

Facts establishing the deleterious properties of rice, used as an article of food.

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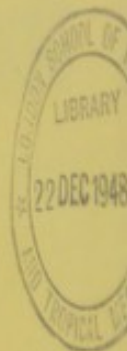


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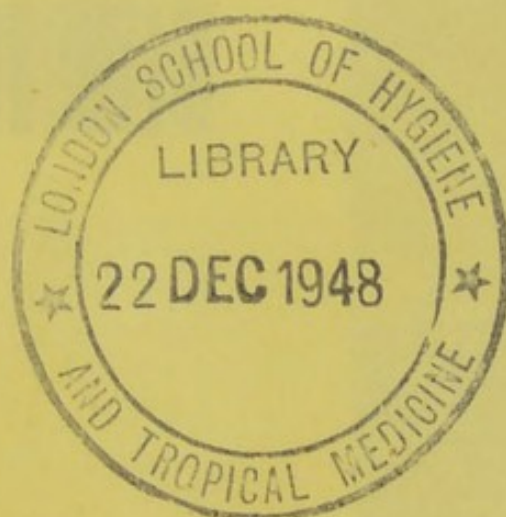
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Robert G. Norman.

1945.





FACTS

ESTABLISHING THE DELETERIOUS PROPERTIES

OF

RICE,

USED AS AN ARTICLE OF FOOD.

BY ROBERT TYTLER, M. D.,

Surgeon in the Honourable East India Company's Service, formerly Assistant-Surgeon of his Majesty's 81st Regiment of Foot, Chief Surgeon of Fort Marlborough and its Dependencies, Acting Superintending Surgeon of the South-Eastern Division of the Bengal Army during the Campaign in Arracan in 1825, Acting Superintending Surgeon of the Dinapore Division of the Bengal Army, and Senior Surgeon in the Field during the recent Campaigns of 1832, 1833, against the Coles and Choars in Chota Nagpore, and the Jungle Mehals.

"And this shall be the plague wherewith the Lord will smite all the people that have fought against Jerusalem; Their flesh shall consume away while they stand upon their feet, and their eyes shall consume away in their holes, and their tongue shall consume away in their month.

"And so shall be the plague of the horse, of the mule, of the camel, and of the ass, and of all the beasts that shall be in these tents, as this plague."—ZECHARIAH, xiv. 12. 15.

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TO
THOMAS WAKLEY, ESQ.

EDITOR OF THE LANCET.

MY DEAR SIR,

THE liberal manner in which you devoted the columns of your highly valuable publication to the promulgation of facts connected with the Deleterious Properties of Rice, cannot for a moment leave me in doubt to whom the following pages, disclosing one of the most important discoveries made of late years in Medical Science, should be inscribed. I therefore do myself the pleasure to prefix your name to the following small work, and beg to subscribe myself,

Yours very faithfully,

ROBERT TYTLER, M. D.

London,
October 28th, 1833.

THOMAS WALKLEY, ESQ.

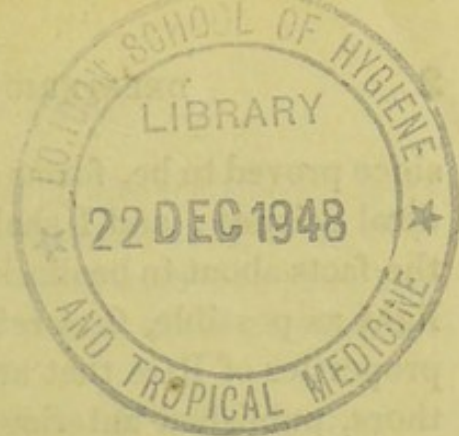
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Yours very faithfully,

ROBERT TYLER, M.D.

London.

Nov. 23rd 1802.



ON

THE DELETERIOUS PROPERTIES

OF

RICE.

It is my intention in this pamphlet to offer several undoubted facts, establishing the important truth, that Rice employed for food, under certain circumstances, is productive of very violent, and even poisonous, effects upon the animal system. The *modus operandi* of Rice, in exciting the morbid actions alluded to, is involved in obscurity. Nevertheless I shall, in illustration of the baneful qualities in question, bring forward a few concise speculations relative to the particular condition of the grain, which I apprehend mainly contributes to the dreadful symptoms now positively ascertained to result from the use of Rice as an article of diet.

In the autumn of the year 1817, the terrible scourge of our race, known by the name of the Indian, or Epidemic Cholera, appeared in the Bengal district of Jessore. By myself the first case of this Epidemic Cholera was seen and treated at that station on the 19th of August of that year, and its origin I demonstrated at the time, to be owing to the employment for food of the Rice harvest, then cutting in Bengal, whence by me this disorder has been named *Morbus Oryzeus*, or Rice disease.

The rise of so formidable a malady, as this fatal distemper has

since proved to be, forms a conspicuous era in the history of Medical Science ; and I shall, therefore, with the view of placing the facts about to be disclosed in as intelligible, plain, and clear light as possible, first refer to those illustrating the deleterious properties of Rice that are found in the works of different authors, published anterior to 1817, then advert to circumstances confirming the noxious qualities of the same kind of grain, which have been established subsequent to the rise of Morbus Oryzeus in that year, and conclude with a few observations, relative to the treatment and prevention of Epidemic Cholera.

SECTION I.

Extracts from the Writings of different Authors, establishing the fact that the deleterious properties of Rice had been made subject of observation anterior to the year 1817.

“ If, as usual, a sufficient quantity of wheat was imported to us from Japan and Surat, I would very readily dispense with Rice, because the bread here of wheat flour is nothing inferior to that in our own country, and in my opinion affords better nourishment than Rice.

“ Experience evinces that hot Rice is not only hurtful to the stomach, but also to the brain, and whole nervous system ; and from the gross and dry vapours rising to the head from this aliment, the optic nerves are frequently so much obstructed as to induce a total blindness. Hence you will seldom, or never, see the Javans, or Maldivians, eat hot Rice.

“ The principal cause of this disease (dysentery), is the drinking an inflammatory liquor, arac, which the Chinese make of Rice, and the holothuria, or what in Holland we used to call quabben or quallen.”—An Account of the Diseases of India, by James Bontius, p. 16, 128.

“ The causes of this fatal calamity (a dreadful dropsical disease with putrid sores which raged in the ship) were principally the sultry heat of the climate and bad provisions—viz., bread full of maggots, spoilt beef and pork, water full of vermin, and a very scanty allowance of that ; and spoilt Rice, which last, even in its best state, affords only a very poor and watery nourishment.”—Letter from the Surgeon of the *America*, ship of war, dated Manilla, November 11, 1762, published by Dr. Lind, and quoted in Dr. Hunter’s Essay on the Diseases of Lascars, p. 223.

“ It is also remarked, that the eating of new Rice affects the eyes.

The fact is certain, though I cannot assume to give the physical reason for it."—Grose's *Voyage to the East Indies*, London, 1772, p. 48.

"The flux, which raged some years ago, spread itself in all parts, making great ravages. Above sixty thousand people, from Cherigaum to Pondicherry, perished.

"Many causes produced it: some were attacked from having passed the night and slept in the open air; others from having eaten cold Rice with curds."—Sonnerat's *Travels*, quoted in the Madras Medical Board's Report, p. 6.

"The officer at the head-quarters was a Mahometan, one of Hyder's chieftains. Mr. Wilson gave him an ingenuous account of his escape from Cuddalore, and the reasons for it, with all the circumstances attending his flight. Chained to a common soldier, he was next day led out almost famished, and nearly naked, to march on foot to Seringapatam. In this wretched state, chained to another fellow-sufferer, under a vertical sun, with a scanty provision of Rice only, he had to travel. He was thrust into a noisome prison, destitute of food and medicine, with one hundred and fifty-three fellow-sufferers, chiefly Highlanders of Colonel Macleod's regiment, men of remarkable size and vigour. Their whole allowance was only a pound of Rice a day per man. The noble and athletic Highlanders were among the first victims. The flux and dropsy daily diminished their numbers. He was attacked with the usual symptoms of the disorder which had carried off so many others. His body was enormously distended, his thighs as big as his waist was before, and his face exceedingly bloated. Death seemed to have seized him for his prey.—He had exchanged his allowance of Rice that day for a small species of grain, called *ratche pier*, which he eagerly devoured; and being very thirsty, he drank the liquor in which it was boiled; and this produced such an amazing effect, that in the course of a few hours his legs and thighs and body, from being ready to burst, were reduced to a skeleton; and though greatly weakened, he was completely relieved, and afterwards recommended the trial with success to many of his fellow-prisoners."—*Memoirs of Captain James Wilson*, by John Griffin, London, 2nd edition, without date.

"The day had now arrived that Colonel Pearse's army was to be visited by a dreadful sickness and mortality from Cholera Morbus.

"I have just seen Dr. Gillies, who tells me that he has opened some of the bodies, which had every appearance of having suffered from a strong poison."—Colonel Pearse's Letter to Mr. Hastings, dated Itchapore, March 26, 1781.

"The army was not attacked with this dreadful disorder, until the provisions, particularly the red Rice which was supplied to the Bazars, was

complained of, being of a very inferior and prejudicial quality, causing (as Colonel Pearse states in a letter to J. H. Cashmajor, Esq., Chief Secretary of the Council of Vizigapatam) violent pains in their bowels, and fluxes."—The British Indian Military Repository, No. II. Calcutta, July, 1822, p. 211, 221.

"To those instances of scurvy occurring without the use of salt provisions, I can add one which fell under my own observation among the Bengal Sipahes in the Carnatic, in the year 1783 and 1784. The troops being then twelve months in arrears, were in great distress for money. They had an allowance of Rice from government, but every other article of provision was at a price almost, if not entirely, beyond their reach. The season also was remarkably cold and wet; under these circumstances many were attacked with scurvy."—An Essay on the Diseases incident to Indian Seamen, or Lascars, by W. Hunter, A. M., Surgeon to the Honourable Company's Marine Establishment in Bengal. Calcutta, 1804, p. 145.

"Singular effect produced by the use of Rice. Extracted from a Memoir by Dr. Bernard, Member of the Royal Academy of Sciences of Beziers, which was read before that Society on the 8th of November, 1786."—"Rice, according to Mr. Zimmerman, is the usual food of a great part of mankind, and to many nations it is the same as bread is to us. The Chinese are remarkably fond of it; the Turks make it the basis of all their meals; and it is always served up on the tables of the inhabitants of Bengal, and of other parts of India. In Europe it is considered as a delicious kind of food; and after it has undergone a slight preparation, is generally permitted to the sick. The want which seems to have arisen from the use of this aliment, and the desire of having a ready supply of it, have induced some people to cultivate it in this quarter of the globe. It is sown in Italy, and the crop which that country produces is soon distributed in the neighbouring provinces.

"But does not this facility in procuring a food which pleases so many nations, and which was known in the remotest antiquity, become the secret cause of a disorder that does not show itself but after a considerable lapse of time? This observation may appear singular, since we rarely find in medical authors any phenomena which give us reason to suspect the salubrity of Rice. If those places where it is cultivated in abundance exhale moist and malignant vapours, this, without doubt, is to be attributed to the necessity under which the inhabitants are of inundating their fields for several weeks before it is sown. This process must necessarily produce exhalations that vitiate the atmosphere in the same manner as in the neighbourhood of some cities of Germany, and of some mountains in France, where the air is phlogisticated by the vapour exhaled from flax and hemp, which are laid to steep in stagnant water. This nuisance, how-

ever, which deserves reprehension, and which tends greatly to injure the health of the inhabitants of those cantons, has been prudently guarded against in Italy by certain laws and regulations. Those who prepare these articles are obliged to do it at the distance of some leagues from any town or city.

“ If the use of Rice is generally prevalent in every part of the globe, it will not be surprising that this substance should sometimes produce singular effects, which must depend either on something peculiar in its nature, or in the constitution of those who use it. Vegetables, without doubt, contain a much less irritating juice, and more analogous to the thickness of our humours than the jelly of indigested flesh upon which we feed; but there are some also which are less wholesome, and which, when continually used, become the remote cause of disease. Besides the great tendency which certain species have to putrefy, they often occasion considerable flatulencies, which Mr. Zimmerman attributes to something cooling, which the generality of them possess.

“ Is it to this predominant quality that we must refer the phenomenon which is the subject of this memoir, or may we not find the cause of it in the internal dilatation of that quantity of air which exhales from the fruits or vegetables which one eats? The celebrated experiment of Hales seems to give some weight to this conjecture: a single apple produced a quantity of air sufficient to fill a space four hundred and eighty times greater than itself. Such a prodigious mass of air proceeds from raisins, that people, after eating a certain quantity of them, have died suddenly. Does Rice, therefore, contain such an abundance of elementary air, as to be able to produce those singular effects, the history of which I am going to trace, when in certain individuals who use it, there may be a stimulus capable of facilitating its expansion? This is what our chemical knowledge has not sufficiently analyzed, and what the continual use of this substance seems to contradict.

“ A merchant of the city of Beziers, who had for a long time lived chiefly upon Rice, finding himself much exhausted by close application to business, in discharging a commission which he had received from government, to furnish certain articles for the Royal Artillery, resolved to renew the use of that substance, which he was remarkably fond of, and from which he thought he had more than once received benefit. He ate of it successively for several days, without having any cause to abandon it; but continuing to use it at every meal, and especially at dinner, he experienced a very singular effect from it, the real cause of which he could not for some time discover. Having one day risen from table to go into his office, where he was wanted upon business, he was seized with a violent sneezing, which continued without interruption for some time; and those

around him observed, that his body was so prodigiously swelled that they could not have known him but by his voice. His features appeared monstrous; his face was three times as large as when in its natural state; his nose, his mouth, and his eyelids, were enormous; and his eyes were so much sunk in his head, that they scarcely received a single ray of light. This extraordinary and surprising state, of which we find no example among the immense number of medical observations which have been published, occasioned no pain to the patient, except when the swelling first began. As the continued sneezing, which preceded this singular phenomenon, was violent, and as the agitation which it occasioned impeded respiration, the patient must have indeed been under very great uneasiness.

“It was no doubt difficult on such an occasion to determine what means were to be employed to discuss this swelling, and to restore the affected organs to their proper tone; but nature, which presides over the preservation of the human species, and which often has astonishing resources, showed that no other assistance was necessary but light nourishment, and that the end of the same day which had given birth to this deformity, would see it disappear. A proper regimen, therefore, was the only remedy that succeeded; a change soon after took place, and the patient, who had been worn out neither by the length of his indisposition nor a load of medicines, did not perceive, that this extraordinary malady which he had experienced was occasioned only by the immoderate use of Rice; which, according to Bontius, greatly affects the nerves, weakens the sight considerably, and even brings on total blindness. This gentleman, therefore, without any fear or timidity, soon after returned to his Rice; but scarcely had he swallowed a few spoonfuls of it, when the same phenomenon appeared, with all its former violence and intensity; while the fits of sneezing succeeded one another with inconceivable violence and rapidity.

“The cause of these astonishing symptoms became then more apparent. It was readily concluded, that they were owing to a sudden impression, made by the Rice which the patient had swallowed, on the cardiac nerves. He therefore avoided the use of this aliment afterwards; he took care that none of it should ever be served up on his table, and notwithstanding the pleasure which he found in eating it, he chose rather to deny himself that gratification than to be exposed to a new crisis.

“But as mankind are easily deceived, and as pleasure sometimes blinds us, both with regard to our faults and our wants, this gentleman, who had hitherto rigidly abstained from Rice, forgot himself one day when it was introduced at dinner, where perhaps good manners did not permit him to refuse it; he therefore swallowed a mouthful of it, but as he instantly recollected his former accident, and already began to per-

ceive symptoms of it, he laid down his spoon, and by taking some aliment of a different kind, was fortunate enough to prevent a third paroxysm; from which, however, he was not exempted till after a moderate fit of sneezing, which generally announced this phenomenon.

