PERIODIC D

BY

L. SALZER, M.D.

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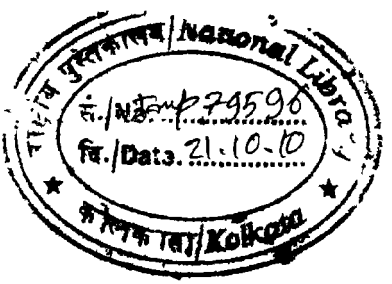

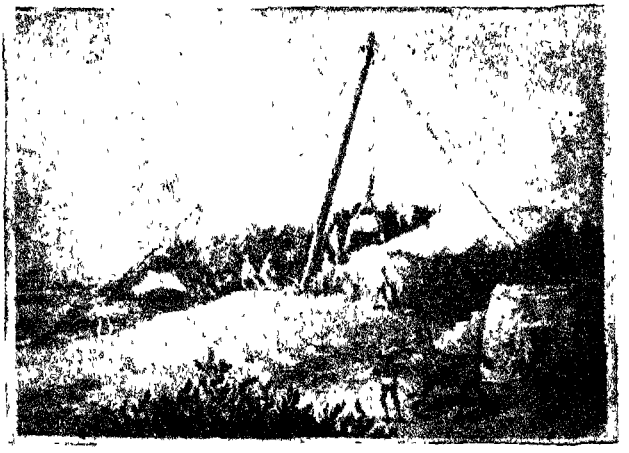

CINERATOR IN OPERATION AT ST. THOMAS' MOUNT.

(From a painting by Lt.-Col. J. B. Richardson, Royal Artillery.)

PINIONS OF THE PRESS, &c.

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REVENUE DEPARTMENT.

G. O of 19th April 1883, No 481.

The Government approve the proposal of supplying all Revenue Officials down to the grade of Deputy Tahsildar, with a copy of Mr. Mills' Pamphlet.

(Signed) E. F WEBSTER,
Secretary to Government

Deputy Surgeon General M. C Furnell, M.D., F.R.C.S., Sanitary Commissioner for Madras, writes:—

"I have read with much interest Veterinary Surgeon J. Mills' Report on Cinerators for the cremation of stable refuse, dead horses, &c. There can I think, be no doubt that from a Sanitary point, his views are perfectly sound, and worthy of adoption."

* * * * *

"In my late tour I saw some capital Cinerators at work, especially at Anantapur, and Tadpatri."

PERIODIC DRUG DISORDERS.

PART I.

GENERAL AND FEBRILE DRUG DISORDERS.

CONTENTS OF PART I.

GENERAL INTRODUCTION.

A COLLECTION of periodic morbid disturbances as having been caused in healthy persons by the use of drugs, may be of some interest to any one who has chosen the science of Medicine as the subject of his study. It is, however, doubtful, whether the slightest practical use could ever be derived from such a collection, by the majority of medical practitioners of the present day. Not even for the purpose of Medical Jurisprudence could this collection of ours be made serviceable; for nine-tenths of the drug-symptoms recorded, are far from being absolute consequences of drug-action; they are, moreover, supposed to be contingent in their manifestation; they have been produced in certain individuals, while others, who might just as well have tried the very same drugs on themselves, might not have developed either the same, or even any similar, symptoms. The majority of the drug-disorders recorded in the following pages are then by no means pharmacognomic that is to say, exclusively pointing to one single drug and no other as the originator of the disorder, and Medical Jurisprudence could hardly avail itself of the fruits of this collection of ours.

It so happens, that the Homœopathic School of Medicine does know how to draw advantage from the administration of drugs, known to have produced contingent symptoms, to patients exhibiting a train of similar symptoms. To the homœopathic practitioner this volume, of which the first Part is herewith presented, should then, according to what I know about the facts connected with the subject, be of great value. How-

ever, even to the homœopath, it is by no means immaterial whether a drug symptom be contingent or pharmacognomic.

In the Section of Periodic Drug Fevers, there are two drugs to be found,—Quinine and Morphine—each of them giving rise to attacks of periodic fever; but while the pathogenesis of the first of these drugs is contingent as far as fever is concerned, the pathogenesis of the other is in this respect characteristic, inasmuch as it has been observed in a large number of men having fallen a prey to the pernicious habit of morphine-intoxication—men of various ages and constitutions, living under different conditions. Of Quinine, we read the following: "A person formerly aguish may very easily reproduce the paroxysm, with greater or less severity, by the untimely and improper use of Quinine"†

Further on: "It is worthy of note, that some persons say that after taking Quinine for some time, the drug itself produces similar symptoms" (of malarial poison with its periodic agues.)—And again: "I have heard intelligent natives ask not to have quinine given to them, as 'they did not wish to make the fever worse.'"—These two last statements are taken from *Climate and Fevers of India* ‡ by Dr., now Sir, JOSEPH FAYRER; no mean authority on the subject. The Morphine periodic fever, on the other hand, constitutes, according to the observations of Dr. LOWENSTEIN,§ a part of a series of morbid phenomena that in their aggregate are

* Pages 42-47

† Dr Phillip's *Materia Medica and Therapeutics, Vegetable Kingdom.* 1874. P. 448.

‡ Page 77. and p. 111.

§ See his Monograph on Morphinism. Berlin.

known as Morphinism ; the morphine-fever is then more than a mere contingent drug effect, it is to a large extent, moreover, an essential member of the morphine-pathogenesis, as affecting men otherwise in perfect health.

I shall quote here what I said on a previous occasion on the subject :

In how far Morphinism is associated with periodicity, we learn from the following observation, concerning individuals who have left off the habitual use of the drug " After the severe symptoms of the period of abstinence have disappeared, and the patients seem to be convalescent, the whole of the symptoms suddenly break out again , this renewed outbreak has, however, no further influence on the course of the case, and generally lasts only one or two days "*

In his later contribution, as recorded in the *Berliner Klinische Wochenschrift*, the author says : " The intervals between the paroxysms show a pure apyrexia, the spleen is mostly enlarged, even to the size of a splenitic tumor, after severe malarial intermittent. Alike to the latter we also find in the Morphin-fever a febris erratica, and from time to time, in perfectly irregular types, we meet chills with high temperature, heat and sweat. Sometimes Morphium-intermittent appear in high-graded states of excitation and severe delirium " The author then describes a second form of morphium fever. " The patients complain nearly daily, especially in the afternoon and evening, of chilliness, increased sensation of heat with only a moderate rise of temperature and excessive thirst, lasting sometimes a few hours, sometimes even as much as twelve hours."

While Morphine thus holds out a fair prospect to prove one of our homœopathic remedies in intermittent

* Lowenstein's Monograph.

fever, it offers at the same time another point of great interest in connection with the subject under discussion.

By the researches of KLEBS, TOMASSI-CRUDELLI and many others, it has been of late ascertained, almost beyond further question, that the occurrence of malarial fever is closely connected with the existence of lower organisms—spores or germs—in the blood of malarial patients. On the other hand, it is known that both Quinine and Morphine have the power of poisoning protozoa and infusoria. Dr. RINGER begins his article on Cinchona and its alkaloid, with the following words: "Salts of quinia are protoplasmic poisons, arresting amœboid and the allied movements of the white corpuscles; even weak solutions are highly poisonous to protozoa and infusoria (Binz) more so even than salts of strychnia and Morphia."—Many believe even that the good Quinine may do in malarial fevers is owing to its capacity of destroying those malarial germs.—Of all the agencies then ever capable of producing paroxysms of intermittent fevers, or some similar disorder, one should have thought Quinine and Morphine to be the last. Yet there is the indisputable fact before us, that Quinine is a most potent agent to re-awaken the latent germs of malaria, and that Morphia is capable of producing paroxysms of intermittent fever in the healthy. Arsenic is another drug known to be a protoplasmic poison, and yet, a glance at the Section of Periodic Drug Fevers, will shew how fruitful this drug is, in producing periodic febrile attacks.

These are facts which are almost more interesting to the physiologist, than they are to us, homœopaths Are those Quinine and Morphine intermittents, when produced in non-malarial climates, also characterised by the existence of *bacilli malariæ*, or not? The answer to this

question might throw some light upon such points concerning the etiology of malarial fevers, which are still more or less obscure. It is, for instance, yet doubtful whether the *bacillus* is the cause or the effect of malarial fevers. The morphium intermittent as produced in a healthy man living in a non-malarial region, that is to say, where the bacillus is not to be found in the air, might help us to clear the doubt.

On a previous occasion,* I have drawn attention to the fact that there is, as it would appear, an antagonism between the chemical and dynamical effects of certain medicinal substances. We know for instance, that acids check the acid secretion of the gastric juice, while the alkalies promote it. Cases are on record where the stomach of cadavers victimised by arsenic-poisoning has withstood decomposition for a long time, although the destructive affinity of arsenic to the living tissue of the stomach is a well ascertained fact. Dr. OZANON of Paris has observed that the peseudo-membrane of croup is best solved by bromine. Allopaths have taken advantage of this fact, and have used the drug in croupy exudations of the larynx. While our provings on the healthy, made long before Dr. OZANON'S observation, have shown that bromine is apt to produce an inflammation of the laryngeal mucous membrane, ending with exudation of coagulable lymph, similar to that of croup. In fact, the use of the drug in our school in cases of croup is based upon those physiological provings. It would then appear that Quinine and Morphine represent two more examples of that strange pharmacodynamic antagonism in one and the same drug.

From Dr. LOWENSTEIN'S Monograph we further learn that Morphine is capable of producing "intermittent

* Homœopathy an Inductive Method of Cure, P. 163.

neuralgia in various nerve-areas, supraorbital, intercostal and cardiac pains." Our colleagues of the olden school in using Morphia-injection in similar cases, have then often proceeded homœopathically without knowing it. This is so often done now-a-days that it would hardly be worth while to refer to it In this particular instance, however, it would appear, that the ignorance was by no means a one-sided one;—we, homœopaths, having been just as little aware of the fact as they themselves. In fact, while we remonstrated all along against their practice as mischievous, they have simply done what we ought not to have left undone long ago.

It is to be hoped that the above is not to be understood in the literal sense of the word. After what we have learnt about the pathogenetic effect of Morphine, the practice of using it as an anodyne in cases of idiopathic neuralgic affections, is so much the more condemnable, knowing as we do now, that the drug can only have the tendency of ultimately aggravating the evil We have hitherto rejected it, because we said all along, it, at the best, only palliates, but does not cure. We know now better; we most emphatically reject it, because it palliates temporarily and tends to aggravate permanently. We fully understand now the words of HAHNEMANN, when he said of Opium, "Nothing has caused more positive evil after apparent good."

But beyond the physiological dose, there is the homœopathic, curative dose, and in thus applying the drug we may, and shall often, succeed in converting a deceptive agent of harmful palliation into one that gives permanent relief.

Concerning the need of a collection of purely pathogenetic symptoms of such drug-disorders that have distinctly repeated themselves in one or many provers at

certain intervals, and have thus established a distinct claim to be looked upon as periodic or paroxysmal—I can again do no better than repeat what I said on the subject at the British Homœopathic Congress, in the year 1882. Here it is.

There are so many ailments whose especial peculiarity it is to appear, disappear, and reappear, all, as it were, of their own accord, that we might almost be tempted to divide diseases into two large classes, *viz.*, periodic and non-periodic.

Granting, for a moment, such a division, we should include in the first class all disorders characterised either by regular or irregular recurrence, so that periodical and paroxysmal disorders might be gathered together into one class. The range could yet be made wider if we included in it all those diseases which manifest, during their course, regular or irregular aggravations or ameliorations. And in order to make the category complete, we might further add to it all diseases marked by some intercurrent symptoms of a periodical or paroxysmal nature.

From a strictly pathological point of view, such a divison could hardly meet with our approval. Intermittent fevers and syphilis would be classified in the same rank, because of the syphilitic bone pains which are regularly aggravated at night.

Yet it cannot be denied that periodic disorders, wherever met with and in whatever way they may manifest themselves, have something in common. If they are not to be classified under one pathological head, they deserve at least to be considered in their ensemble.

It might be said periodicity is, after all, only a symptom accompanying a certain diseased state; it is merely the rhythmical expression of the manner in which a

certain disorder manifests itself, but it by no means constitutes a disorder in itself. This is true enough. But then it is not less true that periodicity characterises often most emphatically certain diseases, and seems to be interwoven with their very root. If it be only a symptom, it certainly is, in many cases, a most characteristic one, and as such, should, especially from the standpoint of therapeutics, not be slighted.

We may almost say that all disorders characterised by periodicity of any kind, are more or less of a chronic tendency; for there is no saying how often the cycle of appearance and disappearance might be repeated.

On the other hand, we find many chronic diseases subject to all sorts of periodical and paroxysmal fluctuations, if left to themselves. We need only hear the history of such sufferers who, in despair of all medical aid, have, once for all, made up their minds to leave evil alone.

If we look to our *Materia Medica*, we find that those drugs which HAHNEMANN considered particularly suitable in chronic diseases, are, as far as their pathogenesis *is concerned, the richest in periodic symptoms.*

Little as we know about the pathology of periodic diseases, it would appear that they take their starting point, in common with all other diseases, from certain physiological laws governing our organism. The temperature of our body is subject to a rhythmical oscillation every twenty-four hours; and a similar oscillation has been observed, corresponding to the seasons of the year. But a rise and fall of temperature means a rise and fall of the stream of life. The first conditions of periodicity are thus physiologically engrafted upon our economy.

Coming now to the large number of drugs which have, each of them in their own way, produced some periodi-

cal attacks in some of the provers, we find, to our great surprise, that there is yet for us a great deal to learn, and, what is more, a great deal to unlearn, with respect to the periodic symptoms they have yielded, and the therapeutic use we make of them.

HAHNEMANN has, from the very beginning of his provings, insisted that the time at which a certain symptom had repeatedly occurred, should not be lost sight of by the prover. He has thus shown us the way, how to meet periodic disorders. In our provings made since, we have followed his example, and have thus far acted according to the strict method of scientific experimentation. But when we come to gather the fruits of the large stock of knowledge we thereby gained, it would appear as if we had altogether left the path of sound and practical reason. It is in our repertories that the treasures of our Materia Médica are stored up for therapeutic use; and it is just in these very repertories where the stumbling-block lies, touching our varied information about periodicity.

Suppose a prover while taking *chamomilla* had felt a toothache between four and five o'clock in the evening. He had never experienced a toothache before. What do we reasonably learn from that fact? That *chamomilla* is capable of producing toothache in the healthy. Do we learn at the same time from that single fact, that the *chamomilla*-toothache is produced, or is liable to be produced, between four and five o'clock in the evening? Decidedly not. After all, an event must occur at some time or other. Was it, then, quite useless on the part of the prover to have recorded the time at which his symptom occurred? By no means. Let him only go on recording exactly the time; the same symptom may repeat itself the next day, or any following day, just

between four and five in the evening, and then his first record will be in so far useful to us, as it would be apt to show some periodic tendency of the symptom. Or there may be no repetition in his own case, but a fellow-prover might have experienced the same symptom at the same time, and such a coincidence in two provers would no less go to show a tendency of the symptom to occur at a certain particular time. But whenever neither the one nor the other is the case, then the symptom has its pathogenetic value as a symptom, but none whatever as to the time at which it had been recorded to have occurred.

If we look, however, to our repertories, we find that this consideration, so simple and evident, has been entirely disregarded. All the rubrics concerning time in those repertories are faulty from beginning to end, because they have been slavishly transferred from the *Materia Medica*, without any discrimination. Most of the drugs enumerated under the headings of time have not the slightest pretension to periodicity. They stand there on the strength of one single occurrence in one single prover, at a certain stated time. And such being the case, they do more mischief than good ; they mislead the inquiring practitioner.

There remains yet something to be said in connection with our subject, about alternating symptoms. We meet now and then with such cases. A man appears to suffer from two different diseases, as far as organopathy and pathology in general are concerned. He suffers for some time from some illness, which we will call A. Hardly has he got rid of it, than another disturbance, of quite another pathological character, makes its appearance in another organ ; a disturbance which we will call B. A. and B. change in this way hands,

to the despair of both the patient and the attending physician.

We are liable in such cases to recur to a double set of remedies, one of them corresponding to the disorder A, the other to the disorder B, alternating the respective remedies as the symptoms alter. It is this a sort of therapeutic patchwork, the only merit of which consists in this, that it sometimes does succeed in benefiting the patient. A more precise study of the case may lead us to a remedy, which "covers" both groups of the symptoms A and B, and such a remedy would no doubt have more chance of success than the above combination.

Yet even then we shall often miss the case. For what does it, after all, mean, when we say a certain drug covers both groups of symptoms? It means that our drug has produced in some prover or provers the symptoms A, and in others the symptoms B. But to bring to bear a compilation of symptoms, as derived from different provers, upon a given pathological case, in order to establish the wanted similarity between drug action and disease, is simply another attempt towards therapeutic patchwork. Again, we may, for all that, meet with success, but we must not wonder if we fail. Nearer we should be to the mark if we could lay hold of a drug which had produced in one and the same prover both the disorders A and B; and the drug which stands nearer yet to our case would be that which had produced in one and the same prover the symptoms A and B in alternation. The rubric of alternation is, however, as yet, very sparingly cultivated, even in our best repertories.

To remedy all these shortcomings, which, I believe, have all along greatly marred the success of the homœo-

pathic treatment of periodic, or malarial, disorders, I have undertaken the task of publishing a collection of periodic drug-disorders, of which the present part as now offered to the reader and student, is the first instalment. The symptoms as recorded therein are for the most part carefully collected from Dr. ALLEN'S Encyclopœdia of *Pure Materia Medica*, which is, as its title implies, a record of the positive effects of drugs upon the healthy human organism Symptoms not derived from the above source, when recorded, are accompanied by a note, stating where they have been derived from.

I avail myself here with pleasure of the opportunity to express my best thanks to my friend Dr. W. BUTCHER of Windsor, who, during my last stay in Europe, greatly assisted me in the work now before the reader, he did so in the midst of a large medical practice, often at the sacrifice of many a night's rest.

A movement is gaining ground in the homœopathic School of Medicine, according to which all symptoms derived from provings of drugs attenuated beyond the 12th Decimal, are to be looked upon as doubtful. I hope to show in my forthcoming work on Vital Energy that there is no ground for such a proceeding on our part. Anyhow, symptoms which have at regular periodic intervals manifested themselves in a prover of perfect health, after having tested a drug, even above the 12th attenuation, should be, and have, in the following collection, been, considered as genuine, beyond all further doubt.

GENERAL PAROXYSMAL DRUG-DISORDERS.

Sudden prostration with coldness. *Apis. Camphor.*

——— indescribable weakness and nausea. *Arsen. hydrogenisatum.*

——— weakness. *Digitalis. Graph. Dulc. Kali carb. Lycopod.**

Rapid loss of strength with fever. *Crotalus.*

Sudden weakness, especially of the chest, she could hardly speak, (accompanied sometimes by a fluttering of the heart). *Spongia.*

Sudden debility with dull pain around the heart and sensation of oppression. *Cuprum arsenicosum.*

Sudden, almost momentary, loss of power, with paleness of the face and sudden nausea, quickly coming and going. *Petroleum.*

Sudden collapse. *Phosphorus.*

——— falling to the ground with cries and convulsions. *Hyosciamus.*

——— falling to the ground without cry. *Hydrocyan. acid. Cuprum.*

——— emaciation. *Crot. tig. Iod. Phosph. Secale corn. Cuprum.*

He falls unconscious to the ground as if struck by lightning, has an involuntary stool and vomits. *Lachesis. (Apis).*

Symptoms come suddenly (the symptoms being of an epileptic or tetanic nature). *Benz. nitr.*

* Attacks of faintness, or faintlike weakness which are not characterised by suddenness are not noticed here.

