that his mind was first awakened on the subject, to endeavour to stimulate all his professional friends and acquaintances to apply themselves to its investigation, because it was interesting as a branch of natural history, and moreover promised to bring with it knowledge most valuable to man. The state of feeling of those medical men in the district where he resided, who had heard of the reported virtues of the cow-pox, and who had also occasionally met with occurrences which seemed to corroborate the popular rumour, will have told the reader the sort of difficulties that Jenner met with, and will likewise prove that it required a mind possessed of all the firmness of purpose which he enjoyed, to induce him to persevere in his pursuits. "We have all heard (they would observe) of what you mention, and we have even seen examples which certainly do give some sort of countenance to the notion to which you allude; but we have also known cases of a perfectly different nature,—many who were reported to have had the cow-pox, having subsequently caught the small-pox. The supposed prophylactic powers probably, therefore, depend upon some peculiarity in the constitution of the individual who has escaped the small-pox; and not on any efficacy of that disorder which they may have received from the cow. In short, the evidence is altogether so

inconclusive and unsatisfactory that we put no value on it, and cannot think that it will lead to any thing but uncertainty and disappointment." Observations such as these Jenner encountered from the commencement of his inquiries. They were often repeated while he was carrying them on, and some of them were even brought forward to weaken his claims to honour and gratitude, after he had refuted all objections by his perseverance, and by his consummate address and patience had divested the question of all its difficulties and obscurities, and given to vague, inapplicable, and useless rumour, the certainty and precision of scientific knowledge.

It was not till some years after his return from London that he had an opportunity of examining into the truth of the traditions respecting cow-pox. This was about the year 1775, and corresponds with the period specified by him in his tract on the Origin of Vaccine Inoculation. There is an apparent diversity in the account there given of the period at which his attention was excited to the subject, and that which has been delivered above. The difference, however, is extremely slight, and arises more from the absence of some of the minute facts which I have mentioned as characteristic of the first dawning of the inquiry in his own mind, antecedent to the actual prosecution of it by distinct and personal observations, than from any real discrepancy in the statements.

In his brief account of the Origin of Vaccine Ino-

culation, he evidently did not consider the details, which it has been thought proper here to give, necessary at that time to be laid before the public. He was not so much describing the history of his own mind, as the history of his efforts, as a medical man, in the investigation which then occupied so much of the public attention.

I am fully entitled to say this from repeated personal communications with Dr. Jenner, from the concurrent testimony of many of his friends, and from the internal evidence which the statement discloses. He could not have mentioned the cow-pox in London in 1770, had it not been a subject of meditation with him before that time. Moreover, in one of his last conversations with an intimate friend, but a few months before his death, he in a particular manner specified the occurrence at Sodbury, and spoke the story of the subsequent progress of his mind in a manner so engaging, so simple, and so humble, that it made an impression never to be effaced.

It was not till 1780 that he was enabled, after much study and inquiry, to unravel many of the perplexing obscurities and contradictions with which the question was enveloped, and which had impressed those who knew the traditions of the country with the opinion that it defied all accurate and satisfactory elucidation. In the month of May of the year just mentioned, he first disclosed his hopes and his fears respecting the great object of his pursuit, to

his friend Edward Gardner. By this time Jenner's mind had caught a glimpse of the reputation which awaited him, but it was still clouded by doubts and difficulties. He then seemed to feel that it might, in God's good providence, be his lot to stand between the living and the dead, and that through him a plague might be stayed. On the other side, the dread of disappointment, and the probability of failing to accomplish his purpose, restrained that eagerness which otherwise would have prompted him prematurely to publish the result of his inquiries, and thereby, probably, by conveying insufficient knowledge, blight for ever his favourite hope.

He was riding with Gardner, on the road between Gloucester and Bristol, near Newport, when the conversation passed of which I have made mention. He went over the natural history of cow-pox; stated his opinion as to the origin of this affection from the heel of the horse; specified the different sorts of disease which attacked the milkers when they handled infected cows; dwelt upon that variety which afforded protection against small-pox; and with deep and anxious emotion mentioned his hope of being able to propagate that variety from one human being to another, till he had disseminated the practice all over the globe, to the total extinction of small-pox. The conversation was concluded by Jenner in words to the following effect:—"Gardner, I have entrusted a most important matter to you, which I firmly believe will prove of essential benefit to the human race. I

know you, and should not wish what I have stated to be brought into conversation; for should any thing untoward turn up in my experiments I should be made, particularly by my medical brethren, the subject of ridicule—for I am the mark they all shoot at."

This caution respecting concealment sprung from no selfish or unworthy motive: it was a suggestion which came into his mind at the moment of making the communication to his friend, and arose entirely from the little sympathy which he had experienced in his previous efforts to excite his professional brethren to co-operate with him, or to treat the matter which so much engaged his own feelings with the consideration it so well deserved. He by no means continued to act on the principle of concealment. Far otherwise; for it will presently appear that vaccination was often the subject of his own correspondence, and also that of his friends.

Some of the facts which I have presented on the authority of Mr. Gardner were given by him in evidence before a Committee of the House of Commons, when a most extraordinary and preposterous attempt was made to strip Dr. Jenner of his well-earned reputation, and to deprive him of his not less merited reward.

While deliberating on the subject of vaccine inoculation he made some experiments regarding the nature of swine-pox (as it is vulgarly called). From facts elsewhere detailed it has been found reason-

able to conclude that this disease, as well as the common variolæ and the variolæ vaccinæ, had one common origin and were, in fact, varieties of the same affection. The circumstance which I am now to mention affords a strong corroboration, and moreover forms a striking incident in the history which I am endeavouring to unfold.

In November 1789, he inoculated his eldest son Edward, who was then about one year and a half old, with swine-pox matter. The progress of the disease seemed similar to that which arises from the insertion of true small-pox matter when the disease is very slight. He sickened on the 8th day: a few pustules appeared; they were late and slow in their progress, and small. Variolous matter was carefully inserted into his arms at five or six different periods, without the slightest inflammation being excited in the part.

On Thursday, April 7th, 1791, variolous matter was again inserted by two small incisions through the cutis. 9th, Evidently inflamed. 10th, An efflorescence of the size of a shilling spread round the inferior wound. 11th, The incision assumed a kind of erysipelatous elevation: the efflorescence much increased. 12th, These appearances much advanced. 13th, A vesicle, containing a brownish fluid, and transparent, about the size of a large split pea on the superior incision, the inferior about twice as big; the surrounding parts affected with erysipelas. The erysipelas extended to the shoulder, and then pretty

quickly went off. The child showed no signs of indisposition the whole time.

March 1792. E. Jenner was again inoculated: the matter was taken from a child that caught the disease in the natural way, and had it pretty full. It was inserted fresh from the pustule. The same evening an inflammation appeared round the incision, which, at the end of twenty hours, increased to the diameter of a sixpence, and some fluid had already been collected on the lips of the scratch, which the child had rubbed off.

Many years elapsed before he had an opportunity of completing his projected experiments in vaccination, and he encountered numerous difficulties in carrying on the preliminary part of his inquiry. In the first place, he had found from his own observation, as well as from that of other medical gentlemen in the county, that what was commonly *called cow-pox*, was not a certain preventive of small-pox. This fact damped, but did not extinguish, his ardour. By prosecuting his investigation a little farther, this difficulty was obviated. He discovered that cows were subject to a variety of spontaneous eruptions on their teats; that they all were capable of communicating sores to the hands of the milkers; and that whatever sore was so produced, was called, in the dairy, cow-pox. This was satisfactory information and removed one great difficulty, and suggested a distinction between these diseases,—

one being called by him the true, the other the spurious, cow-pox ; the former possessing a specific power over the constitution, the other not. This impediment was scarcely removed before another of more formidable aspect arose. He learned that there were well authenticated instances to prove that when the *true* cow-pox broke out among the cattle at a dairy, and was communicated to the milkers, even they had subsequently had small-pox. Tidings of this kind, which seemed to render farther investigation useless, checked for a season his fond hopes; but resistance and difficulty only augmented his energy, and he resumed his labours with redoubled zeal. The result was most happy, and enabled him to take that great step in the progress of his inquiry, without which none of its anticipated advantages could have been realized.

On the former occasion he discovered that there were two distinct affections, both vulgarly denominated cow-pox; that one gave protection against small-pox, that the other did not: but when he found that what he concluded to be the *true* cow-pox itself could not be depended on, he felt much perplexed. Most men would, at this stage, have abandoned the investigation in despair. It was not so with Jenner. He conceived that in such cases there must be some ascertainable cause for the deviation from the ordinary effects of the disease. It occurred to him that the virus of the cow-pox itself might have undergone some change whereby its specific virtues were lost; that, in its deteriorated state, it may have been capa-

ble of producing a local disease upon the hand of the milker, but no such influence upon the constitution as is requisite to render the individual unsusceptible of variolous contagion; so that the same cow might one day communicate a genuine and efficacious preventive, and the next, nothing but a local affection which could exert no beneficial influence whatever on the constitution. This most ingenious and forcible reasoning, supported by analogies drawn from the well-known properties of the virus of small-pox itself, received an ample confirmation from experience, and was the basis on which some of the fundamental rules for the practice of vaccination were founded. It was ascertained that it was only in a certain state of the pustule that virus was afforded capable of imparting to the constitution its protecting power; that matter taken after this period might excite a local disease, but not of such a sort as to render the individual proof against the effects of variolous contagion.