“ No motive could be more interesting than that of preserving health, and preventing an affection always renewed by the use of Rice, to induce one to guard against the effects of this aliment, and to proscribe it with the utmost rigour. This unfortunate man, therefore, employed every care not to again renew so disagreeable a scene; but his commercial labours and occupations increasing, and new speculations subjecting him to greater fatigues, these occasioned such an internal irritation, that it was found necessary to calm it by cooling mucilaginous substances, which had always been attended with success, when he was affected in the like manner. The well-founded fear he entertained respecting Rice, which had become a dangerous kind of food, made him unluckily have recourse to Rice-water, which renewed, after a few days' use, the original swelling which had given him so much alarm.

“ It was undoubtedly highly prudent in this gentleman not to lose sight of the danger to which he was exposed, by his inadvertence in continuing to use this farinaceous substance, which, when in his stomach, occasioned such a singular revolution. He is, therefore, become very cautious with regard to the use of it, that he may for the future prevent the like disagreeable consequences. Rice, which is so generally employed as food among mankind, is eaten in almost every corner of the world, and which is the favourite dish of this merchant, becomes always fatal to him, and occasions the above astonishing symptoms.

“ A mixture of Rice, however, with other aliments of a different kind, makes no sensible impression. He can with safety eat a Rice cake, as it contains a very small portion of it, and as it is besides combined with other substances, which counteract that constant effect produced by it when it is eaten alone, or when it is taken without any mixture.

“ This surprising fact, which undoubtedly deserves the attention of the learned, seems to be owing to a cause not easy to be explained. Poisons, for example, have often produced swellings in different parts of the body; and it is not astonishing that these foreign substances, so contrary to our humours, should give occasion to such symptoms. Some fruits, even of a good quality, when eaten for the first time, have, according to Boerhaave, caused swellings of this kind; of which Barthez seems to have given a learned theory. He attributes these surprising effects to a tonic extension, which the principle of life produces by an unusual sensation on the fibres and cellular tissue, the interstices of which

are easily penetrated by serous humours, and the air that disengages itself from them. May not these frequent sneezings, and that singular swelling of all the parts of the face, be considered as of the same nature? And may not the impression of this aliment, when used to excess, make itself be felt on the nerves and the fibres of the stomach; the influence of which on the nose, and adjacent parts, is demonstrated by observations in such a manner as to cause that tonic extension, which may easily propagate itself by the means of sympathy?

“The Count de Manse tells us, that after having eaten of the same farinaceous substance, he has several times experienced effects somewhat similar, against which chance made him acquainted with the tonic power of cold water applied to the parts affected. He adds also, that by taking the precaution to toast the Rice before it was used, he prevented these pernicious effects.”—*The Literary Magazine and British Review*, for November, 1789, p. 348.

“In every case of Cholera, be careful not to let any Congee, or Rice-water, enter the stomach, for death will be the consequence.”—Extracts concerning Cholera Morbus from a Chinese Medical Book, Ching-che-chin, printed about 1790, vol. ii. p. 26, quoted in *Observations on the Epidemic Cholera, as it appeared in China*. By J. Livingston, M. D. Calcutta Medical Transactions, vol. i. p. 207, 1825.

“Dr. Percival informs us, that, as a wholesome nourishment, Rice is much inferior to salep. He digested several alimentary mixtures, prepared of mutton and water, beat up with bread, sea-biscuit, salep, Rice-flour, sago-powder, potatoes, old cheese, &c., in a heat equal to that of the human body. In forty-eight hours they had all acquired a vinous smell, and were in brisk fermentation, except the mixture with Rice, which did not emit many air bubbles, and was but little changed. The third day several of the mixtures were sweet, and continued to ferment; others had lost their intestine motion, and were sour; but the one which contained the Rice was become putrid. From this experiment it appears that Rice, as an aliment, is slow of fermentation, and a very weak corrector of putrefaction. It is, therefore, an improper diet for hospital patients, but more particularly for sailors in long voyages, because it is incapable of preventing, and will not contribute much to check, the progress of that fatal disease, the sea scurvy. Under certain circumstances, Rice seems disposed of itself to become putrid: for, by long keeping, it sometimes acquires an offensive fetor; nor, according to our author, can it be considered as a very nutritious kind of food, on account of its difficult solubility in the stomach.

“Experience confirms the truth of this conclusion; for it is observed by the planters in the West Indies, that the negroes grow thin, and are

less able to work whilst they subsist on Rice."—Encyclopædia Britannica, third edition, 1797. Article, ORYZA.

"Dr. Trotter says, scurvy is a very common complaint in the country ships in the East Indies, where the religion of the natives obliges them to live at sea on Rice.

"The same physician describes a most virulent scurvy, which prevailed on board a Guinea ship among the slaves, whose food consisted of beans, which were brought from England, and Rice, and Indian corn, which were bought on the coast."—Trotter's Observations on Scurvy, p. 38—52, quoted in Hunter's Diseases of Lascars, p. 144, 145.

"The *Mornington* sailed, outward-bound, on the 15th of December, 1800; got the pilot in Bengal river, May 2nd, when the whole number of deaths amounted to fifty-six. Almost all the native crew, Lascars and Sepoys, were afflicted with the distemper: the Europeans and native Portuguese were exempted from its attack. With respect to the progress of the symptoms, the accounts given by different observers do not exactly agree. According to some, the first was a swelling of the feet, generally pitting on pressure. While it was confined to the feet, which was sometimes for a day or two, the men were able to go about, and did not complain; but the swelling rapidly extended upwards, attended with difficulty of breathing; and after it reached as high as the stomach, the sick inevitably perished in the course of a day. For some time before death they had a severe pain at the pit of the stomach, increased by pressure, and about this period many had bilious vomitings.

"The whole duration of the complaint, from the first seizure to its fatal termination, was often comprised within the space of two days. According to other accounts, the swelling of the feet was preceded by pains of the knees, ankles, and elbows, difficulty of breathing, and pain of the bowels. Others allege that a pain at the region of the stomach, with hardness and swelling of the part, occurred before the swelling of the feet. The face was swelled and bloated, particularly the cheeks, temples, and over the eyes. The patients had much thirst during the whole disease, but greatly increased a little before death; the urine was scanty, and voided with difficulty: they were in general costive.

"The provisions of the Lascars consisted of Rice, as much as they could eat, and dal, (or split-pease,) while it lasted; but during the two last months of the voyage there was none of this remaining.

"The provisions of the Europeans consisted of salt beef and pork, pease-flour, and biscuit. The Europeans had a dram every morning. The diet of the native Portuguese was the same as that of the Europeans."

“ The *Arran* sailed from Portsmouth on the 7th of December.

“ January 13th.—In latitude 9° north, two men died with swellings. The swelling was attended with stiffness and numbness of the joints. From the first appearance of swelling in the feet it extended, in three days, to the abdomen and chest. The face in some was bloated.

“ On the 1st of March arrived at the Cape. In this interval the deaths were very frequent, sometimes two or three in a day.

“ The Lascars, after leaving England, had Rice.

“ The dissection of a man on board the *Arran* proves the distemper to have been really dropsy; that patient's case we may pronounce to have been chiefly anasarca.

“ Among the usual causes of dropsy, the following appear to have operated in the present instance :—

“ First.—Deficient nourishment. The provisions which, by the custom of the service, are supplied to the people were abundant, and of a good quality. But Rice and dal do not of themselves afford sufficient nourishment.”—Hunter's Diseases of Lascars, p. 29—41.

Extract of a letter from Thomas Christie, Esq., Inspector-General of Hospitals in Ceylon, dated Columbo, 20th September, 1803 :—“ I have received your letter of the 4th of August, relating to a disorder which has prevailed amongst the Lascars of some country ships, and which, from your description, I have no hesitation in pronouncing to be the same disease which is so well known in Ceylon, under the name of Beri-beri; and which, even of late, occasioned a very considerable mortality amongst both the European and native troops employed in the Candian war.

“ In my late experience in this disease at Candy, I have more frequently met with complete paralysis than I was accustomed to observe with the men of the 80th at Trincomalie, which I attribute to the greater severity of the disease at Candy, and the impracticability, from the want of supplies, of supporting the strength of the patients with a nourishing and stimulating diet during the progress of the disease. The diet of the Europeans at Candy consisted almost entirely of Rice.”—Hunter's Diseases of Lascars, p. 79.

“ My friend, Mr. Johnson, a surgeon of this city, and practitioner of very accurate observation, informs me that he was witness to a striking solution of the disease on board the *Asia*, East Indiaman, off Canton. Towards the conclusion of the voyage the sailors had been attacked with dropsical symptoms, coming on very suddenly, and without those signs which are thought strictly to characterise scurvy, sponginess of the gums, and petechiæ. This attack could be attributed to nothing but the use of damaged Rice, to an allowance of which they had been unluckily re-

duced. On their arrival in port the principal improvement in their diet was well-fermented bread, which operated as a very active diuretic within twenty-four hours after they had begun its use; and no doubt remained in the minds of any of the sick what it was that performed the cure."—*Observations on the Nature and Cure of Dropsies*, by John Blackall, M.D., Physician to the Devon and Exeter Hospital. London, 1813, p. 323.

"The liquor retailed to seamen in China is certainly of a very destructive nature. Its effects have attracted so much attention, that when his Majesty's ships are leaving the coasts of India for China there is generally an order from the admiral, enjoining the officers to guard as much as possible against the introduction of samshoo among the crews; which, says the order, is found to be poison to the human frame.

"The ordinary mode of preparing samshoo is as follows: the Rice is kept in hot water till the grains are swollen; it is then mixed up with water, in which has been dissolved a preparation called pekah, consisting of Rice flour, liquorice root, aniseed, and garlic."—*Johnson on Tropical Climates*, p. 85.

"If Rice be used soon after it is gathered, namely, within one or two months, it is by no means a wholesome food; and some of the rich natives speculate by giving old paddy in exchange for the new, with profit. The labourers in particular are so poor, that, in many instances, they cannot afford to wait for the grain being sufficiently seasoned.

"The Ceylonese, when they cannot obtain Rice of their own growth, prefer that of the Coromandel coast; and complain if they are under the necessity of feeding for a considerable time upon the moongy rice, which is imported to Ceylon from Bengal."—*A View of the Agricultural, Commercial, and Financial Interests of Ceylon*, by Anthony Bartalacci, Esq. London, 1817, p. 240, 241.

"In the year 1805, when Mr. Limond was returning with the 20th regiment of Native Infantry from Sumbhulpore, forming part of a detachment commanded by Lieut.-Col. Boughton, a number of the Sepoys were affected with rotundah, pur-blindness, or nyctolopia. Those men got better by a change of diet—from poorer to richer. The countries through which the detachment marched were Rice countries, so much so that ten maunds of paddy were procurable for one rupee; and it was whilst the men were in the Rice districts, and lived upon the Rice, on account of its cheapness, that they became affected with the rotundah."

—Communicated to Dr. Tytler, by the late Mr. Limond, Superintending Surgeon of the Benares Division of the Bengal Army.

SECTION II.

Facts establishing the Deleterious Properties of Rice, which have been ascertained subsequent to the rise of Morbus Oryzeus, or the Epidemic Cholera Morbus, anno 1817, in the district of Jessore.

“ In the afternoon of Saturday, the 30th of August, as I was proceeding in the accustomed melancholy route, witnessing on all sides the presence of misery, and hearing the wailings of affliction attending the footsteps of sickness, and lamenting the ravages of death; and agitated with very desponding feelings, expected to hear, in further accounts of the disorder's increase, a new and lamentable catalogue of mortality, a letter was delivered into my palankeen from Mr. Watts, proprietor of the indigo factory of Chooree-mancottee, about four miles from Jessore. In this note the important information was communicated, that several of that gentleman's servants were affected with the prevailing disorder, and it had in them proceeded from eating the new Rice of the present season.”—A Concise Narrative of Facts connected with the Disease, which occurred in the District of Jessore, anno 1817, by Robert Tytler, M.D., p. 14.

“ My dear Sir,—Many of my servants have been attacked with symptoms of Cholera Morbus, and I have happily succeeded in curing them. The cause appears to have originated in their having eaten new Rice, which the natives in general are fond of, both for taste and cheapness. I shall be extremely happy if this information is of any service to you,

And am yours truly,

(Signed)

J. WATTS.

“ Saturday afternoon, To Dr. Tytler, Jessore.”

Remarks upon Morbus Oryzeus, by the same. Part II. p. 40. Calcutta, 1820.

“ At the moment of reading this letter, I asked the bearer, who was running beside the palankeen, whether the new Rice was hurtful; and to my astonishment, and with feelings similar to those we may suppose to have existed in the company who witnessed Columbus' experiment of breaking the egg, I received for answer, ‘that new Rice made all those sick who ate it, and was the cause of the prevailing sickness, and that he, in consequence of being afraid of its bad effects, abstained from its use as food.’ Surprised at this information, which had arrived so unexpectedly, and the disclosure of a fact, hitherto eluding the minutest research I had been able to make, and had been for reasons still inexplicable very studiously concealed on the part of the natives, I hurried over to the jail,

and appearing among the Sepoys, asserted they had been making use of new Rice. No denial, to my still greater amazement, was given to this declaration, and, with feelings of shame depicted on their faces, they produced the chaul or Rice they had been eating, and said if I would give an order they would eat no more.

“ In the jail, my suspicions awakened by the note of Mr. Watts, and corroborated by these later circumstances, received ample confirmation ; for none were affected who had not partaken of this pernicious food, and several who had recently made use of it were falling sick.

“ The Judge readily agreed to the depositions of some of the persons affected, and their friends, being taken at the Cutcherry—

“ On Monday, 1st September, 1817, the following depositions were taken before the magistrate at the Zillah Court, Jessore.

DEPOSITIONS.

“ Asavon, sworn on the Koran.—Deposes that he is an inhabitant of Kirkee, a village in the immediate vicinity of Jessore. The deponent has been in the habit of eating new Rice, and whenever he has done so, has been affected with vomiting and purging. He was seized three hours after eating the new Rice with vomiting.

“ Shakeer Muhummud, sworn on the Koran.—Deposes that he is an inhabitant of the Imaum Baree, in the town of Cusbah. Yesterday his wife died, she was aged 40 years, and had been sick three days, with violent vomitings and purgings. She had been in the habit of eating new Rice mixed with mash calye (a kind of pea), and after eating this food for three days, she dined off the same at twelve o'clock on Saturday the 30th, was taken ill at half-past two on the same day, and died the following morning. Deponent is aware that from the indigestible qualities of the new Rice, a person is liable to be affected with sickness.

“ Kureem Khan, sworn upon the Koran.—Deposes that he is a resident of Collinga, Calcutta, and coachman to the surgeon of the station. He was affected with vomiting and illness the day before yesterday. Deponent ate his breakfast at nine o'clock in the morning, and at twelve was attacked with vomiting. His meal consisted of new Rice and dal.

“ The two following relations were communicated in open court by Hindoos, who, from religious prejudices having an objection to be sworn, were not put upon oath.

“ Kammul Chutterjee, the sircar of a gentleman at the station, states that his attendant, a youth, could not yesterday procure old Rice, he therefore ate new, and this day is affected with sickness, vomiting, and purging.

“ Raddah Mohun, a Bundaree of Inder Morgan, moonshee of the Company's factory at Commercolly, Jessore, ate new Rice yesterday at Nan-

paree, having left the station through fear, and was taken ill this morning with pain of the bowels and sickness.”—*Concise Narrative of Facts*, p. 14—17.