Sudden feeling as if the circulation ceased, a tingling in the whole body extends into the tongue and the ends of the fingers and toes, with anxiety, then she feels deadly tired. *Baryta carb.*

Sudden and incessant change of the place of the pains, they are most constant only in the region of the heart. *Benzoic acid.*

All the pains extend from place to place and suddenly change about. *Nitri dulcis spiritus. Aconite.*

Pains come and go suddenly and wander about. *Rhus ven. Palladium.*

Pains move suddenly from place to place, the pains are momentary, but frequently return ; they are described as pulsative. Mostly within doors. *Polygonum.*

Sudden coming and going of the pains , they appear most frequently on the left side, generally last but a short time, and affect generally muscles and the joints, and not the bones. *Carbolic acid.*

Pains simultaneously felt in all parts of the body. *Agaricus.*

The pains are steady, dull, throbbing and boring ; also sudden, sharp, stinging and pricking. *Merc. iod. flav.*

Sudden acute darting pains, evidently running along the single nerve branches, in almost every part of the body and limbs. *Gelseminum.*

Sudden intense pain so that he cried aloud and ran about as if mad. *Secale corn.*

Sudden spasms associated with intense pain. *Strychn.*

Sudden inflammations. *Belladonna.*

The whole body swelled so rapidly that it was with difficulty she could be undressed. *Dulc. Kali nitr. Tarentula.*

When a pain occurred it came with its full force at once, and so continued till it ceased, and was followed by

drowsiness and stupor. *Phytolacca.*

Pains appear suddenly, lasting four to five minutes, and then disappear just as suddenly. *Lycopodium.*

Sudden appearance and disappearance of all the pains (except the headache) lasting from half an hour to three hours. *Crotalus.*

Suddenly appearing and disappearing drawing pains in almost all parts of the body. *Nitr. acid.*

——— tearing pains *Kali nitr.*

All the pains came suddenly, leaving more gradually (but very soon); except the pain in the face and shoulder. *Sepia.*

Sudden disappearance of the pains (in the evening). *Carbol. acid.*

Quick disappearance of the pain which was intense. *Calc. carb (?)*

Sudden disappearance of pain when it had reached its highest degree, and instantly arising in its stead a pain in some other place. *Bellad. Secale corn. Crotal.*

Dull pressure in various small spots in the body, at first increasing, then suddenly decreasing *Sulph. acid.*

The symptoms steadily increased in severity until they reached their acme, then as steadily decreased, without any remission or periodicity. *Tarentula. Colocynth.*

Many pains, especially the pressive, drawing ones, begin slightly, increase slowly, become severe, and just as slowly disappear. *Stannum.*

Frequently recurring short attacks of great weakness. *Bellad. Cham. Lycop.*

Short attacks of exhaustion, especially of the lower extremities. *Chamomilla.*

Fits of weakness. *Arsenicum.*

Attacks of paralytic weakness with pain in the back. *Cocculus.*

Attack of prostration with faintness and total relaxation of all the limbs. *Camphor.*

Very frequent momentary attacks of faintness, even to sinking down, also with vertigo, followed by colic and griping in the bowels, as in diarrhœa, though he had an ordinary stool. *Carbo veg.**

Frequent loss of all strength with a trembling sensation. *Apis.*

Remission or even intermission of the symptoms, which may lead to a deceptive hope of recovery. *Ars. alb. Carbn. hydrog. Plumb. Digitalinium.*

After the severe symptoms of the period of abstinence have disappeared, and the patient seems to be convalescent, the whole of the symptoms unexpectedly break out again. *Morphinum.*

The symptoms usually intermit for some hours or a day, and then return in a diminished degree. *Oxal. acid.*

Late in producing its effect, the drug acts strongly; its action intermits and is renewed with increased vigor. *Magnes. sulph.*

The most violent symptoms appear within twenty or thirty minutes after taking the drug, and each one in a diminished degree. *Chamomilla.*

Primary and secondary symptoms frequently alternate. *Ignatia.*

Most of the nervous symptoms come suddenly and alternate frequently. *Agaricus.*

All the pains frequently repeat, jump from one part to another, remain nowhere very long, but return easily to the affected part. *Colocynth.*

All the pains alternate rapidly and frequently occur. *Crotalus.*

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* For simple "attacks of faintness" see the usual Repertories.

Transient pain, complete intermission of ten minutes to an hour, and then another pain coming on. *Rumex.*

Pains occurring every ten or twenty minutes with slow contraction of the limbs. *Sec. corn.*

Wandering, digging, pressing pains confined to a small spot, where they remain for a short time, but soon return. *Nux moschata.*

Nervous symptoms come on very irregularly. *Natrum hypochlorosum. (Liquor sodæa chlorata.)*

The pains continued to recur in varying degrees of severity during the first two weeks. *Origanum.* (The pains are rheumatic.)

Short but quickly returning attacks. *Carbon sulph.*

At intervals, the symptoms which are always worse during rest, become aggravated. *Glonoin.*

From time to time tearing in almost every part of the body. *Arnica.*

Pains return frequently and jump from place to place. *Asafœtida.*

Transient drawing and tension in almost all the joints. *Bryonia.* (Drawing and tearing. *Pulsatilla. Kali bichrom.*)

Frequent recurrence of the symptoms during two years. *Viscum album.*

Slight drawing and jerking sensation in the whole body, especially in the joints, returning at indefinite periods. *Rhododendron.*

Occasional rheumatic attacks. *Kali bichrom.*

At one time weakness, at another sensation of vigor in the joints. *China.*

Wasting of the body in proportion to the recuperation of the mind. *Digitalis.*

If the mind is joyous the body is suffering, and *vice versa. Platina.*

Constant change of symptoms, when a new one arises the earlier symptoms cease. *Sanguinaria.*

Symptoms appear in groups, aggravate in the evening and during rest. *Colocynth.*

Sometimes pain on right side, sometimes on left side, but rarely on both sides at once. *Bufo.*

Drawing pains in almost every part of the body, alternately first in one place and then in another. *Sulphur.*

Alternation of pain and local sensation of heat and cold. *Arundo mauritanica.*

Wandering rheumatism without swelling or fever, alternating with pains in internal organs. *China.*

Attacks of epilepsy alternate with paroxysms of apoplexy. *Hyosciamus.*

Alternation of convulsions and rage. *Stramonium.*

Strong convulsions alternating with great excitement of mind. *Stramonium.*

The torpor gave place at irregular intervals to severe convulsive fits. *Stramonium.*

Alternation of spasmodic contraction of the limbs and complete relaxation. *Opium.*

Alternation of contraction and relaxation of various muscles or group of muscles. *Lycopodium.*

Alternation of general convulsions with relaxation or paralysis. *Strychn.*

General twitching, especially violent in the arms alternating with opisthotonos. *Tarentula.*

Tremors alternating with violent convulsions. *Mercur.*

Convulsions alternating with stupor. *Agaricus.*

Convulsions followed by an apparently apoplectic state. *Juniperus virginiana.*

The (convulsive) movements were of a changing character, now resembling chorea, now hysteria, and after

a little while tetanus, even to opisthotonos. *Bellad.*
At intervals he falls into a cataleptic state. *Cantharis.*
Alternation of unsteadiness and syncope. *Tart. emit.*
Either general restlessness or nausea. *Tart. emit.*

GENERAL PERIODIC DRUG-DISORDERS.

Periodical feeling of weakness. *Ferrum.*
Daily at a certain hour, (mostly in the evening) faintness. *Lycopod.*
Almost every other hour frequent attacks of extreme weakness and insensibility. *Aconite.*
Frequent return at regular hours, of the pain and uneasiness, as in fever and ague. *Arsenic.*
Periodic return of pains. *Ferrum.*
There is marked periodicity in the symptoms. *Tarentula.*
Periodic return of the symptoms, often clock-like in its regularity. *Cedron.*
The attacks recur periodically. *Centaurea Tagana.*
Obstinate periodical pains. *Secale corn.*
The symptoms subsequent to the bite assume a periodic character, with tendency of the chachectic symptoms to return. *Vipera.*
Convulsions occurring regularly. *Strychn.*
The most violent spasms seem to occur periodically, so that the recurrence of a new attack could be foreseen. *Secale corn.*
Periodical appearance of twitches and spasms, often associated with hallucinations. *Alcohol.*
Daily return of epileptic fits. *Arsenic.*
Better and worse on alternate days. *Thuja. Calc. carb. Lycopus.*

The medicine has begun a second round or course which has been longer; all the symptoms are more decided, distinct and prolonged than the first time, and the medicine seems to act more searchingly than in the first round, although the dose has not been repeated. *Physostigma.*

In one or two days the attacks cease and then continue again for a couple of days, so that a certain periodicity may be observed in the symptoms. *Anacardium.*

Complaints assume the form of intermittent fever. *Antim. oxid.*

Symptoms which repeat daily came later. *Palladium.*

The symptoms recur in an intermittent type, in one to three days and duplicate, appearing in the morning, forenoon, afternoon, before and after midnight, at the day of the occurrence. *Thuja.*

Every four days (later in the proving every two days) the symptoms seem to aggravate. *Dirca palustris.*

Most of the primary effects of large doses last five days, in one prover many of the symptoms returned after the second five days, and then disappeared for weeks. *Sabad.*

Every seven days the attacks (particular to the action of the drug on the prover) reappear, with the exception of the urinary symptoms. *Cantharis.*

In seven days' paroxyms; involuntary alternate extension and contraction of the muscles in different parts of the body, without pain and with full consciousness. *Lycopod.*

Appearance of the symptoms every 8 days. *Tellur.*

The spasms mostly returned on the ninth day, (in some other case after a month). *Secale corn.*

Return of the symptoms on the fourteenth day. *Chelid. maj.*

The symptoms seem to reappear after three weeks. *Magnesia carb.*

After the third week all the symptoms come on again; they appear more on the left side of the body. *Antim. crud.*

Thinks the symptoms return every four weeks, and continue about six days, and then remit. *Plantago.*

Some of the pains and the itching reappear after four weeks. *Ferr. magnet.*

The effects noticed the first few days and the original symptoms of the disease, for example, troubles with the digestion, &c., are for the most part repeated after from two to four weeks. *Carlsbad.*

The same symptoms (erysipelatous) appear every year about the same time. *Rhus ven. Lachesis. Thuja.*

Periodic return of symptoms every year. *Crotal. Lachesis.* (And all other snake poisons)

In spring and fall the symptoms reappear or aggravate. *Robinia.*

Drug-Disorders aggravated by Weather.

With cold weather rheumatism occurs, leaving with the hot weather. *Calc. phosph.*

In winter rheumatic pains much more severe than in summer. *Kali bichrom.*

Especially at the beginning of the cold season rheumatic pains and pains in the bones. *Kali iod.*

Sufferings during cold weather, and the prevalence of north-western winds. *Rhus tox.*

Could not bear as well as usual the cold weather. *Formic acid.*

Cold, damp weather aggravates the symptoms. *Ledum.*

One marked symptom presented by all these patients (coming from the mercurial mines of Almaden, in Spain) is their susceptibility to cold ; a current of air, a change of temperature, a cold or damp season, all aggravate and cause suffering *

In moist cold weather frightfully severe pains about the joints (very strikingly resembling the chronic sufferings produced by alcoholism), the pains do not run in the course of the nerve, like neuralgia, nor are they exactly in the joints, like articular rheumatism, they seem to encircle the limb, the finger, immediately above or below a joint. *Chloralum.*

Aggravation of all the symptoms from great heat, great cold, and especially from stormy weather. *Tabacum.*

During low barometer and when the wind blows, the pains aggravate. *Tabacum.*

Damp weather aggravates the pains. *Curare. Colocynth.*

Dampness of air aggravates the rheumatic symptoms, especially at night. *Polyporus pinicola.*

Dampness and change of weather aggravate all the symptoms. *Tarentula.*

Worse in rainy weather. *Pæonia.*

Sensitiveness to change of weather. *Calc. carb. Chamomilla. Cupr. acet. Sulph. Vipera.*

Every change of weather is felt by her in the head and limbs. *Silicea.*

Especially during change of weather, nervous. *Mercury.*

Sensitiveness of the skin to every change of temperature, especially cold air, drafts and the evening

* Report of Dr. Paul Raymond, in *Le Progrès Médical* for December 6, 1884.

air; shivering easily runs through the whole body. *Lycopod.*

Almost all the symptoms reappear with rough weather. *Rhododendron.*

He experiences pain previous to change of weather. *Phosph. Gastein.*

Stormy weather affects him; he feels already a restlessness in his blood a few days before. *Psorinum.*

Stormy weather makes him sick, and causes hæmorhoidal troubles. *Psorinum.*

Exacerbation of all the symptoms in stormy weather. *Sarracenia.*

At the approach of a tempest a sort of a swoon. *Petroleum.*

On the approach of and during a storm, he is violently affected, the powers are exhausted when walking, he cannot proceed, is obliged to be led, becomes very weak and sleepy, with heaviness and heat of the body. *Silicea.*

She is very sensitive to the electricity of the atmosphere; it gives her painful feeling and low spirit. *Raphanus.*

About new moon, most of the symptoms make their appearance. *Silicea.*

GENERAL DRUG-DISORDERS OCCURRING IN THE MORNING.

Early in the morning, most symptoms appear. *Alumina.*

Early in the morning symptoms aggravate. *Physostigma.**

The symptoms remaining longest with the prover appear in the morning hours. *Calc. phosph.*

Most of the symptoms observed by the prover appeared in the morning. *Rhododendron.*

In the morning till 10 or 11 O'clock all symptoms worse. *Conium.*

Immediately after waking, pains renewed. *Ignatia.* (?)

From 2 to 4 A. M., all the symptoms, except the feeling of weakness in the epigastric region, aggravated. *Podophyllum*

Symptoms aggravate in the morning. *Tarentula.*

The symptoms most frequently occur early in the morning on waking. *Verat. vir.*

Some symptoms appear every morning. *Erygeron.*

Morning and evening, all the symptoms worse. *Kali cyanat. Curare. Guiacum. Ranunculus bulb.*

Symptoms occur especially in the morning and in the evening and are frequently caused by damp weather. *Nitri dulc. spir.*

Most symptoms appear to be aggravated, morning and evening. *Sanguin. can.*

In the morning before breakfast (and at 6 in the evening), almost all symptoms worse. *Lactic acid.*

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* Physostigma-symptoms seem to aggravate early in the morning, towards noon, and in the evening.

From morning till evening the symptoms aggravate. *Robinia.*

The patient feels worse in the morning of one day and in the afternoon of the next. *Eupat. perf.*

Trembling in the Morning.

Trembling of hands in the morning. *Alcohol.*

In the morning trembling over the whole body. *Ars. alb. Baryta carb.*

Tremors generally worse in the morning. *Mercur.*

Tremulous sensation over the whole body in the morning. *Nux vom.*

Pains, Muscular Stiffness.

In the morning the muscular stiffness is increased and extends to the arm and forearm which are painful when moved. *Ars. alb.*

Morning and evening painful cramps, doubly painful in the cold air. *Bufo.*

Every morning on awaking, sharp pains all over the body and aching pains across the shoulders and back of the neck. *Ars. alb.*

Especially in the morning when rising, before she begins to move about, intense bone pain here and there. *Silicea.**

Early in the morning, rheumatic symptoms worse. *Dioscorea.*

After sleep always so stiff, and feeling of being bruised sometimes that he could scarcely move. *Lachesis.*

In the morning in bed, pain in all the joints, as from a heavy weight pressing upon them, disappearing on rising. *China.*

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* Generally the pains of *Silicea* are aggravated by motion.

After sound sleep, arms feel sore in the morning. *Nux vom.*

Especially in the morning every spot in the body is painful when taken hold of, as if bruised, or as if suppurating, especially in the pit of the stomach. *Bryonia.*

Shooting pains all over the body and in the limbs, especially between her shoulders, at the anterior angles of the scapulæ; worse in the morning, and before getting up. *Natrum hypochlorosum (Liquor sodæ chlorata.)*

Various Morning Complaints.

In the morning on waking, a beating of the arteries of the head and of all parts of the body. *Belladonna.*

In the morning puffiness of the whole body, better in the afternoon. *Natrum carb.*

Weakness, Lassitude, &c.

Early in the morning, weariness. *Agaricus. Bryon. Caps. Antim. sulph. Colch. Lycop. Con. Petrol. Sepia. Phosph. Phosph. ac. Plumb. Staphys. Strontiana. Aurum. Carbo an. (?) Silic. Ilia. Bufo. Sulph.*

After breakfast, fainting fits. *Bufo.*

In the morning great weakness and stretching of limbs. *Carbo veg.*

Faint and unrefreshed when rising in the morning; feels stronger during the day. *Carbo veg.*

In the morning when in bed, excessive weariness. *Petrol.*

Every morning feeling of weakness as if he be attacked by a fit of vertigo. *Kali carb.*

In the morning on rising, weakness of the whole body, especially in the arms and feet. *Lachesis.*

Every morning weakness, in the beginning rather physical prostration, sleepiness; afterwards rather mental

prostration. *Lachesis.**

General loss of power in the body, as if he had not slept enough, with an otherwise active mind, in the morning. *Verat. alb.*

Feeling of heaviness in the body and weariness in the lower limbs in the morning. *Zinc.*

Weariness, without sleepiness, in the morning, all the limbs are sore as if bruised, and as if there were no strength in them. *Staphisagria.*

At 9 A. M. and 10 P. M., feeling of weakness (especially in the groins). *Physostigma.*

In the morning she was constantly weary, and seemed to have had no sleep, with aching in all the bones, especially bruised feeling in the legs. *Prunus spinosa.*

Especially in the morning, great physical and mental exhaustion. *Lachesis.*

In the morning in sleep, a decided sensation of weakness; on waking, general sick feeling, vertigo, feeling of lead in the occiput, can scarcely raise the head from the pillow; all the joints seem sprained; pressure in the small of the back, and fullness of the abdomen; after half an hour, every thing disappears; afterwards, repeated in less degree. *Lachesis.*

Morning after rising (and often also in the evening), very weak with throbbing of the heart. *Lachesis.*

In the morning after a good sleep, he is more weary than in the evening on lying down. *Magnes. carb.*

Especially morning and evening, and after moving about, great exhaustion and weariness. *Mercurialis.*

In the morning, weariness, especially of the lower extremities. *Mur. ac.*

In the morning before rising from bed, feeling of great

* Another prover reports to be physically prostrated and mentally indolent in the morning.

weakness, disappearing after rising. *Natr. mur.*

In the morning after rising, greater weariness than in the evening on going to bed. *Nux vom.*

On rising in the morning, does not feel quite well, he dreads to rise, as if exhausted by a long walk; it disappears after rising. *Nux vom.*

On waking, langour, increasing after rising. *Rhus tox. Bryon.*

In the morning after rising, feeling of discomfort over whole body, disappearing on moving about. *Pulsat.*

Every morning after rising from bed, attacks of general weakness. *Petiveria.*

In the morning after rising, till 10 O'clock, very much exhausted. *Nitr. ac.* (?)

Early in the morning, very tired, pain as from bruises in the head and all the limbs. *Aurum.**

Early in the morning, very weak. *Aurum.*

On awaking in the morning, feeling of fatigue (after heavy sleep in the night) followed by drowsiness in the forenoon. *Podophyllum.*

Great exhaustion in the morning, on waking from a deep sleep, so that the confused and sleepy condition continues after rising from bed. *Calc. carb.*

Awakes several mornings in a state of restlessness and anxiety. *Lycop.*

MORNING-AMELIORATION.