Having proceeded thus far, all doubts respecting the propriety of attempting to propagate the cow-pox by means of inoculation were at an end. The causes of failure in the casual dissemination of the disease were ascertained, and his chief care was to avoid them in attempting to propagate it by artificial means. A long period elapsed before he had an opportunity of putting his theory to the test of experiment; but he continued to collect information from all quarters. He carried, in 1788, a drawing of the casual disease, as seen on the hands of the

milkers, to London and showed it to Sir E. Home and others. The subject was occasionally canvassed among the medical men there: it was (as has been already noticed) mentioned in lectures; and Dr. Adams thought fit to draw the attention of his brethren to it in one of his publications. Mr. Cline, in reference to this fact, has the following remark in one of his letters to Dr. Jenner:—

"I am very glad to learn that you are prosecuting your inquiries on the cow-pox, for it is a most interesting and curious subject. All that Adams had heard of the disease was from me."*

But this is not all: Dr. Jenner not only wrote and spoke about the subject himself, but he encouraged his friends to do so likewise. I present a striking proof of the liberality of his mind in this respect, in the subjoined extract of a letter from Dr. Haygarth, written in answer to one from Dr. Worthington, an intimate friend of Jenner.

"Your account of the cow-pox is indeed very marvellous: being so strange a history, and so contradictory to all past observations on this subject, very clear and full evidence will be required to render it credible.

"You say that this whole rare phenomenon is soon to be published; but do not mention whether by yourself or some other medical friend. In either case, I trust that no reliance will be placed upon vulgar stories."

* St. Mary Axe, London, August 11th, 1796.

"The author should admit nothing but what he has proved by his own personal observation, both in the brute and human species. It would be useless to specify the doubts which must be satisfied upon this subject before rational belief can be obtained.

"If a physician should adopt such a doctrine, and much more, if he should publish it upon inadequate evidence, his character would materially suffer in the public opinion of his knowledge and discernment."*

The subject of small-pox had in a particular manner engaged the attention of Dr. Haygarth, and he had published a work intended to promote the extermination of that disease. The opinion expressed by this eminent and learned physician is such as would have been delivered by most persons in his situation, who were not fully apprised of the strong evidence which had been accumulated in favour of the virtues of cow-pox.

The facts concerning the origin of this affection were investigated with as much patience, and passed through as severe a scrutiny as any of those which regarded the nature of the disease itself. Jenner was quite as communicative, also, on the one subject as on the other. His nephew George Jenner, in the year 1787, went into the stable with him to look at a horse with diseased heels.—"There," said he, pointing to the horse's heels, "is the source of small-pox. I have much to say on that subject, which I hope in

* Chester, April 15th, 1794.

due time to give to the world." Again, writing to a friend some years after this period (1794), he observes:—

"Our friend ———, at our last meeting, treated my discovery of the origin of the cow-pox as chimerical. Farther investigation has convinced me of the truth of my assertion, beyond the possibility of a denial. Domestication of animals has certainly proved a prolific source of diseases among men. But I must not anticipate: you shall have a paper."*

Subsequently to this letter, and before the publication of his Inquiry in 1798, he made many experiments in order to demonstrate the connection between the grease and the cow-pox; but difficulties of a nature not easily overcome interfered with his success. Not long after this period he enjoyed the sublime gratification of seeing a more important part of his doctrine completely substantiated; and the probability, therefore, of rendering his labours subservient to the most beneficent, the most interesting of all human objects, placed beyond a doubt. Hitherto he had only observed the casual disease, and investigated its laws: it yet remained to be proved whether it was possible to propagate the affection by artificial inoculation from one human being to another; and thereby, at will, communicate security to all who were liable to small-pox. An opportunity occurred on the 14th of May, 1796, of instituting

* Berkeley, 1794.

this experiment. Matter was taken from the hand of Sarah Nelmes who had been infected by her master's cows, and inserted by two superficial incisions into the arms of James Phipps, a healthy boy of about eight years old. He went through the disease apparently in a regular and satisfactory manner; but the most agitating part of the trial still remained to be performed. It was needful to ascertain whether he was secure from the contagion of small-pox. This point, so full of anxiety to Dr. Jenner, was fairly put to issue on the first of the following July. Variolous matter, immediately taken from a pustule, was carefully inserted by several incisions, but no disease followed. He communicated the event to his friend Gardner, in the following letter.

Dear Gardner,

As I promised to let you know how I proceeded in my inquiry into the nature of that singular disease the Cow-Pox, and being fully satisfied how much you feel interested in its success, you will be gratified in hearing that I have at length accomplished what I have been so long waiting for, the passing of the Vaccine Virus from one human being to another by the ordinary mode of inoculation.

A boy of the name of Phipps* was inoculated in the arm

* The 14th of May is an annual festival in Berlin to commemorate the day on which Jenner made this experiment; and at the meeting of the medical men, held for this laudable purpose in 1819, the official returns made by vaccinators from the different departments gave an account of 307,596 persons vaccinated in 1817 in the Prussian dominions, which did not include

from a pustule on the hand of a young woman who was infected by her master's cows. Having never seen the disease but in its casual way before; that is, when communicated from the cow to the hand of the milker, I was astonished at the close resemblance of the pustules, in some of their stages, to the variolous pustules. But now listen to the most delightful part of my story. The boy has since been inoculated for the small pox which, as I ventured to predict, produced no effect. I shall now pursue my experiments with redoubled ardour.

Believe me yours, very sincerely,

Berkeley, July 19, 1796. EDWARD JENNER.

Were I to fix upon any period in the life of this admirable man that was more full than another of deep and intense emotion, more elevated by anxious and benevolent hopes, more absorbed with generous and ardent wishes for the complete success of a scheme fraught with great and disinterested benefit to his fellow men, I would mention that portion of it which we have now been contemplating. The situation in which he then stood seldom had a parallel in the history of our race. No invention ever

the total number; as from several of the departments the returns for that year had not yet arrived. This number, far exceeding the births that can have taken place during that time, shows a great advancement towards making the practice universal; and when this is once accomplished, the list of annual vaccinations, compared with the births and burials, will precisely indicate the state of the country in regard to the liability of its inhabitants to take the small pox."—See *Cross* on the Varioloid Epidemic at Norwich.

before promised to have such an immediate and extensive influence upon the lives of his fellow-creatures; no discovery elaborated by the patience, or skill, or science of man was ever calculated, in any comparable degree, to produce such consequences as that which at this period centred in the heart of Jenner. It was a heart above all others capable of rejoicing in the possession of such a secret. This was not, like most of the results of human labours, more rich in the prospect of future advantage than in present good. He, at that period, had it in his power to impart knowledge the advantages of which might be rendered as manifest and palpable as they were universal. It is pleasing to know that the state of his mind corresponded with the solemnity and magnitude of the occasion. There was a great struggle within him how to conduct himself. His natural benevolence would have stirred him up to act with some degree of precipitancy, to give to the world all that he had learned on the matter before his knowledge was complete, because he felt that the death of every one who became a victim to small-pox might almost be said to have been caused through his neglect. But in this, certainly one of the most trying emergencies that ever occurred in the life of any man, he was enabled to conduct himself with all the prudence, all the generosity and caution that befitted an individual to whom such high things were committed. He was not led away by selfish feelings, neither was he elated by pride nor

vain glory, nor hurried beyond propriety by over-eagerness and zeal: he maintained the humility, the simplicity, and the disinterestedness of his character on this, as on every other occasion. It was his custom at this time to meditate much as he rambled in the meadows under the castle at Berkeley. He has left us a picture of his feelings, at this period, full of interest and full of piety:—

"While the vaccine discovery was progressive the joy I felt at the prospect before me of being the instrument destined to take away from the world one of its greatest calamities, blended with the fond hope of enjoying independence and domestic peace and happiness, was often so excessive that, in pursuing my favourite subject among the meadows, I have sometimes found myself in a kind of reverie. It is pleasant to me to recollect that these reflections always ended in devout acknowledgments to that Being from whom this and all other mercies flow."

From the period just mentioned till the spring of 1798, Dr. Jenner's researches were intercepted by the disappearance of cow-pox from the dairies. It again showed itself, and he had an opportunity of pursuing his inquiries. He repeated his inoculations with the utmost care, and then prepared his work for the press. It was his intention that it should have first appeared before the public in the Transactions of the Royal Society; but this design was abandoned, and the work appeared as a separate publication.

Before bringing it out he was extremely desirous of proving, by direct experiment, the truth of his opinion as to the origin of cow-pox, which at that time only rested upon circumstantial evidence. Being foiled in his hopes of seeing more of that disease in its casual form in the dairies he made many efforts, in 1797, to generate it from the heel of the horse. In reference to these experiments he wrote, on the 2d of August of that year, to a friend in the following terms:—

"The simple experiment of applying the matter from the heel of the horse, in its proper state, to the nipples of the cows, when they are in a proper state to be infected by it, is not so easily made as at first sight may be imagined; after waiting with impatience for months in my own neighbourhood, without effect, I sent a messenger to Bristol, in vain, to procure the true virus. I even procured a young horse, kept him constantly in the stable, and fed him with beans in order to make his heels swell, but to no purpose. By the time the Pamphlet goes to a second edition, I hope to be able to give some decisive experiments."

Notwithstanding the patience and accuracy of his researches, and the very interesting results to which they led, he continued, before he gave them to the public, to deliberate on his projected work with the most solemn and anxious care. This mature and laudable consideration is manifest in every sentence of the treatise, and it as much redounds to

his honour as a philosopher as it does to his modesty as a man. Knowing, as we do, the magnificent results that have arisen from that small work, beyond all doubt the most extensively beneficial that science ever contributed for the welfare of man, it may be interesting to the reader to learn the manner in which the author, in his private correspondence with his friends, sometimes wrote about it.

"I have shown a copy of my intended paper on the cow-pox to our friend Worthington, who has been pleased to express his approbation of it, and to recommend my publishing it as a pamphlet instead of sending it to the Royal Society."*

The gentleman mentioned in the above extract was not the only one to whom he submitted the manuscript. His friends Gardner and Hicks were also often consulted about it; and, finally, before it was sent to the press it was accurately and faithfully scrutinized by a select number of his particular associates, at Rudhall near Ross in Herefordshire, the seat of Thomas Westfaling, Esq. They all felt deeply interested in the investigation; they all saw that a matter of so much moment ought to be canvassed with the greatest care; for the dearest interest of their fellow-creatures, as well as of their own affectionately loved friend, was involved in it. The party present on this occasion were Mr. Westfaling, Dr. Worthington, Mr. Paytherus, and Mr. H. Hicks.