“ My dear Sir,—I thank you for your report, which I shall forward to government to-morrow, strongly recommending that an inquiry be immediately made in the adjacent districts of Fureedpore, Dacca, and Mymensing, into the cause of the disorder at present prevailing ; and pointing out that instructions be issued, with the strongest injunctions, to ascertain the nature of the food eaten by the inhabitants of those parts. The number of deaths are represented to be very alarming in that quarter, with every symptom similar to the Jessore disease, violent purging and vomiting, and no doubt arising from the same cause. These districts are Rice districts ; and the Ouse crops which produce the Rice here called new Rice, are cut and gathered at the same period, and of course the inhabitants have, as here, indulged their palates and their love of money, the Rice being cheaper and sweeter. All the natives in Cutcherry now readily acknowledge that the disease proceeded only from the nature of their food ; and a man who had charge of the jail last year, reminds me of my having last August prohibited the sale of new Rice in consequence of one of the prisoners having died suddenly, immediately after eating a quantity in his dinner. I have sent for the inquest held on his body ; and for any further documents I may have in my office. The immediate cause of the disease is now to my mind fully established, and with confidence I shall be able to report it to government.

“ This instant the record of an inquest taken on the body of a convict, on the 11th of September 1816, has been brought from the office. Kirmandee Moodee was taken ill on the 10th, and died on the morning of the 11th, in the hospital of the Cholera Morbus.

“ Another cause mentioned is, that the Aman crop, or Rice which ripens in the months of Agan, Poos, and Maug, corresponding with our December, January and February months, failed, and consequently became scarce. The Ouse and new Rice proved a most luxuriant harvest, and the value of course much less and cheaper.

“ The old adage, ‘ Truth will out at last ;’ we have, I think, gained a victory over their prejudices ; and our friend the Pundit, may rest assured his predictions of Pooroosh Karas, and of the five Saturdays in Car-tick, will not so easily be credited again. Yours sincerely.

(Signed)

CHARLES CHAPMAN.

“ Monday.—I return Watts’s note, it is not necessary to send it to government.

“ Dr. Tytler.”

Letter from the Judge and Magistrate of Jessore, written and despatched to its address, on the day the foregoing depositions were taken.

“During the year in which the epidemic arose, much bad Rice had been grown in Bengal, and there seems no reason to doubt that grain of this noxious description, when taken into the stomach of a person predisposed to the disease, frequently induced the attack.”—Report of the Bengal Medical Board, on the Epidemic Cholera Morbus, in the years 1817, 1818, 1819, p. 164.

“Goormohen, bearer, while eating with his comrades about noon on the 21st instant, was attacked with the Cholera Morbus. On the 22nd he was troubled with a strangury. The above-mentioned bearer has been in the habit of eating the Rarha Rice since it was cut in November last. This dreadful malady is raging in the Rarha villages.”—Letter signed M. W. I—— re, April 25th, 1818, published in the Calcutta Times, May 5th, 1818.

“Towards the end of June, 1818, three young men, brothers, barbers by trade, and inhabitants of the city of Allahabad, proceeded in prosecution of their profession, or that of shaving pilgrims and devotees who come to Allahabad for the purpose of bathing in the river, formed at the junction of the Ganges and Jumna, to the village of Daroo-gunge, situated upon the bank of the former, and near the union of the two streams.

“At that time a boat happened to arrive from Bengal laden with Rice, of a red colour, which was exposed for sale at the rate of fourteen seers for one rupee. These brothers purchased the value of one rupee, returned into the city, and having cooked the Rice, partook of it for food. Immediately posterior to this meal they were all seized with the Heija, or prevailing distemper. Two perished in the course of twenty-four hours, and the third was understood to be in a dying state.”—Remarks upon Morbus Oryzeus, part I. p. 88.

“Your letters respecting the Cholera Morbus bring a circumstance to my recollection, which took place at the period that fatal disease committed such ravages amongst the bearers and camp-followers of the centre division of the grand army. It is as follows:—A servant of mine, a carpenter, got leave to go to his village for the space of a month; but he came back in a few days with a report, that fifty people had died in the village, and all from eating Rice lately arrived in boats from Bengal, which had been sold at a cheap rate. This man was, in consequence, so much prejudiced against Rice, that he could not bear the sight of it.

“The village was situated near a branch of the river Goomtee.”—Extract of a letter from Lieutenant Mc Kinnon, Honourable Company’s 21st Regiment N. I., addressed to Dr. Tytler.

“In some Persian memoirs relating to the history of Oude, which I lately had occasion to peruse, I met with the following passage in one

written by Sheikh Fyz Buksh, formerly in the service of Shooja-ood-Dowla, and since employed by his widow and two successive ministers, in situations of the highest credit and responsibility. He now resides at Fyzabad.

“Early in the year 1818, the atmosphere of Lucknow became impregnated with the latent seeds of a pestilential disease, which raged with so much fury, that hundreds of dead bodies were daily carried from every street of the city. It was remarked, that every one who ate Rice at night, vomited it forth undigested in the morning, and almost instantly expired.

“From Lucknow it extended itself through all the towns and villages on the road, killing thousands in its way till it entered the city of Fyzabad, where more than two thousand were swept away by its fury.

“His son, who was at Lucknow at the time, tells me that some boats of poisonous Rice were brought to that city from the eastward, that the people who ate of it were soon after attacked by the disease, and expired in a few hours; that a part of the Rice was carried to Fyzabad for sale, and the disease followed in its train, destroying a great part of the inhabitants of every village through which it passed.

“I ought not to have concluded my letter without acquainting you that the part of the memoirs which I have extracted, was written before the author had heard of the importation of Rice from the eastward.

“The people did not believe all Rice to be poisonous; but the merchants who had purchased the grain at a very low rate, were suspected of mixing it with the Rice of the country. The grain is said to have been large and yellow; and the people who use Rice, the respectable order, have the yellow grains carefully picked out.”—Extract of a letter addressed to Dr. Tytler, from Lieutenant W. Sleeman, Honourable Company's 12th regiment N. I., dated August 19th, 1819.

“On the 12th February, 1819, the *Lady Carrington*, free-trader, arrived off the Sand-heads. At that time there was only one person on the sick list, and he was convalescent from phrenitis, there was no other person whatever sick in the ship. The provisions on board were all expended, excepting one cask of flour, one of beef, and three of pork. It became, therefore, necessary to obtain a supply the earliest opportunity, and application was accordingly made to a pilot schooner on the morning of the 13th.

“The vessel at this time was a long way from land, and had not had any communication with the shore. As there was a number of Chinamen on board who came passengers from St. Helena, the captain particularly requested a supply of Rice, and five or six bags were sent on board

from the *Pilot* schooner. A quantity of this grain, which had a reddish appearance, and the Chinamen observed was of an inferior quality to what they had been in the habit of using, was immediately served out to them; and the ship's company consisting of Europeans, the latter, who at first made some objections to use it, were under the necessity of employing it as food, in consequence of there being no biscuit; and a seer to each man was served out daily. The bags were expended in the course of three days, and consequently the Rice was all eaten before the ship reached Kedgerree, or had any communication with the shore.

"At 3 p. m., on the 13th, two hours posterior to the first meal of the Rice, five Europeans were reported to the surgeon incapable of doing duty from sickness, having been seized with vomiting and all the usual symptoms of Cholera. In the course of the same evening, four Chinamen were reported to be seized in a similar manner. On the morning of the 14th, eight more men were upon the sick list; and at 2 p. m., just after dinner, two more became also affected; and in the evening of the same day, five more were seized with symptoms of Dysentery."—Statement communicated to Dr. Tytler, by Acting-Assistant Surgeon Barnett (formerly Surgeon of the *Lady Carrington*), at Dinapore, September 1820; and published in the *Ghost of the Asiatic Mirror*, Friday, September 20th, 1820.

"On September 3rd, 1819, Lieutenant Newton, of the 3rd regiment of Native Infantry, mentioned to me that about six weeks before, at Banda, in Bundelcund, a grasscutter in his service was seized with the prevailing distemper after eating a meal of Rice. He expired the following day.

"The Khidmutgar of Lieutenant Newton, named Mudhoo, and a Musulman, also related that many persons at Banda died in the same manner, and their disease was occasioned from the employment of a bad kind of Rice which was selling cheap in the bazar."—Remarks upon *Morbus Oryzeus*, part 1, p. 89.

"A part of the Bengal force, with some of the Madras troops, were detached to Chanda, when on their return they discovered that Otta was not procurable, consequently they lived for about six days almost entirely upon Rice. The first march they made on their return, the Cholera appeared in the detachment, and continued to rage with great fury for ten days afterwards."—*Calcutta Journal*, October 7th, 1819.

"The common food of the Sepoys necessarily changed as bread increased, and Rice diminished in price; and from an article of diet, whereof a remarkably small bulk satisfies the stomach, and gives consistence to the feces, he had recourse to Rice, of which perhaps a larger quantity may be taken into the stomach than of any other substance, and commu-

nicates to the stools a form of peculiar liquidity."—Report of the Madras Medical Board on the Epidemic Cholera, p. 236.

"On the 30th of November, 1823, I reached Fort Marlborough, on the island Sumatra, and took charge of the hospital of convicts at Bencoolen, who were transported from India to that place. Sumatra produces large quantities of laddang paddy, or Rice, which grows on the sides of hills without water. This paddy is consumed by the natives of Sumatra, but the convicts were fed with Rice from Bengal; and when I arrived the convicts were eating that particular kind of Rice which I had discovered to possess deleterious qualities. The consequence was, that the hospital was filled with the most dreadful gangrene; a gangrene so horrible that I know not what to call it which will adequately express the shocking nature of the disease. At my suggestion, Sir Stamford Raffles, of whom you must all have heard, ordered the diet to be changed, and a more nutritious and wholesome aliment was accordingly given out, the result of which was, that the gangrene wholly disappeared. This was reported to the Bengal government." Dr. Tytler's Speech at the London Medical Society, Oct. 7th, 1833.

"At the conclusion of Captain Welsh's testimony, we learn a fact most important in a medical point of view,—that he is unable to use plain Rice as food, in consequence of its affecting his stomach.

"From the testimony of the next witness, Lieutenant Kelly, it is ascertained the Rice, issued to the soldiers of the regiment, has been very bad, and, moreover, that the generality of officers are compelled at this place to subsist on Rice.

"While Captain Welsh and other officers, who from various causes do not make copious use of this grain, have enjoyed health amidst surrounding sickness and mortality; others, by whom it is freely employed, have been affected with severe indisposition at the time the native troops, who have scarcely any other food, are nearly entirely in hospital; a remark also applicable to the European portion of the army, that is likewise unfortunately obliged for want of other sustenance, to have recourse to the indiscriminate employment of the same grain."—Summary of Evidence submitted to the Arracan Court of Inquiry, 1825, by Dr. Tytler.

"The Sepoys are chiefly recruited from the upper provinces, and their usual food is ottah (coarse flour). When they are sent down to Bengal, they are obliged to subsist chiefly on Rice, a food they have never been used to, and which, combined with the difference of climate and water, frequently brings on fevers, and bowel complaints, which terminate fatally."—On the Art of Preserving Health, in India. By T. E. Baker, Surgeon of the 10th Light Cavalry, Calcutta, 1829, p. 52.

“Mr. Birtwhistle said he had been in the three Presidencies of India as well as China, and had had ample opportunities of witnessing the direful effects resulting from eating Rice of an inferior quality. He thought Dr. Tytler’s opinions were entitled to the greatest consideration. He (Mr. B) was in Bombay in 1828, when the ships were laid up, waiting for cargoes, and he now well remembered that in those ships where Rice was issued in lieu of bread, the Cholera invariably prevailed. One of the Company’s large ships on the short voyage from Bombay to Singapore lost thirty-two men from Cholera, and he was told in China that Rice had been regularly issued to the crew. The disease was not arrested till they arrived at Singapore, and a change was made in the diet. He had attended several of the country ships in China, on board of which Lascars were constantly dying after three or four hours’ illness, and Captain Stewart of the *Golconda*, as well as others who had resided in India some years, attributed it to the bad quality of the Rice. The facts relative to fowls becoming diseased after eating Rice, was well known to gentlemen who had sailed to India. With regard to the identity of the diseases in India and England, he Mr. B., after having seen cholera in the three Presidencies, and most of the cases which had occurred in the eastern part of the metropolis, considered them as one and the same disease.”—Mr. Birtwhistle’s speech at the London Medical Society, October 21, 1833.

“Since the above discussion took place, Mr. Birtwhistle has forwarded the following: He says, ‘That during the time he was in China the Lascars on board the country ships, who lived exclusively on Rice, were attacked with Cholera; whilst in the American and European ships, in which rice was not an article of diet, he did not witness a single case. The case of the third officer in his ship (the *Sarah*), Mr. Coleman, is deserving of notice. This man was passionately fond of Rice and curry, and one day went out to Dungaree, a low resort for sailors in Bombay, on purpose to have what he called a good tuck out of his favourite food, he came on board congratulating himself on the excellence of the meal he had made. Two hours afterwards, however, he was attacked with cholera, and although previously a remarkably healthy and robust man, died in eight hours. In this case the secretion and evacuation of urine were carried on copiously.’—Lancet, Oct. 26th, 1833, p. 181.

SECTION III.

Attestation of Four Experiments by C. Stewart, Esq., Surgeon in the Honourable Company's Service, Lieut. Glegg, Honourable Company's Service, and Dr. A. C. Duncan, Assistant Surgeon in the Honourable Company's Service.

Attestation of an experiment by C. Stewart, Esq.

“ Dear Tytler,—I return your John Bull in the East for September and November, with many thanks for the perusal of them. You may certainly satisfy SCEPTIC (a correspondent of the John Bull, that Rice will kill goats at all events. I had written thus far when your note of this morning was put into my hands; I have not the least objection to certify that I witnessed the effects of raw Rice on a goat, which died in about thirty hours after having eaten a seer (2lb. avoirdupoise) of it.

Yours truly,

(Signed)

“ C. STEWART.”

“ Allahabad, May 10th, 1822.”

Published in the Calcutta John Bull May 20th, 1822.

Attestation of an experiment by Lieut. Glegg.

To the Editor of the John Bull.

“ Sir,—Being on my way to join my corps, I was necessitated to remain at this place for a few days, in consequence of the want of cattle, carriage, &c.; and having the pleasure of Dr. Tytler's acquaintance, and being in a great degree a sceptic as to the truth of his theory respecting the deleterious effects of Rice, I requested that gentleman to favour me with some proof of the accuracy of the circumstances he has so frequently advanced.

“ To this he readily assented; and on Monday last a strong female goat was procured, and deprived of access to food from that evening till the morning of the following Thursday. Wednesday being the vaccination day, I accompanied Dr. T. into the city, where we purchased two rupees'-worth of Bengal Rice out of one of the common shops. There were two species of this grain; one a reddish coarse rice, selling at the rate of sixteen seers for the rupee; the other a finer kind, whiter, and to appearance pretty good Rice, selling at eleven seers for the rupee.

“ A mixture of the two kinds of Rice, in equal parts, was placed before the animal on Thursday morning. During the day it continued to eat this grain, and occasionally drank some water. The following day its appetite greatly diminished; the two following days it ate nothing,

and to me it seemed affected with a disease similar to the distemper in cattle. During the night between Sunday and Monday it uttered most distressing cries at intervals, as if in great agony; and in the morning it was found dead.

“ Within twenty-four hours after eating the Rice the animal’s bowels were strongly affected, as the evacuations were changed to what in this country is called bilious; which appearance continued and increased till the death of the animal.

“ On opening the bowels, the contents of the stomach and bowels consisted merely of Rice, mixed with a little dirty fluid, in an undigested state.

“ The quantity of Rice eaten by the animal did not exceed two seers.

“ This experiment, I sincerely confess, has greatly tended to convince me of the accuracy of Dr. Tytler’s opinion; and I do certainly think that his discovery is not only deserving of general attention, but is of most serious importance, and highly worthy of investigation by medical gentlemen.—I am, Sir,

“ Your most obedient servant,

(Signed)

“ H. V. GLEGG,

“ Lieut. 2d Battalion 16th Native Infantry.”

“ Allahabad, 16th December, 1822.”

Published in the Calcutta John Bull, December, 1822.

Attestation of two experiments by Dr. A. C. Duncan, assistant surgeon in the Honourable Company’s service.