Towards morning, improvement. *Ailanthus.*

Better after rising, till noon, and from 4 to 6 P. M. *Merc. iod. flav.*

She feels a great deal better in the morning. *Psorinum.*

She feels better in the morning. *Zinc.*

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* This feeling of lassitude and pain, disappeared in some provers after rising; in others it caused a desire to lie down again.

GENERAL DRUG-DISORDERS OCCURRING IN THE FORENOON.

Aggravation between 10 or 11 A. M. and 2 P. M. *Picric ac.*

During the forenoon, continual restlessness; desire to move about, not knowing where to go or what to do. *Cimicifuga*

Every day, about 10 A. M., head commences to ache, with severe aching pain in the back, but more especially in the legs, this would gradually increase until 3 P. M., when the pains in the legs were so severe that I had to lie down to get relief, with this there was great despondency and weakness; from 3 to 5 P. M., it would gradually pass away, and all the evening I would feel perfectly well. *Polyporus pinicola.*

Nervous symptoms commencing after 9 O'clock each day, not very strongly marked the first day, but getting worse and worse each day. *Lilium.*

The primary action, particularly the pain in the joint, the weakness and drowsiness, seemed to be especially violent in the last hours of the forenoon. *Sabadilla.*

Pale, dizzy, as if fainting, two forenoons in succession. *Staphisagria.*

Worse in the forenoon. *Stramon.*

The spasms generally occurred in the forenoon. *Secale corn.*

Symptoms in general aggravate in the forenoon. *Kali bichrom.*

In the forenoon, general weakness, even to sinking down. *Carbo anim.*

FORENOON-AMELIORATION.

Better after rising, till noon, and from 4 to 6 P. M. *Merc. iod. flav.*

From 11 to 12 A. M., pains cease. *Rumex.*

Some symptoms disappear from 9 to 12 A. M. *Guiacum.*

GENERAL DRUG-DISORDERS OCCURRING AT NOON.

Towards noon, general prostration. *Carbo veget.**

Symptoms worse from noon till 4 P. M., and again from 6 P. M. till rising in the morning. *Merc. iod. flav.*

Symptoms worse at noon. *Pæonia. Physostigma.*

Symptoms still return, especially marked about 12 to 1 P. M. and 4 to 6 P. M. *Sepia.*

At noon after eating, the symptoms generally returned. *Chelidon. majus.*

Most of the symptoms appear after dinner, (which takes place in Germany about noon) and in the evening. *Zinc.*

At noon and in the evening, the pain always commences when eating, and lasts as long as he continues to eat. *Phosphorus.*

At noon, the symptoms reappear. *Argent met.*

In the middle of the day, nervous excitement. *Bryonia.*

At noon, a peculiar uneasiness and excitement of the nervous system. *Sulphur.*

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* This symptom has often been verified by me in practice, and has served me to differentiate between *Carbo vegetabilis* and *animalis*, the latter having aggravations in the forenoon, while the former has aggravation at noon and afternoon, as seen from this and the following section.

GENERAL AFTERNOON DISORDERS.

In the afternoon, general aggravation, especially the symptoms of the mucous membrane. *Aloes.*

During the afternoon, severe aches and pains in various parts of the body with severe stitches in the sides, especially the posterior portion of the right side, aggravated by the slightest motion. *Badiaga.*

Every afternoon, the whole body trembled from uneasiness and anxiety ; it seems to him as though he had committed a great crime, this terminated by violent weeping, even in the street, in the presence of strangers. *Carbo veget.*

Muscular lameness and soreness had become quite general, affecting chiefly, however, the lower limbs, in the afternoon. *Myrica.*

For many afternoons, she is seized with weakness and anxiety, she knows not how to comfort herself, what to do with herself ; this state leaves her in the evening. *Ammon. carb.*

Most of the symptoms appear after dinner (which is generally taken in Germany, where Hahnemann's provings were made, at noon or a little afterwards) and in the evening. *Zinc.*

Symptoms appear to be most prominent after dinner, from 2-30 to 3. *Gratiola.*

The symptoms appear particularly in the afternoon and evening. *Tarentula.*

Afternoon and evening, many symptoms reappear. *Rhododendron.*

The pains are worse after three O'clock both in the afternoon and night. *Thuja.*

Exacerbation of all the symptoms, about midnight and 3 P. M. *Saracenia.*

During the afternoon, all symptoms aggravated by mental work. *Fagopyrum.*

In the afternoon, many symptoms occur. *Lachesis.*

In the afternoon, general aggravation. *Eridyction californica. Spigelia. Senecio.*

In the afternoon, the pains are generally felt. *Aconitum lycoctonum.**

In the afternoon, about 3 O'clock, the symptoms generally seemed intensified. *Indium.*

From 3 to 6 P. M., daily aggravation of symptoms. *Fagopyrum.*

At 4 P. M., generally very weak and weary. *Manganum*

Her symptoms are aggravated at 4 P. M., at 8 O'clock she feels better but weak. *Lycopodium.*

From 4 to 6 P M., aggravation of symptoms. *Saponinum.*

From about 5 P. M. to 8 A. M., all symptoms aggravate. *Lil. tigr.*

In the afternoon, great excitement. *Bryonia.*

In the afternoon, great weariness. *Bryonia.*

In the afternoon, lassitude. *Colocynth.*

In the afternoon, debility. (In one prover, accompanied by increase of warmth in the whole body and heat in the palms of the hand. *Argent. nitr.*

Every afternoon, great faintness and constant yawning. *Aurum.*

Every afternoon, about 5 or 6, is attended with great

* This is not the case with the *Aconite* generally used in the homœopathic school.

weakness. *Merc. sol.*

Weakness and sleepiness every afternoon, from 2 to 3. *Sulph.*

Weak and prostrated, in the afternoon. *Sulph.*

Afternoon-Amelioration.

Afternoon and evening, often quite well (of catarrhal symptoms.) *Cepa.*

Better from 4 to 6 P. M., and after rising till noon. *Merc. iod. flav.*

Most of the symptoms cease in the afternoon, after eating, also at night, after supper. *Phosph.*

Pulsatilla symptoms rarely arise about 4 P. M.

GENERAL DRUG-DISORDERS OCCURRING IN THE EVENING.

In the evening, especially before going to bed, *subsultus tendinum. Alcohol.*

Tremors worse in the evening, when he is fatigued. *Plumbum.*

Every evening, 7 O'clock, strange uneasiness, which rouses the child from its slumber, it tosses about in bed and screams, until it falls into a sound sleep towards 10 O'clock. During the uneasiness, the head feels bloated and burning; next morning, the face is covered with spots, as if scarlatina would break out. *Ammon. carb.*

During the evening, uneasy, restless; could confine himself to nothing, wanted to be moving from place to place. *Baptisia. Merc. sol. Rumex.*

In the evening, great uneasiness, especially in the limbs, he was unable to lie still. *Calc. carb.*

Every evening, spasms with delirium, alternating with quiet humor, wildness and outbreaks of rage, with inclination to bite. *Crocus sat.*

In the evening, in bed, a great internal restlessness through the whole body, every particle trembles and is in a vibratory action. *Eupion.*

Especially in the evening and at night, often waking from sleep—lameness and stiffness with spasmodic restlessness in the muscles and tendons. *Hypericum.*

At 8 P. M., extreme restlessness begins, lasting all night till morning. *Merc. sol.*

Pinching here and there, in the whole body, worse in

the evening. *Kali iod.*

Especially in the evening and the night, pulling in all the muscles. *Copaiba.*

Evening air is unbearable to her, her feet become heavy, the external air is unpleasant to her, and every part of her body becomes sore. *Ammon. carb.*

The evening air distressed him. *Merc. sol.*

Noticed especially in the evening as it became dark, painful paralytic sensation about the ligaments of the joints as in the commencement of a paroxysm of intermittent fever, with chilliness. *Pulsatilla.*

Sharp, cramp-like jerking pain becomes firmly situated close to those parts of the body which bend (to neck, elbows and hip) and especially occurs in the evening and during rest, it is not in the joints but only near them, and seems to prefer the extensors rather than the flexors, and also to be worse in the morning. *Lactuca.*

In the evening from 5 O'clock, the pains are aggravated while lying down, but not in bed, the nights were free from pain, except on waking, which however was not caused by the pains, the warmth of the bed also did not aggravate the pain. *Ledum.*

As soon as he went to bed in the evening, the pains recommenced and banished sleep. *Merc. sol.*

In the evening and night in bed, in the morning on awaking, the pains are aggravated. *Cubeb.*

In the evening, frequent sharp pains darting from one part to another. *Dioscor.*

The principal time of the *Pulsatilla* symptoms is in the evening; next to this, the hours until midnight. *Pulsatilla* symptoms more rarely arise about 4 P. M.*

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* This is an exact translation from the original German of Hahnemann. Allen's translation of this passage is faulty and misleading. L. S.

In the evening, symptoms appear particularly. *Aloes. Alumina. Dulcam. Helleb. nigra. Aster. rub. Ledum. Pallad. Sumbul. Verat. vir. Zinc.*

In the evening, symptoms aggravate. *Natr. sulph. Kali nitr. Lachesis.* (In one prover) *Hyosc. (?) Nitr. ac. Plat. (?)*

In the evening and night, the symptoms are particularly apt to appear. *Gambogia.*

From evening till midnight, all the symptoms aggravate. *Bromine.*

Toward evening and during night till 4 A. M., all symptoms aggravate. *Æthusa. Phosph. Sepia. Thuja.*

Most of the symptoms appear to be aggravated, evening and morning. *Sanguin. canad.*

In the evening, symptoms aggravate, often connected with weariness of lower limbs. *Colocynth. Physostigma.*

Towards evening and on lying down, symptoms aggravate, amelioration on motion and on rising. *Ptelea trifoliata.*

Paralysis of the whole body, in all the joints, worse on attempting to rise after sitting, and in the evening. *Rhus tox.*

In the evening in bed, as soon as she closes the eyes, uneasiness. *Magnes. mur.*

Symptoms still return, especially marked between 12 to 1 and 4 to 6 P. M. *Sepia.*

In the evening, a general feeling of fatigue which increased to a very distressing degree. *Ars. alb. Berberis. Bryon. Colocynth. Ignat. Manganum.* (Especially after a meal) *Bufo.* (With faintness and nausea) *Asar. Europ.* (With sick feeling) *Causticum.* (With cardiac depression and nausea) *Lycopus.*

Evening and morning, great lassitude, also heaviness in limbs. *Ammon. carb.* (And chilliness) *Calc. carb.*

Symptoms appear in groups and were aggravated in the evening. *Colocynth.*

The symptoms are especially violent every other evening. *Pulsatilla.*

EVENING-AMELIORATION.

Evening (and afternoon,) all catarrhal symptoms and pain better. *Cepa.*

In the evening, symptoms disappear, with the exception of confusion in the head, and head symptoms in general. *Chelidon.*

After 9 P. M., the pains in the joints, &c., diminish gradually, and are not at all felt during the night. *Ledum.*

Evening amelioration of all pains. *Kali bichrom.*

In the evening, all symptoms disappear, except distension of the abdomen. *Asafœtida.*

GENERAL NIGHT DISORDERS.

Tossing about, anxiety at night. *Ars. alb.*

At night, very restless, feverish, must walk about. *Acon.*

In the fore part of the night, restless. *Podophyl.*

At night, very restless, continually wakes, urinates frequently, and drinks very much. *Calend.*

At night, he can get no quiet position ; he cannot lie still a moment. *Caust. Lycopod. Cimicifuga. Ignat.* (With grinding of teeth, now and then convulsions.) *Bellad. Rhus tox. Phosph. Merc. sol.*

At night, it seemed as if something forced him out of bed. *Rhus tox.*

At night, he could lie only on the back. *Rhus tox.*

Lying on the left side at night causes anxiety. *Phosph.*

Nightly nervousness. *Argent. nitr.*

At night, a kind of restless prostration. *Canthar.*

Towards night, general want of tone and life in all functions. *Piper methyst.*

Always more miserable at bed time. *Pulsat. nut.*

At night, everything rocks within him as in a ship. *Baryta carb*

When waking in the night, burning in all the veins. *Ars. alb.*

At night, during sleep, the pains are felt. *Ars. alb.*

Before midnight, the pain awakes him. *Ars. alb.*

At night, when awaking, there is anxiety, dyspnœa and sweat. *Alumina.*

Just after falling asleep, the pains became more violent

and he awoke. *Merc. sol.*

Tremors preventing sleep at night. *Merc. sol.*

As soon as he went to bed in the evening, the pains recommenced and banished sleep. *Merc. sol.*

Severe pains all over, worse at night. *Mercurius.*

Nightly drawing pains in the head and extremities. *Mercurius.*

Exostosis, especially on the tibia, swelling and sensitiveness of the periosteum, especially aggravated at night, by the warmth of the bed, and in cold damp weather, thunder-storms, &c. *Mercurius.*

Nightly burrowing pains in the bones. *Manganum.*

Especially at night, bone pains. *Curare.*

Distressing, burning and boring pains in the bones, which at night became intolerable and almost prevented sleep; the pains were especially severe in the bones of the skull, palate and nasal bones and in the teeth. *Phosph.*

Especially at night, the dampness of the air aggravates greatly the rheumatic symptoms. *Polyporus pinicola.*

The pains come on at night, in the first days of the provings, and are on the left side, extending backward to the body and head. *Plantago.*

At night, the pains are generally worse, they frequently drive one to the border of distraction, not unfrequently with unquenchable thirst and redness of the cheeks, also with hot sweat on the head even in the hair; the pains generally seem intolerable and not to be endured. *Chamomilla.*

All the symptoms were aggravated at night, and particularly by lying in bed; they compelled him frequently to rise and walk about the house: daylight finds him worn out and exhausted. *Plumb.*

Gnawing, burning pains in the flesh, worse at night,

permitting no sleep. *Secale corn.**

The most violent spasms occurred in the night. *Secale cor.*

Jerking through the whole body, at night, during sleep, and at noon. *Zinc.*

On going to bed, cramps, formication in all the limbs, neuralgic pains causing anguish and preventing sleep. *Bufo.*

When going to sleep, startings in the muscles, and shocks through the feet. *Allium sat.*

At night, especially on stretching out the legs and toes, cramps are felt in these parts. *Bufo.*

At night, the sticking pains appear for the most part, or are then worse. *Gambogia.*

Epileptic fits very often occur at night. *Curare.*

At night, epileptic fit about new moon, first the body becomes stretched, afterward it is jerked into the air, but without a cry and without biting the tongue *Silicea.*

Symptoms are particularly apt to occur in the evening, and at night. *Gambogia.*

At night, pains aggravate. *Cuprum. Hep. sulph. Kali iod. Manganum. Mancinella. Natr. sulph. Nitrum (?) Sepia.*

At night, many symptoms appear. *Merc. iod. flav.*

Towards midnight, symptoms aggravated. *Naja trip.*

Worse after sleep, at night. *Pœonia.*

At night, from 11 to 12, all symptoms appear worse. *Conium mac.*

In the morning, at two or three O'clock, the pains occur, so that he is unable to remain lying, and is worse than during the day while moving about. *Kali carb.*

Exacerbation of all the symptoms about midnight, and at 3 P. M. *Saracen.*

* This is just the kind of pains which most practitioners would consider as characteristic of *Arsenic*.

Pains are worse, after three O'clock, both in the afternoon and at night. *Thuja.*

NIGHT-AMELIORATION.

At night, all symptoms ameliorate. *Angustura.*

At night, a great number of symptoms disappear. *Alumina.*

There are some provers who reported amelioration of pain at night. *Plumbum.*

PAROXYSMAL FEBRILE MOVEMENTS.

Sudden coldness crept over him. *Arsen.*

Suddenly cold sensation in the left side of the back, as if he had been dashed with cold water, lasting a long time. *Crocus.*

Violent febrile chills for several days. *Carboneum oxygenisatum.*

Repeated shaking chills, so that the patient seems to be affected with an intermittent fever. *Cupr acet.*

Several attacks of chilliness *Digitalinum.*

Febrile paroxysms, first shivering, then chilliness, without thirst. *Ipec.*

Sense of cold, at times in one place, at times in another. *Arnica.*

Alternation of chilliness and diarrhœa ; chilliness from one diarrhœa-like stool to another , flushing of heat, especially at the face, during stool. *Merc. sol.*

Alternately, very hot and very cold hands and feet. *Phytolacca.*

Sometimes her feet are icy cold, again burning hot. *Graphites.*

Local sensations of cold or heat alternate with the pain. *Arundo Mauritanica.*

Alternation of heat in the pit of the stomach with coldness. *Lachesis.*

Heat in the head alternates with chilliness in the lower limbs. *Sepia.*

Chill and depression suddenly alternating with a reactionary warmth. *Camph.* (Hahnemann).

Alternating generation of heat and chilliness, not perceptible to the external touch. *Merc. sol.*

Alternating attacks of chill and heat and *vice versâ*, in various forms; either heat and cold in succession, or heat of certain parts with general rigors at the same time, form a prominent feature in the fever caused by *Aconite.*

Rapid alternation of heat and cold. *Arsen. alb.*

Alternate heat and coldness in different parts of the body. *Arundo mauritanica. Solanum nigrum. Clochic. Carlsbad. Sep Silic. Alumina.*

Frequent variation of temperature, now glowing heat, now cold over the back. *Atropinum.* (In the back) *Verat alb.*

Repeated attacks of chilliness and shivering in the back, with the usual general warmth of the body. *Coffea.*

Febrile condition, with alternation of chill and heat. *Iodium.*

Now heat, now coldness (the whole night) *Aconite. Angustura. Baryta carb.*

Alternation of heat and cold, rising like waves from the lower part of the body. *Bufo.*

Very hot, then very cold. *Arsen. alb.*

Either she feels too cold (and nevertheless is not cold to the touch,) or else she is too warm, (and nevertheless is not warm to the touch,) except perhaps in the palms of the hands. *Arsen alb.*

The fever shows itself at one time by an effervescence of the blood, at another by an icy coldness of the whole body, so much so that it has been compared to the action of an intermittent fever. (From breathing the dust of the Cinchona bark by the workers in Quinin factories, according to Chevalier's report.)