These gentlemen listened to all the details with

* June 1797.

jealous ears; they sat in judgment on the work, and did honestly and kindly acquit them of their duty. Their judgment approved; their most benevolent feelings were gratified; and it only remained for them to applaud their friend, who then stood before them in a situation more truly interesting than they could express, and to urge him on his path by encouraging him in his purpose of opening, for the benefit of all, that stream of life and health which he had been permitted to discover.

It was a special honour to have been associated with Jenner on such an occasion. The mind, in dwelling upon occurrences of this kind, naturally seeks for parallels in the histories of the lives of eminent men in other times. But the situation of Jenner scarcely admits of illustrations of this sort: he seemed to hold in his hand one of the "gates of death," and to him it seemed to be given to close it.

When Columbus, by his judicious study of cosmography, anticipated the discovery of another hemisphere; when Newton beheld the host of heaven yielding up the secret of their movements to his patient and sublime researches; when Bacon, in the well-founded reliance on his almost superhuman powers, took a flight over the heads of men and with perfect confidence looked forward to a far distant age for the blossom and the fruit of that intellectual seed which he had so abundantly scattered,—the inward gratification derived from the consciousness that truth and wisdom were to be imparted through

them to their fellow-mortals, and that the ultimate result would be felt in beneficial consequences to every class of society, doubtless imparted a joy and satisfaction to their souls of the most gratifying description. When Harvey, too, by the successful issue of his labours had accomplished the most remarkable discovery that up to his time had been made in medicine, and thereby enjoyed the happiness of knowing that improvements in all the practical parts of his profession must reward his perseverance and make up for the neglect and injustice of his contemporaries, we cannot doubt that he experienced that inward peace and happiness which his jealous detractors could not intermeddle with.

But if discoveries are to be estimated by their power of ministering to the benefit of man, which of all those that have most distinguished their authors can be compared with that of which we are now treating?

I cannot allude to the event commemorated above without bespeaking the reader's patience, while I dwell for a short time on the character of one of the gentlemen who was present at this interesting deliberation. Of the others I cannot write here; for, as they are still among us, truth itself might wear an appearance of flattery distasteful, I am sure, to their nature, and foreign to mine. But, unhappily for all those who knew him, this restraint does not apply to Thomas Westfaling. He expired suddenly at Bath in 1815; and though I may now speak of

him as my heart dictates, I am unable to say what is worthy of him. As the friend and adviser of Jenner his character will not be uninteresting to any; but as the friend and lover of every thing good he has claims to the consideration of all. For myself, I should be unworthy of the office which I now attempt to execute were I not to indulge in paying a passing tribute of love and veneration to a character which bore conspicuously the marks of rare intellectual endowments and most generous and engaging virtues, and was in an especial manner endeared to myself by many acts of kindred sympathy and friendship during a most trying period of my own life.

All matters having been duly arranged the Inquiry was published about the end of June, 1798. The dedication to his friend Dr. Parry of Bath bears date the 21st of that month. The work was printed in the quarto form and very little exceeded seventy pages.

The first few paragraphs unfold the author's opinions respecting the influence that the artificial and luxurious habits of civilized life may have had in rendering man liable to disease; and in pursuing the same train of reasoning he is led to believe that the domestication of animals, not originally intended for our associates, may have inflicted upon our race maladies of various kinds and multiplied the number of our ills.

These notions are with much simplicity and elegance stated in the following sentences:—

"The deviation of man from the state in which he was originally placed by nature seems to have proved to him a prolific source of diseases. From the love of splendour, from the indulgences of luxury, and from his fondness for amusement he has familiarised himself with a great number of animals, which may not originally have been intended for his associates."

"The wolf, disarmed of ferocity, is now pillowed in the lady's lap.* The cat, the little tiger of our island whose natural home is the forest, is equally domesticated, and caressed. The cow, the hog, the sheep, and the horse are all, for a variety of purposes, brought under his care and dominion."

"There is a disease to which the horse, from his state of domestication, is frequently subject: the farriers have termed it *the grease*. It is an inflammation and swelling in the heel from which issues matter possessing properties of a very peculiar kind that seems capable of generating a disease in the human body (after it has undergone the modification that I shall presently speak of) which bears so strong a resemblance to the small-pox that I think it highly probable it may be the source of that disease."

Together with this statement of the author's opinion respecting the origin and nature of the disease

* The late Mr. John Hunter proved by experiments that the dog is the wolf in a degenerated state.

the Inquiry contained twenty-three cases, detailed at length, illustrative of the progress of the infection. The first sixteen cases were examples of the casual disease; the rest were the result of inoculation. One among the former is of an individual who having been infected from the heel of the horse, afterwards completely resisted small-pox contagion. Among the latter is mentioned the case of his second son, Robert Fitzharding Jenner, an infant eleven months old; and of several other children who were vaccinated on the 12th of April, 1798, with matter taken from the arm of Hannah Excell. It is particularly specified, "that Robert Jenner did not receive the infection."

I beg the reader to notice this circumstance; for many years afterwards a calumny of a very injurious nature was propagated respecting his abandonment of vaccination, because under danger of an urgent nature he found it indispensable to have this child inoculated with small-pox.

The important information contained in the part of the Inquiry just noticed, concluded by some modest and most sagacious remarks regarding alike the main object of the investigation, and others which were interwoven with it. He considered his assertion "that the cow-pox protects the human constitution from the infection of small pox" proved by the facts adduced. With regard to the opinion that the source of the infection of cow-pox "is a peculiar morbid matter arising from the heel of the horse" he be-

lieved that though it had not been completely proved by actual experiments made under his own eye, it nevertheless was supported by evidence sufficiently strong to establish it.

When the Inquiry was printed he imagined that the matter secreted in the heel of the horse required to be modified by passing through the system of the cow, in order to afford it the peculiar protecting powers which it evinced when it appeared in the shape of what is vulgarly called cow-pox on the hands of the milkers. In the infancy of the investigation this was a most natural conclusion; but subsequent trials proved that the *equine* matter, which had *never* undergone any change from passing through the constitution of the cow, exhibits all the characters of, and affords all the security which can be obtained from vaccine matter strictly so called.

The last paragraph of this interesting Inquiry indicates a strain of modest feeling respecting the probable issue of the author's labours, which cannot now be perused without exciting the utmost respect and admiration. The reader, in the preceding narrative, has witnessed the painful agitation of his mind while contemplating in secret the mighty aim which filled his soul. He had satisfied himself by direct and careful experiment of the truth of all the main facts, and of course saw clearly that his most sanguine expectations were likely to be completely realized. Under such circumstances the following

subdued and unpretending sentences are eminently deserving of notice :—

" Thus far have I proceeded in an inquiry founded, as it must appear, on the basis of experiment in which, however, conjecture has been occasionally admitted, in order to present to persons well situated for such discussions objects for a more minute investigation. In the mean time I shall myself continue to prosecute this inquiry, encouraged by the hope of its becoming essentially beneficial to mankind."

Before the publication took place Dr. Jenner had repaired to London for the purpose of exhibiting the cow-pox, and of demonstrating to his professional friends the accuracy of his delineations and the truth of his assertions.

He left Berkeley with Mrs. Jenner and his daughter on the 24th of April, 1798. They slept the first night at Cirencester; next day they proceeded to Benson, and the following afternoon they arrived in Pall-Mall, where they dined with Mrs. Jenner's relative Mr. Ladbroke. Dr. Jenner remained in London till the 14th of July; on that day he quitted it, and arrived in Cheltenham the same evening.

I am thus particular in specifying the dates, which I have ascertained by a reference to his journal, because they are connected with a remarkable fact in the history of vaccination. It will scarcely be believed, that with all his efforts and those of his friends, he was unable during the period of nearly

three months that he continued in the metropolis, to procure one person on whom he could exhibit the vaccine disease. I remember he often stated that his patience had been exhausted on that occasion, and that he had actually quitted the capital without having accomplished the object of his journey; but it was not till lately I discovered that he had so much cause for feeling disappointed. The tardiness and distrust evinced on the present occasion formed a striking contrast to the eagerness and zeal with which persons of all ranks, without knowledge and consideration, rushed to the adoption of a practice that was offered to them by unskilful hands, and by which consequences of a most disastrous nature ensued. Of course it was to be expected that a practice, involving such unexpected and uncommon results, should, on its being first mentioned, excite great doubt and surprise; but it is nevertheless a strange circumstance, that the author of that practice, a man known in the highest circles of medical science as worthy of all credit, and as an accurate and enlightened observer, should have been unable, notwithstanding the proofs which his Inquiry contained of the safety and importance of vaccination, to prevail on one individual to submit to the operation during his stay in London.

Some of the virus which he carried with him was consigned to Mr. Cline, who, in the end of July, inserted it by two punctures into the hip of a patient. There is a curious fact connected with this first in-

teresting and successful exhibition of the *variolæ vaccinæ* in London. I mention it because it shows, together with the other circumstances just detailed, the extreme caution with which some of the early trials were conducted. The patient on whom Mr. Cline operated had some affection of the hip joint, and it was thought that the counter-irritation excited by the cow-pox might prove beneficial to the disease. This was the reason that the virus was inserted on the hip; and for the same reason it was intended to convert the vaccine pustule into an issue, after it had passed through its proper course.

I state these facts on the authority of repeated personal communications from Dr. Jenner; they are substantiated by the statements which are recorded in his journal, and are also corroborated by two letters from Mr. Cline to Dr. Jenner, which I think it right to annex in this place.

Extracts from Journal of 1798.

"That the matter of cow-pox, like the small-pox matter, may be preserved without any diminution in its active qualities is evinced by the following experiment.

"Mr. Cline inoculated a child with matter that had been taken from the pustule on the arm of Hannah Excell (see page 39 pamphlet) when in a limpid ichorous state, and dried by exposure to the air, after being preserved three months on a quill in a seal. The following is the result:—

COPY OF MR. CLINE'S LETTER.