“ My dear Tytler,—I have to return you my best thanks for your kindness in performing your experiments with Ouse Rice on the goats, in confirmation of your theories on that subject.

“ You have most certainly proved that Rice of this description is capable of producing morbid effects on the animal economy, and apparently in proportion to the quantity taken. Many objections might be urged against the experiments; but they cannot invalidate the fact that the Rice produced a diseased action in the goat, and the result of your experiments is well calculated to draw attention to the effects produced on the human system by grain used as an article of diet.

“ The effect produced in the first experiment was undoubtedly dysentery, from irritation of the stomach and bowels; and the preservation of the life of the animal may be in a great measure ascribed to the evacuation of the noxious matter.

“ The second experiment, in which the animal died, was very interesting, as it bore so great an analogy to those cases of Cholera, where the patient is cut off suddenly, and without previous evacuation.

"The most remarkable circumstance, however, is the striking resemblance of the matter contained in the stomach of the animal to that evacuated by Cholera patients, by vomiting and purging. The similarity was so remarkable, that I have no hesitation in saying that had any practitioner witnessed such a discharge in a patient, he would have pronounced the case to be Cholera.

"Yours sincerely,

(Signed)

"A. C. DUNCAN, M. D.

"Gorrukpore, May 24th, 1829."

Published in the Calcutta John Bull, June 4th, 1829.

SECTION IV.

Relation of an Experiment, in which the Deleterious Properties of Rice were attended with remarkable Effects, attested by Captain Wroughton, Revenue Surveyor in the Honourable Company's Service, and Dr. Duncan; together with a Detail of Facts adduced in illustration of that Experiment.

"Gorrukpore, July 18th, 1823.

"Sir,—I do myself the honour to forward to you the inclosed letter, and its accompaniments, which I will feel obliged by your transmitting, at your earliest convenience, to the Medical Board.

"I have the honour to be, Sir,

"Your most obedient servant,

"R. TYTLER, M. D.,

"Surgeon 50th Regiment Native Infantry.

"To R. Limond, Esq., Superintending Surgeon, Benares."

"Gorrukpore, July 18th, 1829.

"Sir,—I do myself the honour to forward, for the information of the Medical Board, the accompanying details of an experiment lately performed at this station, and attested by Captain Wroughton, Revenue Surveyor of this District, and Dr. Duncan, Assistant-Surgeon 6th Cavalry. Phagedenic ulcers, similar to those produced in the animals upon which the experiment in question was tried, I have not unfrequently, in this country, observed in hospital patients under my care; and have heretofore uniformly referred them to a syphilitic origin, while the experiment, the details of which are herewith annexed, has demonstrated

very satisfactorily the possibility of such ulcers proceeding from a very different cause. I have, therefore, deemed it a point of duty to bring the information contained in the annexed documents to the notice of the Medical Board.—I have the honour to be, Sir,

“ Your most obedient servant,

“ R. TYTLER, M. D.,

“ Surgeon 50th Regt. Native Infantry.

“ To J. Adam, Esq., M. D., Secretary of the Medical Board.”

DETAILS OF THE EXPERIMENT.

“ I, Robert Wroughton, do evidence that I saw, at 2 p. m., on the 27th of June, 1829, two goats (male), in health, and so far as I could discover without any complaint whatever. These animals, I understood, had been kept without provision of any kind whatever, saving water, for the two preceding days. In my presence and Dr. Duncan's, Dr. Tytler supplied them with a coarse description of Rice, which he informed me had been purchased by Dr. Duncan and himself in the Captain Gunge Bazar that morning, and expressly for the performance of this experiment, I being doubtful of the effects of Rice on the animal system; in so far as I did not imagine this simple food could occasion any serious consequences to the animals that might feed upon it.

“ The animals ate in my presence a small quantity of the Rice, and drank a little water; the former was evidently taken with great reluctance.

“ Dr. Tytler having promised to let me know as soon as any change in the animals should show itself; within twenty-four hours I received a note from the Doctor, intimating that one of the goats was affected, and begging me to come over and witness the fact. At 1 p. m. of the 28th I did so; and then observed that the smaller of the goats was certainly labouring under the effects of a serious diarrhœa; the other also had a different appearance from what I observed on the previous day.

“ Dr. Tytler satisfied me, by a forcible shake of the bodies of both animals, that they contained a quantity of some liquid substance, the sound resembling that of a half empty water skin, or bheestee bag.

“ From what I have witnessed this day, I have no hesitation in stating, that, to the best of my judgment, it appears evident the sickness in both animals may be justly ascribed to the Rice and water given to, or taken by, the animals upon an empty stomach: and that the distemper could not be attributed to the Rice alone, nor the water alone. And hence it does appear to me, as far as I can discriminate, that coarse Rice and good water, (without any other ingredient,) received into the stomach, are capable of producing serious disease to animal life.

“ June 29th, 1829.—I further evidence, I have again seen the goats this day; the larger one is affected in the same way, and suffering under a diarrhœa, similar to what I observed in the lesser one yesterday.

“ The purging of the small goat seems much abated this day; but the unnatural motion of its stomach evinces, decidedly, that it is still diseased, and occupied by a considerable quantity of some liquid substance.

“ Both goats ate more Rice in my presence this day; but Dr. Tytler states that they have not eaten much between the hours of two yesterday and ten to-day. In all, I understand, about two chattacks (four ounces) have been consumed by each animal.

“ 30th.—This day I have again seen the goats; the larger one is still purged considerably, but the lesser one not near so much so. The contents of the stomach of each animal still appears to be some liquid substance.

“ The symptoms, so far, are much the same as I have noticed on the previous days. But there is one symptom that strikes me this day in the larger, which was not apparent yesterday. The animal is affected with a very bad cough, and betrays much anxiety and difficulty in breathing. The animals refused to eat any of the Rice in my presence to-day; and the dishes containing the food appear to be untouched, although given early this morning by Dr. Tytler's information, which goes farther to say they have touched no food since yesterday at twelve o'clock.

“ 1st July, at 12 o'clock a. m.—This day I have again seen the goats. The diarrhœa appears stopped in both animals; but the intestines seem still occupied with the liquid, although to a less degree in the small goat than in the larger. The larger goat appears still dull and heavy, not so much so the little one; in which animal a new symptom has made its appearance, and which I learnt from Dr. Tytler was first noticed by him yesterday afternoon, the penis of this animal is in a violent state of inflammation, approaching to gangrene.

“ The large goat refuses both Rice and water, but the smaller one eats a little.

“ 14th July, 1829.—Since last report, in consequence of the goats refusing to eat their Rice, they were turned loose, and allowed to graze as usual, conceiving that the bad effects of the quantity of Rice and water that they had taken had been clearly demonstrated.

“ The diseased parts of the small goat had sloughed off; and since the animal has been allowed to have free access to the grass his secrets have become healthy.

“ The shaking of liquid in the bowels of the large goat continued at the time he received his liberty, evincing, as far as my judgment goes, that the effects of the Rice and water had not ceased; and yesterday

calling accidentally on Dr. Tytler, he showed me the large animal similarly diseased with the small one, but apparently much more severely; the glans of the penis being in a decided state of mortification, which, of course, I conceive can only have arisen from precisely the same cause which produced it in the smaller at an earlier period. I examined the large goat this morning, and find the gangrene increased.

" July 17th.—I have examined the goat this day; the mortified parts have sloughed off, and the sore has a healthy appearance. The liquid motion of the stomach has also disappeared; but the animal is still affected with cough, which is the only remaining symptom of disease.

(Signed)

" R. WROUGHTON."

" I hereby certify that I witnessed the above experiment, and that the facts are correctly detailed.

(Signed)

" ALEXR. C. DUNCAN,

" Assistant Surgeon 6th Cavalry.

" Gorrukpore, 18th July, 1829."

" My dear Tytler,—I can have no possible objection to your calling upon me, whenever required, in support of the truth of the Rice experiments; which, however hitherto unfavourably received, would, upon fair inspection, satisfy the most fastidious persons that the experiments are both extremely interesting, and the results very curious, and such as I could not have credited had I not witnessed them.

" Yours very truly,

(Signed)

" R. WROUGHTON, R. S.

" 18th July, 1829."

FACTS ILLUSTRATIVE OF THE FOREGOING EXPERIMENT.

" *First series.—The production of gangrene and mortification.*

" The patients laboured under a universal dropsy, accompanied with swelled and putrefied gums, a stiffness at the joints of the knees, livid stains, and scorbutic spots.

" The cause of this fatal calamity was spoiled Rice."—Letter from the Surgeon of the *America*, ship of war, 1762.

" Having fortunately heard (May 4th, 1804) that the *Britannia*, Capt. Dawson, had arrived off Calcutta the preceding evening from St. Helena, I went on board of her, accompanied by Capt. Roberts, to inquire if any of the crew were sick of the scurvy.

" The man most afflicted (a Lascar) we found under the long-boat, eating, with seemingly good appetite, Rice and water; his cheeks frightfully puffed, and the whole face rather bloated; the left leg and thigh a

little swelled, the muscles on which were so hard, that, passing the finger round the leg, about four inches below the knee, it was difficult, if not impossible, to determine by the touch when it passed from over the tibia to the tibialis anticus muscle; the calf of the right leg was also very hard, and the hardness extended to a little above the knee, but without any swelling. The ham of the left leg was rigidly contracted; and on being desired to raise himself up, which he did with difficulty, and not without assistance, he showed us that he was unable to straighten the limbs. He complained of shortness of breath on making the least exertion, and of pain in the left side, near the scrobiculus cordis, on which he said he was unable to sleep; observing, at the same time, that the whole of the left side was more affected than the right. The mouth was most shockingly affected: on the palate, between the uvula and upper jaw teeth, on the right side, was a large scorbutic ulcer, rising considerably above the surrounding parts, and covered with a clot of dark-coloured blood. Captain Roberts observed, that, in the worst cases of scurvy he had ever met with, he had never seen so severe an affection of the mouth."—Hunter's Diseases of Lascars, p. 228.

"In the case of a mendicant Brahmin considerably advanced in years, who died of this disease (Cholera Morbus, or Morbus Oryzeus), after four days' illness, I found the anterior surface of the arch of the colon sphacelated, for the space of about a quarter of an inch in diameter, forming a circumscribed isolated deep black spot, where the poison from some fortuitous circumstance appeared to have been concentrated, and acted with most virulent potency."—Remarks on Morbus Oryzeus, part second, p. 33.

"The disease thus existing in the Bencoolen hospital, comes properly under the name of that destructive malady called the Hospital Gangrene; but its causes, as the result proves, depended upon circumstances widely different from conditions of atmosphere, or the existence of contagion within the hospital. At the time these disorders so lamentably prevailed, the patients appeared to have been very indifferently supplied with a sufficiency of food. The food of the convicts, and that supplied from the Company's stores to those who were sick in the hospital, consisted almost entirely of Rice, and of that description which from a long course of investigation and experimental research, I had ascertained on the continent of India to have become vitiated by means of the excessive rains to which the grain is exposed whilst growing."—Diseases of Bencoolen, by R. Tytler, M. D.—Transactions of the Calcutta Medical Society, vol. 2, p. 191, 192.

"Certainly as an additional cause (of gangrenous ulcer) must be stated, the great deficiency of the rations, and which continued for many months

after the regiment reached this presidency; the men, being unable to procure dholl or ghee, were forced to subsist on Rice alone."—On the gangrenous ulcer which occurred in the 65th regiment N. I., in 1825, at Penang, by J. Leslie, Esq., Calcutta Medical Transactions, vol. 3, p. 160.

The foregoing illustrations of the above-detailed experiment, distinctly prove that the effects of Rice upon the animal system are precisely similar to those produced by means of distempered rye, or secale cornutum, but which is more commonly known by the denomination of rye ergotè, the cockspur, or ergotted rye, as the following extract will prove.

"The tendency to mortification induced by living on vitiated Rye is very remarkable; we have on record a deplorable example of the effects of such diet, where a woman and her six children were dreadfully attacked with a sphacelus of their lower extremities."—Practice of Surgery, by Samuel Cooper, London, 1813, p. 28.

Second series of Facts illustrative of the foregoing experiment.

Effects produced upon the urinary and genital organs—"The urine was scanty and voided with difficulty. The provisions of the Lascars consisted of Rice."—Hunter's Diseases of Indian Seamen, p. 31.

"Fully aware of the pernicious consequences resulting from the use of unripe grain or new Rice, the higher classes maintained, though falsely, that they never employed it as food; while it is known that such as do not eat it from necessity, use this kind of Rice as a medicine, supposed to be capable of exciting a high degree of stimulus in certain organs of the body."—Concise Narrative of Facts, second edition, p. 41.

"On the 22nd he was troubled with a strangury, which remained till the evening of the 23rd. The above-mentioned bearer has been in the habit of eating the Rarha Rice."—Letters signed M. W.—I—re, 25th of April, 1818. Calcutta Times, May 5th, 1818.

"A disease occurs among horses, which is considered to be peculiar to Java, and is particularly rife in those parts of the country which are in the immediate neighbourhood of the Dutch metropolis. The symptoms are, runnings at the nostrils, mouth, and eyes, with general emaciation of the body, ulcerations on the neck and behind the ears, and the animal in the last stage, being affected with laborious breathing, dies, reduced previously to a deplorable state of misery. This fatal distemper annually destroys great numbers of these valuable animals, and is believed to be extremely infectious; but horses in Java are fed with paddy, and the disorder, to the best of my recollection, takes place in those months when the grain has been recently cut and is given to them as food."—Preface to the Concise Narrative of Facts, second edition, p. 13.

In the course of the year 1822, I fed a female goat with Rice; the

animal ate the grain freely, and in the course of a few days was affected with runnings at the nose, and symptoms exactly analogous to those affecting the horses which I had seen perish from the distemper on the island of Java. Suddenly, in the animal in question, the discharge from the nostrils ceased, and the suffering creature was attacked with a copious discharge from the vagina resembling gonorrhœa. In this instance was accordingly exhibited a metastasis of a very peculiar description, manifesting the singular effects produced by Rice upon the genital organs and a discharge from one mucous surface, which constituted a violent species of glanders, being suddenly changed into a disorder that in the human subject would undoubtedly have been deemed a venereal taint, and the result of impure connexion.

Now it is exceedingly deserving of remark that in the interior of Java, the women in particular are affected with gonorrhœa, in prodigious numbers. But is it possible, I ask, reasoning from the conclusions which we may justly draw from the above facts, that since those people are all copious Rice eaters, the use of that grain may in many instances produce an affection of the genital organs, which might be mistaken for a disease having a venereal origin? The important deduction to which these remarks give rise will not escape the reader, that a female of character and reputation might lose her fair fame from innocently making use of an article of sustenance universally eaten, but whose peculiarly pernicious qualities are both unknown and unsuspected.

The above facts decidedly illustrate the connexion subsisting between the effects of Rice and Rye ergotè, inasmuch as the latter, it is now ascertained to be an authentic medical truth, produces a peculiar action on the human uterus. With the view of facilitating parturition, that substance is therefore given to females in difficult labours, and it is affirmed is found productive of the desired result.

SECTION V.

Facts demonstrating that pestilential vapours directly destructive of animal life, are, under certain circumstances, emitted by Rice.

“It is remarked that the heat produced by Rice, when heaped in large piles, will not allow insects living inside of it.”—Bartolacci’s account of Ceylon. London, 1817, p. 220.

“ The meals of the slaves should be carefully inspected, to prevent their using unwholesome food, and maize preferred to Rice for their nourishment, as the former does not undergo that fermentation in a ship’s hold, which, whilst it spoils its nutritive qualities, renders it liable to produce the most baneful effect on the system.”—Opinions of French Surgeons, at Bourbon, *Feuille Hebdomadaire*, 15th December, 1819.

“ A certain quantity both of Ouse and Amaun Rice, having been collected in the same place, and kept there in similar varnished pegue jars, we made the following observations in the forenoon of Wednesday last.