Chilliness and heat, alternately, from time to time, with

vertigo, constant anxiety and qualmishness. *Verat alb.*

Constant alternation of coldness and heat in various parts ; at one time the hands were cold, at another warm ; at one time the lower leg, at another the thigh was cold, at another, warm ; at one time the forehead was cold and the cheeks hot, etc., or (in the evening) flying shiverings with burning in the cheeks *Chamom.*

Constant alternations of chilliness and heat : she is constantly attacked by great heat of the feet rising up through the whole body, with sensation as though blood rushed into the face , but she was rather pale than red. After a few minutes, again creepings of icy coldness from the head down to the feet, and the heat momentarily disappeared. These attacks appeared several times, during the day *Cocculus.*

Febrile Paroxysms : Frequent thrills throughout the body, as when one warms himself by the fire in cold weather, after which he became so weak that he was obliged to lie down , all without thirst or sweat. *Cocculus.**

Directly after the chill, comes a flying heat and pricking in the skin, rapidly followed by perspiration, which at times is profuse, and lasting even from 12 to 24 hours. *Gelseminum.*

After one to several hours, chilliness subsides, general heat supervenes, mostly about the head and face, with full pulse, from 80 to 100. *Gelseminum.*

Want of life, like an internal coldness ; heat almost constantly alternating with chilliness, pale looks with blue rings around the eyes ; with dread of heat in the

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* Alteration and short duration of opposite febrile movements, all of them marked by reduced vital energy, is characteristic of the *Cocculus* fever *(Hennigke)*

cold, and dread of cold in the heat. *Sulph.*

Frequent recurring fits of shuddering, passing off quickly, without immediate heat or thirst afterwards. Sometime afterwards sudden heat, especially in the face ; feels as if hot breath came out of his nose. The fits of shuddering recur 8 or 10 times ; paroxysms of heat less frequent but longer lasting. *Sabadilla.*

Alternation of burning internal heat and cold feeling externally. *Sabadilla.*

Alternate chilliness and heat, with great redness and heat of the face. *Lycopod.*

Chilliness internally, with heat of the face and burning sensation in the cheeks. *Merc. sol.*

Alternate chilliness and heat, the latter with photophobia. *Hep. sulph.*

In frequent paroxysms (commencing early in the morning), bitter taste in the mouth, then chill with thirst, then much heat with interrupted sleep *Hep. sulph*

Frequent attacks of fever, followed by chill and heat with bloated red face, and thirst during the chill and the heat, the intervals, when there is no febrile movement, last about half an hour. *Ammon. mur.*

Several attacks of fever with thirst, coldness in the hands and feet, followed by heat of the pale face, and especially heat of the hands and feet, with cutting colic. *Cina.*

Fever for several days, more constant when not in bed, chilliness over the whole body without thirst ; cold hands, with internal burning heat and dulness of the head, great sleepiness, heaviness and weakness of the feet and stiffness of the hollow of the knees ; after lying down in bed, immediate heat and perspiration all over, also without thirst. *Helleb. nig.*

Always either chilly, or in sweat. *Causticum.*

Febrile attacks of chill and sweat, throughout the whole day, intermingled with a persistent sensation of heat and redness of the face, alternating with a little thirst. *China.*

Frequent shaking chills, often with chattering of the teeth, at various times, especially in the open air, lasting an hour; frequently followed by warm perspiration for a quarter of an hour, with a feeling of relief *Merc. cor.*

Alternation of cold clammy skin with febrile heat. *Doryphora.*

Chill—hiccup—sweat—hiccup. *Ars alb.*

Coldness of the body and dryness of the skin alternate with cold sweats. *Ars alb.*

Alternations of chill and heat, great exhaustion, vertigo, night sweats, fantasies, oppression of the chest with coated tongue, anorexia, earthy, yellow sunken face, and great prostration *Carlsbad.*

Alternation of coldness and heat, followed by profuse sweat. *Cyclamen.*

Sudden alternations of heat and chill, chills generally followed by general heat and sweat over the whole body, without thirst, either in the cold or hot stage, (mostly with confusion of the head). *Bellad.*

For several days, chill and heat, mostly shaking chills, followed by general dry heat; a little sweat only, early in the morning. *Ammon carb.*

After one to several hours, chilliness subsides, general heat supervenes, mostly about the head and face, with full pulse, from 80 to 100. *Gelseminum* *

Several attacks, in the morning, during the day, and especially in the evening; at first, much thirst, then,

* In most cases, perspiration follows the febrile reaction, and continues from a few minutes to several hours. *Gelseminum.*

after sometime, shivering, lingering heat, without thirst, during which he desires to be covered, at times, transient perspiration. *Lachesis.* (These attacks lasted for several weeks, and were at last relieved by *China*)

After an access of insanity, general chill, severe shaking, horripilation, chattering of the teeth, compressive headache, burning thirst, with fear of drinking water, after which he craves. After a new attack of insanity, the chill and yawning of the preceding fever repeated *Tarentula.*

Rigors were amongst the first symptoms noticed, chills began in the lumbar region and spread over the whole body, aggravated by the slightest draft of cold air, coldness of the whole body, increase of artificial heat produced chilliness; could not keep warm, though sitting beside a hot stove almost constantly. *Tarentula.*

Shivering, horripilation and general shaking, in coldness, yawning, violent thirst, with need of stretching; compressive headache; symptoms like the first stage of intermittent, lasting one hour, followed by pain in the heart, as if it would jump out of its place, pain in the left arm, followed by muscular weakness, heat and cough, fever with a scorching heat, intense thirst, pain in the left arm, dryness of the mouth, oppression, panting and dispnœa. *Tarentula.*

Fever paroxysms begin with chill and heat and end with sweat. *Ammon mur*

Unaccountably feverish, first hot then cold. *Calc. carb.*

Burning heat through the whole body, alternating with intense coldness that causes trembling and shaking, and repeats several times; feet constantly cold. *Tarentula.*

Sensation of heat alternating with flushes of chilliness, over the whole back. *Carlsbad.*

Whole surface of the body feels hot and dry with occasional chill, principally up and down the back as if ague would come on. *Baptisia.*

Frequent paroxysms of fever, consisting of general flushes of heat and frequent recurring chilliness and shivering (especially over the face, back, chest, and arms). *Merc sol.*

Paroxysms of heat with great anxiety as from compression in the chest, without thirst, alternating with a sensation of coldness over the whole body, and great prostration. *Merc. sol.*

Chilliness and heat alternating with faintness, nausea, pain in the right temple, redness of the eyeballs, dry and red tongue, and thirst for cold water. *Zingiber*

Alternate heat and chill, hot and cold sweat, while a dull, incessant ache pervades the bones and joints. *Opium.**

Burning heat, suddenly alternating with chilliness and shuddering, at short intervals *Sanguinaria.*

Sudden burning heat of the cheeks, with cold forehead,

* The above symptom is taken from a report of Dr Shearer, as published in the *North China Herald*, June 28, 1883, concerning opium eaters who try to break the habit The following is the report in full "Amongst the first symptoms attendant on breaking off the habit are · a constant propensity to yawn, gape, and stretch, together with languor and general uneasiness Loss of appetite and a sense of constriction or cramp in the stomach come on, the mouth and throat become dry, and there is frequent sneezing As the hours go on, shudders run through the frame with alternating heats and chills, hot and cold sweats, while a dull incessant ache pervades the bones and joints. Then follows a host of indescribable sensations, burning, tingling, twitching, that seem to run immediately underneath the surface of the skin, and prompt one to cry out for relief, or strike or clutch the nearest object in one's agony The brain is excited and irritable, and the head aches and throbs as if it would burst. Sleep there is none, and one will go for ten or twelve days and nights without, so far as one can judge, a single moment's loss of consciousness. The strength is reduced to the lowest point, and the least exertion induces panting and distress. But this only lasts for a time. Unaided by medicine, these symptoms last for twenty or thirty days, gradually abating, and then die away".

without thirst. *Sabad.*

Heat and perspiration at times, alternating with chilliness *Raphanus.*

Almost uninterrupted heat of the whole body, with redness of the face, and sweat of the head and body, after the heat, chilliness and coldness with deadness of the hands, lasting four days. *Sepia.*

Flushes of Heat.

Sudden flushes of heat, red face, and cold hands. *Euphrasia.*

Flushing heat, in the face, with febrile shivering of the body. *Sulph.*

Sudden and frequent congestion to the head, with anxiety, followed by rigor over the back, often repeated. *Aconite.*

Flushes of heat and cold, across the shoulders. *Phosph.*

Sudden warmth over the whole body, speedily disappearing, followed by weakness of all the parts. *Digitalis.*

Flushes of heat (all over the body) *Iod.* With redness of face, and fever all over. *Oleum jecor. asel.*

Flushes over the whole body, as if perspiration would break out. *Ferrum* Glonoin.*

Frequent short attacks of flushes of heat, during the day. *Cepa Clemat. Nitr. ac. Sanguin. Silic.* (Especially in the evening, with slight febrile restlessness and burning heat in the palms. *Phosph*)

Sudden dry heat, on every motion and every noise. *Bryonia.*

**Ferrum*, like *Chloral*, has face flushed—but there are no "flushes" towards the face: the flushes are over the whole body, like the flushes of *Iod*

Every quarter of an hour, heat in the face and over the whole body. *Ambra gris.*

Frequently alternating attacks of general heat, followed by sudden flushes of heat over the whole body. *Ignatia.*

Violent rising of heat to the head, every five minutes. *Sepia.*

Flushing of the face. *Amyl nit. Glon. Baptis.**

Sudden attack of general heat, as if hot water had been dashed upon her, accompanied by sad mood, weeping, and despair of life in general *Calc carb.*

Frequent flushes of heat in the head, without subsequent sweat. *Magnes carb.*

Sudden attacks of heat, while sitting, sometimes with anxiety. *Graphites.*

Flushes of heat over the whole body or some particular part of the body (head, face, down the arms, along the sciatic nerve, from chest or pit of stomach to head, &c) *Glonoin.*

Frequent rising of heat from the abdomen to the head, with burning in the cheeks. *Lycopod.*

Orgasm of blood, rising of heat from the chest to the face and head, with heat and redness of the face, especially the cheeks. *Tilia.*

Great uneasiness and orgasm of blood. *Sulph.*

Heat as from orgasm of blood, with sensitiveness of the throat. *Lachesis.*

The whole side of the body upon which he lies is painful, as if ulcerating, with intolerable thirst and frequent flushes of heat in the head. *Silic.*

After even slight motion of the body, she became weak

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* *Chloral* would apparently deserve a place amongst the drugs above mentioned; but under the action of *Chloral* the face *is* flushed—there are no flushings.

with orgasm of blood in the chest, the face became hot and the body began to glow, the vessels were hard, and distended, and her breath left her; only after resting a long time, she recovered. *Spongia.*

Heat of the stomach, and an unpleasant feeling throughout the whole body, as if feverish, soreness and languidness of the limbs, indigestion, eructation. Heat in stomach worse before, better after, eating. *Ferrum.*

Several attacks of heat with anxiety, daily, pain in the præcordial region, weeping and inconsolable, she longed to die on the spot. *Spongia.*

Frequent orgasm of blood, with (at times) violent palpitation, or, paroxysms of anxious heat. *Phosph* *

Intense heat in the head, and great orgasm of blood. *Calc. carb.*

Frequent rush of blood to the face, and painful fullness of the whole right half of the body and the lower extremities *Limulus*

Febrile attacks, from time to time *Iod Sulph ac.*

Frequently recurring sensation of heat in the head, with external heat and redness of the face, alternating with paleness *Magnes carb.*

Frequently recurring heat of the whole body, with great redness of the face. *Magnes. carb*

General heat alternates with crampy pain in the chest. *Lachnanthes.*

Heat of the head alternating with diarrhœa. *Bellad.*

Face, at times, a little flushed, at times, of a livid hue. *Glonoin*

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* Thinking very intensely, is likely to bring on a sensation of heat, as if dashed with hot water *Phos.*

Flushes of Heat with Sweat.

Paroxysms of flushings of heat, with moisture of the hands, frequently during the day. *Nitr. ac.*

Sudden heat, with sweat and anxious palpitation of the heart. *Alumina.*

Suddenly, head and face very warm; this warmth extends over the whole body, is most intense in the region of the stomach and bowels, and accompanied by sweat. *Aconitum.*

Attacks of flushes of heat, as if hot water were poured on one, with redness of the face, sweat of the whole body, and anxiety without thirst, yet without dryness of throat. *Sepia.*

Frequent flushes in the face and the whole body, followed by perspiration. *Ammon. mur Silic Petrol.*

Flushes in the face and head followed by perspiration. *Zingiber*

Flushes of heat over the whole body, accompanied by perspiration. *Alcohol. Acet ac Oxal. ac. Spongia*

In those instances in which sweating took place, the face became flushed and was most marked when the perspiration was greatest, the flush involved the cheeks and the ears, but soon passed away, and was succeeded by pallor. *Jaborandi.*

Alternation of dry skin with perspiration. *Apis. Daphne indica.*

Paroxysmal Sweat.

Suddenly occurring and as quickly disappearing, general sweat. *Bellad.*

Frequent momentary sweat, over the whole body, without any heat. *Hep. sulph.*

Transient perspiration, between the attacks of the fever. *Lachesis.*

Much disposition to sweat, sometimes hot, sometimes cold, particularly in the hands and feet. *Sepia.*

Cold sweat alternately, on different parts of the body. *Conium.*

Chilliness alternates with perspiration. *Saccharum album.**

Cold clammy perspiration, of an intermittent nature. *Cuprum arsen.*

Paroxysmal Drug Fevers.

Intermittent fever, returning frequently during the day, at indefinite periods; first, general heat with sweat in the face, violent thirst and bitterness of the mouth, then chill with general coldness even in the face, with inclination to vomit, pressure in the forehead, extending into the temple; during the heat, vertigo, as if he would fall. *Sepia.*

Fever paroxysms, with burning pain and formication,† all over the body. *Arundo maur.*

Fever paroxysms, with nausea, coldness, thirst, pain in the bowels, and salivation. *Arundo maur.*

The typhus-like fever, with extreme restlessness alternating with stupor. *Ars. alb.*

Febrile attacks. *Jalapa.*

Attack of actual fever (in one prover, this febrile attack resembled rheumatic fever). *Eucalyptus.*

Repeated attacks of fever, with pain in the shoulders and nape of the neck. *Ars alb.*

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*See p. 46.

† In women, formication begins in the loins and rises to the face, where it is succeeded by perspiration.

PERIODIC DRUG FEVERS.

In some cases, the intermittent fever appears like a *febris erratica*; there occur, at indefinite times, attacks of chillines, heat, and sweat. *Morphinum.*

Hectic fever. *Cuprum. Merc. Plumb.*

Hectic fever, with emaciation, cough, night-sweats, diarrhœa, dyspnœa, and troublesome swellings of the feet and legs. *Ac. ac. (?)*

Daily repeated chills, with sensation of a heavy dragging up of the abdomen when walking and standing. *Carbon. oxygen.*

Coldness of the feet, every day (often associated with oppression of the chest); at times, painfully cold; after which, heat sometimes follows. *Lachesis.*

Shivering over the whole day, with hot face and cold hands, without thirst—repeated after 24 hours. *Hyos.*

Quotidian intermittent fever, which returns every day, at the same time. *Cactus.*

Daily, at the same hour, chill, followed by heat. *China.*

Quotidian ague, sometimes tertian. *Ars. alb.*

Violent shivering with yawnings, as in intermittent fever, which she had ten years before; with this the head is confused, drawing in the left tibia down to the ankle, whereby the foot becomes quite cold; this is repeated every other day, as chilliness with cold feet. *Bromium.*

Every other day, chills. *Merc. sulph.*

Usually tertian, or sometimes quotidian, type of intermittent fever, sometimes anticipating, sometimes postponing: patient complains that at the time when the

fever usually occurs, he feels uncomfortable, exhausted ; with the febrile paroxysms are associated neuralgic pains in various nerve-area, (supraorbital, intercostal, and cardiac pains) ; spleen enlarged ; after the paroxysm a sediment is noticed in the urine. In the more violent forms of intermittents, delirium occurs during the height of the fever ; in this delirium patient cannot be kept in bed, and is excited even to raving ; great exhaustion and prostration follow the fever and continue into the apyrexia. *Morphinum.*

Anticipating type of tertian intermittent fever. The fever returned four times, receding two hours each time and lasting two hours. Chill passed down the back and around the abdomen. *Ol. jec. as.*

Postponing chills. *Kissingen.*

Tertian fever. *Baryta mur.*

Swelling of the whole body, face, abdomen, legs and the arms down to the wrist joints, without thirst, but with great shortness of breath lasting three weeks ; fever every second or third day, chill and heat alternating, coming on at irregular hours, even at night, the heat accompanied with sweat all over *Sepia* *

She had three attacks of intermittent fever ; the first in November, lasting three days ; the second in December, lasting seven days, and the third from the 14 to 16th of January. The symptoms of the attack were as follow : Between 8-30 and 9 A. M., after getting out of bed, chilly with chattering of teeth, nails and lips blue, sometimes sickness on waking, bad taste in the mouth, desire for much cold drink, pulse feeble, wanted to lie down, and be quiet and wrapped up,

* The above symptoms give us a fair picture of *Berry-Berry*—a disease common in various parts of India. Study in connexion with *Sepia., Dulcam. Kali nitr. Natr. Hypochloros. Tarentula.* and (according to Hering) *Nux mosch.*

breath offensive, tongue brown ; this lasted till 1 P. M., then fever came on. During the fever, there was full pulse, frontal pain, not much thirst, especially hot to touch on abdomen, with pain there, feet and hands cold objectively, could not bear the least draught, breath offensive, tongue brown ; this lasted till 4 or 5 P. M., she then seemed well for one or two hours. Then about 6 P. M., she was slightly chilly, till about 8 P. M. Then there was heat again, could not sleep, had bad dreams ; could not sleep after 3 A. M. She was losing flesh very fast and getting very weak. The second attack was the most severe, and the third (which occurred after she had been removed to another room, free from the arsenical wall-paper) was the slightest *Arsenic.*

Regular intermittent form of fever (in one woman who had taken an infusion of matches). *Phosphorus.*

Quotidian or tertian fever, in the forenoon or towards evening, preceded or not by chilliness. *Centaur. tagan.*

Every third day, repeated tearings over the whole body, with chills all over the body. *Anacard.*

Every seven days, fever and ague. *Ammon. mur.*

After the lapse of 5 weeks, disagreeable feeling of chilliness returning. *Antim. crud.*

Complaints assume the form of intermittent fever. *Antim. ox.*

Paroxyms similar to intermittent fever, repeated, at first, every two weeks, and then, every month, finally remaining away for a year ; the paroxysm lasted from half an hour to two hours, consisting of shivering of the limbs, ending with perspiration. *Strychn.*

Intermittent fever seems very prevalent amongst the workers in nearly all the mines and factories, as reported by nearly all observers ; but whether due to

mercury or local causes, is uncertain. *Mercury.**

One of the men who escaped salivation suffered from intermittent fever. *Mercury.*

The reactionary fever after the poisoning assumed the type of an intermittent. *Vipera.*

A person formerly aguish may very easily reproduce the paroxysm, with greater or less severity, by the untimely and improper use of *Quinine.*
(Phillip's Mat. Med and Therapeutics. Vegetable Kingdom 1874. P 448)

It is worthy of note, that some persons say that after taking quinine for some time, the drug itself produces similar symptoms. (of malarial poisoning with its periodic agues)†

I have heard intelligent natives ask not to have quinine given to them, as 'they did not wish to make the fever worse'‡

Occasionally, some fever *Cuprum.*

Daily fever. *Conium.*

Daily fever, at the same hour, with very short breath. *Cina.*

Paroxysms of fever, returning at the same hour, every day. *Ars. alb.*

Quotidian or tertian, remittent or intermittent, rather postponing than anticipating. *Gambogia.*

Intermittent fever, quotidian, tertian, quartan. *Podophyl.*

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* Allopaths are in the habit of prescribing some mercurial preparation prior to administration of quinine, in cases of intermittents. The mercury is prescribed on the ground of some vague speculation, with which we can have nothing to do. Experience seems however to show, that quinine manifests its antiperiodic virtues better when preceded by mercury. May it not be that Mercury is in a rough way homœopathic to intermittents and paves the way to the quinine?

† Climate and Fevers of India. By Dr. J Fayrer, London. Churchhill. 1882. P. 77.

‡ Ibid. P. 111.

Quartan fever, with constant diarrhœa at the days free from fever. *Iod.*

Quotidian febrile state, consisting in increased heat, frequent pulse, heat in the palm of the hand, and desire of lying down all the time, with aggravated ideas about his disease. *Tarentula*

The fever persisted for a few days with an irregular type, and necessitated the employment of antiperiodics. *Vipera*

Fever recurs for several days, sometimes in the morning, sometimes in the evening. *Verat alb*

Fever, continued or intermittent, quotidian, tertian or quartan, always with great prostration. *Robinia*

Tertian fever, with general painful weariness, great hunger and urgent thirst. *Bufo (?)*

Quartan fever, with intense heat and violent delirium. *Bufo (?)*

Intermittent fever, every one, two, or three days, irregular in its type. *Saccharum album*

From another prover, rather oversensitive to the effects of white sugar, as commonly used, we have a description of the fever, which was invariably caused in him, whenever he took sugar: *chill* commencing in the small of the back, and spreading thence up and down; severe headache, and occasional vomiting; *fever*, followed by headache, morbid hunger, and a hectic flush on the cheeks; *no sweat*, except when weakened by repeated attacks; before and during the paroxysm the burning in stomach and back was simply intolerable; no thirst.