Lincoln's-Inn Fields, 2d Aug. 1798.

"The cow-pox experiment has succeeded admirably. The child sickened on the seventh day; and the fever, which was moderate, subsided on the eleventh day. The inflammation extended to about four inches diameter, and then gradually subsided without having been attended with pain, or other inconvenience. The ulcer was not large enough to contain a pea, therefore, I have not converted it into an issue as I intended.* I have since inoculated him with small-pox matter in three places, which were slightly inflamed on the third day, and then subsided.

"Dr. Lister, who was formerly physician to the Small-pox Hospital, attended the child with me, and he is convinced that it is not possible to give him the small-pox.

"I think the substituting of cow-pox poison for the small-pox promises to be one of the greatest improvements that has ever been made in medicine: for it is not only so safe in itself, but also does not endanger others by contagion, in which way the small-pox has done infinite mischief. The more I think on the subject the more I am impressed with its importance.

With great esteem I am, dear Sir,
Your faithful servant,
HENRY CLINE."

* This boy was brought to town on account of some disease in the joint of the hip. Mr. C. therefore inoculated near the part, with the view of exciting inflammation, and subsequently of forming an issue. E. J.

"With the intention of proceeding with the experiments, Mr. Cline took matter from the pustule, and with it inoculated three other children; but on none of these did it take any effect."

"I have observed that the matter of cow-pox appears to lose its powers of infection after it ceases to be limpid. Probably it might have passed the bounds of perfection when Mr. Cline made his second experiment."

HENRY CLINE, ESQ. TO DR. JENNER.

Lincoln's-Inn Fields, 18th August, 1798.

"MY DEAR SIR,

"Seven days since, I inoculated three children with cow-pox matter, and I have the mortification of finding that the infection has not taken, and I fear I shall be entirely disappointed unless you can contrive to send me some fresh matter. I think it might come in a quill in a letter, or inclosed in a bit of tin-foil, by the same conveyance, or in any other way that may be more convenient.

With much esteem, I am, dear Sir,
Your faithful servant,
HENRY CLINE."

Mr. Cline having failed to propagate the disease from the first case of successful vaccination which occurred in London and Dr. Jenner having at that time no fresh lymph to transmit, it was not in his power to gratify the anxious wishes of the many professional men who now eagerly sought an opportunity of witnessing the progress of the affection, and of putting its alleged prophylactic powers to the test. It might have been expected that under such cir-

cumstances his brethren would have patiently awaited the result of further observation before they ventured to question the accuracy of the statements and to impugn the authority of Jenner, sustained as they were by many facts brought forward with minute and jealous attention to every thing that was necessary to gain them credit if true, and to secure their speedy refutation if false. There were indeed many, and those too of the most learned and respectable, who immediately did justice to the merits of Jenner, and cordially and thankfully acknowledged the many important consequences which were involved in the subject that he had so ably and so modestly brought before them. Others, confident in their own knowledge and trusting too much to the dim light of their own understanding, did not hesitate on very slender grounds at once to deride the doctrine and condemn the practice. Better things might have been anticipated from the gentlemen who distinguished themselves in this ignoble opposition.

Mr. Cline, perceiving at once from the success of his first trial what incalculable blessings were connected with the diffusion of the practice, with just and becoming regard for the welfare of Jenner wished his personal advantage to keep pace in some degree with the benefits which he had it in his power to impart to mankind. He therefore immediately advised him to quit the country and to take a house in Grosvenor Square, and promised him 10,000*l.* per

annum as the result of his practice. In this opinion Mr. Cline was supported by the authority of an extremely accurate observer, and a most competent judge of such matters, the late Sir W. Farquhar. All these splendid prospects of wealth and distinction could not move Jenner. His sentiments on this occasion may be gathered from a letter, which he wrote to a friend who had also suggested to him a similar course.

Cheltenham, September 29th.

It is very clear from your representation that there is now an opening in town for any physician whose reputation stood fair in the public eye. But here, my dear friend, here is the rub. Shall I, who even in the morning of my days sought the lowly and sequestered paths of life, the valley, and not the mountain; shall I, now my evening is fast approaching, hold myself up as an object for fortune and for fame?—Admitting it as a certainty that I obtain both, what stock should I add to my little fund of happiness?

My fortune, with what flows in from my profession, is sufficient to gratify my wishes; indeed so limited is my ambition and that of my nearest connexions, that were I precluded from future practice I should be enabled to obtain all I want. And as for fame what is it? a gilded butt, for ever pierced with the arrows of malignancy. The name of John Hunter stamps this observation with the signature of truth. However, this I promise you, that as soon as my engagements here cease, you shall see me in Town.—In my last letter I told you how much I was perplexed; my perplexity really amounts to agitation. On the one hand, unwilling to come to town myself for the

sake of practice, and on the other, fearful that the practice I have recommended may fall into the hands of those who are incapable of conducting it, I am thrown into a state that was at first not perceptible as likely to happen to me; for, believe me, I am not callous to all the feelings of those wounds which, from misrepresentation, might fall on my reputation; on the contrary, no nerves could feel more acutely; and they now are actually in a tremor from anticipation.

How very few are capable of conducting physiological experiments! I am fearful that before we thoroughly understand what is cow-pox matter, and what is not, some confusion may arise; for which I shall, unjustly, be made answerable. In the first place, instances will occur where those who have truly had the disease shall be subjected to the common process of inoculation, inflammation, vesication, and even pus will appear on the wounded part. The axilla will show that the lymphatics have been active and the system may even, in a very limited degree, feel the consequence. What would the enemies to the improvement of science say to this? I leave you to answer this question. But the very same thing has happened again and again to those who have had the small-pox; and do not those (nurses for example) who are much exposed to the contagion of small-pox—

(The remainder of this letter is unfortunately lost.)

Who can read this prophetic letter without admiring the sagacity of the writer? Who can know the sufferings which he actually endured from the very causes he had thus anticipated, and not lament that such a man should have been so injured?

I shall close this chapter with a few of the communications made to him, respecting his first publi-

cation, by men of high character and extensive medical information. These are chiefly valuable as marking their opinions at an early stage of the investigation.

DR. PERCIVAL TO DR. JENNER.

Manchester, Nov. 20th, 1798.

DEAR SIR,

About a fortnight ago, I received your very obliging letter, accompanying an "*Inquiry into the Causes and Effects of the Variolæ Vaccinæ*." This truly valuable work I had before read with much interest, not only on account of the novelty and importance of the subject but as being the production of one whom I highly esteem. To receive it from your hands, therefore, I need not assure you was peculiarly acceptable to me; and I beg to return my best acknowledgments for this mark of your kind remembrance and attention.

The facts which you have adduced incontestably prove the existence of the cow-pox and its ready communication to the human species. But a larger induction is yet necessary to evince that the virus of the *variolæ vaccinæ* renders the person who has been affected with it secure during the whole of life, from the infection of the small-pox. You have opened, however, a new and most productive region of investigation; and I hope you will continue and enlarge your researches, and incite others to engage in the same laudable pursuit.

As soon as I had perused your work, several months since, I wrote to my excellent friend Dr. Haygarth (late of Chester, now of Bath) urging him to engage in a correspondence with you on his favourite and benevolent plan of exterminating the small-pox, of which your discovery

points out a more probable mean than any which has yet been proposed. Permit me to express a wish that you would confer with Dr. H., either personally or by letter, on this interesting subject.

Mr. Simmons, an ingenious surgeon of this town, has inoculated a human subject with the ichor issuing from what is termed the grease in horses; but the fluid introduced, though eight punctures were made, neither occasioned inflammation nor eruption; yet the same child was soon afterwards inoculated with success for the small-pox. I showed your letter to Mr. Simmons, who desires me to present his compliments, and to state to you, that he has now engaged a herd of cows, and is busily employed in making such experiments as your publication has suggested. It is very remarkable, that the cow-pox has been hitherto unnoticed in Cheshire, which is not less a dairy country than Gloucestershire, and where the office of milking is performed also by men and maid servants indiscriminately.

* * * * * *

Dr. Hicks to Dr. Jenner.

Bristol, October 3d, 1798.

Dear Jenner,

I thank you for your friendly letter, the subject of which before I received it has lately been much in my mind. I am in doubt in what form to bring it forward. Dr. Beddoes has solicited me to publish it in a volume which he is about to publish at Christmas under the title of Contributions to Physical and Medical Knowledge. But, perhaps, it might excite the attention of the public more particularly if it were given to it separately.—What is your opinion?

Your book I have taken care to get read by many, as I

have recommended it to our public library, and to several private societies. It is in general much approved. Dr. Beddoes says it will do you much credit. I do not see that you need hesitate to accept of the invitation given you to inoculate with the cow-pox, convinced as you are that it will secure the person so inoculated from ever being infected with the small-pox.

I should be very much obliged to Mr. Shrapnell for his observations on what was vulgarly called the pig-pox. I wish you had been able to have communicated the cow-pox to the cow by means of inoculation from a greasy horse's heel,—your work would have been then more complete and satisfactory. But, as the inquiry will be prosecuted by you, you will of course make some experiments of that nature.

* * * * * *

From Francis Knight, Esq. to Dr. Jenner.

My dear Sir,

I hasten to make my best acknowledgment for your kind recollection of me in your late publication, which was left at my house a few days ago while I was absent with a patient in Yorkshire. I have read it over with much satisfaction; and, from a long residence in the dairy part of Wiltshire as well as in Gloucestershire, know the facts to be well supported; at least it was a general opinion among the dairy-men that those who had received the cow-pox were not susceptible of the variolous disease. The cow-pox pustule is very familiar to my eye, and I am quite charmed with the delineation of it in your plates. You have opened to the world a very curious field of investigation, and it is too interesting a subject to die with the day. No one can be so well qualified to pursue this subject as

yourself yet I shall, in a more humble line, seek every opportunity of making experiments that may establish a point of so much importance to the world.