“ Temperature of the room, 86° .

“ Item of the open jar that contained the Amaun, or fine Rice, $85\frac{1}{2}^{\circ}$.

“ Item of the open jar that contained the Ouse or coarse Rice, almost 88° .

“ Item on plunging the thermometer into the fine Rice, 86° .

“ Item on plunging it into the coarse Rice, almost 100° .

“ It is evident, in the present case, that there was in the fine Rice, a power which may be considered as real life; and enabled that Rice to preserve its own organic temperature unaltered, even in an atmospheric medium of a higher temperature. It appears on the other hand, that there was in the coarse Rice, a degree of fermentation, or beginning of death in short, which disengaged gases from it, and made it lose caloric so as to raise the temperature around.”—*Calcutta Times newspaper*, September 14th, 1819.

From these brief but important remarks, we learn that the vapours emitted by coarse Rice, are most abundant in quantity; and, moreover, perceive that such exhalations must inevitably be attended with a powerful effect as natural chemical agents, when they were found capable of raising the thermometer to the height of two degrees above the temperature of the common atmospheric air, with which they happened to be mixed within the pegue jar; and the fermentative or putrefactive process by which they were extricated, must have also been existing with great energy, when the contact of the fermenting Rice had the effect of causing the Mercury to ascend to the elevation of fourteen degrees above the temperature of the common air, and nearly twelve higher than the heat of the superincumbent calorific vapours.

It is hence rendered evident, from a knowledge of the above-stated facts, that vapours of the aforementioned description must cause the holds of ships laden with Rice to prove most noxious to the lives of sailors, who are compelled in the course of their nautical duty to descend into those confined cavities; and that the fact is identically so, is convincingly proved by means of the following interesting and valuable documents.

DEATH OF FOUR MEN OCCASIONED BY RICE VAPOURS.

“A singular but melancholy accident happened on board the *Grab*, Hamoody, Nakooda, Cooty Caya, in the course of her voyage from Calcutta to this port.

“When off Ceylon about two months ago, on sounding the pumps, it was observed that the ship had made more water than usual; upon which a man went down into the well to ascertain the state of it, not immediately returning nor giving any answer when called to, his brother went down after him. As he also did not return nor give any answer, the se-rang of the ship went down, but he likewise returned no answer. A man then descended with a lantern, and it was observed that when he had reached the bottom, the lantern dropped out of his hand, and the man himself fell down.

“The main hatches were then opened, and a passage made to the place by unstowing part of the cargo of Rice. The four men were found lying senseless around the pumps, but with some appearance of life remaining. They were immediately removed, but we regret to state that they all died in the course of an hour or two afterwards.”—Bombay Courier, March 1, 1817.

Captain Bowie's statement, communicated to Dr. Tytler, at Batavia in the island of Java, October, 1823.

“TO DR. TYTLER.

“Sir,—Your letters in the Bengal papers sometime ago, attracted much notice. But I am well convinced not so much attention was paid to them as they really deserved. Where you mention Rice of a twelve-month's growth back being prejudicial to health, if used as food, is beyond all doubt correct, as I have, and all my crew, thirty-nine in number, experienced. And I am further beyond all doubt convinced, and have had bodily proof, that it is still more pernicious when enclosed in a store or ship's hold, where there is no free circulation of air.

“On the 11th of July, 1823, I landed at Passerwan, island of Java, a cargo of about 200 tons of Rice, that had been confined in a store belonging to the government for a space of about eighteen months. When taken on board it had all the appearance of good Rice, and was sold as such. But its pernicious qualities were soon evinced.

“As soon as the vessel was loaded I repaired on board, and was immediately attacked, owing to my using this Rice, with the disease commonly called Cholera Morbus. My chief officer, Mr. Burn, and all my crew, were attacked a few days previous, and only saved their lives by remaining on deck. After the crew recovered, when sent below on ship's duty,

if for the space of an hour, they had an immediate attack, and with much difficulty through medicine were restored.

“ When at Blinou, island of Banka, a gentleman visited me, and after looking through the vessel below, although I informed him of the effects that were liable to ensue, and after eating of the Rice, he went on shore complaining of an attack of Cholera, and died next day. He was the son of General Van Gheen, the commander of the cavalry at Batavia.

“ I therefore, in support of your opinions, as I have read in the Calcutta papers, do declare that I am positively convinced of the truth of what you have urged.

“ I am, sir, with much respect, your most obedient servant,

(Signed)

“ J. BOWIE,

“ Batavia, Oct. 11, 1823. Commander of the brig *Elizabeth*.”

Published in the Calcutta John Bull, December, 1823.

SECTION VI.

Extracts from the writings of different authors, relative to diseases affecting farinaceous grains in Europe, and the calamitous consequences ensuing from the use of vitiated grain for food.

“ Smut, in husbandry, a disease in corn, when the grains instead of being filled with flour are full of a stinking black powder.

“ As to the cause of this distemperature, some have attributed it to excessive rankness or fatness of the soil, to the manuring the land with rotten vegetables, and to the sowing smutty seed. Mr. Bradley thinks it is owing to the same cause with a blight, viz. to multitudes of insects. But Mr. Tull is convinced from experiment, that it is caused by too much moisture. For, planting several plants of corn in troughs of very moist earth, they all produced smutty ears, while very few such were found in the field whence these plants were taken.

“ The bread made of smutty corn is very pernicious, acting as a narcotic, occasioning not only sleepiness, but vertigoes and even convulsions.”
—Encyclopæd. Britann. third edition, Article on SMUT.

“ Mildew is said to be a kind of thick, clammy, sweet juice, exhaled from, or falling down upon, the leaves and blossoms of plants. By its thickness and clamminess, it prevents perspiration, and hinders the growth of the plants. It sometimes rests on the leaves of trees in form of a fatty juice.

“ Mr. J. S. Segar, the author of a treatise upon this subject, observes that the mildew is of such a sharp corrosive nature, that it raises blisters on the feet of the shepherds who go barefoot, and even consumes the hoofs of the cattle. He suspects that it possesses some arsenical qualities, though he does not pretend to affirm this positively. The same author considers the mildew as a principal cause of epidemical distempers among cattle. The disorder attacks the stomach, is accompanied with pimples on the tongue, loss of appetite, a desiccation of the aliments in the stomach, a cough, and difficulty of respiration.”—*Encyclopæd. Britann.*, Article on MILDEW.

“ It is certain that many epidemic diseases take their rise from the bad qualities of food. If the bread corn is in any way distempered, it never fails to bring on disorders amongst the country people.”—*A Treatise on Cattle*, by John Mills, Esq., London, 1776, p. 432.

“ It was long ago known that corrupted corn was poisonous to the animal body. Galen remarked that the seeds of *colium temulentum*, mixed with wheat or the degenerate grain called black wheat, would produce fevers, headaches, delirium, and gangrenous ulcers.”—*Rees's Encyclopedia*, Article on ERGOT.

“ Another very remarkable species of mortification from an internal cause, is that originating from eating bread made of bad black wheat or rye.”—*Cooper's Surgical Dictionary*, p. 704.

“ Grain thus injured by some fungus or other, has been found, when employed as food, productive of two dreadful diseases, to both of which, indeed, the French have given the name of ergot, as occasioned by a common cause, as they have also that of *mal des ardens*, from the burning internal heat which is felt in either case. The one of these diseases is a typhus fever, with the general character of pestis, or what Sauvages calls *erysipelas pestilens*, which is synonymous with the third variety of pestis in the present work.”—*Good's Study of Medicine*, vol. 3, p. 915.

“ Ergot is an elongated excrescence, which fills the place of the seed in the glume or husk of rye. De Candollé believed that it was a small fungus belonging to the genus *scleroticum*, and arranged it under the specific name *clavus*. M. Tessier first combated this opinion by observing that he had seen seeds, one half of which was sound rye, and the other half ergot; and M. Viry has asserted that it is actually a morbid modification of the rye itself, an opinion at least highly probable.”—*London Medical Repository*, vol. 8, p. 49, 1817.

“ M. Viry conceives, with great probability, that it is to the acrid and putrescent animal matter contained in the ergot, that we must refer the poisonous properties of this production.”—*London Medical Repository*, vol. 8, p. 36. 1817.

“Ergot, in agriculture, is a vegetable disease, which affects different sorts of grains and other crops. It very often attacks the rye in France, and occasionally in this country, in such seasons as are very moist; the grain in these cases becoming considerably elongated, being either straight or crooked, and containing a black meal along with the white.

“The earliest account of the disease of rye, and of its pernicious influence on the human body, with which we are acquainted, is contained in a letter from M. Dodart to the editor of the *Journal des Savans*, published in March, 1676.

“The ergot was particularly observed in rye in wet seasons, and more especially when a wet spring was succeeded by excessive heat. M. Dodart remarks that the bread which was made of ergotted rye, did not differ from ordinary bread in point of taste, and that this rye was most particularly pernicious when new.

“Writers, in general, agree in stating that the disease, which the ergotted rye induces, is prevalent only at the conclusion of harvest, and ceases before the commencement of winter; and that it was chiefly observed among the poor, who were unable to procure wheaten bread in those seasons of humidity and scarcity. Besides the spontaneous gangrene of the limbs, another species of disease has been ascribed to the use of ergotted rye, by Hoffman, Tissot, and some other writers. The disease alluded to was a febrile disease, said to be of a contagious and malignant nature, and to be accompanied and principally characterised by various spasmodic and convulsive symptoms, by which, or by a general epilepsy, the patients were frequently carried off. This disease is said to have been epidemic in Hessia, Westphalia, and other parts of Germany, at different periods in the 16th and 17th centuries.”—Rees’s *Encyclopedia*, Article on ERGOT.

“Most of the knowledge which we at present possess respecting chronic or dry gangrene, has been obtained from watching the progress of the disease produced by eating unsound Rye. This disease has been observed to occur in those districts in which Rye forms the principal food of the inhabitants. It occurs only, however, in those districts after very rainy and moist seasons; seasons in which the grain is liable to be affected with a particular disease well known in France by the name of ergot, or cockspur in Rye. In this disease, the grains of Rye grow to a large size, acquire a black colour, and have a compact horny substance. Few seasons pass without the Rye containing more or less of this vitiated grain, but it is produced chiefly in rainy and moist seasons, and in those years it is produced in such quantities as to form sometimes nearly one fourth of the whole produce of Rye.”

“It is in those seasons only in which the ergot or cockspur is very

abundant that the mortification makes its appearance, and it has from this circumstance been very naturally inferred that this spur, or disease in the Rye, was the cause of the mortification."—Thomson on Inflammation, p. 538.

"A pig, six weeks old, was fed with food containing an admixture of cockspur. On the 12th day after this animal had taken about four ounces and a half of the Rye, the extremities of the ears and feet began to assume a red colour: by the 18th the ears began to droop, and the tail to become red also; the belly became smaller, tense, and painful; by the 22nd day the ears and tail became cold, and the animal died on the 23rd, after having had some convulsive fits, and after having consumed a pound and six ounces of cockspur. Several inflamed spots were perceptible in the liver, stomach, the small and large intestines."—Thomson on Inflammation, p. 546.

"Accounts from some of the departments mention, that the most fatal effects had been produced in several individuals who had eaten bread made of Rye ergotè."

"Dysentery and a gangrenous state of the intestines have followed the use of such bread, and in many cases it has produced death."—London Medical Repository, vol. 7, 1817, p. 247.

SECTION VII.

Inference from the foregoing facts that the Deleterious Qualities of Rice are owing to the grain being affected with Ergot, or a vitiation analogous to that distemperature.

From the preceding extracts we learn, that Rye becomes affected with ergot in moist seasons, and are moreover made acquainted with the fact, that the seeds distempered with cockspur have a compact horny appearance, and become swollen to a large size, while a frightful disease is produced in those individuals by whom this distempered corn is employed as an article of subsistence. The resemblance of the disease produced by the use of vitiated Rye to that excited by the employment for food of Rice, has not escaped the observation of medical writers. Thus Orton remarks,—

"It is also worthy of inquiry how far the fatal epidemic called Feu Sacre, Feu de St. Antoine, and Ergot, which at different periods has prevailed extensively in Europe, particularly at Sologne in 1650, partakes of

the nature of cholera. From the bare circumstance of the sweating sickness having been attributed by Dr. Willan to the same cause with that disease (injured corn), it is probable that a strong analogy exists between them, and it is particularly remarked that the latter was attended with spasms."

"The disease produced by horned or ergotted Rye, is particularly interesting from the analogy which it bears to cholera, and the probability which exists, that bad Rice has occasionally contributed to produce the Indian Epidemic."—An Essay on the Epidemic Cholera of India, by Reginald Orton, Assistant Surgeon in His Majesty's 34th regiment of Foot, Madras, 1820, vol. 1, p. 177, 192.

By the same writer, and in the page last quoted, we are informed, that, "the Ergot in Rye is said to appear usually in hot summers, succeeding to very wet springs," and that "it is said to be marked by a violet skin over the grain." Now, in Lieutenant Sleeman's letter, the grains of pernicious Rice are described as being of a large size, and possessing a yellow colour; and by Colonel Pearse and Mr. Barnett, the noxious grain is mentioned as having been red, and consequently I infer, that Rice exposed to excessive rain whilst growing, is liable, in the self-same manner with grain in other countries, to be affected with a species of ergot; and when so distempered, produces, in common with vitiated Rye, a most baneful influence on the animal frame; and accordingly Rice, owing to its extended use for food, if eaten in that deteriorated state, must naturally and inevitably form a fertile source of fatal diseases prevalent amongst mankind.

This deeply interesting subject of medical research becomes still further illustrated from the succeeding facts, which prove that the Rice crops grown in Bengal during the year 1817, were more than usually exposed to the causes productive of ergot in farinaceous grain; and we may therefore naturally conclude those crops were either affected with real ergot, or at least tainted with a modification of that distemperature.

By the testimony of the Bengal Medical Board (vide Report on the Cholera Morbus, p. 96), the epidemic made its first appearance in the eastern parts of Bengal, in the autumn of the year 1817; and upon the authority of the same official report, it is established that the preceding season had been remarkable for moisture. For in that report it is stated, that so early as February, "it commenced raining heavily on the night of the 1st, and so continued every 3rd or 4th day till the end of the month. In March much and very heavy rain still continued to fall. On the 21st there was an exceedingly violent thunder and hail storm, followed by torrents of rain, which greatly injured the spring grain crop. From Loodeeanah to the Presidency there was scarcely a district or village in

which the prospects of the Rubhee harvest were not blasted by heavy falls of rain, and long-continued humidity of the atmosphere.

“ April was generally cloudy with strong southerly winds and frequent thunder storms and north-westerners ; on the 18th there was a heavy fall of rain. In May the southerly winds kept blowing moderately, with frequent showers ; on the 25th of that month, at least fifteen or twenty days earlier than ordinary, the rains set in, and there was almost continual rain, with variable winds, close weather, and heavy clouds, till its close. From the 4th of June to the end of the month there was scarcely a fair day. In July there was hardly a dry day, and an immense quantity of rain fell. From the 1st to the 10th of August, excessive heavy and almost incessant rain continued to fall ; on the 8th, 9th, 10th, and 11th, it poured in torrents and without interruption.”—Bengal Report *passim*.

The consequence of that inclement season (according to the same Report) was “ that during the year in which the epidemic arose, much bad Rice had been grown in Bengal.”—But the Rice of that season is not proved by any fact on record to have been affected with either smut or mildew ; and since it was confessedly and undeniably bad, it must of course have been distempered either with real ergot, the only vitiation, besides mildew and smut, to which grain is liable, and to the causes producing which it had been so fully exposed, or deteriorated by a variation of that fatal distemperature.

SECTION VIII.

Conjecture of the Author, that the Deleterious Properties of Rice Ergotè arise from a Noxious Principle inherent in the Grain, and which may be termed Ergotine, or Oryzine.