Fever of a remittent type, and sometimes with brain symptoms. *Rhus. tox. Alstonia constricta* *

Constant fever of a remittent type, reaching its highest

* According to the unpublished provings of Dr. Bepin Behari Moitra, late of the Chandney Hospital.

point in the evening of the eighth day, when the pulse was exceedingly small and soft. *Phosphor*

Fever of an adynamic intermittent type, (such as I have frequently witnessed in Peshawar on the north-west frontier of India) with considerable prostration during these seven days. *Strychn.*

In this way (*viz*, by administration to healthy men ¼ grain doses of arsenious acid) can be produced, in healthy persons, attacks of remittent fever, though not such rigors as those of true fever, but only flushing heat, disappearing and returning, and chiefly felt in præcordial region, whence it passes to the rest of the body, and is especially felt in forehead and eyebrows. Such accessions terminate sometimes in partial or general sweats, and at other times merely in a moist state of the skin. *Arsen*

Regularly recurring perspiration *Strychn. Ant. crud.*

PERIODIC MORNING DRUG-FEVER.

CHILL.

Weak and chilly, in the morning. *Verat. alb.*

In the morning, she feels chilly while in bed ; chilliness continues the whole forenoon *Arn mont.**

Morning when in bed, he has a feeling of cold on the right side on which he is lying. *Arn. mont. (?)*

At 5 A. M. in bed, chilliness. *Bovista.*

From 6 to 9 A. M., chilliness, cold to the touch externally, with griping in the abdomen, without subsequent heat and without thirst. *Bovista.*

Several mornings in succession about 8, shivering for one hour and a half. *Conium.*

On rising from bed in the morning, chilliness, which was preceded by sweat at about midnight. *Hep. sulph.*

In the morning in bed, chilliness. *Graphites.*

For several days commencing in the morning, general, shaking chills with gooseflesh , painful sensitiveness of the external head to touch and motion ; drawing tearing in the limbs, and frequent sticking in the joints, especially of the elbows and shoulders, without thirst *Helleb. nig.*

From morning till evening, chillness for 4 days. *Magnes. carb.*

Chilliness in the morning after rising, for several days in succession. *Nux vom.*

In the morning, sensation of chilliness on the back and

* *Arnica* has : when waking from sleep (day or night) he feels an internal continued chilliness, without ever having any shivering.

limbs, with painfulness of the skin as if it had been frozen, and a sensation of falling asleep in the limbs, like that caused by cold water. *Nux vom.*

In the forenoon before nine, chilliness, ice-cold hands and blue nails, (he was obliged to lie down) lasting till noon. After the chilliness, thirst, followed by heaviness of the head, throbbing pain in the occiput, and heat of the face, with usual warmth of the rest of the body, lasting till 3 P. M.; in the evening, felt well; at night, profuse sweat, especially at the abdomen. After the heat, nausea Quotidian attack. *Dros.*

Chill on rising; chill preceded by a miliary eruption, most copiously developed on the forehead and face; during chill, great hunger; any food taken was speedily vomited; intolerable pain in the back and neck and hip joint; in the hot stage, urgent thirst with muttering delirium. Miliary rash becomes dark, almost of a livid color. This group of symptoms repeated itself daily for a fortnight. *Ailanthus.*

Every day at 9 A. M., febrile shivering down the back, with some nausea, without subsequent heat. *Magnes. carb.*

At 4 A. M., severe attack of cough, with shivering, lasting for hours. *Anacardium.*

Morning chills—sweat in the evening. *Phosph.**

In the morning and evening, chill and internal chilliness; it constantly seems as though one would freeze even in a warm room. *Pulsat.*

Morning and evening, chilliness. *Chlorum (?)*

Fever with shaking chill, especially in the morning. *Sarracenia.*

Chilliness, every morning after rising.† *Spigelia.*

* As a rule, *Phosphorus* has rather pronounced evening chills.
† The chills extend from the feet upward.

Chilliness without thirst, every morning. *Thuja.*

Febrile chill with thirst, in the morning. *Verat. alb.*

In the morning, first chilliness, afterwards heat. *Arnica.*

In the morning after waking, chilliness, sometimes with slight heat between the attacks of chilliness ; this continues till after midday, when it is followed by an increased warmth, especially in the head, with symptoms of impending coryza, especially moisture of the nose and sneezing. *Berberis.*

In the morning, coldness with shuddering, in the afternoon, general heat and thirst. *Copaiba.*

In the morning, chilliness, heat throughout the rest of the day, but no perspiration. *Eupat perf.*

In the morning, the paroxysm of fever generally commences, thirst several hours before the chill, which continues during the chill and heat. *Eupat. perf.*

Especially morning and evening, (on going to sleep) persistent icy coldness of the feet, mostly with heat of the face, violent beating of the heart, and apprehensiveness. *Natr. carb.*

PERIODIC MORNING HEAT.

In the morning, the febrile symptoms occur more particularly and are accompanied with great malaise and tendency to delirium, which ceases during the sweat. *Æthusa*

In the morning especially, dry hot skin, lasting till midday. *Ailanthus. (?)*

In the morning after waking, dry heat over the body. *Arnica.*

For several mornings on waking, after a restless night, orgasm of blood. *Calc. carb.*

In the morning, troublesome heat in the palms of the hands. *Carb. an.*

In the morning, glowing heat in the face. *Crocus. Sepia.*

He gets very hot in the face, in the morning; pale face, in the evening. *Sepia.*

Violent dry heat in the head, with glowing face, in the morning on waking. *Sulph.*

In the forenoon, in others in the morning, heat in the head. *Bryonia.*

In the morning in bed, sensation of general heat with thirst, whereby he does not wish to be uncovered. *Ignatia.*

About 3 A. M., heat all over. *Ignatia.*

Especially in the morning, increased warmth. *Mephitis.*

Very early in the morning, heat in the soles of the feet; he tries to cover them, because cold causes intolerable pain. *Nux vom.*

Fever, every day in the morning. *Thuja.*

Fever, especially in the morning on waking, in the evening when going to bed, and during the night. *Kali iod.*

Morning till evening, fever. *Robinia.*

Febrile heat, every morning about 9 O'clock, and in the afternoon about 5, lasting about an hour, with deep yawning, excessive thirst, headache and pulsation in the abdomen. *Kali carb.*

Anxious heat, from 4 to 5 A. M. and from 5 to 6 P. M. *Sepia.*

Dry heat, in the morning in bed. *Sulph.*

The night fever abates in the morning. *Aconite.*

MORNING SWEAT.

Morning sweat, over the whole body. *Am. carb. Coloc. Natr. mur. Silic. Calc. carb. Lycop. Nux vom. Phosp. ac. Nitr. ac. Ferrum. Magnes. carb. Acet. ac. Pimpinella. Calc. acet. Sepia. Tilia. Pulsat. Rhus tox. Senecio.*

Morning sweat, over the whole body, from the time he

wakes to the time he rises. *Ars. alb.*

Towards morning, general sweat with only the ordinary warmth of the body. *Helleb. nig.*

Sweat, especially towards morning, but also during the night. *Chelid. majus. Kali iod.*

Every morning, he perspires ; if he falls asleep a second time, and if he then rises, he is so weary and exhausted, that he would rather lie down again. *Ignatia.*

Nearly every morning, sweat with thirst. *Magnes. mur.*

Every morning, sour sweat all over, with great weakness of the limbs, for the first hour afterwards. *Iod.*

Began to perspire, after 5 A. M. *Nux vom.*

Every morning, perspiration all over, exhausting him. *Phosphorus.*

Towards morning, perspiration and feeling of anxiety. *Phosph.*

During the sleep in the morning, sweat, disappearing after waking. *Pulsat.*

Sweat, every morning in bed after waking. *Sepia.*

Sweat, in the morning after waking, continues all day, makes him weak in the evening *Sepia.*

Sleep heavy, exhausting, every night, with sweat in the morning. *Hypericum.*

Profuse perspiration, after 4 A. M. every morning. *Stannum.*

Morning sweat always after waking, about 6 or 7 O'clock. *Sulph.*

Profuse sweat at waking, 5-30 A. M. *Sepia.*

When remaining in bed after 6 O'clock, begins to perspire. *Alumina.*

Especially in the morning in bed, debilitating, sour, sweat. *Bufo. Lycop.*

Sourish night sweats, five mornings in succession. *Sepia.*

In the morning on waking, general biting, itching per-

spiration. *Paris quadrif.*

Morning sweat, mostly on lower part of the body. *Sepia.*

Every morning, profuse sweat of the feet. *Pulsat.*

Sweat on both thighs, in the morning *Rhus tox. (?)*

Morning sweat, on the joints. *Ammon. carb.*

Morning sweat, only on the face. *Ars. alb.*

Early in the morning, sweat (profuse over the whole body, or solely about the head). *Hep. sulph.*

Every morning in bed, sweat on the neck. *Euphorbium.*

Every morning in bed, sweat on the sternum. *Graphites.*

Morning sweat, mostly on the neck, nape of the neck, and forehead. *Stannum.*

Profuse perspiration in the morning, only on itching parts. *Sulph.*

In the morning, the paralysed parts are often covered with a copious viscous perspiration. *Plumbum.*

Towards morning, cold, sweaty feet. *Mercur.*

Towards and in the morning, sweat on single parts. *Calc phosph.*

Morning and night sweats. *Ammon. mur. Ant. tart. Argent nitr*

Every other morning, general warm sweat *Antim crud*

In the morning at daybreak, perspiration, till towards noon, on alternate mornings, and each time preceded by headache *Ferrum.*

Sweat, especially upon the chest, every morning, from 5 to 6 for 8 days in succession. *Bovista.*

Morning perspiration, particularly on the body and occiput. *Ferr. magnet.*

PERIODIC FORENOON DRUG-FEVER.

CHILL.

In the forenoon, much thirst, an hour after, chill over the back *Angustura.*

From noon, and at times appearing earlier, till evening, febrile chill with gooseflesh.* *Carduus benedictus.*

Chilliness, in the forenoon *Antim. crud. Sarsap. Graph*

Usually about 10 A. M., lasting from half an hour to an hour, chilliness, in the back, with cold hands and blue nails, sometimes the coldness extends into the arms *Conium mac*

Shivering, several forenoons, about 10 O'clock, with coldness in the hands, deadness of the fingers, and insensibility of their tips. *Stannum.*

Intermittent fever, especially in the forenoon. *Guarea.*†

In the forenoon, lassitude and great chilliness, in the afternoon, shaking chilliness in the back *Alumina.(?)*

Before midday and in the evening, horripilation. *Allium sativa.*

At 11 A. M., chill, in the evening at 6, heat. *Carbo veg.*

Daily at 10 A M., febrile chill, but gradually recurring later Head constantly hot during febrile chill, great heat of head and face in the afternoon. *Kissingen.*

At 9-45 A. M, frequent chilliness in the back with cold hands. *Ledum.*

Chilliness for an hour, at 10 A. M., followed by rest till 3 P. M., then heat in the head and the hands, for two hours, with thirst. *Sulph.*

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* Paralytic like heaviness of the limbs, worse during the fever.

† The *Guarea* symptoms as they are quoted in Allen's Encyclopædia from Dr. Petoz's Record, contain both pathogenetic and clinical symptoms.

Fever, every forenoon; internal chilliness, worse daily, with vertigo as if the head would sink down, without thirst; followed by such great weakness, that he could no longer go upstairs, with perspiration day and night only on the head, which was puffy *Sulph.*

Till 11 A. M., I am always very cold, from 12 to 2 P. M., excessively hot, from 3 to 4 P M., again cold, and before bed time, hot once more *Sulph.*

The whole forenoon, shuddering over the whole body which passed into a febrile chill with gooseflesh and coldness, the head being hot and the hands cold. *Argent. nitr.*

FORENOON HEAT.

From 11 A. M to 12 or 1 O'clock, hectic fever every day. *Argent. met.*

In the forenoon, (in other provers, in the morning), heat in the head. *Bryonia*

From 10 A. M to 3 P. M, external heat. *Canthar.*

At 11 A. M. or thereabout, heat and redness of face in patches. *Natr. mur.*

Fever, usually occurring from 10 A. M. to 8 P M., or from midnight to 8 A M, without being preceded by perceptible cold. Sweat, little. *Silicea.*

Great heat of the face and hands with prostration and hypochondriac mood for several forenoons. *Nux mosch.*

Flushes of heat, every day after breakfast. *Thuja.*

Every forenoon, or every other forenoon, heat, preceded or not by chilliness. *Centaura tag.*

FORENOON SWEAT.

There is not a single remedy in our Materia Medica which had produced a periodic forenoon sweat, and only one remedy that had produced partial periodic

noon-sweat, as may be seen from the following:

Unusual perspiration of the feet, not offensive, so that by 6 P. M., he had to dry his stockings; this was repeated for several days, beginning at noon. *Lactic acid.*

PERIODIC NOON DRUG-FEVER.

CHILL.

About noon, chills along the spine, and with them a sensation of heat and increased lethargy; the hands and feet were not cold, but rather hot, as also was the head. The chills appeared in the upper part of the spine, close to the occiput, and extended downwards to the extreme end of the coccyx, but did not radiate from the spine. Warmth dissipated them for a time. Neither motion nor open air affected them. About 5 P M, the chills subsided, no sweat followed, but profound sleepiness set in, a sleepiness so intense, that the prover retired three hours earlier than was his custom. He did not fall asleep, however, but lay enchanted by a vivid imaginaton. At 10 O'clock, the prover became restless, felt the bed burning hot, the legs and back ached, and the brain seemed too large for the skull, about midnight he noticed that the palms of the hands, the lower parts of the abdomen and the inner sides of the thighs were bathed with perspiration. These febrile attacks continued regularly for six consecutive days *Argent nitr* * *(Hahnemannian*

* As far back as 1876, in a paper contributed to the World's Homœopathic Convention, held at Philadelphia, I recommended *Argent. nitr.* in malarial cachexia and in cirrhosis of the liver of malarial origin. Since then I have learnt that physiological experiments on animals with the above mentioned salt gave rise to a shrunken liver with increase of connective tissue both in the liver and in the kidneys. (See *Lancet*, July 22, 1882.) And now we learn besides that a regular intermittent fever has been produced in man by the use of the salt.

Monthly, July 1883.)

At noon again, occurred the usual shivering as if after exposure to a draft of air, with blueness of the nails, and gooseskin, at first on the outside of both arms, then on the back down to the sacrum, and lastly on the abdomen, when he felt as if he were stroked across with something cold. It was lessened by the heat of fire and increased by movement, and was accompanied by the following symptoms: weariness, paleness of the face which has a suffering expression, pain in the middle of the upper arms and of the thighs and legs as if the bones were broken, and pains shooting through the outside of the feet. All these symptoms did not interfere with the prover's appetite, on the contrary, he ate his food with relish. *Sulph.*

Between 12 and 1, coldness, chilliness, sleepiness; at 3-30, heat, fever and headache, an hour later, fever and headache begin to disappear *Ferr. iod.*

NOON-HEAT.

About noon, uncommon burning in hand and feet. *Ammon carb.*

Every day about noon, sudden heat of the head and redness of the face, with considerable obstruction of vision, and great thirst, lasting an hour. *Bellad.*

Every forenoon at 11 O'clock, paroxysm of fever without thirst and without previous chill, lasting one hour; she felt hot and was hot to touch, with red face, followed by anxiety and slight sweat, especially on the hand and feet and on the face, for four days in succession. (Previous to menstruation). *Calc. carb. (?)*

From noon till evening, fever with violent heat about the head, dark redness of the face, and thirst, headache set in half an hour before the heat. *Silic.*

At noon (after eating), glowing hot cheeks, with cold hands and feet without shivering, recurring at the same time, for two days. *Capsicum.*

Fever commencing at noon, becomes quite severe at 3 P. M. *Ferr. iod.*

During the midday rest, great heat of the face, with throbbing in the cheeks and forehead, the whole face looked brownish red; after resting a little, the heat of the face disappeared, but the headache remained, with frequent urging to urinate, till the next noon. *Kreas.*

Attack of fever, at noon. *Spiranthes.**

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* This drug requires further study.

PERIODIC AFTERNOON DRUG-FEVER.

CHILL.

In the afternoon, continued chilliness with external heat and red face. *Ars alb.*

In the afternoon, extremities and face cool, towards 5 P. M., cold. *Ars alb.*

In the afternoon, fever; shuddering about the head with stretching and drawing in the limbs, followed by chilliness and goose-skin; in the evening, fever; and till 9, heat over the body, especially the face, without sweat; cold hands and feet. *Ars. alb*

Every afternoon, shivering down the back, which seems to commence in the chest. *Carbo anim.*

In the afternoon, shivering more frequent. *Æthusa.*

Chilliness, always coming on in the afternoon, and lasting till late into the night, with slight general weakness and heaviness of the limbs. *Coc. cact.*

Every afternoon, chilliness for two hours, with cold hands and dryness of the mouth. *Petrol*

In the afternoon, chilly, must go to bed, (this is succeeded in one prover by heat and sweat.) *Ferrum.*

In the afternoon, chilliness, (then some heat) then profuse cold sweat, all without any thirst. *Gelsem.*

In the afternoon, fever; chilliness and coldness with blue nails, for four hours, followed by general heat and burning of the hands, with thirst, without subsequent sweat. *Nitric ac.*

Febrile chill, in the afternoon, lasting an hour, followed by heat all over, lasting a quarter of an hour, after-

wards general perspiration for two hours, thirst neither during chill nor heat. *Nitr. acid.*

Every afternoon, coldness and weakness. *Phosph.*

Repeated shivering, in the afternoon, in the evening, general burning heat and violent thirst, frightful starting up preventing sleep, pain like wandering labor pains, painfulness of the whole body, so that she would not turn over in bed, and watery diarrhœa. *Pulsatilla.*

During the afternoon, great coldness of the lower extremities. *Rumex.*

Nearly daily, especially in the afternoon and evening, the patients complain of chilliness, increased sensation of heat, with only a moderate rise of temperature, and excessive thirst, lasting, sometimes only four hours, sometimes even for 12 hours. *Morphia.* (Dr. Lœvinstein. *Berliner Klinische Wochenschrift* No. 6, 1880)

Worse, in the afternoon, constant coldness, as if cold water were dashed over her. *Baryta carb.*

Especially in the afternoon, at night, and after meals, chills. *Sarracenia.*

Distressing sensation of chilliness, in the afternoon, especially in the arms. *Silicea.*

Short chill, every afternoon, followed by heat and thirst, with cold feet and sweat on the face and hand; dry cough at night as soon as he got into bed. *Sulph.*

Especially in the afternoon and at night, alternate coldness and heat, or shivering followed by heat, once or twice a day, or every two days. *Bellad.*

Afternoon, every second day, coldness with thirst and sleep, followed, on waking, by heat with pressive pain in the inguinal region, without subsequent sweat. *Borax.*

At 1 P. M. and somewhat later, each day, fever, consisting only of chilliness. *Canthar.*

Chilliness, every afternoon about 1 O'clock, with hot ears and hands. *Pulsat.*

At two O'clock after dinner, shuddering preceded by headache, left side. *Chlorum.*

At 3 O'clock every afternoon, chilliness with hunger, the chilliness increased after a meal. *Ars. alb.*

At 3 P M, severe chill, (3 P M. was the time when his headache was usually worse) beginning with yawning, discomfort, anxiety and chilliness, accompanied by oppression of the chest, pain in the neck and drawing in the upper extremities, increased frontal headache. After a two hours' chill, came a moderate heat, which lasted till 8 P M, with hot dry mouth, during which the patient fell asleep, at first, frequent startings during the unrefreshing sleep, but after midnight, he became quiet. *Arsen hydrogenisatum*

At 3 P M., shivering, with or without thirst, without subsequent heat *Angustura.*

Every afternoon at 3 O'clock, chilly, she shudders, worse in warmth, the chills run down the back; hands feel as if dead, feverish hot after about an hour, with a hoarse cough, heat of the cheeks and hands without thirst; ceases gradually, but she feels heavy and prostrate. *Apis*

Every afternoon, from 3 O'clock till evening, chilliness, increasing progressively without any subsequent heat or thrist. *Lycopod.*

Internal shivering, with great thirst, (in another prover, without thirst) without subsequent heat, about 3 P. M., for several days. *Staphisagr.*

Horripilation between the shoulder blades, sometimes between 3 or 4 P M., or in the evening. *Sarracenia.*

At about 4 P. M., chilliness, incessant yawning, nausea, inclination to vomit, chilliness starting from the back

and extending over the whole body, with coldness of the hands and feet, no sweat, no thirst, but heat which was confined to the face, the chill lasted two hours and a half and ended with excessive weakness and weariness of the feet, inclination to sleep, and drawing in the wrist and fingers of both hands. *Lycopod.*

About 4 P M., chill without thirst, (preceded however by thirst about 2 P. M.,) coldness of the face and hands, with anxiety and oppression of the chest; afterwards, lying down, and drawing pains in the back extending to the occiput and thence to the temples and crown of the head, three hours afterwards, heat of the body, without the thirst; the skin was burning hot, there was sweat only on the face trickling down in large drops like pearls, sleepiness without sleep, full of restlessness, the next morning sweat over the whole body *Pulsatilla.*

Every afternoon, from 4 till going to sleep, chilliness extending up the back. *Magnes. carb.*

At 5 P. M, violent chilliness, especially of back and feet, after half an hour sweat without thirst. *Alumina.*

Every afternoon at 5 O'clock, the shuddering returned. *Arsen alb.*

AFTERNOON-HEAT.