I am not anxious to know how or what the change is which the animal economy undergoes: it is sufficient for me to have proof that a lighter disease may be uniformly substituted for a greater one. I shall feel infinitely obliged by any new communications or directions that you may have to make, and in my next Gloucestershire visit shall eagerly seek the opportunity of acknowledging in *propria persona* how much I think the world indebted to your researches. Perhaps it may fall in your way to accommodate me with some fresh cow-pox matter. I know some people of fashion who are well disposed to let me make the experiment on some of their children.

Dear Sir,

Your obliged and faithful

Humble servant,

FRANCIS KNIGHT.

Clifford-street, Sept. 10, 1798.

CHAPTER V.

OPINIONS OF DR. JENNER RESPECTING THE VARIOLÆ, AND VARIOLÆ VACCINÆ—ILLUSTRATIONS DRAWN FROM THEIR LITERARY AND MEDICAL HISTORY.

HAVING now traced the progress of Dr. Jenner's observations respecting cow-pox it may not be unimportant, with a view to illustrate his opinions, to endeavour to find out if ancient records and traditions discover any affinity between that disorder and the small-pox, as it affects the human subject. Independent of the historical information which such an inquiry must elicit it claims attention from its intimate connexion with those questions which have most agitated the public mind respecting the origin of the cow-pox itself, as well as of its prophylactic virtues.

These considerations must be my apology for entering so much at length into a discussion which to the general reader may appear somewhat tedious. It is moreover my duty to state that this examination, undertaken to elucidate an obscure part of the

most interesting of all pathological subjects, has afforded me the true gratification of finding at every step additional reason to admire the accuracy of Dr. Jenner's observations, and it has enabled me to bring forward a great weight of unprejudiced and impartial testimony to support his doctrines.

He always considered small-pox and cow-pox as modifications of the same distemper; and that, in employing vaccine lymph, we only made use of means to impregnate the constitution with the disease in its mildest, instead of propagating it in its virulent and contagious form, as is done when small-pox is inoculated. The name which he gave to the former, Variolæ Vaccinæ, sufficiently and strongly indicates his sentiments on this head. Different individuals have questioned the propriety of this name; but had they been aware of the facts about to be enumerated they would have seen that none more appropriate could have been adopted.

Many writers have imagined that the epidemic diseases which affect the human race are peculiar to our species, and have no influence on the inferior animals; and they have been not less decided in the opinion that the diseases of other animals are not communicable to man. The disclosures which have been made by the history of the Variolæ Vaccinæ have shown that both these opinions are erroneous: and other proofs of a more convincing nature will, hereafter, be adduced.

Without laying greater stress upon the following

facts than they can reasonably bear, I think it will be admitted that they sustain these propositions:—

First, that an eruptive disease *common* both to man and to the inferior animals has been known in different ages, and in different countries; and that the descriptions given of this eruptive disease by various writers accord so completely with those acknowledged to be characteristic of small-pox, as to render it highly probable that this disease actually existed at a much earlier period than that usually assigned to its origin.

Secondly, that as there are numberless writers who have described the small-pox in man, so there are others of established name and reputation, who have treated of a similar eruptive and pestilential disease as existing in various countries and in different times among the inferior animals, but especially among cattle; that to this disease they have unhesitatingly applied the name of VARIOLA; and actually recommended such treatment as experience had proved to be useful when that disease attacks man.

Should these propositions be established they will go far to prove that the variolæ of men and of the inferior animals are essentially and originally the same; and that from their first appearance to the present hour they have existed under various modifications. I am prepared to expect opposition to the opinion respecting their simultaneous origin; but whatever sentiments may be entertained on that subject, the facts connected with it are well worthy

of consideration, and can scarcely fail to give a degree of confidence in the inoculation for the variolæ vaccinæ which that practice, unfortunately for mankind, has not yet acquired.

Although it is not, now, usual to refer to the Sacred volume in matters of medical history I feel that, on the present occasion, I should be unable to deal with this subject as it deserves were I to abstain from taking the strong ground it affords for corroborating events and opinions narrated by historians and naturalists. In this, therefore, the earliest historical record in the world we have a distinct announcement that there was one eruptive disease common to man and to beast. The number of similar instances mentioned in profane writers demonstrates that such phenomena were not peculiar to one era, but have been observed in different ages and countries ever since their first occurrence.

As every event connected with the origin and progress of small-pox has derived additional interest and importance from the singular phenomena exhibited in the history and properties of cow-pox, it will be right to examine more minutely into the descriptions above referred to.

The reader may be aware that Philo, the learned Jew, wrote, in the first century, a work on the Life of Moses; and on that part of the Book of Exodus which describes the plagues inflicted on the Egyptians he has introduced a paraphrase or commentary on the words of the inspired historian. That portion

of the commentary which refers to the ninth chapter of Exodus, 9th and 10th verses, delineates the plague of "*boils and blains.*" The Greek words of the Septuagint, synonimous with our translation, "Boils breaking forth with blains," are ἕλκη φλυκτιδες ἀναζέσσαι, ulcera pustulis ex fervore ebullientibus. Philo's enlarged description runs thus: Ἔπειλα κονιορλὸς αἰφνίδιον ἐπενεχθεὶς, ἀνθρώποις τε καὶ ἀλόγοις ζώοις ἀγρίαν καὶ δυσαλθὴ καῖλὰ τῆς δορᾶς ἁπάσης ἕλκωσιν εἰρ-ῥάζεῖο, καὶ τὰ σώμαῖα εὐθὺς συνώδει ταῖς ἐξανθήσεσιν, ὑποπύες ἔχονῖα φλυκῖαίνας, ἃς ἐτόπασεν ἄν τις ἀφανῶς ὑποκαιομένας ἀναζεῖν, ἀλγηδόσι τε καὶ περιωδυνίαις, κατὰ τὸ εἰκὸς, ἐκ τῆς ἑλκώσεως καὶ φλογώσεως πιεζόμενοι, μᾶλλον ἢ ἐχ ἧτῖον τῶν σωμάτων τὰς ψυκὰς ἔκαμνον, ἐκλείρυχωμένοι ταῖς ἀνιαις. Ἓν γὰρ ἄν τις ἀπὸ κεφαλῆς ἄχρι ποδῶν συνεχὲς ἕλκος ἐθεάσαῖο, τῶν καῖλὰ μέλος καὶ μέρος διεσ-παρμένων, εἰς μίαν καὶ τὴν αὐτὴν ἰδέαν ἀποκριθέντων.*

The late Dr. Willan, in his "Dissertation on the Antiquity of Small-pox" quotes some of these words of Philo, and he appeals to the passage to prove that it contains a lively and accurate description of small-pox. As Philo wrote in the first

* φίλωνός τοῦ Ιουδαίου, &c. Vol. II. pp. 100, 101. Περὶ Μωσέως. Ed. Mangey. "Coortus repentè pulvis in homines et bruta illatus, tetris et incurabilibus pene ulceribus totam cutem obserebat. Itaque statim tota corpora, efflorescente passim eruptione, in tumore erant, purulentis scatentia pustulis, quas existimasses subter occultè suffervescentes ebullire: dolore autem et cruciatu, ut æquum est, propter exulcerationem et inflammationem oppressi, magis adeo aut certe non minus animis laborabant, angoribus confecti. Quippe a capite ad pedes ulcus continuatum cerneres, iis quæ per membra et artus sparsa erant, in unam et eandem speciem confusis."

century, Dr. Willan very fairly contends that this disease must have been known as a specific malady in his time. Of the accuracy of Dr. Willan's opinion respecting the nature of the disease described by Philo no competent judge can doubt; but it is a singular fact that this description did not merely refer to a "malady known at the time Philo wrote," but to one known many centuries before. His words apply to the plague of boils and blains, as recorded by Moses. It is, therefore, evident that if Philo's account be descriptive of the small-pox, it carries back the antiquity of that disease, not to the first century, but to the much more remote period of nearly fifteen hundred years before the Christian era. And it is not unimportant here to remark that the histories and traditions of the Eastern nations, particularly the Chinese and Hindoos, refer the commencement of this disease to a corresponding epoch.

The interpretation given by Philo, explicit and distinct as it is, derives confirmation from the remarks of the learned Scheuchzer, in his "Physica Sacra." I subjoin his version of the Sacred text, with his comments thereon.*

* "Et dixit Dominus ad Moysen et Aaron, Tollite plenas manus cineris de camino, et spargat illum Moyses in cœlum coram Pharaone.

Sitque pulvis super omnem terram Ægypti, erunt enim in hominibus ac jumentis ulcera et vesicæ turgentes in universa terra Ægypti.

The original Hebrew is said to be still more expressive of the eruptive character of the disease; and, of consequence, goes to strengthen the opinion that *that disease* was the small-pox.

Tuleruntque cinerem de camino et steterunt coram Pharaone, et sparsit illum Moyses in cœlum, factaque sunt ulcera vesicarum turgentium in hominibus et jumentis.

Nec poterant malefici (Magi) stare coram Moyse propter ulcera, quæ in illis erant, et in omnibus Ægyptiis.

Altius rursus in graduali pœnarum scala scandit justissimus Deus, Ægyptios affligens apostematibus et ulceribus, (Hebraice) *ulcere germinante inflationes.* Non videntur inflationes hæ ulcerosæ *bubones* vel *carbunculi pestilentiales*, sed tumores inflammatorii cum vesicis vel pustulis in cute elevatis, sero acri urente plenis; fuit hoc malum, quod in Peste perrarum, commune hominibus et jumentis, molestum potiusquam lethale: nil legimus de strage magna vel hominum vel pecorum: imo vero, quod rursus in Peste rarum, obambulare poterant Ægyptii; Magi stetisse quidem se videntur coram Pharaone, sed non constiterunt, scilicet absque insigni doloris sensu et signo."

The following observations of this writer refer to the *bubonic* plague, and show that the distinction between the above disease and the pestilence is strongly contrasted in the Scriptures.