We learn from Bontius, that the principal cause of dysentery is arac, a liquor made from Rice ; this liquor is spirituous, and obtained by means of distillation. We are further informed by Johnson that samsoo, a liquor also prepared from Rice, is poison to the human frame ; and in consequence of its fatal effects, the use of this liquor is strictly prohibited on board of his Majesty's ships of war. The physicians of China, in their publication, so far back as the year 1790, declare that death will be the consequence, should any conjee, or Rice-water, be admitted into the stomach, in cases of Cholera ; an observation, the truth of which is sin-

gularly illustrated by the succeeding passage, extracted from "Remarks upon Morbus Oryzeus."

"At Berhampore, in the month of November 1817, I was informed that several European soldiers had died in the hospital from the prevailing malady, or, as it was termed by the medical gentlemen of that station, Spasmodic Cholera. These persons, it was well ascertained, had not made use of Rice; and this was conceived to convey an unanswerable argument against the accuracy of the cause assigned in these pages for the origin of the disease. It appeared, however, that these patients, who were convalescent from fever, had been liberally supplied with conjee, made of Ouse Rice; and this, accompanied with its usual deleterious effect, produced Morbus Oryzeus, proceeding with celerity to its fatal termination.

"A remarkable instance of the dangerous effects following the use of conjee, made from the pernicious rice, occurred at Allahabad. Upon the 29th of May, 1818, the servant of a gentleman avowedly, as the man confessed the fact, was seized with the symptoms of the raging malady from eating purubee chaul, or Ouse Rice, the product of the preceding year, which had just arrived from Calcutta. By administering calomel, assisted with an occasional grain of opium, his master succeeding in checking the progress of the symptoms, and the cure seemed on the point of being complete; but, unfortunately, as the patient's thirst continued troublesome, he was directed to drink plentifully of conjee, made from what was supposed to be good Rice, yet consisting merely of the finer kind of grain belonging to the autumnal crop of 1817. The consequence was an immediate return of the disorder, with aggravated symptoms in its worst form."—Remarks upon Morbus Oryzeus, Part II. p. 58.

But it is rendered apparent, by means of the facts last adduced, that liquids in which Rice has been boiled, or liquors distilled from that grain, are endowed with deleterious properties; we consequently may conclude that a deleterious principle is, during the process of boiling, or distillation, imparted from the grain to the liquid so prepared; and that the presence of this principle produces the noxious results observed to follow the employment of liquors made from Rice. The existence of this principle, I conceive, therefore to be established, and should it hereafter be found to be peculiar to Rice *ergotè* only, it would in that case admit of the designation *ergotine*; but should it, on the other hand, be discovered to be resident in all Rice, it would then more properly be termed *oryzine*. The reader will, however, not fail to bear in mind that this is a mere conjecture, or hypothetical conclusion, the accuracy of which remains to be determined by chemical analysis.

SECTION IX.

Circumstances attending the appearance of Morbus Oryzeus, or the Epidemic Cholera, in the city of Allahabad, during the year 1818, and the Exclusion of that fatal Malady from the Jail by the prohibition of Rice for Food to the Convicts, together with a notice of facts occurring at Bancoorah in 1832.

Towards the end of the year 1817, a proclamation was issued by the Supreme Government of British India, of which the following is an extract :—

“ Fort William, November 28th, 1817,
“ Territorial Department.

“ PROCLAMATION.

“ By the Honourable the Vice-President in Council.

“ The price of grain having been considerably enhanced in the ceded and conquered provinces, the Honourable the Vice-President in Council, with the view of encouraging the importation of grain into those provinces from the provinces of Bengal and Behar, has been pleased to direct that a bounty shall be paid on all grain imported at Allahabad from the provinces of Bengal and Behar within three months, and at Cawnpore, Futteh-Ghur, or Agra, within four months from the date of this proclamation.

“ The following is the rate of bounty which will be paid at each of the above-mentioned stations.

“ On all grain, wheat and barley excepted—

“ At Allahabad, for 100 maunds	- -	19 rupees.
“ Cawnpore, ditto	- - - -	23 ditto.
“ Futteh-Ghur, ditto	- - - -	27 ditto.
“ Agra, ditto	- - - -	27 ditto.

“ Published by order of the Honourable Vice-President in Council.

(Signed)

“ HOLT MACKENZIE,

“ Secretary to Government.

“ Territorial Department.”

From the Medical Board's report (p. 25), it appears that “ the epidemic broke out suddenly in the town and district of Allahabad in the end of March, 1818. Now this date gives exactly three months from the period at which was published the above government advertisement, offering a bounty upon the exportation of Bengal Rice; and hence,

agreeably to its terms, sufficient space was allowed for boats reaching Allahabad from the lower provinces anterior to the malady's appearance in that city. The disease, therefore, accompanied the progress of the boats laden with the bounty grain; and the arrival of the noxious cholera-spreading Rice is distinctly traceable in these notes addressed to myself, I being at that time (March, 1818) Civil Surgeon of the station of Allahabad, to the charge of which I had been appointed upon my removal from Jessore in the preceding year.

"Dear T.—I send you a neemoonah of 600 bags now landing at Benee ghaut; each bag contains one maund and a half. The Rice is Purubee.—Yours ever,

"T. H. BODDAM,

"Collector of Government Customs.

"To R. Tytler, Esq."

"Dear Tytler,—I have written out a case for you; and have got some Rice for you—300 maunds at Turee Mulls.—Yours ever,

(Signed)

"R. H. B.

"R. Tytler, Esq."

From the same.

"150 maunds of the accompanying Rice was landed from Baugalpor last night."

The Rice ergotè continued to be landed daily at the Allahabad ghauts; and the pestilential effects resulting from the employment of this vitiated grain for food are perceptible in the subjoined communications.

"My dear Tytler,—My tailor is here, and has thrown off a quantity of Rice, and feels very sick, with a pain all over his body; what shall I do for him?—Yours truly,

(Signed)

"M. THOMAS,

"Fort Adjutant and Barrack Master.

"Allahabad, 1818.

"Dr. Tytler."

"My dear Dr.—My moonshee's mother has, by all accounts, a confirmed Cholera, and confesses eating the Rice, which has come up in great quantities. Pray send her some medicine, and let your black man go to her, as she is in extremity.—Yours ever,

(Signed)

"R. H. B.

"R. Tytler, Esq."

" My dear Sir,—I have the pleasure to send you a paper of Rice, the same (barring a bull) and last, which the Naik had been eating previous to his death, and which I procured from the house where his wedding took place, a coss and a half hence, the day before.

" The man arrived here late in the evening of the day he took his last meal, perfectly well; was put on duty in the same state at seven o'clock next morning, and sent to the hospital, on his being taken ill, at ten o'clock that day, and died in two hours following; had two stools; also was seized with vomiting a short time previous to his decease, without griping however.—I am, my dear Sir, yours truly,

(Signed)

" J. C. ODELL,

" May 21st.

" Lieutenant 21st Regiment Native Infantry.

" R. Tytler, Esq."

" My dear Sir,—I have the pleasure to send you a sample of Rice. A man has been attacked with vomiting three different times after eating of the same; no purging. This is the same kind of Rice that all the Sepoys eat. Be so good as to inform me what you think of it, and you will oblige yours truly,

(Signed)

" JAS. BARKER,

" 29th May.

" Assistant-Surgeon 21st Native Infantry.

" R. Tytler, Esq., Kyd Gunge."

The foregoing notes were written between the end of March and close of the month of May, 1818; during which time, and subsequently, the vitiated Rice continued to be imported into the city of Allahabad in large quantities. The mortality was in consequence very great; for from the report we learn that " the epidemic at Allahabad prevailed during several months with great malignancy, sweeping off nearly 10,000 of the inhabitants;" and, as is apparent from this official letter, the population could not be restrained in the use of Rice.

" Sir,—I fully appreciate the humanity of your proposal to take up your residence at the Cutwallie, for the purpose of personally visiting the sick; but I conceive the measure would greatly interfere with your other duties, although, should the sickness continue to increase, it may be necessary for you to do so.

" I have done every thing in my power to admonish the inhabitants against the indiscriminate use of Rice as an article of food. I have again published your opinion as to its fatal effects; but I much fear that the necessities of the people present an insurmountable barrier to their desisting from eating it.—I am, Sir, your most obedient servant,

(Signed)

" H. SHAKESPEARE, I. M.

" Zillah, Allahabad, 29th July, 1818.

" To Dr. Tytler."

The imported grain was, however, rigidly excluded from the jail, as is testified by these documents.

“ Sir,—I have been favoured with your letter of this date, and have issued orders to the jail darogah in future to search the articles of food brought to the jail, and attach any Rice which may be brought there different to the muster which you have approved; and to report immediately to you, or the native doctor, any person being taken ill; and that any infraction of these orders will subject him to severe punishment, if not to dismissal from office.—I am, Sir,

“ Your most obedient servant,

(Signed)

“ H. SHAKESPEARE, I. M.

“ Zillah, Allahabad, 29th May, 1818.

“ To Dr. Tytler.”

“ Dear Tytler,—You may rely upon it I will do every thing in my power to prevent the introduction of Rice into the jail.

“ Yours sincerely,

(Signed)

“ H. SHAKESPEARE.

“ To Dr. Tytler, Assistant-Surgeon, Allahabad.”

“ Sir,—I have been favoured with your letter of yesterday's date, and have imposed a fine on the bunya, which will, I trust, prevent the introduction of bad Rice into the jail in future.—I am, Sir,

“ Your most obedient servant,

(Signed)

“ H. SHAKESPEARE, Mag.

“ Zillah, Allahabad, the 2nd of October, 1818.”

And the satisfactory result of this prohibitory measure, respecting the deleterious Rice, is afforded in this recorded official testimonial, which, under God's mercy, I received after the inspection by the Judge of Circuit of the jail hospital, upon the arrival of that officer at the station.

“ Sir,—I have much satisfaction in forwarding to you the annexed extract of a letter from Mr. Elliott, Acting Judge of Circuit for the Division of Benares, on his closing the second session of the Court for the year 1818.—I am, Sir,

“ Your most obedient servant,

(Signed)

“ H. SHAKESPEARE, Mag.

“ Zillah, Allahabad, the 25th Nov. 1818.

“ To Dr. Tytler, Assistant-Surgeon, Allahabad.”

Extract of a letter from Mr. J. B. Elliott, Acting Judge of Court of Circuit for the Division of Benares, dated the 25th November, 1818.

“ Para. 2d.—I have no remarks to offer respecting your commitments, your police, or the state of the prisoners in the jail. The number of prisoners who have died in the hospital during the last seven months appears very inconsiderable compared with other Zillahs, which is creditable to the zeal and ability of Dr. Tytler.—(True extract.)

(Signed)

“ H. SHAKESPEARE, Mag.”

Return of Sick in the Hospital belonging to the Jail of Zillah, Allahabad, comprehending on the 1st of April 533 Prisoners. and on the 1st of July, 1818, 507 Prisoners.

NAMES OF DISEASES.	Remaining on the 31st March, 1818.	Admitted from 1st April to 1st July, 1818.	Total of Sick.	Discharged from 1st April to 1st July, 1818.	Died from 1st April to 1st July, 1818.	Proportion of Sick to Prisoners.	Proportion of Deaths to Sick.	Remaining on 1st July, 1818.	REMARKS.
Fevers	13	74	87	77	4	1 in 7 and a fraction.	1 in 34 & a fraction.	6	Towards the latter end of March a number of boats, loaded with Ouse Rice the produce of last year, arrived at this station: from Bengal; the immediate consequence of which circumstance was, that the distemper which has proved fatal in so many parts of the country, made its appearance in the city of Allahabad and its neighbourhood. The same disorder also commenced its attacks upon the convicts confined in jail. But by the prompt and humane exertions of the judge and magistrate, who at the suggestion of the surgeon prohibited the use of the Rice to the prisoners, the disease was speedily checked in the jail, and only two prisoners have there fallen victims to its effects.
Diarrhoeas	4	24	28	22	2			4	
Venereal	2	7	9	7				2	
Rheumatisms	3	20	23	20				3	
Ulcers	3	51	54	51				3	
Ophthalmia	1	7	8	6				2	
Total.....	26	183	209	183	6			20	

Return of Sick in the Hospital belonging to the Jail of Zillah, Allahabad, comprehending on the 1st of July 507 Prisoners, and on the 1st of October 1818, 568 Prisoners.

NAMES OF DISEASES.	Remaining on the 30th June, 1818.	Admitted from 1st July to 1st October.	Total of Sick.	Discharged from 1st July to 1st October.	Died from 1st July to 1st October.	Proportion of Sick to Prisoners.	Proportion of Deaths to Sick.	Remaining on 1st October.	REMARKS.
Fevers	6	71	77	70	1	1 in 8 and a fraction.		6	From the beginning of July to the 1st of September the disease arising from the employment of pernicious Rice, raged at Allahabad and its neighbourhood with very considerable violence, and numbers of persons fell victims to its ravages. But by the rigid exclusion of this deleterious article of food from the convicts in the jail, the disorder was effectually prevented from making its appearance amongst the prisoners. The person whose death is recorded, was a man far advanced in years, and his constitution had been much injured by previous attacks of sickness.
Diarrhoeas	4	31	35	30				5	
Venereal	2	5	7	6			1 in 165	1	
Rheumatism	3	21	24	19				5	
Ulcers and Wounds	3	33	36	28				8	
Ophthalmia	2	12	14	12				2	
Total....	20	173	193	165	1	—	—	27	

"In June 1832, the right wing of the 50th regiment Native Infantry proceeded to Bancoorah, and was exposed to the whole of the rains in temporary huts. Yet no cholera made its appearance in those troops, although they were hutted close to the walls of the jail, where the cholera prevailed to an immense extent. This then was exactly the converse of what occurred at Allahabad, as I was now in charge of the troops, and another medical officer in charge of the jail. Mr. Cheek, the surgeon in charge of the jail, asked my opinion respecting the existence of the cholera in his hospital. I pointed out to him the presence of the deleterious Rice in his jail, and showed him the documents I have now shown you; and to prove to him that the disease was not contagious, I inhaled the breath of one of his worst cases. The consequence was, that Mr. Cheek recommended to the magistrate that an alteration should be made in the diet. It was thereupon changed, and the effect was, that the disease almost wholly disappeared during the time that the alteration in the food continued."—Dr. Tytler's Speech at the London Medical Society, October 7th, 1833.

"My Dear Tytler,—I am very anxious for your advice regarding the Cholera, and as I wish for a consultation, I have sent a public letter. Kindly say at what hour I shall call for you after 9 a. m.

"The treatment is not of so much importance as to prevent the disease. How this is to be done God only knows; any step you deem right I shall gladly follow."

Mr. Cheek's letter to Dr. Tytler, October 12th, 1832.

"No Cholera exists among the Sepoys (although they are close to jail), to whom I find warning has been given regarding the Rice.

"I recommend a change of diet, not only on account of the late cases which have occurred in the jail, but because the jail has never of late been any one month free from cases of Cholera."

Mr. Cheek's letter to the magistrate of Bancoorah, dated October 1833.

SECTION X.

Dreadful Effects produced by East India Rice, in countries at a distance from Hindoostan, into which it is ascertained that it had been imported as an article of commercial speculation, and employed for food without its deleterious qualities being suspected.

I shall now contrast the result of the splendid facts of the agency of Bengal Rice, in producing the Epidemic Cholera, thus established at Allahabad, through means of an experiment on an extensive scale (the

jail containing between 500 and 600 prisoners), fairly tried at the height of the epidemic, and, from the mercy of Almighty God, attended with complete success, with the frightful pestilential consequences ensuing in distant countries; that although very different in respect of climate to that station, were nevertheless equally affected with disease, attendant upon the introduction of the vitiated Rice into them for an article of commercial speculation, and used as food, without its deleterious properties being suspected.

Extract of a Letter from St. Helena, 28th Sept., 1818.