In the afternoon, constant heat increased by the slightest motion, it affects the head especially. *Antim. tart.*

In the afternoon, heat in the hands and in the head. *Berberis.*

Daily, in the afternoon, fever. *Chelid. Cina. Stram.*

Every afternoon, heat followed by increased sweat and deep sleep. *Cina.*

In the afternoon, frequently repeated flushes of heat. *Colchicum.*

Several afternoons, dry heat all over the body, as if perspiration would break out. *Natr. sulph.*

Afternoon and evening, (during menstruation) heat and orgasm in the head, with heat and perspiration of the whole body. *Magnes. mur*

In the afternoon, fever; heat, without previous chill. *Phosph.*

In the afternoon, the heat and many abdominal symptoms worse. *Phytolacca.*

Every afternoon from 1 to 6, attack of heat. *Sepia.*

Heat about the head, increased every afternoon and evening. *Santoninum.*

Flushes every afternoon, headache. *Natr. phosph.*

Fever, beginning in the afternoon and lasting all night. *Sarracen (?)*

Heat of the body, every afternoon, without thirst, with cold fever. *Squilla.*

Febrile paroxysms, during afternoon, consisting of heat and frightful thirst, very short breath. *Silicea.*

For the first three afternoons, the body feels warm. *Angustura.*

In the afternoon, heat over the whole body, without thirst, with sensation of dryness of the skin, though with some perspiration on the face. *Ignatia.*

At 2 P. M., feverish, much heat in head and face, with heavy headache and pain in eyes, throbbing in the temples. *Physostigma.*

After dinner, a sort of fever, alternate heat and chilliness, sweat on the head from 1 to 4 P. M., then headache which left a pain in the nape of the neck. *Sepia.* (This was for two days preceded by pain in the region of the navel, mucus discharge from rectum, and congestion of blood to the chest).

Fever recurred for 4 to 5 days regularly, between 2 and

3 P. M., gradually subsiding between 8 and 9 *Sanguinaria canad*

In the afternoon, the fever returned, commencing about noon, becoming quite severe at 3 P. M. The skin was not very dry, but warm and hot, at 4 P. M., the fever disappeared and the pulse decreased, the skin began to be moist, but there was no very profuse perspiration, except on the forehead. *Ferr. iod*

At 3 P M., rather warm, feverish, but not thirsty. *Ferrum.**

Quotidian fever, commencing at 2 or 3 P. M. and continuing into the night, burning heat accompanied by partial and transient chills, incoherent speech, great prostration, and often paralysis of the limbs. *Curare.*

Fever, every afternoon from 3 to 6. *Nitrogenium oxygenisatum*

Every afternoon at 4 P M, heat in the face, with nausea, and heaviness in the whole body, eating relieves. *Anacard.*

At 4 P. M., general dry heat, with a full, hard pulse (ears cold). *Chelid.*

Between 3 and 4 P. M., heat, with headache, great thirst, pulse 100, scanty and dark urine, uneasy night. *Clematis.*

Heat and perspiration over the whole body, from 4 to 5 P. M., followed by chilliness, during and after the heat thirst. *Stannum.*

Heat of the face, every afternoon from 5 to 9. *Sulph.*

At 5 P. M., burning heat in the palms of hands and soles of feet, extending thence up, and over all the limbs, with general restlessness, greatly increasing in the evening and after going to bed, with constant search-

* One prover records. Heat with perspiration, after chills, at 3 P M.

ing for a cold place in bed. *Lil. tigr.*

AFTERNOON-SWEAT.

In the afternoon, profuse, sour, offensive perspiration *Fluor ac.*

In the afternoon and evening, sweat of the feet most profuse. *Graphites.*

Every afternoon, hands sweat very much. *Iod.*

Especially in the afternoon, inclined to sweat on the slightest exertion, with a feeling of anxiety. *Berberis.*

PERIODIC EVENING DRUG-FEVER.

CHILL.

In the evening, attacks of chilliness, frequently accompanied by hair standing on end, blue hands and nails, chattering of teeth and shaking, sometimes these symptoms are followed by nightly heat, and by sweat in the morning. *Ammon carb.*

Towards evening, frequent chilliness continuing until going to bed. *Ammon carb.*

In the evening, after lying down, and as often as she awakes, chilliness. *Ammon. mur.*

In the evening, chilliness, with or without thirst, sometimes preceded by thirst. *Ammon. mur.*

Every evening, feverish chill, without thirst and without subsequent heat. *Agaric. musc.*

Frequent repetitions of chills, in the evening, or alternations of chill and heat. *Alumina.*

Becomes chilly, at sunset. *Ignatia.*

Mostly in the evening, chilliness. *Arnica.*

In the evening, attack of chilliness lasting 5 minutes, and again in the morning on waking. *Arsen. alb.*

Every evening, rigors followed by heat *Ars alb.*

In the evening, coldness of the hands and feet and even about the abdomen. *Ars. alb.*

Towards evening, fever, chilliness, with drowsiness and disagreeable sick feeling through the whole body as after a paroxysm of fever, after midnight, profuse sweat on the thighs. *Ars alb.*

In the evening, coldness of various parts of the body. *Aurum.*

From 7 to 10 P. M., (for 8 days) fever, commencing with chilliness in the back, the first day with thirst ; no heat or sweat afterwards ; every time, with violent drawing pain in the abdomen. *Bovista.*

In the evening, chilliness lasting the whole night. *Bovista.*

Hot and red cheeks, with chill all over, goose-flesh and thirst. *Bryonia.*

After lying down, chilliness in bed. *Bryon.*

Evening chill. *Calc. carb.* and *caust. Petrol. Manganum. Magnes. mur. Nitr. ac. Phellandrium aquat. Phosph. Pulsat. Sepia. Kali iod.* and *nitr. Sabina. Cyclamen. Chelidon.*

About 6 or 7 P. M, shivering, thirst, anxiety, uneasiness, loss of senses and intolerance of noise (this was preceded the first day (?) by general heat and sweat without thirst of a few hours' duration). *Capsicum.*

In the evening when in bed, chilliness followed by sweat during sleep. *Carbo anim.*

In the evening before going to sleep, shivering, with weariness and flushes of heat. *Carbo veget.*

In the evening, very cold hands and feet. *Carbo veget.*

Towards evening, chilliness, hopeless despondent mood, pain in the chest and great sleepiness. *Ant. tart.*

In the evening in bed, (for 8 days in succession) wide awake, cannot fall asleep an hour ; this symptom is accompanied by frequent shiverings, especially over the whole of the left side upon which he does not lie, or by sexual desire with erection, when getting warm, which makes him yet more awake ; this repeated itself after five weeks. *Antim. crud.*

Especially in the evening, flushing of the face, and cold hands and feet *Aconite.*

Towards evening, burning heat in the head and face, with redness of the cheeks and outward pressing

headache ; at the same time, rigor over the whole body, and thirst. *Aconite.*

Towards 6 P. M., (next day a precisely similar attack at 5 P. M.,) chilliness quickly followed by severe frontal headache, extending into both the parietal regions, red eyes, itching of the eyelids internally and externally, icy coldness of the hands and of *the tip of the nose* even at the height of the febrile reaction, while the rest of the face was red and burning hot. *Cedron.*

At 8 P. M., chills, cramps in limbs, palpitation, thirst for cold water. *Cedron.*

Feverish paroxysms, every day in some provers and every other day in others, towards 8 O'clock P. M., preceded by depressed spirit, dulness of the senses, and pressive headache at noon , cramps, then contracting and tearing pains in the upper and lower extremities, with a cold sensation in the hands and feet ; mouth dry , great thirst, and desire for cold water , chills and shivering, sometimes very strong shivering of the whole body ; palpitation of the heart and hurried respiration ; pulse weak and oppressed. These symptoms lasted for one or two hours, varied much in intensity ; they were followed by a sensation of dry heat and then by a profuse perspiration, full and quick pulse with animated red face. Cold and pale in the apyrexia ; thirst and desire for warm drinks. *Cedron.*

The evening paroxysm of fever returns, (stronger on one day, weaker on another) during more than three successive weeks after leaving off the medicine. *Cedron.*

In the evening, he is always chilly, without any thirst ; he longs to be near the stove. *Natr. sulph.*

Chill for 1 hour, in the evening, without subsequent heat. *Sarsap*

Evening fever, every day; chilliness followed by heat. *Lycopod.**

Every evening, chilliness when in bed until midnight; after midnight, he feels warm and hot; early in the morning, sour-smelling sweat. *Lycop.*

At 6 P. M., chilliness starting from the back with a feeling as if water were spurted over the back, with stupefying sleep, followed by uneasy sleep, tearing in the limbs, nausea, inclination to vomit, uninterrupted yawning. *Lycop.*

Every evening, before going to sleep, chill, stitches here and there, in the sides of the chest, abdomen, and in the limbs, sometimes so violent that she started, pain under the sternum at every inspiration, and itching of the arms and legs with little pimples. *Silic.*†

Cold feet, every evening. *Petrol.*

At 6 or 7 O'clock every evening, violent chilliness without any subsequent heat. *Hep. sulp.*

Especially in the evening, always with chilliness, trembling in all the limbs, the chilliness does not disappear even in a warm room *Cocculus Ind.*

Every evening, the child complains of coldness for half an hour. *Graphites.*

Daily intermittent fever, shaking chill in the evening, followed after an hour by heat of the face and cold feet, without subsequent sweat. *Graphites.*

Several evenings, feverish, shivers in the back *Graphites.*

Chilliness, always on lying down in the evening, perspiration every morning *Helleb. nigr.*

In the evening, shaking chill, with redness of the face. *Ignatia.*

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* The *Lycopod* evening-chilliness starts as a rule from the back.

†This group of symptoms is preceded by sweat, sometimes very profuse, in the morning, nausea, heaviness, and weariness in the limbs.

Several evenings, great chilliness as in fever, without thirst. *Kali carb.*

Daily at 6 P. M., first febrile chill for an hour with thirst, then heat without thirst, with profuse, fluent coryza, followed by slight perspiration during a natural sleep, on the subsequent morning, scraping in the throat, bad taste in the mouth, loss of appetite, and agglutination of the left eye. *Kali carb.*

About 6 P. M, (postponing at the 3rd and 4th day till 8 P. M,) chill followed by, or alternating with, heat. *Antim. tart.*

Every evening on going to bed, creeping chills down the back *Lil. tigr.*

About 5 to 6, vomiting with retching, excessive nausea, great anguish in the pit of the stomach, and external heat mingled with shivering, followed by sweat with chilliness. *Digitalis*

Two evenings in succession, chilliness with thirst. *Natr mur*

In the evening after lying down, violent chill and sleep for an hour, followed by heat, with headache, roaring in the ears, and nausea. *Nux vom*

Towards 6 P. M, chilliness with intercurrent attacks of heat *Nux vom.*

Every evening, chill, accompanied by an attack of acid vomiting and purging for six hours, with spasmodic pain in the region of the navel. *Oleum jecoris aselli*

Towards evening, (or always worse towards evening) chilliness even when close to the fire; the head is affected and giddy, thirst, redness of the face, and soft frequent pulse above 100 While in bed, external heat with internal chilliness; at last the heat increased, the skin became hot and dry, pulse frequent without thirst, after midnight, the skin became gradually

moist, and sweat broke out on the chest, abdomen and head. After two O'clock, sleep with confused dreams; in the next morning, tongue coated, head dull, face pale, and always on rising there is a stitch extending through the head from below upwards. *Plumbum*

From the evening till midnight, feet icy cold. *Psorinum.*

In the evening as it becomes dark, painful paralytic sensation about the ligaments of the joints as in the commencement of a paroxysm of intermittent fever, with chilliness. *Pulsatilla*

In the evening and at night, the hand and foot on one side are cold, on the other side, hot. *Pulsat*

Very violent chill, in the evening, with external coldness without shivering and without thirst; in the morning a senation of heat as if sweat would break out (which does not), without thirst and without external heat, though with hot hand and aversion to uncovering *Pulsat*

At about 8 or 9 O'clock, general chill with burning in the hands and feet and external heat, afterwards in bed, sweat till midnight. *Ratanhia.*

In the evening, chilliness and heat; the face seemed very hot, though the cheeks were cold to the touch and pale; the breath came very hot from the mouth, two afternoons in succession *Rhus tox.*

About 5 P. M, stretching of the limbs, shivering over the whole body, with much thirst, cold hands, heat and redness of the face; also again in the evening in bed, shivering; in the morning, perspiration over the whole body, with pressure in the temples. *Rhus tox.*

In the evening before going to sleep, sensation of chilliness in the back and in the posterior portion of the arms, extending down to the hips, several times, as if

he were wrapped in cloth dipped in ice-cold water, for 20 minutes, after which she became warm; after the second attack, swelling of the left tendon achilles. *Berberis.*

In the evening, chilliness, disappearing after lying down. *Kali nitr*

In the evening, voilent chill, especially in the shoulders. *Silic. Sarracen.*

Chilliness in the throat 3 or 4 times, in the evening, for 5 days. *Sepia.*

Very cold feet, in the evening, mainly in bed, after this had passed off, cold hands. *Sepia.*

Feverish attacks, mostly in the evening, consisting of coldness, troubles in the abdomen *Aran diad*

In the evening, weary, and sleepiness in all the limbs, with chilliness. *Calc. carb*

Frequent alternations of chill and heat, in the evening, dry heat in the face, without redness, with chilliness; after the heat, still more violent chill, cold creeping over the whole body; profuse perspiration during sleep; towards morning after waking, he falls asleep again. *Phosph. ac.*

Chilliness, every evening before going to sleep, perspiration, sometimes very profuse, every morning. *Silicea.*

The legs *as far as the knees* and the feet icy cold, in the evening. *Silicea.*

Icy cold feet, during the day, but at night in bed, burning heat of the feet and hands, with drawing pain in the limbs as far as the knees. *Silic*

Chilliness, every evening; in the bed great warmth, and sour perspiration in the morning. *Sulph.*

Chilliness for two hours, every evening at 8 O'clock, without heat, but afterwards on waking at night, heat without thirst. *Sulph.*

Shiverings in the evening, followed by heat of the face and hands, with thirst. (In another prover, shivering without subsequent heat.) *Sulph.*

Chilliness with headache, in the evening, disappearing after lying down. *Sulph.*

Chilliness in the back, in the evening, without subsequent heat. *Sulph.*

Coldness of the feet, especially in the evening. *Sulph.*

Heat in the face, during the day, then every evening about 5 or 6, chilliness for half an hour, followed by heat all over, for an hour. *Sulph.*

Chilliness, every evening from 6 to 7-30, with excessive heat of the body, dryness of the mouth, and thirst. *Thuja.*

Shaking chill, with pale sunken face, weak, rapid and irregular pulse, often with nausea and vomiting; at last the pulse became large and full with general heat; red face puffed, followed by very restless sleep with distressing dreams and exhaustion, followed at last by copious sweat. The whole attack usually lasted from 8 to 10 hours, generally began at the end of a day's work, continued throughout the night, and ceased in the morning, so that the man was able to return to work (of zinc-melting). *Zinc.*

At 6 P. M. every other day, chilliness, with weariness of the thighs, and bruised feeling. *Ars. alb.*

Every other day in the evening, shivering with thirst, followed by very violent dry heat, so that she believed that fiery sparks were darting before her eyes, followed by a little sweat at night. *Carbo anim.*

Quotidian or tertian evening-fever. *Cedron.*

Every other day towards evening, chill over the whole body, without any thirst, with want of appetite; sleeplessness and restless tossing about in bed. *Alumina.*

Every other evening, chills commenced at 7 ; they caused him to start high up in his bed, without any consecutive heat or sweat. *Lpcopod.*

In one case (of the many febrile attacks occurring amongst the workers in Quinine factories, as a consequence of the inhaled cinchona bark-dust) the fever assumed a tertian type and was cured by *Salicin.* There was another similar case which ceased (either spontaneously, or) under the treatment of a weak Quinine-solution. (Heinigke's Materia Medica).

EVENING-HEAT.