" Commoda heic se offert occasio explanandi specialius diram, quæ Pestis nomine venit, Luem. Prima fit mentio morbi truculentissimi Pestis, Exod. v. 3. ' Et dixerunt, Deus Ebræorum vocavit nos, licet nobis quæso ut eamus iter trium dierum in desertum, et sacrificemus Domino Deo nostro, ne forte accidat nobis Pestilentia aut Gladius.'

Id imprimis urgeo argumentum, quod ex textu citato desumi potest. Allegat Moses in conspectu infensissimi regis pro argumento dimissionis obtinendæ persuasorio Pestem, morbum Ægyptiis certe haud ignotum, æque cognitum ac est bellum, malum mundo coævum. Quis est quæso qui sibi persuadere

Whatever may be thought of this opinion, it is fit to observe that the eruption which constituted the plague of "boils breaking forth with blains upon man and upon beast throughout all the land of Egypt," does not appear, from the Sacred text, to have been removed from the sufferers, as some of their other inflictions were, by Divine interposition; but was left to its natural course, and thus may have been propagated through successive generations of mankind, as we know has been the case with small-pox.

Let us now endeavour to prove from other authorities that diseases similar in their nature have affected man and brutes in common from the earliest periods of profane history.

Though the testimony of Homer, as a poet, is not quite unexceptionable in matters of this kind, it is fully adequate to prove the antiquity of the belief that man may participate in the distempers of the brute creation.

possit, loqui populi Israelitici procuratorem, imo Dei oratorem extraordinarium, de re prorsus regi et Ægyptiis ignota, quam certè risu explosisset rex a veri Dei cultu, et populi Israelitici petito alienissimus?

Imo vero ex propositione oratoris inferre licet, *Pestem* quam in proscenium ducit, morbum fuisse maxime notum, Ægypti endemium, et forte tunc vel in Ægypto, vel in vicinia jam grassantem, quandoquidem profectionem populi proponit tanquam remedium abigendæ pesti idoneum. Malum leve quoddam nec curasset Rex, nec proposuisset vel comminatus fuisset Moses. Produci debebat argumentum, quo dari posset supplicationi pondus."

" On mules and dogs th' infection first began;
And last the vengeful arrows fix'd in man.*"

The instances of a similar description recorded by the Roman historians are numerous. Livy, in particular, mentions many such: some of his accounts are so striking that they must not be omitted in this place.

Though he makes mention of " Pestilentiæ," in a cursory way, in the early annals of Rome, we do not find any worthy of being referred to till the year 290 U. C. (Anno ante Christum 464.) This historian's words are: " Grave tempus et forte annus pestilens erat urbi agrisque, nec hominibus magis, quam pecori; et auxere vim morbi terrores populationis pecoribus agrestibusque in urbem acceptis." He adds, " Ministeriaque invicem ac contagio ipsa vulgabant morbos."

The next great pestilence recorded in Livy occurred in the year U. C. 300. (A. C. 454.) " Duo simul mala ingentia exorta, fames pestilentiaque, fœda homini, fœda pecori. Vastati agri sunt: urbs assiduis exhausta funeribus; multæ et claræ lugubres domus."

In the year 317 U. C. (A. C. 437.) " Pestilentia eo anno aliarum rerum otium præbuit: magna tamen clades in urbe agrisque, promiscue hominum pecorumque pernicie, accepta."

Of the following year he says, " Eo anno vis

* Οὐρῆας μὲν πρῶτον ἐπώχελο, καὶ κύνας ἀργές·
Α'τὰρ ἔπειτ' αὐτοῖσι βέλος ἐχεπευκὲς ἐφιεὶς,
Βάλλ'· αἰεὶ δὲ πυραὶ νεκύων καίοντο θαμειαί.

morbi levata; neque a penuria frumenti, quia ante visum erat, periculum fuit."

In L. 4. c. 30. U. C. 325. (A. C. 429.) we find: "Defectus alibi aquarum circa torridos fontes rivosque stragem siti pecorum morientium dedit: scabie alia absumpta: vulgatique contactu in homines morbi, et primo in agrestes ingruerant servitiaque."

In the year 354 U. C. (A. C. 400.) "Tristem hiemem, sive ex intemperie cœli, raptim mutatione in contrarium facta, sive alia qua de causa, gravis pestilensque omnibus animalibus æstas excepit."

It would be easy to swell the list of pestilences noticed by this historian in the course of his work; the above-mentioned, however, afford ample testimony to the position that epidemic and epizöotic distempers are very intimately connected, if not on many occasions closely allied.

Again, in the years 434. 3. he gives an account of a pestilence raging extensively and mortally among men and cattle; the latter, he says, were affected with scabies, an eruptive disease, in describing which, Vegetius adds, "Scabies jumentis periculum generat, contagiosa namque est et transit in plures; cutem populis æstuans prurigo pervadit."

Of this epidemic Livy goes on to say that the diseases of the cattle were transferred, by contact, to slaves and labourers; but soon after, the dreadful pestilence fixed itself on the inhabitants of the city itself.

Of the year 396 A. C. Livy's summary is:—

" Tristem hiemem gravis pestilensque *omnibus animalibus* æstas excepit, insanabili pernicie." He describes the epidemic of the year 277 A. C. thus:— " Urbem adfecit pestilentia, pecudes hominesque communi strage corripiens; sed præcipue gravidarum abortibus formidabilis."

Another severe epidemic is described by the same historian, attended with some circumstances well worthy of notice. It raged among horned cattle as well as among men. U. C. 576. (A. C. 178.) " Delectus consulibus eo difficilior erat, quod pestilentia, quæ priore anno in boves ingruerat, eo verteret in hominum morbos. Servitia maxime moriebantur. Eorum strages per omnes vias insepultorum erat;— ne liberorum quidem funeribus Libitina sufficiebat. Cadavera, intacta a canibus ac vulturibus, tabes absumebat; satisque constabat nec illo, nec priore anno, in tanta strage boum hominumque vulturium usquam visum."

Orosius, lib. 4, in the year U. C. 477. gives us this account: " Gravis pestilentia urbem ac fines ejus invasit; quæ, cum omnes, præcipue mulieres pecudesque corripiens, necatis in utero fœtibus, futura prole vacuabat." That of 482 U. C. also was probably a continuation or revival of the former. Oros. lib. 4.

Dionysius of Halicarnassus, in his " Roman Antiquities," furnishes us with, at least, presumptive proofs that, amongst the numerous pestilential epidemics wherewith, from time to time, Rome was visited, an

eruptive fever of a peculiar kind occasionally showed itself; thus, for instance, in that fatal λοιμος *(pestis)* which raged in the reign of Tarquinius Superbus. The historian mentions some of the striking symptoms incidentally, whilst relating the mission of Tarquin's two sons, Aruns and Titus, in company with Junius Brutus, to consult the Delphic oracle respecting the cause and cure of this very alarming plague "ὑπερ του λοιμου."—"For there raged over his whole kingdom a certain unusual disease, among *girls* and *boys*, under which many *died* (or many *bodies* were *corrupted*, as the Greek also signifies), but the sickness was most severe and difficult of cure in *pregnant* women, destroying the mothers, together with their infants, in crowds." *

There occurs another still more remarkable description of an epidemic pervading the Roman territory, (in the year U. C. 290. and A. C. 464): it commenced among the inferior animals, and then extended its ravages to man. This circumstance is strongly asserted both by Livy and Dionysius Halicarnasseus, but the latter states it more minutely and vigorously, thus:—"The following year, Lucius Fabius and Pub. Servius Priscus having commenced their government, the Romans did not en-

* Κατέσκηψε γάρ τις ἐπὶ τῆς ἐκείνου βασιλείας οὐκ εἰωθυῖα νόσος εἰς παρθένους τὲ καὶ παῖδας, ὑφ' ἧς πολλὰ διεφθάρη σώματα, χαλεπωτάτη τὲ καὶ δυσίατος εἰς τὰς κυούσας γυναῖκας, αὐτοῖς βρέφεσιν ἀποκτείνουσα τὰς μητέρας 'ν ταῖς ἀγοραῖς.—Vide Dionys. Halicar. Antiquit. Rom. Lib. IV. p. 196.—Lutetiæ, R. Stephan. offic.

gage in any work of a warlike or political nature worth mentioning, as they were grievously affected with a pestilential disease, more severe than ever attacked them before; it first assailed the *horses at pasture*, and the herds of cattle; after these it raged among the flocks of goats and sheep, and destroyed nearly all the quadrupeds; then it seized on the shepherds and agricultural labourers; and passing through the entire region, fell upon the city. Indeed, so great was the multitude of attendants and slaves, and poor population destroyed, that it was not an easy matter to ascertain the number. At first the dying were carried away in heaps on waggons, and those who expired of whom no account at all was taken were thrown into the stream of the river running by. Of the senate, a fourth part was estimated to have perished; amongst whom were the two chiefs, and many of the leading men of the state.

"This disease began about the kalends of September, and lasted through that whole year."*

* Though I have given in the text an accurate translation, yet I think the original much more expressive, and therefore transcribe part of it here.

'Ρωμαῖοι—ὑπὸ νόσου κακωθέντες, ὡς οὔπω πρότερον, λοιμικῆς, ἣ τὸ μὲν πρῶτον ἵππων τὲ φορβάδων καὶ βόων ἀγέλαις προσῆλθεν, ἀπὸ δὲ τούτων εἰς αἰπόλια καὶ ποίμνας κατέσκηψε, καὶ διέφθειρεν ὀλίγου δεῖν πάντα τὰ τετράποδα, ἔπειτα τῶν νομέων καὶ γεωργῶν ἥψατο, καὶ διελθουσα διὰ πάσης τῆς χώρας, εἰς τὴν πολίν ἐνέπεσε. Id. Lib. IX. p. 459.