"No ships are allowed to remain here longer than is absolutely necessary; all supplies come from the Cape, but they are very scanty, and what fresh meat is afforded from this channel, is wholly engrossed by the troops. The ships never get a meal of it; and, during the last five months, they had only one-third bread, no cocoa, and no peas; the deficiency is wholly made up of Rice. Dysentery consequently prevails much, and all the vessels have lost many men. The *Musquito* has lost about twenty-three in three months, and the *Conqueror* has scarcely seamen enough on board to work the ship."—Times London Newspaper, November 16th, 1818.

"Fourteen or fifteen years since, a disease prevailed, almost universally, amongst the boys of the London Orphan Asylum, then situated in Hackney-road, the chief symptom of which was diarrhœa. The medical men who attended the institution were consulted, but no cause for the disorder could be discovered, and very great difficulty was experienced in its treatment. A principal article of food in the diet of the boys was Rice of a very inferior quality, and at last, at the suggestion of the master of the school, the use of a very large share of the Rice was discontinued in the meals, when the diarrhœa was checked, and the boys speedily recovered their health. Vomiting and diarrhœa were prominent symptoms in the above cases."—Lancet, No. 528, p. 119.

"It has been said, and may be urged as an argument against me, that the disease was introduced into the Mauritius by the *Topaze* frigate. No statement, however, can be more unfounded, or more pernicious in its consequences. The facts are these:—In the year 1818, the inhabitants of the Mauritius suffered greatly from destructive fires which occurred in the Isle of France. Feeling for their distresses, the merchants of Calcutta sent them, as a present, large quantities of the pernicious Rice of 1817. It went from Calcutta to Port Louis, reached its destination in 1818, and came into use in 1819, and immediately the Cholera broke out amongst the slaves of the island, who suffered tremendously. A committee of medical officers was immediately called by General Darling, who

(probably from what he had seen in the India newspapers) directed their attention to the effects of Rice as food. But they said that they had no reason to apprehend that the cause of the disease was in the food. No cause for the disease was therefore recognised by them. Of this committee, Dr. Burke, the present Inspector-General of his Majesty's hospitals in India, was the president. Well, in 1830, I met Dr. Burke in Calcutta, and had an interview with him. He told me that he was particularly anxious to see me on the subject of the Rice, and I accordingly laid before him the facts I had accumulated. He examined them carefully, said he was perfectly astonished at them, admitted that there could be no doubt as to the real cause of the disease in the Mauritius, said that my opinion had hitherto not been understood, gave me several facts and arguments in confirmation of the disease on that island having been produced by the Rice sent from Calcutta, added that he considered my statements and conclusions to be of the utmost importance to medical science, that they were particularly valuable to medical officers in the charge of troops, and, finally, authorised me to state his opinions to this effect, in his name, to the Medical Society of Calcutta. I now revert to the point from which I deviated to state these facts. In 1823 I left Allahabad, and reached Calcutta in the April of that year. On my arrival, I was examined by the Medical Board of that Presidency, with reference to the question before us, and for five hours was under interrogation respecting it. What was the result? Why, the Board acknowledged that my facts were incontrovertible, and that my arguments thereon were valid; but they came to the conclusion, that though the vitiation of the Rice was so great, and produced such dreadful effects, it was an evil of too great magnitude to admit of a remedy—and there the matter ended.”—Dr. Tytler's Speech, *Lancet*, No. 528, p. 112.

“By recent advices from the Persian Gulf, we learn, that the Epidemic Cholera had found its way to the Arabian coast, and was doing incredible mischief.

“In the province of Oman it had carried off forty thousand people; and in the city of Muscat, and its neighbouring villages, no less than ten thousand persons had fallen victims to it, in the short space of ten days.

“It is a curious circumstance, that the food of the Arabs in those parts is chiefly Rice from Bengal, or the large red sort grown on the Malabar coast.”—*Calcutta John Bull*, September 27th, 1821.

“Previous to the year 1813, the trade between India and Britain, was solely in the hands of the East India Company, whence it was called “the Company's monopoly;” and the revenues of India being entirely in the hands of the government (that is the Company), only the best articles of produce were exported from India; for the producers did not find with

the government any sale for the refuse produce of their lands. It was not the interest of the Company to trade in bad articles. Hence the Rice exported under the Company's monopoly was the best that could be procured. Hence, also, the Bengal Rice then possessed a high reputation in Europe. But, in 1813, the whole state of commerce became changed. The Trade with India was suddenly thrown open by the modification of the Company's charter by the Parliament of Great Britain; and from that event must be dated the exportation of bad Rice from India into Europe. The free ships which reached India in 1814-15, and 16, were supplied with cargoes of Rice which had been accumulating in the markets of Calcutta from want of a sale for it. Now, in 1817, the Rice crops, injured by the following causes, were reaped:—1st. The grain was blasted by the unparalleled wetness of the season in which it was grown; and, 2ndly, it was cut before it was fully ripe. The reasons why it was so cut were these;—the necessities of the natives were very urgent before the harvest was ready, the crops of the preceding year (1816) having failed; and an encouragement was given by the allowance of the bounty I have before mentioned, to reap too soon, in order that the owners might send the grain for sale into the Upper Provinces. In 1818, an Act of Parliament was passed opening the trade direct between India and the ports of the Mediterranean, and immediately an immense quantity of the Rice of 1817 was exported into Gibraltar, Malta, &c., whence it got to Cadiz, and the result was, the well-known disease which broke out amongst the Spanish soldiers in 1819. It produced so dreadful a pestilence in that army, as almost to destroy it. Since then, a market has been found in Europe for the refuse of the Rice crops of India, which did not previously exist, as it is the object of the free traders to buy cheap, that a ready sale may be obtained, while it is a great object with the natives of India to sell the traders whatever is not disposable in India. Annually, an immense quantity of Rice is grown, which used to be considered so bad in India, that it was thrown into the rivers. That Rice is now saved, and is brought over in vast loads to Europe, and sold and used as food. Almost every grocer's shop in England contains it, and it has become a common food with the pauper population of this country. From Britain, quantities of it are carried to the continent, besides which it is carried direct from India to France in French bottoms. It is taken to Trieste, whence it finds its way over Germany, and is carried through the Bosphorus into the Black Sea to Odessa, whence it is conveyed all over Russia; and as land-carriage is excessively dear in India, and water-carriage comparatively cheap, immense quantities of this Rice are carried to Batavia and other ports of the eastern islands, where it is embarked on board of Dutch and Ham-burgh bottoms, and thus makes its way into innumerable other ports

of Europe. Mark the progress of a free trader. The captain and officers have nothing to do with the cargoes of the ships. They merely navigate the vessels, and, generally, very well. When the ships reach the Hoogley (the branch of the Ganges which passes Calcutta), the captain and most of the crew generally reside on shore. The bags of Rice are put on board by natives who know nothing of its quality. That Rice is procured in the bags by an agent, from a sirkar, for the owners at home, and he also knows nothing more of the Rice than what he sees it designated in the commercial papers, "fine," "coarse," "marketable," &c. The Bengalee sirkars are known to be the most unprincipled set of dealers in the world. Their only object is to acquire money, without reference to the quality of the article which they sell. These sirkars purchase from the zemindars (landowners) the refuse of their lands, and the zemindars, finding a market for the inferior Rice, urge the ryots (or peasantry) to cut the Rice, to supply the markets, without reference to the grain being ripe. Hence, by means of the free trade, and the peace which succeeded the battle of Waterloo (for it was that, don't you see, which opened the continent), a market has been found for the very worst descriptions of Rice, which was not in existence anterior to the year 1813. The disease and the free trade therefore unhappily accompanied each other."—Dr. Tytler's Speech, *Lancet*, No. 528, p. 114.

"A letter from Gibraltar, dated October 2, 1819, says,—Our commerce has lately had many very severe shocks, from repeated failures of great houses, and from the Epidemic raging in Spain. Rice continues unsaleable at two dollars per cwt."—*Calcutta Journal*, February 22nd, 1820.

"By the arrival reported above, we have received private accounts from Gibraltar to the 18th of October, and Cape papers to the 11th of December. From the former we learn that the yellow fever had been raging dreadfully at Cadiz, and at the period of the latest advices, was still increasing in violence. In the beginning of October the deaths there, by this pestilential disease, were upwards of sixty per day, and, in the middle of the same month, they had become more than a hundred daily."—*Bengal Hurkaru*, February 21st, 1820.

"The foregoing extracts prove the cheap rate, namely, 'unsaleable at two dollars per cwt.,' at which the East India Rice of 1817's growth was procurable in the markets in the vicinity of Cadiz, while the yellow fever raged in that city; but the direct pernicious effect of the Rice, in producing that pestilential disease, is rendered apparent by means of the succeeding notes, which were addressed to me by the late Mr. Murphy, Roman Catholic Clergyman of Calcutta.

"Mr. Murphy, on the 20th of June, declares to Dr. Tytler, that he

was at Cadiz in the year 1819, when the pestilence raged furiously in Andalusia; and further states that the soldiers destined for the American expedition were most miserably treated with regard to provisions, having to live on bad bread and Rice; and he, Mr. Murphy, was frequently in the habit of taking Rice to dinner, and that he was affected with the epidemic in that city."

(Signed)

"F. B. MURPHY.

"Dated June 20th, 1833."

"Four of my countrymen of the order of St. Augustine, who had to my certain knowledge frequently eaten Rice, were all affected with the distemper, of whom one died. Moreover in my own convent, amongst numbers who were infected with the distemper, about ten had departed this life, and were all likewise in the habit of eating Rice."

(Signed)

"F. B. MURPHY."

"It is observable that the importation of the disease (i. e. the yellow fever above alluded to) from a foreign country, is still credited by the authorities and mass of the people in Spain."—*Medico-Chirurgical Review*, December, 1821, p. 488.

It is highly important to notice, that the yellow fever of 1819, as the succeeding extracts show, does not form the first instance of that disease raging at Cadiz, having been ascribed to the same cause, namely, the employment of vitiated grain for an article of subsistence.

"Of the epidemic in 1764, an account has been written in Latin by Doctor Salvarez or Salvaresa, then a principal physician at Cadiz, by which it appears to have resembled the yellow fever of America. He indeed calls it Vomito Prieto, because black vomiting as well as yellowness of the skin frequently occurred."—*Bancroft's Essay on Yellow Fever*, p. 441.

"It appears that the epidemic of 1764 was confined solely to Cadiz, and that, according to Salvaresa, it was occasioned by the old and corrupted corn. Amongst the poor whose diet consisted chiefly of bread, the disorder was most violent. In this year the animals were first affected, and the mortality was particularly observed amongst those which fed on grain, viz. poultry, pigeons, &c."—*Sir James Fellowes' Reports*, p. 72.

While the deadly produce of the Rice crops of 1817 was thus manifesting its destructive effects amongst the Spanish soldiers at Cadiz, the following facts decidedly prove that its pestilential properties were attended with equally calamitous results amongst the British troops, stationed in our own settlements in the West India Islands.

“ Liverpool, November 1st, 1819.

“ Rice, East India, is rather more saleable, principally for shipment to the West Indies; the prices are low, say from 11s. 6d. to 15s. per cwt.”—Bengal Hurkaru, March 6th, 1820.

“ Liverpool, November 8th, 1819.

“ For Rice there has been of late (this phraseology of course implies a period doubtless anterior to the month of November 1819) rather more inquiry, chiefly for shipment to the West Indies.”—Bengal Hurkaru, March 6th, 1820.

“ Liverpool, December 14th, 1819.

“ Rice for home use, notwithstanding the distressed state of the country, is very limited; but there is a pretty steady and we think an increasing demand for shipment to the West Indies.”—Bengal Hurkaru, May 17th, 1820.

The Bengal Rice having been thus industriously (as may be collected from the above notices) introduced by commercial speculators into the West India Islands during the course of the year 1819, disease and mortality, and precisely under the same aspect as appeared at Cadiz, accompanied the progress of this fatal grain, and their destructive presence along with the accounts conveying intelligence of the continued shipment of the East India Rice is recorded in these notices.

“ The yellow fever has recommenced its ravages at Martinique and St. Domingo.”—Bengal Hurkaru, February 16th, 1820.

“ Letters from Jamaica, dated September 2nd, stated that the yellow fever had been severely felt on that island.”—Bengal Hurkaru, March 7th, 1820.

Of the 92nd and 50th regiments, upwards of 400 men and about 40 women and children have perished in the short space of three or four months, and two-thirds of the whole within the last six weeks.”—Kingston, September 4th, 1819.—*Asiatic Mirror*, April 7th, 1820.

“ *To the Editor of the Lancet.*

“ Sir,—Reading in your Journal Dr. Tytler’s statement relative to the production of cholera in India, from the use of bad or damaged Rice, I was struck with a curious coincidence—the origin of *yellow fever* at Antigua in, I think, 1816, from the same cause. A vessel, with a large quantity of rice on board, was wrecked there in that year. The rice was strewed along the shore, and collected largely by the negro population, amongst whom fever shortly after commenced to a great extent, and proved very fatal. From the investigation consequently made by the

then governor, Sir B. D'Urban (by whom, in 1827, at Demerara the circumstances were stated to me), this fatal fever was proved to have originated amongst all those who had collected, and had in possession, or had partaken of, the damaged grain. I remain, Sir, truly yours,

W. HACKET, M. D.,
Surgeon to the Forces."

" Newry, Oct. 18th, 1833.

" *To Dr. Tytler, &c. &c. &c.*

" DEAR SIR,—Having heard your statement last night at the Medical Society, I beg leave to send you the following facts, which you are at liberty to use in any way you please:—

" In July, 1832, I was specially ordered by the Belgian Minister of War to proceed to Mons, to take charge of the dépôts of the 2nd Chasseurs *a cheval*, and the 9th Infantry, which two regiments were suffering serious losses from cholera. On my arrival, after inspecting the barracks, I ordered them to be immediately washed with quick-lime, and afterwards well fumigated. After giving these orders, I proceeded to the kitchen to taste the soup and bread, when I observed at the bottom of the copper a great quantity of rice, and the officer who accompanied me asked me " if I thought the rice produced the *rice stools* which the soldiers had prior to and during the disease," or words to that effect. Without then being in possession of the invaluable facts which you, Sir, brought forward at the two last meetings of the Medical Society at which I was present, I said that the soup was thick enough without the rice, and that it should be omitted. The direction was complied with, and from that time we had but one case of cholera.

" Thus this dreadful scourge disappeared with the prohibition of the rice, and I do most sincerely think that the question you have brought forward deserves the serious attention of every practitioner in Europe, as it appears to me to be the opening of a new era in Medical science.

" I have the honour to remain,

" Yours very respectfully,

" Oct. 22, 1833,

" E. S. BLUNDELL.

" 13, Orchard-street, Portman-square.

" P. S. Should you wish to see the official documents, I shall have pleasure in laying them before you."—*Lancet*, No. 530, p. 181, 182.

" *To the Editor of the India Gazette.*

" Sir,—Through the kindness of an American gentleman, I have, within the last three days, obtained possession of the following most interesting facts, which are completely decisive regarding the origin of the

Asiatic Cholera, as it has been promulgated by me, as well as the deleterious effects produced by vitiated Rice, and their analogy, as I have so often stated, with the fatal symptoms arising from the employment of cockspur rye.

“ The detail of the facts alluded to is contained in the *Columbian Centinel*, No. 587, published at Boston, on August 7th, 1832, and discloses these important particulars.

“ On Sunday, 5th of August, 1832, a severe sickness commenced among the prisoners confined within the state prison of Charlestown. The symptoms were severe attacks of vomiting and purging; and this malady was imputed to the use of ergotted or cockspurred rye, which was imagined to have been mixed with the rye, from which their bread and coffee were made. But it was subsequently discovered that the assertion regarding the rye was erroneous, and the facts as established were found to be these.