Evening fever. *Ambra gris. Argent. nitr. Ars alb. Asarum europ. Calc. carb. Causticum. Fagopyrum. Kali nitr Petrol Sabina. Stram. Zinc.*

Evening exacerbation of fever. *Acon Alcohol.*

Towards evening, burning heat in head and face, redness of cheeks with out-pressing headache, at the same time rigor of the whole body *Acon.*

Towards evening, dry heat in the face with anxiety. *Aconite.*

For many evenings, heat in the face and lobules. *Silic*

From 5 to 6, flushes of heat in the face, burning hot hands, dry tongue and agitated breath. *Petroleum.*

Her face became very red, every evening, with feverish heat. *Pulsatilla.*

Every evening, glowing heat of one or the other cheek, lasting two hours, without thirst. *Phosph*

From 5 to 9 P. M., burning heat in the face with glowing redness, great dryness in the mouth, and great thirst, pressive headache, and vibration before the eyes, causing vertigo, lachrymation. *Platinum.*

At 5 P. M., head hot, feeling of fullness. *Sepia.*

Burning heat in the face, towards evening. *Eupion.*

Violent heat in the head, three evenings in succession. *Zinc.*

Increased warmth of the cheeks and body, with pressive confused headache in the temples and sides of the forehead, towards evening, for three days in succession. *Angustura.*

Every evening about 7 P. M., (after sunset) heat, commencing in the head, where it is mostly felt, lasting till noon next day ; hands and feet continually hot, but worse in the evening, the heat is better in open air. *Sepia.*

Face much heated, in the evening, with heat in the head *Sepia.*

Great heat in the head with heat of the forehead, redness of the face, slight general heat, worse in the evening, with much thirst. *Stannum.*

Heat in the head, in the evening, with cold feet. *Sulph.*

Flushes of heat over the cheeks for two hours, several times in the evening, the pulse being 60, with feeling of dryness in the tongue, without thirst and without previous chilliness *Valeriana.*

Attacks of flushes of heat, especially in the evening, with slight febrile restlessness and burning heat in the palms *Phosph.*

Every evening, feverish, hot palms and hot nape. *Laches.*

Especially in the evening, very hot hands and feet, with frequent violent tearing in the latter ; she does not know where to put her feet in order to find a cool spot. *Lachesis.*

In the evening, heat in hands and feet. *Ledum.*

In the evening, heat in the palms of the hands, soles of the feet, and in the face, immediately after lying down (with thirst) afterwards sweat. Fourth evening, heat without thirst. *Ammon. mur.*

Towards evening, heat of the ears, and hot red tip of the nose. *Capsicum.*

In the evening, flitting heat over the whole body, with thirst. *Al. cepa.*

Immediately after lying down in the evening, sensation of heat. *Bryon.*

Quotidian evening fever, with great depression. *Bufo.*

Towards evening, orgasm of blood with great sexual excitement. *Clemat.*

For several evenings, dry heat with thirst, followed by colic and headache. *Silic.*

Every evening through the night, dry heat with headache on the vertex and in the nape of the neck, lasting till noon. *Graphites.*

Every evening, violent fever, with loss of appetite and headache; internal chill with external heat; the febrile heat lasted all night. *Laches.*

From 4 P. M. through the night, (three evenings in succession) burning febrile heat, with almost unquenchable thirst, distressing headache and slight delirium. *Hep. sulph.*

For several evenings in succession, feverish heat an hour and a half, accompanied by headache. *Ammon. carb.*

Towards 8 P. M., feverish paroxysms every day (in some provers, every other day) preceded by depressed spirits, dulness of the senses, and pressive headache at noon; cramps, then contracting and tearing pain in the upper and lower extremities, with a cold sensation in the hands and feet; mouth dry, great thirst and desire for cold water; chills and shivering, sometimes very strong; palpitation of the heart and hurried respiration, pulse weak and oppressed, followed by a sensation of dry heat, and then of profuse perspiration, full and quick pulse, with animated red face,

cold and pale in the apyrexia, thirst and desire for warm (in some, for cold) drinks, and discharge of large quantities of pale urine. *Cedron.*

At 6 O'clock in the evening, paroxysms of fever, great heat about the head with cold feet and absence of thirst, intolerable headache, with pressure from within outward, burning in the eyes, dryness in the nose, and a burning hot sensation in the nose when taking an inspiration, feeling of debility and a bruised pain in all the limbs, and weariness of the mind ; restless, almost sleepless nights, owing to vivid dreams and dry heat of the body ; during his morning slumber a general sweat broke out which alleviated his sufferings. This paroxysm of fever returned the two following evenings, but in a lesser degree. *Rhodod.*

In the evening, between 5 and 6 and especially after lying down, burning heat over the whole body, especially violent in the head, with internal shivering and chilliness without thirst ; when he desires to drink, the water becomes repugnant to him, and he is able to drink only a little at a time. *Helleb. nigr.*

Three evenings in succession, great restlessness with pressive headache and feverish heat. *Ruta.*

Evening heat with coryza alternating with cold. *Cepa.*

Especially in the evening, feverish as after taking cold, with heat in the face, tongue and mouth feel burnt and dry, without thirst, drinks only a small quantity of water ; restlessness in all the limbs so that he cannot hold them still : the next day the tongue is coated. *Cepa.*

In the evening after dinner, she has a slight feverish attack ; she is cold and hot ; she becomes nervous ; pain in the throat as if there were something there to bring up, and when hawking she feels a smarting and

afterwards a sweet taste. *Raphanus.*

Dry heat and thirst for several evenings, followed by pain in the abdomen and head. *Silic.*

Towards 6 O'clock, fever as yesterday, with want of appetite, followed by increased pain in the abdomen. *Antim. tart.*

Febrile paroxysm, every evening, burning heat, drinks very frequently but little, with frequent urging to stool, and at night frequent emission of scanty brown urine. *Lycopod.*

In the evening, sudden flushes of heat. *Natr. sulph.*

At 7 P. M, fever; little chill, considerable heat, sweat more or less. *Elaps.*

In the evening, disagreeable warmth over the whole body (another prover describes a similar feeling as agreeable) with perspiration. *Laches.*

From 6 to 12 P. M, fever with redness of the face. *Lachnanthes.*

In the evening, (for the first five days) the patient had a moderate, but regular elevation of temperature. *Phosphor.*

In the evening, dry heat of the body with distended veins and burning hands that seek out cold places. *Pulsat.*

In the evening, flushes of heat, then itching *Sepia.*

From 4 to 5 A M. and from 5 to 6 P. M., anxious heat. *Sepia.*

At 11 A. M, for several days, chill, in the evening at 6, heat *Carbo. veget.*

In the evening, heat with anxiety. *Hypericum.*

Daily, in the evening, febrile paroxysm, first heat then chilliness. *Lycopod.*

At 6, heat, must lie down till 10, then sweat, and after the sweat thirst, for 4 days (this has been preceded

by coldness immediately after eating). *Borax.*

In the evening and at night, the heat increases with tendency to sweat. *Berberis.*

EVENING-SWEAT.

From evening till morning, profuse general sweat. *Sepia.*

For several evenings, a glutinous, annoying perspiration, with itching here and there. *Fluor acid.*

Every second or fourth evening, profuse perspiration on the head and back, lasting three quarters of an hour. *Mur. ac.*

PERIODIC NIGHT DRUG-FEVER.

CHILL.

Before midnight, quotidian fever. *Arundo maurit.*

At 10 O'clock in the evening, violent internal chilliness for a quarter of an hour. *Petrol.*

Every night after an hour's sleep, was awakened by chilliness over the whole body, with drawing in the limbs, without subsequent heat. *Phosph. ac.*

Every night on going to bed, creeping chills down the back, for a month. *Lilium tigr.*

Every morning about 3 O'clock, great chilliness, accompanied by languor, headache and great dyspnœa, followed by great heat and thirst, and terminated by profuse perspiration *Natr. mur.*

3 A. M, violent chill, then profuse sweat all over except the head, which is warm only. *Thuja* *

Chilliness at night; he cannot get warm, least of all his feet, nor can he fall asleep. *Ammon. carb.*

At night in bed, the upper parts of the body were hot, the limbs were cold and only gradually became warm, towards morning. *Carbo anim.*

At night in bed especially, chill repeatedly down the spine and all over. *Canchelago.*

At night in bed especially, shivers down the back. *Allium cepa.*

In the night, the testes feel cold (to others, not subjectively). *Agnus cast.*

* Some of the drug-fevers occurring late in the night will b found under the rubric of "Morning."

, in his sleep, on awaking he is immediat
gain. *Ammon. carb.*
as she awakes in the night, chilliness. *Ca*
out thirst.) *Ammon. mur.*
restlessness and frequent awaking with chi
Kali iod. Silic. (With inability to collect
Staphisagria.
chilliness, preventing him from sleep. *Am*
inthar.
illiness, at night, during which the skin v
out cold. *Thuja.*
on lying down, shuddering *Aconite*
obstinate coldness. *Bufo Calc. carb. Carbo ve*
Sulph.
the night, chilliness, in the morning, chillin
usea on the least motion. *Eupat perfol.* (*?*
al nights, violent shaking chills, with loosen
bowels, followed by great heat and perspirat
r. *Phosph.*
much thirst, (often awaking him from sle
ness, chilliness, and heat. *Aconite.*
on of warmth with chilliness, during the nig
tura. Baryta carb.
febrile chill, succeeded quickly by heat of
with frequent micturition and lassitude of
on the following night, two attacks of the sa
ith vertigo and thirst. *Bellad.*
ght of the 14th (of the proving), a rigor, follc
in excessively copious perspiration, sleepl
he following night, another rigor, followed
t skin and perspiration. *Aconite.*

tion ; as the rigors come on, and during their continuance, her languor is excessive and the headache and dyspnœa almost indescribable. *Nat. mur.*

Nightly febrile attack ; before the chill, intolerable drawing pains through the thighs and legs that obliged him to alternately draw them up and stretch them out. *Nux vom.*

Intense chilliness, at night, followed by heat and profuse sweat. *Carboneum sulphuratum.*

During the nightly fever, especially during the chill, increase of pain. *Hep. sulph.*

BEFORE-MIDNIGHT-HEAT.

Before midnight, fever. *Cadmium sulph. Verat. alb.*

Before midnight, heat, anxiety (in one case merely heat of the feet) after midnight, sweat. *Magnes. mur.*

Heat increased till about midnight ; skin dry, pulse frequent, without thirst , after midnight, the skin became gradually moist until sweat broke out on the chest, abdomen and head ; after two O'clock, sleep with confused dreams. On the next morning, tongue coated, face pale, head dull, and always on rising there is a stitch extending through the head from below upwards. *Plumb.*

Anxiety and heat do not permit him to fall asleep, before midnight, for many days. *Ars alb.*

MIDNIGHT-HEAT.

About midnight, dry heat. *Elaps.*

The intermittent fever of *Silicea* has little sweat (nor severe rigors either) usually occurring from 10 A.M. to 8 P. M., or from midnight to 8 A. M.

AFTER-MIDNIGHT-HEAT.

At 2 O'clock at night, fever, increased warmth over the whole body, sweat in the face and on the feet, and

tension in hypochondria and hypogastrium, producing colicy pains and feeling of anxiety. *Ars. alb.*

After midnight, feeling of heat and anxiety with inclination to uncover herself *Ars. alb.*

At 2 A. M., heat without thirst, disappears in the morning, worse again after breakfast. *Cepa.*

Sometimes from 2 to 3 A. M, vascular excitement. *Gastein.*

He wakes after midnight, with heat over the whole body and violent thirst, the pulse is full, soft, accelerated; afterwards sweat over the whole body, especially on the forehead. *Ranunculus sceler.*

NIGHT-HEAT.

Heat at night. *Agar. musc. Aurant. am Bryon. Carbon. sulph. Colch. Graphites. Ignat. Lachesis. Spiranthes.*

The whole night, heat, restlessness, pulsation in head hindering sleep. *Ars. alb.*

The whole night, dry heat, with sleeplessness, anxiety, and restlessness, and whenever she puts her hand out of bed, coldness, chilliness and thirst. *Baryta carb.*

Much orgasm of blood, with many dreams and restless sleep (especially during menstruation). *Calc carb. Oleum jecor. as.*

At night, internal heat, especially in the hands and feet, with dry tongue in the morning without thirst, with external heat in the head. *Calc. carb.*

At night, excessive orgasm of blood; he imagines the blood will burst his veins and heart. *Ammon carb.* (With throbbing in all the vessels.) *Silic.* (With prevention of sleep.) *Sepia.*

At night, great internal heat, so that he could scarcely remain in bed, with great dread of the slightest exposure. *Magnes. carb.*

Especially at night, febrile attacks. *Merc. sol.*

Night heat, without thirst and sweat. *Ars. alb.*

Sensation of heat at night, without thirst. *Pulsat.*

At night, heat (without thirst) with frequent awaking. *Phosph.* (With hot breath from the mouth, though there was no dryness of the mouth.) *Coffea crudæ.*

Intolerable sensation of heat, at night, without perspiration, causing restless tossing about, inability to sleep. *Pulsat*

At night, heat and thirst without severe chill and without being followed by sweat. *Carbo anim.*

At night, excessive heat with thirst. *Arundo maur.*

Febrile heat, all night, with violent thirst and rattling respiration. *Silic.*

Only in the night, heat, and in the morning after rising, more internally, the hands are always dry and rough, the mouth is dry and sticky; moderate thirst, a desire for succulent food; no sweat Every day, for two weeks. *Sabadilla.*

Night and morning, febrile paroxysm. *Kali bich.*

At night, internal heat with thirst and frequent awaking. *Magnes. mur.*

At night, febrile heat and sweat with ravenous hunger that could not be appeased, followed by chilliness, with chattering of the teeth and external coldness, after the chill internal heat, especially in the hands, with constant external coldness. *Phosph.*

At night in bed, the head and upper part of the body were hot, but the limbs were cold and only gradually became warm towards morning *Carbo anim*

At night, warmth in the head, genitals and legs. *Mephitis.*

At night, the blood seems hot, especially in the hands. *Nitr. ac.*

Every night, heat in the palms of the hands. *Ol. jec. as.*

At night, feeling of heat in the whole body, especially in the palms of the hands. *Sulph.*

Heat of the feet, with burning sensation in the evening

in bed, so that she was obliged to uncover them for several hours, followed by uneasiness, itching and crawling in them, so that he was obliged to rub them. *Sulph.*

Cold feet became warm, at night. *Silic.*

Heat over the whole body frequently woke her at night; no perspiration, excessive thirst caused by dryness low down in the throat *Nitr ac.*

Frequent wakings, during the night, during some of which there were flushes of heat and desire to throw off the bed-cloth, when the thermometer was below zero. *Actæa rac.*

At night, sensation of heat, with restless sleep. *Lachesis.*

NIGHT-SWEAT.*

Sweat, at night. *Act. racem. Ambra. gris. Angust Anthrakokali. Ars. alb. Borax Bellad. Bryon Cupr. Helleb nigr. Iod. Kali carb. Magnes carb. Merc. iod. rub. Merc sol. Natr carb* and *mur. Ol jec as. Phosph. Saracen. Silic Sulph*

As soon as he gets warm in bed, sweat, accompanied by chilliness. *Argent nitr.*

Evening in bed, immediately after lying down, sweat. *Asarum europ*

Night sweat, especially before midnight, with cold limbs. *Calc. carb.**

As soon as he closes his eyes, he breaks out into an excessive sweat. *Carbo. anim.* (Even during the day while dozing.) *Conium*

As soon as he falls asleep at night, an agreeable warm perspiration broke out on all parts that were covered, which disappeared on waking. This was frequently repeated at night. *Thuja.*

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* *Calc. carb.* produces also: Sweat frequently breaking out during the day (on the slightest motion, in one prover.)

Always slight sweat, before going to bed. *Sepia.**

Every evening an hour and a half after lying down, perspiration. *Merc. sol.*

After lying in bed for one or two hours in the evening, there is first cold perspiration of the feet before they become warm. *Mur. ac*

Before midnight, perspiration with dry cough. *Mur ac.*

At night commencing at midnight, sweat; afterwards chilliness in bed and after rising every morning. *Hep-s.*

About midnight, sweat (especially on the back). *Hep-s.*

About midnight, frequent perspiration during slumber. *Ferrum.*

About midnight, profuse perspiration commencing at the head and most profuse on the chest. *Phosph. ac.*

Sweat of the odour of bad eggs, towards midnight. *Staphisagria*

Perspiration after midnight, for several nights. *Staphisagria.*

Sometimes towards midnight, some sweat. *Bryon.*

After midnight, sweat and thirst. *Magnes. mur.*

Sweat, every night after midnight, mostly on the chest. *Lycopod.*

After midnight, general perspiration. *Ambra gris. Baryta carb.*

During sleep after midnight, perspiration, lasting till morning *Phosphorus.*

Sweat, after midnight *Nux vom.*

After midnight, profuse sweat awaking her. *Berberis.*

After 3 A. M., profuse night sweat. *Bryon.*

From 3 A. M. till towards morning, perspiration over the whole body. *Mercurialis.*

Much sweat, during sleep, especially on the head. *Sepia.*

The patient sweats profusely, especially on the back and neck, when he sleeps. *China.*

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* *Sepia* has also: Sweat of lower limbs *during the day.*

During the night-sleep, restless, with much perspiration. *Opium. Sulph.*

Sweat, all over, on waking from sleep. (Dry heat while asleep) *Sambucus nigr.*

Every time after sleeping, (even in the day) very tormenting, pouring sweat, followed by great exhaustion. *Antim. ox.*

At night during sleep, sweat, disappearing on waking. *Euphras.*

No perspiration, during sleep at night, otherwise constant perspiration, even during the midday nap. *Natr. mur.*

At night, profuse sweat, with frequent waking ; on waking the sweat ceases, and returns on falling asleep. *Cham.*

Awakened in the night, by sweat on some parts of the body. *Calc phosph.*

Profuse sweat, at night, without feeling weak afterwards. *Bellad. Samb. nigr.* (And without thirst.) *Natr sulph.*

Nocturnal sweats, with weariness. *Ferrum.*

Every night, profuse sweat, with want of appetite and debility, as if he were threatened with consumption. *Silicea.*

Exhausting night sweats. *Baryta carb. Mercury.* *

For several nights, copious, general warm sweats ; exhaustion towards morning, followed, on several succeeding mornings, by perspiration only on the breast on the side not lain upon, and in the axilla. *Benzinum.*

Every night (and early in the morning), sweats, and is then quite hot. *Ammon carb.*

Slow fever with night sweat. *Acet. ac.*

Night sweat, all night, with heat, cannot bear uncovering. *Zinc.*

Night sweat, profuse, offensive. *Carbo anim.* (And sour-

* The perspirations consequent upon *Mercury* are prevalent at night, though there is a disposition to sweat day and night.

By the same Author.

Lectures on

CHOLERA AND ITS HOMŒOPATHIC TREATMENT.

Price: Rs. 4-4 and Rs. 4-12, including postage.

OPINIONS OF THE PRESS.

It is a long time since we had the pleasure of welcoming such a sterling addition to our scientific literature as is this important work of our eminent colleague of Calcutta. Homœopathy has won its most glorious laurels in the treatment of Asiatic Cholera, and the statistics in its favor are simply and absolutely overwhelming. But we lacked a systematic treatise on the Homœopathic treatment of cholera in its various forms; this want is now supplied by Dr. Salzer in these "Lectures" which we commend very strongly to all practitioners of scientific medicine. India is the home of Cholera. It is there endemic, and hence the fittingness of receiving a treatise on Cholera from that country.

The following drugs are fairly considered · Camphor, Hydrocyanic Acid, Chlorodyne, Cyanide of Potassium, Arsenicum Album, Cuprum, Secale Corn, Ergotine, Ricinus (a *very* important Chapter), Merc. Cor, Jatropha Curcas, Euphorbia, Veratrum Album, Tartar Emetic, Aconite, Nicotine, Salicylic Acid—*i. e.*, these are considered in their pathogenetic and therapeutic relationships to Cholera. In concluding this little notice, we offer our best thanks to our learned author for this important contribution to our standard literature. What beautiful reading is this work, and how refreshing as compared with the sterile lucubrations of the Allopathic authorities on this subject.—*Homœopathic World, January 1884*

We do not know when we read a book which gave us more satisfaction from the first to the last page. One perusal will not do If Dr. Salzer could be persuaded to work out a Materia Medica on the plan which he carried out in the therapeia of cholera, we would then better understand the why and wherefore of the action of each drug, and Homœopathic Materia Medica would then stand on such a scientific basis that even its most bitter enemies had to acknowledge the truth which has always been in it.

Salzer strictly divides cholera in three different types, the spasmodic, diarrhœic and paralytic, and closely differentiates the remedies belonging to each class. Whenever cyanosis and objective coldness of the body sets in at the commencement of the disease, it may be considered almost a sure sign that we have before us a case of cholera attended with arterial spasms, and Camphor and Hydrocyanic Acid are mostly indicated; but no

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routine treatment, but strict individualization ; and where the one or the other remedy is indicated, we should hold fast to it, and set our hopes for the salvation of the patient on it. .....