In this passage we have a most positive and distinct statement that this pestilence, of whatever nature or kind it might

Herodian relates, that in the reign of the emperor Commodus, a dreadful pestilence attacked the whole of Italy; but it raged more violently in Rome itself, inasmuch as that city abounded in its own proper population, as well as with a confluence of strangers from all parts of the world; whence followed a great destruction, both of beasts of burden and men ("πολλή τέ τις φθορὰ ἐγένετο ὑποζυγίων ἅμα καὶ ἀνθρώπων.") The historian, after relating the retreat of the Emperor from Rome, by the advice of his physicians, to Laurentum, to avail himself of the salubrity of its air, and its coolness, adds, "The disease, however, still advanced to a greater height, attended by a great mortality among men, and all the domesticated animals." *

It would not be difficult to increase the catalogue of pestilential diseases affecting both men and beasts at or about the same period; but as that point has been already sufficiently established, it will be better to bring forward such documents as seem more especially to illustrate the history of small-pox itself; and then to prove by unquestionable evidence that *that*

have been, commenced in the equine and bovine tribes of animals; from them it passed to the goat and sheep kind; then to the shepherds and farm-servants; and last of all made its way into the capital; having first traversed the whole Roman territory. Livy records the same epizöotic and epidemic disease in terms not materially different; and to which I have also referred.

* Πάντων τε ζώων τοῖς ἀνθρώποις συνοίκων.—Lib. I. cap. 12.

disease has at various times affected the inferior animals. I shall, then, have accomplished the object I proposed in commencing this disquisition; and its connection with Dr. Jenner's discovery of the Variolæ Vaccinæ will thus be rendered apparent.

Perhaps the earliest authentic account of any eruptive disease subsequent to that which is mentioned in Exodus, and commented on by Philo, is that given by Thucydides, in his history of the Peloponnesian war. This truly classical and elegant writer has given a delineation which carries with it all the authority of accuracy and truth. The symptoms which he enumerates resemble very strongly those of small-pox, whilst he is silent on those which characterize the true plague, such as buboes, parotids, and carbuncles. It, therefore, is fair to conclude that this latter disease is not that which he witnessed, as it is impossible to believe that a writer who is distinguished above most others by the minuteness of his descriptions, should have omitted those abovementioned, had they existed. He states that the disease proceeded from Ethiopia, and that it was brought into Athens from the Piræus. His entire description is peculiarly animated, and gives an appalling view of the ravages of the disease. As it is too long for insertion here, I shall select that part which points out the manner of attack, and the subsequent symptoms.

" Some persons from no ostensible cause, but on a sudden, being in health, were first seized with violent

heats of the head, and rednesses and inflammation of the eyes; and as to the interior (of the head), the faux or throat, and tongue, were immediately bloody (εὐθὺς αἱματώδη), and the breath emitted, bad and fœtid. Next after these (symptoms) sneezing and hoarseness came on, and in a little while the disease (πόνος) descended into the chest with a violent cough. And when it settled in the stomach (καρδίαν) it both turned it, and all off-scourings of bile, that have been named by physicians, succeeded; and these with great distress, (ταλαιπωρίας,) molestia. The greater part were affected with a fruitless hiccup, accompanied with strong spasm; with some, having immediate interval of ease; with others, much later. And the body, to the outward touch, was not very hot, neither was it pale, but somewhat red, livid, effloresced with small pustules and botches (ἕλκεσιν)."*

Such is the description of the incipient and eruptive symptoms of this fatal epidemic: that they are not those which characterize bubonic plague, is, I think, very evident. In the quotation from the ori-

* Τοὺς δ' ἄλλους ἀπ' οὐδεμιᾶς προφάσεως, ἀλλ' ἐξαίφνης, ὑγιεῖς ὄντας, πρῶτον μὲν τῆς κεφαλῆς θέρμαι ἰσχυραὶ καὶ τῶν ὀφθαλμῶν ἐρυθήματα καὶ φλόγωσις ἐλάμβανε, καὶ τὰ ἐνΐος, ἥ τε φάρυγξ καὶ ἡ γλῶσσα, εὐθὺς αἱματώδη ἦν, καὶ πνεῦμα ἄτοπον καὶ δυσῶδες ἠφίει· ἔπειτα, ἐξ αὐτῶν πταρμὸς καὶ βράγχος ἐπεγίγνετο, καὶ ἐν οὐ πολλῷ χρόνῳ καὶ ἐβαινεν ἐς τὰ στήθη ὁ πόνος, μετὰ βηχὸς ἰσχυροῦ· καὶ ὁπότε ἐς τὴν καρδίαν στηρίξαι, ἀνέστρεφέ τε αὐτὴν, καὶ ἀποκαθάρσεις χολῆς πᾶσαι, ὅσαι ὑπὸ ἰατρῶν ὠνομασμέναι εἰσὶν, επῆεσαν, καὶ αὗται μετὰ ταλαιπωρίας μεγάλης. Λύγξ τε τοῖς μὲν, μετὰ ταῦτα λωφήσαντα, τοῖς δὲ, καὶ πολλῷ ὕστερον. καὶ τὸ μὲν ἔξωθεν ἁπτομένῳ σῶμα, οὔτ' ἄγαν θερμὸν ἦν, οὔτε χλωρὸν, ἀλλ' ὑπέρυθρον, πελιδνὸν, φλυκταίναις μικραῖς καὶ ἕλκεσιν ἐξηνθηκός. L. II. c. 49.

ginal will be found, if I mistake not, as accurate an account of the leading symptoms of variola as could possibly be expected from any historian not medical. The sudden attack, without any obvious exciting cause; the strong heats of the head; the erythema and inflammation of the eyes; the state of the pharynx, tongue, and fauces; the particular fœtor of the breath; the sneezing, and hoarseness, and violent cough, combined with distress (πονος) in the chest; let these be taken in conjunction with the symptoms which succeed, and which denote the eruptive stage of this epidemic fever, *(especially as pointed out in the last sentence of the Greek quotation)* and we have, if I mistake not, a very lively description of a varioloïd disease.

Another part of Thucydides' narrative worthy of attention is that wherein he states that even after the disease had continued so long as to have reached its height, "the body was not wasted, but bore up against the distress beyond all expectation, so that many perished on the ninth or seventh day, having still a degree of strength (τι δυνάμεως) remaining." Now this we know is often remarkably the case in variolous fever. The historian further states that many who escaped beyond this period of the disease were attacked with a strong ulceration of the bowels, and along with this, a diarrhœa which could not be restrained, by which many were at last destroyed through weakness (ἀσθενεία). He proceeds to add that, if any one got over the greatest (most severe)

symptoms, a seizure, in return, upon the extreme parts left its mark there; for it made its attack ἐς αἰδοῖα, and upon the extremities of the hands and feet; and many ultimately escaped with the loss of these, and of *their eyes* also.

Another remarkable circumstance attendant on this epidemic, as noticed by Thucydides, is the immunity from a second attack of the distemper; at least from a fatal one, on the part of those who had once got well over it; so fixed was this belief in themselves and others, that they were deemed "*fortunate* and *happy*." The mode of expression adopted by the historian, is at once significant and forcible. διὰ τὸ προειδέναι τε', καὶ αὐτοὶ ἤδη ἐν τῷ θαρσαλέῳ εἶναι· δὶς γὰρ τὸν αὐτὸν, ὥστε καὶ κτείνειν, οὐκ ἐπελάμβανε.

Contemporaneous with the pestilential epidemy of Thucydides we find from Herodotus the historian, and the epistles of Hippocrates, the father of physic, that a similar disease prevailed in the hosts of Artaxerxes; but whence this pestilence proceeded does not appear:—that it was very fatal to the army is evinced by Artaxerxes' very urgent letter for medical assistance, as given in the epistles of the Coan sage, who afterwards made it his boast to the Athenians that he would not lend his aid to cure the enemies of his country.

Though Hippocrates has not in any part of his works treated expressly on small-pox as a disease, *sui generis*, yet I think it will be manifest, on an examination of some passages in his writings, that he

was not only acquainted with it, but has absolutely marked the *eruption* as characterizing a species in his classification of fevers. These he thus enumerates in the sixth book of his Epidemics, article 17. Πυρετοὶ, οἱ μὲν δακνώδεες τῇ χειρί. οἱ δὲ πρηέες. οἱ δὲ οὐ δακνώδεες μὲν, ἐπαναδιδόντες δέ. οἱ δέ ὀξεές μὲν, ἡσσώμενοι δὲ τῆς χειρός. οἱ δὲ περικαέες εὐθέως. οἱ δὲ διὰ παντὸς βληχροί. ξηροί. οἱ δὲ ἀλμυρώδεες. οἱ δὲ πεμφιγώδεες ἰδεῖν δεινοί. οἱ δὲ πρὸς τὴν χεῖρα νοτιώδεες. οἱ δὲ ἐξέρυθροι. οἱ δὲ πελιοί. οἱ δὲ ἔξωχροι. καὶ τὰ ἄλλα τοιουτότροπα.

"Some fevers are pungent, (or *biting*) to the touch; some are mild; some are not pungent, yet increasing, (or giving out;) some are sharp or acute, but yielding to the hand; some are forthwith, (or quickly) very ardent; others altogether, (or throughout) feeble and arid. Some are salt, others *pustular, dreadful to behold*; some moist to the hand, (or touch;) some very red, others livid, some very pale, and others of the same kind."

The above may be fairly considered a brief summary of the different kinds of fever with which Hippocrates was acquainted; but let us hear his commentator Galen on these very passages; chiefly, however, on that with which we have most concern, and which contains the very remarkable expressions "pustular, dreadful to behold." Passing over his comments, judicious as they appear to be, on all those species which precede the salt and pustular, let us confine our attention to them. He (Galen) begins by saying, "Of these the arid is sufficiently

manifest," (i. e. distinguishable by the touch ;)—" not so the salt, for salt is not distinguishable by the touch, but by taste alone." But what follows is less clear, where he says, " others pustular, dreadful to behold ;"—and here we find a different reading. In most of the copies, the words " to behold," being placed before " pustular," but in a few, the word " dreadful" being inserted after " to behold." Sabinus is the only commentator that I have found who was acquainted with this reading, and he is followed by Metrodorus, and all who have come after him down to *———, though in a very few copies I have found it simply " others pustular," without either " to behold," or " dreadful."