“ Upon Friday, 3rd of August, a change took place in the prisoners' diet, from potatoes to Rice. The words of the report detailing this fact are too important to be passed over without quotation. They are these: ‘ Perhaps the change of diet may account for the appearance of the disease. The change of diet was Rice instead of potatoes. We learn that the prisoners had eaten Rice with their dinner ever since last Friday.’

“ These then are the facts:—In the state prison of Charlestown, containing 216 prisoners, a change of diet from potatoes to Rice took place on Friday the 3rd of August. The Rice was continued to the prisoners on Saturday, and at 3 p. m. on Sunday, or within sixty hours after its introduction for food, 25 convicts were sick; and at three minutes before 1 a. m. on Monday morning, 110 of the convicts were, under the care of the physicians, affected with the same symptoms, ensuing to a change of diet from potatoes to Rice.—Your obedient servant,

“ R. TYTLER, M. D.

“ Fort William, April 3, 1822.”

India Gazette, No. 735.

“ EFFECTS OF RICE ON CHILDREN.

“ *To the Editor of the Lancet.*

“ Sir,—I have read the communications of Dr. Tytler respecting the ‘ Rice question ’ with much interest, and cannot but admire the manly expositions of the Doctor, as well as the good tact and talent he displays in answering all who appear to take a different view of the subject. If it be not one of paramount consequence to the public and the medical pro-

fession, I know not what is ; neither will it remain in its present state. The Doctor calls for the aid of the profession, and as the matter is so important, every fact should be forwarded, in order that the discoverer's views may be elucidated. About seven or eight years back, my family (a large one) used to partake of puddings made of rice, which was purchased at about two-pence halfpenny per pound. These were frequently made on the supposition that they were wholesome and nutritious. At that period, all of the children were attacked at intervals with diarrhœa, and they evidently fell away in muscular vigour. I certainly, for some time, did not attribute the purging to the Rice, it being the last article of diet I suspected. I occasionally partook of some of those puddings myself, and whenever I did so, was invariably affected with pain in the stomach, and other dyspeptic symptoms. I soon after countermanded the Rice, when the diarrhœa and other symptoms vanished, and the children regained their usual healthy looks. One of them (a boy now in Christ's Hospital), however, nearly lost his life ; and had not his moans roused the vigilance of his mother, who was in an adjoining room, he decidedly would, in a few minutes, have fallen a victim to the attack. He had, during the night, been seized with vomiting and purging, to such an extent as to fill a large earthenware vessel. His mother found him extended on the bed, the liquid motions and contents of the stomach being involuntarily ejected, for his appearance was that of a corpse, and indeed most ghastly and terrific ; his face pallid in the extreme ; the eyes sunken, and having a livid dark hue surrounding them ; the mouth had the same circle of lead colour about it. Means being at hand, the state of collapse was fortunately overcome, although he very nearly expired during the reaction. I then considered it the worst case of English Cholera I had ever encountered. It may be as well to say, that no other bad case happened in my family after this, since which, Rice, in every shape, has been an object of suspicion.—Perhaps the attention of Dr. Tytler has not been drawn to the inferior pastry sold at the various retail shops in the metropolis, vast quantities being made with Rice-flour, and, upon fair presumption, not of the best quality. Your reports generally are admirable, and the Doctor appears fully to appreciate them.

“ I remain, Sir, your obedient servant,

“ THOS. LITCHFIELD, M.R.C.S.

“ Twickenham, Oct. 27, 1833.”

Lancet, No. 531.

SECTION XI.

Detail of Facts regarding the poisonous qualities possessed by an oleaginous tunic or skinny covering named Kun and Koora, which encloses the grains of Rice, and is frequently mixed with Flour, Meal, and Otta.

Extracts of Dr. Tytler's Letters addressed to the
Spirit of Public Opinion, Calcutta.

On the 2nd of September last, I reached the city of Ghazeepore, and to my surprise discovered in the bazar of that place what had hitherto eluded my research in all the towns of the upper provinces into which my inquiries have been directed. I mean persons openly engaged in the operation of cleansing Rice received from Bengal, from the thick inner shell, named Kun in the higher, and Koora in the lower provinces, which immediately envelops the seed below the husk. This operation is performed I now understand chiefly at Ghazeepore, and the Rice after being partially cleaned is then sent for sale into the different towns situated higher up on the Ganges. Whether this assertion be correct of course I possess no means of determining, but a minute search repeatedly made at Allahabad, has never allowed me to witness the process I have lately had an opportunity of seeing at Ghazeepore, and which takes place in this manner. The Rice, or grain previously separated from the husk or paddy shell, is placed in considerable quantity within a circular hole formed in the ground, and then agitated but not bruised by means of a wooden block exactly resembling though of smaller dimensions the instrument with which bricks are pounded all over the country. This operation requires considerable exertion, and is performed, as I witnessed it, by the foot of a man moving the extremity of the beater whilst his hands are supported against the wall of the hut or cleansing shop. When the Rice has been sufficiently agitated, it is removed from the hole by women, and placed in sieves, where it is again agitated by the latter, they blowing with their mouths at the same, by which means the Kun or Koora, loosened by the preceding operation, being blown over the edge of the sieve or falling through the pores is collected in large heaps, of which I saw several, in appearance resembling brown dust, dark-coloured coarse flour or otta. The quantity separated from the Bengal Rice, during the short time I witnessed the process, was altogether incredible; and even after the Rice had been in the ideas of the shop persons sufficiently cleansed, a very large portion of the same deleterious substance was seen adhering to each seed. The Koora in its separate state is brown-coloured, of a lighter feel,

but coarser to the touch than flour; it however much resembles the latter, and to a cursory observer would certainly be mistaken for farinaceous matter. It emits a most fetid smell, has a disagreeable pungent taste, something similar to that of musty flour, and is admitted by all the natives to whom I have spoken upon the subject to be rank poison to men, although it may serve for food to fowls and pigs. The facts connected with the existence of this poisonous substance in the Bazars are extremely important; it seems it is disposed of at the rate of two seers for one pice, and when the meal of farinaceous seeds is dear it is mixed with bruised millet, bajrah, barley wheat, flour, &c., in such a manner as to compose a cheap otta, that is disposed of to poor people, a class of persons who I learn from the same authority are enabled to use it, while it will infallibly kill the Bulee Adamees, or persons of the higher ranks. The presence and sale of Koora, which constitutes a common article of traffic, therefore fully explains the nature of the peculiar substance entering into the composition of poisonous otta, that is so frequently eaten by the natives and produces *Morbus Oryzeus*, while the persons affected had been led to credit they had not been making use of Rice. The deleterious properties of Koora or Kun depend evidently on two circumstances; it contains not a particle of farinaceous matter, and it is impregnated with an acrid, essential oil, of a highly poisonous quality, and which I have little doubt is closely allied in its properties to the oil of tobacco, bitter almonds, &c.

I was informed, on the 6th of September, by a native inhabitant of a small village at the mouth of the Sota, or river leading to the city of Arrah, that the Rice which grew in that district during the years when the heija or severe sickness raged, was in a great measure useless, because it produced destructive bowel complaints and fevers, owing to the unusual quantity of kun, or koora, which the paddy contained. The natives were, therefore, from its deleterious properties, obliged to throw large quantities of the grain into the river, in consequence of its being pernicious and unfit for food.

Several natives were examined on the 12th of September, at the house of Dr. Morrison, Civil Surgeon of Moozufferpore, by this gentleman, in my presence. Those persons unequivocally admitted the noxious properties of koora, and the deleterious effects of Rice, to which it is attached, and which forms a common article of food of the inhabitants of the Tirhoot district. One man afforded the important information couched in this strong fact, that the natives are so well aware of the pernicious qualities of certain kinds of Rice, that when Sepoys are sent into different places of the district to collect the revenues, the villagers give the noxious grain to them for food, in order to make them sick and produce their destruction. On the 13th of September, at the indigo

factory of Bilsund, the same facts respecting the deleterious properties of Rice were substantiated by inquiries amongst the natives, who named the Rice Satee, which grows commonly in the Tirhoot district, forms the food of the inhabitants, and in every particular corresponds with the Ouse Rice of the lower parts of Bengal. At a village near a branch of the river Bagmutty, on the 17th September, the natives fully admitted the deleterious qualities of Satee Rice, of which they brought me several samples; and stated it to be extremely pernicious on account of the Kun it contains, and said, it is the employment of this grain which kills numbers of them with heija. The Satee harvest was cutting at the date mentioned, and I saw the grain growing in almost every part of the country through which I travelled. These facts are important, and the more so, because I have now the satisfaction to say, that personal observation at length permits me to refute the assertion, reiterated by a correspondent of the Bengal Hurkaru, that Rice forms no part of the food of the inhabitants of the Tirhoot district.

A respectable native on the 21st September was examined in the quarters of a surgeon of high rank, at Dinapore, in the presence of three gentlemen besides myself, whose names, not having solicited permission, I do not at present find myself at liberty to mention. The answers obtained from this person were equally conclusive. The specimen of Koora presented for his inspection was immediately recognised to be Koora, and stated to be a rank poison, and to produce sickness attended with discharges of aum or bile, followed by death, in all those who eat Rice to which it is attached, and that this is a fact well known to the natives. Specimens of Rice submitted to this person were also acknowledged to be of an extremely deleterious kind, and he emphatically observed that any person employing them for food must soon die.

At Ghazeepore, on the 1st of October, the following statement was delivered to me in the house of Major Green, by Dr. Campbell, assistant surgeon in his Majesty's 24th regiment. 'This gentleman was in Jamaica during the course of the years 1814, 15, and 16, and at that time was informed by a planter of twenty years residence on the island, a man of observation and ability, that the inner shell or rind of a species of grain resembling Rice, and if it be not in fact common Rice, is at least a species of *Oryza*, was poisonous when used as food, and on several occasions is used by the negroes when fresh and green as a poison for many nefarious purposes. One of these Dr. C. particularly recollects to have been related to him; viz., that in the determination of guilt or innocence a species of enchantment is employed by the negroes the name of which is Ubia. It consists in causing the person accused to drink of a peculiar kind of liquid administered to him by a certain person; and if after the

draught the accused fall into convulsions succeeded soon by death, he is guilty ; but if these effects do not take place, he is accounted innocent. Now it not unfrequently happens that if the priest, or administrator of the liquid, wish to favour the accused however guilty, he refrains from mingling a deadly substance in the draught, and vice versa administers a deadly potion to a man, however innocent, whom he is desirous of destroying ; and the poison used upon those occasions is a decoction of the inner rind of this species of Rice which has been mentioned. The importance of this relation is too apparent to require in this place the slightest illustration ; but it is proper to remark, that these interesting facts closely coincide with the circumstances stated by the native at Mozufferpore, of certain kinds of Rice being used as a well-known poison by the inhabitants of this country ; and they also go far to establish the conclusion drawn in my work regarding the identity of West Indian yellow Fever and Morbus Oryzeus, which, from want of direct fact, I was compelled in my late publication to infer, rather than assert, in consequence of a number of striking circumstances connected with these diseases. Yours very truly,

R. TYTLER.

October 5th, 1820.

Another circumstance to be attended to is, that the Rice sent on board the *Lady Carrington* was confessedly noxious. This is known from the grain possessing a reddish colour, and the Chinamen declaring that it was of an inferior quality to what they had been in the habit of using. But this red colour in Rice is principally owing to the grain not being properly cleaned from the koora or poisonous rind, which the natives universally admit to be a sufficient cause of sickness and death in all who employ Rice for food to which the koora remains attached. That the Rice sent on board the *Carrington* was not properly cleaned, and besides that it was actually grain of a noxious description, I may assert I possess positive information ; because a sample of poisonous Rice, which I showed to the surgeon of that vessel, he declared to be precisely the same kind of seed that was received from the pilot schooner ; and this seed was so completely covered with koora that I well know no Lascar either on board of a pilot schooner or other vessel, unless perhaps driven by actual necessity, would employ it for food, and then not till it is cleaned or shelled, while a European, Negro, or Chinaman, eating it with the koora untouched, of course falls a sacrifice to the carelessness and ignorance of those who are engaged to provide with food the crew of the ship to which he belongs. With respect to the attention paid by natives to free the Rice employed by them as food from koora, any one may easily satisfy himself by walking along the river side and observing the care taken by the Dandeers on board of the river boats to clean their grain, by

beating it in large wooden mortars, from any portion of this poisonous substance.

I have lately fed a large, healthy fowl upon koorah only ; and the consequence is that the animal, although still alive, after eating it twice a day for fourteen days, has become affected with diarrhœa, is shrivelled almost to a skeleton, and a large gangrenous sore, that is daily increasing, has made its appearance at the side of the mouth, and threatens to separate the beak from the head, while an increasing sore is also seen near the root of the tongue.—Spirit of Public Opinion, Allahabad, October 18th, 1820.

About the time the animal mentioned in the above extract was fed with koorah, I caused a healthy kid to swallow the same deleterious substance ; nearly one seer or two pounds was admitted into the animal's stomach, and it expired in dreadful agony within eight days from the commencement of the experiment, reduced in leanness almost to a skeleton. Upon opening the body the mass of koorah was discovered in the stomach, paunch, and bowels, wholly undigested.

SECTION XII.

Treatment of the Morbus Oryzeus, or the Epidemic Cholera Morbus.

The treatment in Cholera Oryzea, or Epidemic Cholera Morbus, from the facts detailed in the preceding pages, becomes sufficiently obvious. It consists merely, as ascertained by means of my experience in various regions of Hindoostan, in expelling with the utmost promptitude the noxious ingesta from the stomach and bowels of the patient ; and supporting the sufferer's strength, at the same time, with some warm cordial and stimulating liquid. To accomplish the first object, mild, but effectual purgatives are the most advisable, such as castor oil, in half an ounce or an ounce dose ; calomel in doses of from three to six grains, repeated as occasion may require ; and compound powder of jalap, in the usual dose of from half a dram to one dram. The purgatives are to be given as the symptoms appear to indicate, and should be aided by a small dose of solid opium, or laudanum, if their retention on the stomach be found difficult. The stimulants proper to be employed in the cold and sinking stage of the disease, are, ether, ammonia, or spirits of lavender, in the usual doses of from ten drops to one dram mixed with water, and warm brandy-and-water, in such moderate quantities as the patient's stomach may be able to retain. Bottles of warm water, or warm bricks, and sti-

mulant applications, embrocations, &c. to the feet and surface of the body, in order to produce the return of the circulation, and secure its equalization throughout the system, are also highly necessary as auxiliaries. But the main dependence for cure is to be placed on mild purgative medicines. The diet should be light, and of easy digestion, such as beef-tea, chicken-broth, veal soup, &c.; but Rice, and Rice-water, must in all shapes be avoided like the venom of a serpent, or the deadly poisons of arsenic and corrosive sublimate. Barley-water, or gruel of oatmeal, is, however, highly proper and beneficial.

Regarding the prevention of the *Morbus Oryzeus*, or Epidemic Cholera *Morbus*, in the United Kingdom, it is evident from the foregoing facts that this desirable object can alone be effected, by prohibiting the exportation of bad or deleterious Rice from foreign ports, and passing an act of the legislature strictly forbidding its importation under the severest penalties for sale into the markets of Great Britain. Such an act would, in fact, prove of the greatest benefit to British India, because, to my certain knowledge, wheat of the finest description is grown in that country, and by encouragement being given for the growth of that wholesome, and nutritious grain, disease would not only be banished from the vast domains of our Oriental empire, but the agricultural improvement of Hindoostan would irresistibly proceed far beyond what the brief limits of this work allow me to detail.

The question of Deleterious Rice proved the subject of an animated debate before the Medical Society of London, which continued during four successive nights of the Society's meeting—viz. : on 30th September, 5th October, 14th October, and 21st October, 1833; at the termination of that discussion, the thanks of the Society were presented to the Author in the following terms:—"That the cordial thanks of this Society be given to Dr. Tytler for the information he has communicated to the members relative to the production of cholera in India by the use of deleterious Rice, and for his having established the fact, that similar deleterious Rice is now selling in the markets of England."



* JZF

1833