After exercising his critical acumen in the examination of the word πεμφιξ; and after offering several senses, he concludes with the question, whether the passage should be taken with two expressions out of the three, thus πεμφιγώδεες ἰδεῖν. Some, he says, have removed the word ἰδεῖν. Others who have not expunged it, have interpreted it either of fevers with φλυκταίναι, or of such as put life in danger, (or affect life :) and he thinks it probable, that Hippocrates may be here speaking of fevers of the λοιμὸς kind; for he says, " as yet, he (Hippocrates) passes over this *one* sort of fever. Now that it is attended with φλυκταίναι we have the testi-

* Galen has not mentioned the name of the author to whom he alludes in this place.

mony of Thucydides, who tells us "the body to the outward touch was neither very hot, nor very pale; but somewhat red, livid, broke out (or effloresced) with small pustules and ulcers." Galen, after some discussion of the passage in Hippocrates, then proceeds, "The addition of '*dreadful to behold*,' according to the reading of Sabinus's copy, is good, for the πεμφιγώδεες are *dreadful* to look at. I have said this before, and now repeat it: for that they are said to be dreadful to look at with reference to us, if they are affected with (φλυκταίναι and ελκεα) pustules and ulcers: but with respect to the patients themselves, when they become delirious and fix their eyes on you in a dreadful manner, &c." At length he sums up, thus, "Wherefore it is most probable to conclude, that either the fever puffy to the touch, (πνευματώδης) or that of the λοιμὸς kind has been described by the word πεμφιγώδης: but if we add the *dreadful* δεινοί to the term πεμφιγώδεες the λοιμώδης *alone* is intended or meant: the difference of which fever, with regard to others is, that the *heat* is of a putrid nature, as in the λοιμὸς which now prevails, and which has continued for so very long a time. For which reason, those who labour under it do not appear hot and burning to those who touch them. though their *inside* is violently affected with a sensation of heat, as Thucydides has said. Galen then cites Thucydides at some length, including the passage formerly quoted by him: 'ὅτε δ' ἐν αὐτῳ φλυκταίναι γίνονται, καὶ ὁ Θεκυδίδης μαρτυρεῖ γράφων οὕτως.

"καὶ τὸ μὲν ἔξωθεν ἁπτομένῳ σωμα οὔτε ἄγαν θερμὸν ἦν, οὔτε χλωρὸν, ἀλλ' ὑπέρυθρον, πελιδνὸν, φλυκταίναις μικραῖς καὶ ἕλκεσιν ἐξηνθηκός."

It may be to the purpose here to state, that according to Hippocrates, Galen, and the other Greek writers, the terms λοιμὸς and λοιμώδης were applied to all pestilential epidemics of whatever class or kind: as will be best evinced by consulting their works.

The opinions of the eastern nations, with regard to the high antiquity of small-pox, have been already alluded to. In China it would appear to have been known from time immemorial; or at least so far back as the dynasty Tcheouè, about 1122 years before Christ. The Chinese name for the disease is Tai-tou, which means "venom from the mother's breast." Père D'Entrecolles, a Jesuit, states that he had read some Chinese books, which notice small-pox as existing in the earliest ages. Père Du Halde, and other Jesuit missionaries, inform us of the existence of a Goddess in the Chinese mythology, under whose superintendence this disease (small-pox) is peculiarly placed: and further, their learned men believe that it has existed in China for 3000 years.

In Hindoostan, if the Brahmins are to be credited, the small-pox is of the remotest antiquity. The Brahmins say that the Veda (one of their sacred writings, which they refer back to an era nearly as remote as that of Moses,) contains forms of worship

and offerings to a female divinity, whose tutelar care is exercised over small-pox. A particular tribe of these priests lays claim to the knowledge and practice of inoculation from time immemorial.

What weight is to be given to this testimony, in the general argument for the antiquity of small-pox, must be left to individual judgment; I cannot but think, however, that so many concurring traditions and historical statements go nigh to establish a strong probability of the origin I have assigned to small-pox. That a communication subsisted between the ancient inhabitants of China and India, on the one hand, and those of Egypt on the other, is evinced, as well from ancient history as from a similarity of religious rites, from names of remarkable places, and from existing monuments, emblems of superstition, and temples for the worship of their common idols.

In connexion with this subject we find that at a later period the elder Pliny adds his testimony to the accumulated evidence of ages that many eruptive diseases were to be traced to Egypt, as their *fons et origo.* In speaking of elephantiasis he says "Egypti peculiare hoc malum," and in his observations on "lichen," another cuticular disease imported into Italy in the reign of Tiberius Cæsar, he makes this remark "Adveneruntque ex Ægypto genitrice talium vitiorum medici hanc solam operam afferentes, magna sua præda."

And of the plague itself he says, " Qua in re observatum, a meridianis partibus ad occasum solis pestilentiam semper ire."

It now remains to endeavour to trace a connexion between the eruptive diseases just described, and those which are known from history to have extended their ravages over the world subsequent to the Christian era. During the reigns of more than twenty Roman emperors many descriptions are given, and different symptoms enumerated by historians,—of accounts strictly medical we have few or none. Loss of sight in numerous cases, and still more frequently a severe inflammatory affection of the eyes of those attacked, is particularly noticed. This, together with the pustular eruption and the absence of buboes and parotids, would seem to distinguish the disease from the *pestis inguinaria*, or true plague; and with other symptoms to identify it with small-pox.

So frequent were the visitations of these epidemics, that mention is made of them in almost every reign from that of Domitian downwards.

In the eighth year of the joint reign of the Roman emperors, Marcus Aurelius and Lucius Verus, and of the Christian era 170, a most destructive pestilence raged throughout many provinces of the empire: of this Eusebius, in his Chronicle, thus speaks, " Lues magna provincias occupavit, Roma ex magna parte vexata."

This is the same pestilential eruptive fever which

Galen witnessed at Rome, and of which he says, (as has been already noticed) that it exactly resembled the λοιμος at Athens, as described by Thucydides.

Of this also Julius Capitolinus (in Lucio Vero) writes—" Fuit ejus fati ut in eas provincias per quas rediit Romam usque luem secum deferre videretur. Et nata fertur pestilentia in Babylonia, ubi de templo Apollinis ex arcula aurea, quem miles forte inciderat, spiritus pestilens evasit, atque inde Parthos Orbemque complesse."

In the third year of the reign of Gallus and Volusian, (A. D. 256.) a great " pestis" afflicted the world: it was said to have originated in Ethiopia; thence to have spread over the whole empire, and scarcely to have ceased within a period of ten years. This distemper raged throughout the whole of Egypt during these times, as Eusebius relates (in Chronico).* Africa, too, in its entire extent would appear to have suffered from this pestilential visitation, as we learn from Pontius in Vita St. Cypriani; and Gregory Nyssenus.

Cyprian in his pastoral letter to the Christians under his care, enjoins them to show the nature and power of their religious faith, by their brotherly love towards each other, and their good offices to their

* As I had not access to Eusebius' Chronicon in the original, the passages adduced are from the Ecclesiastical Annals of Baronius.—The same may be observed with respect to some other Greek authorities.

Pagan neighbours and fellow-citizens; and they obeyed his injunctions with the willing minds of martyrs, in assisting and rendering service even to their enemies.

Cyprian's address is entitled "De Mortalitate;" and in the form of a note to it is given a description of the disease.*

A. D. 263.—In the ninth year of the Emperor Gallienus, a pestiferous and deadly disease broke out at Alexandria in Egypt, of which Eusebius gives us some notices from the letters of

* D. Cæcil. Cyprian. de Mortalitate, sive lue mortiferâ. Vide not. p. 156. fol. Oxon. "Revera morbus iste epidemicus tam varia et erratica habuit symptomata ut ad pestis proprie dictæ typum minime responderet. Corporis vires solutus in fluxum venter eviscerabat. In faucium vulnera conceptus medullitus ignis exæstuabat. Assiduo vomitu intestina quatiebantur, oculi vi sanguinis inardescebant, quorundam pedes vel aliquæ membrorum partes contagio morbidæ putredinis amputabantur, debilitabatur incessus, obstruebatur auditus, cæcatus fuit aspectus. Teterrima hæc lues in Arabia primum nata, deinde in Ægyptum devecta, postmodum in Africam processit, et exinde per occidentalis Romani imperii partes grassabatur; furore Atheniensis illius, quam describit Thucydides æmulo, itinere consueto, et via quasi prætoria: ait enim Plinius L. 7. c. 50: Observatum à meridianis partibus ad occasum solis pestilentiam semper ire.

Imperantibus Gallo et Volusiano hoc malum contigit, testibus Eusebio in Chron. Oros. l. 7. et Zonar. Annal. l. 2. Porro pacis tempore hoc evenisse docet Euseb. l. 7. c. 22. ex literis Dionys. Alex."

This description of the disease is taken from Tertullian.

Dionysius, then Bishop of Alexandria, written at or about the festival of Easter. "In such a crowd of miseries as at present overwhelm us, neither at this time nor at any other, nay not even at that period which men deem of all other the most joyful, does it seem fit that a festival should be celebrated. For now all are full of lamentations; now all weep; now nought but sorrow and complaints occupy the whole city, on account not only of the multitude of those who have just died, but of those who are dying every day. As it is written of the first-born of the Egyptians, so now also a great cry is sent forth: for there is not a house in which there is not one dead."

After forcibly depicting the exemplary conduct of the Christians towards their fellow-sufferers, he contrasts it with that of their Pagan neighbours thus, "But the Gentiles acted contrarywise in every respect; for they forcibly drove out of their houses those who began to show signs of sickness; they deserted their nearest friends; they cast the half-living into the streets; they exposed the dead bodies without sepulture to be torn asunder by dogs; seeking to avert from themselves all participation, or as it were all communion of death; from which, however, it was evident they could not escape, notwithstanding all their devices."*

* In this, and other similar quotations, the reader is requested to bear in mind that the early writers did not sufficiently dis-