Feeding of cholera patients is the last chapter of this most interesting book. To be the author of such a volume is an honor, and we must heartily thank the author for the most valuable Christmas gift.—*North American Journal of Homœopathy, February 1884.*

In these nine lectures Dr Salzer has made a most valuable contribution to the literature of Homœopathy and cholera treatment. In a masterly way he discusses the place occupied by the various remedies that have been used in cholera, and their relative value, and no one who is ever likely to meet with the disease in practice can afford to overlook this work Especially valuable is the definition of the place of *Camphor* * * * * * *Hydrocyanic Acid* and *Cyanide of Potassium* are highly praised Of *Cuprum* Dr Salzer does not speak so highly as we should have expected. His remarks on *Secale* and *Ricinus* (Seeds, not Oil) are most suggestive In conclusion, we heartily recommend this work to the study of all, even those who may never see cholera It throws much light on the action of the remedies discussed, which cannot fail to be of service to those who employ them in other diseases —*British Journal of Homœopathy, April 1884*

It is a volume of lectures full of practical wisdom—the first of well-utilized experience and sound thought Dr. Salzer admirably defines the place of Camphor in cholera treatment ....The book is full of valuable matter.—*New York Medical Times, April 1884*

We owe many apologies to the author of these really valuable lectures for the long delay which has occurred in bringing them under the notice of our readers, a delay which we sincerely regret

Dr Salzer is a physician practising, and who has practised for many years, in Calcutta, the centre of the natural *habitat* of cholera. His experience in dealing with the disease has been great, his observation has evidently been very careful, and his critical study of it, both pathologically and therapeutically, acute and cautious. He is, therefore, an authority upon the subject whereof he writes, and consequently has a strong claim upon our attention.

Almost the first page of his book contains a warning to which, with the possibility of an epidemic of cholera ever looming before us, we should do well to take heed. In past epidemics the success of homœopathic treatment has been very striking in this country, and generally so in India. This is almost universally admitted by all competent judges ; nevertheless, one of the reasons inducing Dr. Salzer to deliver the course of lectures he has since published was the fact that, shortly before he undertook this duty, cholera had been unusually severe in India, and had baffled the practitioners of homœopathy no less than those of the

old school of medicine. After admitting that the unusual virulence of the disease was one cause of the excessive mortality under treatment of every kind, he suggests that, as homœopathists, we may have run into a groove with regard to our treatment of cholera, and have held fast to our traditional mode of procedure, while the type of the disease has been gradually changing.

Mere routine will not give good results in the treatment of epidemics any more than it will in other forms of disease. Each epidemic must be studied in relation to the pathogenetic action of drugs if remedial measures are to be found.

To assist in determining the right remedies Dr. Salzer first examines the pathology of cholera. In doing so he discusses three varieties of it—the spasmodic and non-spasmodic forms, and *cholera paralytica*, while common to all, underlying each, is, he shows, a venous condition of the blood. The chapter devoted to this part of his subject—chapter II.—is one of considerable interest

In these lectures Dr Salzer discusses in a fuller, more instructive, and more interesting manner than any previous writer on the disease has done, the precise indications for the selection of remedies in its treatment

In the event of an invasion of cholera, we would strongly urge these lectures on the attention of our colleagues They will assist us in meeting the foe more completely than any other essays at our command, and above all will preserve us from the pitfalls ever surrounding a mere routine therapeia —*The Monthly Homœopathic Review. June, 1885.*

BY THE SAME AUTHOR.

(In the Press)

VITAL ENERGY:

OR,

THE MECHANICAL THEORY OF THE UNIVERSE AND ITS APPLICATION TO ORGANIC LIFE

BERIGNY & Co.

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A PRIMER

ON

CATTLE DISEASE

BY

VETERINARY SURGEON

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PREFACE.

At the Chinchli Show held in 1886, Mr. W. Lee-Warner, the President, proposed that the occasion of such collections of cattle-owners, horse breeders, and others interested in the Exhibition should be taken to disseminate useful information regarding the treatment of cattle-diseases, shoeing, and other matters of practical importance. The late Regent of Kolhápur cordially approved of Mr. Lee-Warner's suggestion, and, at the request of the latter, Mr. J. H. Steel, Veterinary Surgeon, kindly undertook the task and wrote a Primer on Horse-shoeing shortly afterwards. This has already been printed and published and a good number of its copies in Maráthi were distributed amongst the people at the Show last year. On this occasion, Colonel H. N Reeves, the President, having suggested the preparation of a similar pamphlet on Cattle Diseases, Veterinary Surgeon Steel accordingly wrote this pamphlet, copies of which have now been printed for distribution among the exhibitors of cattle at future Exhibitions.

Translations of this treatise in Maráthi and Kanarese are under preparation and will be printed and published for the benefit of the Native public in due course of time.

[In its Resolution No. 1621, R. D., dated 9th March 1888, the Government of Bombay ordered that the Primer in English and three Vernaculars (Maráthi, Gujaráti, and Kánarese) be distributed amongst Government Officers, Local Boards, and Municipalities]

A PRIMER ON CATTLE DISEASE.

SECTION I.

INTRODUCTION.

1. Somehow or other it has become the custom in India to speak of "cattle disease" as though it were a simple matter, a single disorder to which cattle are liable and concerning which any partially educated man may be taught full details in about a fortnight.

2. The ox (and his cousin, the buffalo) is liable to almost as many disorders as man or the horse, he may die from almost as many causes and from some which can affect neither man nor the horse. Veterinary Surgeons, therefore, have to study general surgery and medicine as applied to the diseases of the ox and *special* surgery and medicine; this is the study of a life-time and not lightly to be taken in hand, for cattle are just as liable to suffer from bad treatment of disease as are horses or men, only fully educated Veterinarians are therefore quite competent to treat cattle disease of all kinds. However, there are few Veterinarians in India and the prevalence of cattle diseases is enormous, so this little work is intended to inform owners of cattle and those placed in charge of bullocks, cows, and buffaloes about some very important forms of cattle disease which are mentioned in most books as "Plagues" or "Murrains."

3. One of these plagues or murrains is so widely prevalent in India that it is sometimes called "cattle disease" in Reports and Returns to Government, but this is very misleading, for it seems to imply that there is one and only one disease among cattle which spreads by sick animals being mixed with the healthy, whereas there are at least twenty "contagious disorders" of cattle. It is of the greatest importance that these disorders be distinguished from one another, because the measures which are taken for cure and prevention of one may be quite unsuited for others and thus harm may be done in treatment rather than good.

4. *Rinderpest* or "*cattle plague*" is the greatest scourge of the ox tribe in India. It prevails constantly in one

part or the other of this country and is extremely fatal; the amount of money lost by agriculturists in India from this cause alone is a most serious matter to Government as causing loss of revenue and to the cattle-owners as causing loss of crops and of milk.

Foot and mouth disease is even more prevalent and also is a cause of much loss, but since it is constantly present cattle-owners do not take any measures for its prevention and few for its cure; this is a great mistake, for the disease can be cured by very simple measures and its spread prevented. Increased milk supply, fewer deaths, and greater strength and fitness for work will result from treatment of this disorder, provided the owners carry out the treatment carefully and as directed.

Anthrax or "*Black death*" is a terrible disorder which sometimes suddenly carries off large numbers of cattle; it often cannot be cured, but it can be prevented.

To these three plagues must be added the *Lung disorder* or "*Pleuro*" not frequent in India but with which all cattle-owners should be acquainted, as it is a very serious matter when this contagious disease is found among cattle.

5. There are many other causes of numerous losses among cattle, such as Scrofula, Rabies, "Dropping after calving," worms in the lungs, and abortion, but they will not be dealt with in this Primer, because it is desired to make the little book as simple as possible.

SECTION II.

SYMPTOMS.

1. All men accustomed to cattle can tell when the animals are in *health*. When not diseased they feed heartily, chew the cud regularly; have good healthy-looking dung, not too hard nor too soft, and coloured differently according to the kind of food they have been eating; there is plenty of urine, it is passed easily, and is not of too deep a yellow colour nor red; the skin is soft and can be moved easily over the ribs, the hair lies smoothly after the animal has been cleaned, and it is bright and glossy; the eyes are active in movement, transparent, and free from tears or discharge of any kind; the nose or "muffle" is not too dry nor too moist, but covered with a "dew"; the mouth is wet with saliva,

but neither watery, nor soapy, nor dirty; the ears are moved freely. The animal is active, seems to take an interest in what is going on around, mixes with the other cattle and often licks the coat of some friend. The legs and general surface of the body, as also the horns and ears, are neither hot and dry, nor intensely cold.

2. The earliest indications of an ox being *out of sorts* are generally dullness, thirst, separation from the rest of the herd (if out at pasture), refusal of food, not chewing the cud, dung hard and dry, urine small in quantity and dark-coloured, skin looks tight and the hairs stand on end, and the animal may be noticed to shiver every now and then; mouth, skin, and muffle dry and hot, eyes either very bright or dull-looking, not moving freely, ears hanging, weakness, and restlessness. These are the symptoms of *fever*, which almost always sets in as the first sign likely to be noticed in contagious disease. It is most important to notice these earliest symptoms as they indicate the best time for treatment, and, especially, for separation of the deseased from the healthy.

3. Diarrhœa is a symptom of the utmost importance, for, although it may arise from bad food, changes of weather, and other simple causes, when a number of animals become affected at the same time with this derangement it is generally an outbreak of *Rinderpest*. No doubt can remain as to the nature of disorder if the discharges from the bowels be of most offensive odour, sometimes a little bloody, and often mixed with small white masses which look like steeped grains of barley. Extreme weakness and prostration, coldness of the mouth and limbs, red blood streaks in the mouth, and a watery discharge from the nostrils and eyes are found in this disease, and very often cows affected with it throw their calves before the proper time (abortion). Most cases in this country have no ulcers in the mouth, but careful examination may be made for them as being sometimes present.

4. Sudden death of a number of cattle at one time may be due to poisoning; but it also may arise from the disease known as *anthrax* a terribly fatal derangement which leaves but little time for efforts at cure. Sometimes animals affected with this disorder die as though from a stroke of apoplexy; they become giddy or wild in manner or extremely stupid and then fall dead. In other cases, the animal

suddenly becomes prostrated, suffers from severe colic, a large amount of blood passes from the bowels, and death soon occurs. Pigs, dogs, and other scavengers eating the discharges, soon die, and the carcass may seem to decompose even before actual death. Another form of anthrax begins by a swelling of some part of the body, which at first may be taken for a sprain, a sting, or some other injury; it, however, very rapidly grows larger, becomes cold and crackles under the finger because of gases, the result of decomposition, being set free in the tumour. When cut into, the tumour discharges a quantity of black frothy-looking blood. The swelling rapidly extends over the body and the animal very soon dies after becoming much deformed by swelling. In cases where anthrax is suspected, the membranes of the mouth, eyes, and (in the female) generative passage, should be examined; in most cases of the disorder they will be found to have large blotches of dark blood in their substance producing purplish discolouration.

5. The leading symptoms of *Foot and mouth disease* are the animal not eating and having a flow of saliva from the mouth. This saliva hangs in strings and is constantly sucked in by peculiar movement of the lips and cheeks. On looking at the tongue, lips, and other parts of the front of the mouth, we see large white blisters, or red-looking ulcers if the blisters have broken, from an eight anna piece to a rupee in size. Generally, both mouth and feet are affected, sometimes only the mouth, in other cases only the feet. Lameness, frequent shaking of the feet as though to get rid of irritation, and collection of flies about the clefts of the feet will draw attention to these parts, and the skin above the hoofs and between the toes will be found moist, hot, and swollen, or ulcers will be observed to have already formed. In cows, an eruption may form on the teats and there will be a loss of milk, either complete or partial. In very bad cases, the udder or milk bag becomes inflamed and the cow may have her powers of producing milk permanently diminished. Calves drinking the milk from affected cows may die with diarrhœa or without any marked symptoms. Fowls sometimes take this disease from sick cattle and, since even human beings may suffer from it, the milk should not be used as food, especially for children, without boiling.

6. "*Pleuro*" is difficult for an ordinary observer to detect, but any case in which the breathing becomes very hard

cough is present, there is a grunt in the act of breathing, the bowels are very obstinately confined, and the animal feels pain when the side of the chest is pressed firmly, should be treated as suspicious and the animal separated from other cattle.

7. Thus the following are the most serious symptoms of sick cattle :—Sudden and extreme weakness with fever, diarrhœa (especially if there be blood in the evacuations), sores in the mouth or on the feet, suddenly appearing swellings which increase in size rapidly and become filled with gas and the occurrence of which cannot be traced to any known injury. Symptoms of disordered brain, and the appearance of purple blotches on the skin or membranes (especially of the eyes) also are suspicious of communicable disorder.

When any of these symptoms are observed, the sick animal or animals should be at once separated from the healthy, but *the same precaution should be taken whenever more than one animal becomes suddenly diseased in the same place.*

SECTION III.

POST-MORTEM EXAMINATION.

1. In all cases of death of cattle the carcass should be opened and the causes of death ascertained; this may enable the owner to take precautions in time to save his other cattle if the case be one of communicable disease. The owner need not open the body himself, the work can be done by a Mhár or other sweeper, who will be able to point out any disease which is conspicuous, or, if the sight of the carcass be offensive to the owner, the Mhár should report what was found wrong Sometimes ordinary disease of a non-communicable nature will be reported and the mind of the owner put at rest, but even then he may learn something which will enable him to improve the feeding or care of his other cattle. Thus if the animal died from inflammation of the bowels he should alter the food of the remainder; or if from liver disease he should increase the green food and give more work; if from kidney disorder he must alter the pasture or drinking water.

2. In many cases of sudden death no distinct disease will be found on examination of the carcass; this is a serious matter and shows that the disease is one causing alterations of the blood and liable to spread from sick to healthy animals. It is most important to remember that animals which die first in an outbreak of cattle disease, generally, after death give *no* distinct signs of the disease in their different viscera, even before death they show the symptoms much less distinctly than those cattle which die later in the outbreak. The very old, the weakly, and the very young generally are the first to die, the disease gets a better hold, so to speak, on the strong and vigorous and leaves its mark on them more distinctly than on those which are not strong enough to resist it.

3. The principal signs after death of the most important fatal cattle diseases, such indications as cannot be seen until we open the animal, are:—

In *Rinderpest*, the blood is of an unusual purple red colour, the bowels are marked over with red branching vessels, and, on slitting them open, small white barley-grain-like (or fat-like) masses will be found among the bowel contents or fixed on the red spots. The last bowel, near the anus, is red in streaks and the true stomach is red inside and may even be much discoloured by blood, particularly where the bowel commences from it.

In *anthrax*, the spleen may be found very large and full of black blood, the blood in general will be of a very dark colour, blood spots may be found outside and inside the heart and in many other parts of the body, the bowels may be full of blood, there may be much watery fluid in the belly and against the bowels, or in various parts of the body may be seen jelly-like masses either of a blood colour or greenish-yellow. Big blood blotches may be seen on slitting open the stomach and intestines.

In *food and mouth disease* occasionally, especially in very young animals, there is found ulceration of the bowels along almost the whole of their length.

In "*pleuro*," the chest contains much watery or milky fluid, mixed with which is white solid material, causing the lungs to become attached to the walls of the chest. The lungs themselves are large, smell very peculiarly, are generally only partly diseased and of a greenish colour.

The surface exposed on cutting into the enlarged parts is solid and of a beautiful marbled appearance, consisting of light red or dark red patches with yellow gelatinous bands separating them from one another.

4. The *post-mortem* appearances must be considered with the symptoms in deciding on the nature of an outbreak of disease. If the conditions found after death in several animals are alike the disease from which they died is probably a communicable one, but the fact of the same conditions not being found in each case does not prove that the animals died from different disorders. All the facts of an outbreak have to be considered, but *it is better to take precautions in non-communicable disorder than to omit precautions when the disease proves to be communicable. In any case of doubt precaution should be taken.*

SECTION IV.

CAUSES.

There is one, and only one, actual cause at work in the production of these diseases and that is the poison which belongs to each disorder. These poisons may be compared to the seeds of plants, each disease has its own peculiar poison which will produce it and it only, and each poison requires certain conditions by which it may be carried from one animal to another and the fresh soil in which the poison finds itself, namely, the blood of the animal, must be suitable for it to grow in. Under the head of causes, therefore, we have to consider the poison or virus, the manner in which it is carried from the sick to the healthy, and the conditions of the blood and body in general of the healthy animal which render it a suitable soil for the growth and development of the poison.

2. We have compared the poison to seeds; it actually does resemble seeds to an extent in the way in which it is conveyed and in the fact that it developes only in suitable soil and under special conditions. The poison is, roughly speaking, a kind of mould or fungus, and we are all familiar with the rapidity of growth of these peculiar kinds of plants. The poison is in the form of germs or spores, that is, extremely minute grains of dust, such as float about in the air and can be seen in a sun-beam. These spores are so minute

a custom of standing animals with feet sore from foot and mouth disease in tanks to cure them. This is most erroneous and a great danger to the healthy.

(c.) Even the air may carry disease germs (*Infection*). Therefore the sick should always be put at some distance from all healthy animals—from all pastures, and from roads. A few yards is not enough distance between the healthy and the sick, at least 300 feet may generally be allowed and the sick should be put on the leeward side of the village, because the germs are carried further with the wind than against it.

4. It is remarkable that not all animals have their blood in a suitable state for the development of germs. Firstly we may note that anthrax and foot and mouth disease affect all warm-blooded animals, quadrupeds, and birds; that rinderpest affects the ox and animals like him and also sheep, but not horses, men, and other animals which do not chew the cud; "pleuro" affects only ox-like animals. We must always remember that an animal may be a carrier of the disease although unable to suffer from it. Secondly, it is a *very rare* thing for an animal to suffer a second time from anthrax or rinderpest, but he may have attacks of foot and mouth disease over and over again. Thus, in this respect the different plagues vary considerably in their characters; and it seems as if while anthrax and rinderpest poisons exhaust the matters which nourish them in the blood, the foot and mouth poison has no such effect. Thirdly, in every outbreak we find some individual cattle which resist the disease and remain among the sick without suffering in any way. They are said to enjoy *immunity*. A question receiving much attention from cattle doctors in the present day is whether we cannot find some artificial means of securing immunity for cattle from the most serious cattle plagues, just as doctors have for men from small-pox by vaccination. We have succeeded to an extent as far as anthrax is concerned.

5. We have just seen that some animals resist these diseases, on the other hand some take them very readily; this is termed *predisposition*. It in some cases is the result merely of special peculiarity of the individual animal, but it not unfrequently depends on one or more of the following causes:—

(a.) Youth or old age. The young and the old generally die first in an outbreak and, as they are of but little value, not much notice is taken of their death, and thus the disease gains a firm footing before the cattle-owner becomes alarmed.

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(*b*) Weakness from any cause, such as insufficient food or previous non-communicable disease.

(*c.*) Bad food, deficient in nourishment, mouldy, coarse, and indigestible.

(*d.*) Filthy drinking water, as from tanks and streams almost dried up and contaminated by sewage from the village

(*e*) Exposure to cold winds, fogs, rain, &c, especially sudden exposure of heated animals

(*f.*) Uncleaned, strong-smelling cattle sheds with collections of manure in, or close by, them

Many of these predisposing causes may be removed by care on the part of the cattle-owner to provide sufficient shelter and so on, as we shall explain hereafter All doctors in treating disease, rely on the principle "remove the cause, and the effect will cease." *By increased care of his cattle in avoidance of the causes of communicable diseases, as mentioned in this section, the owner will lessen the frequency of, and loss from, cattle plagues.*

SECTION V.

RESULTS

In dealing with the health of animals the question is generally one of rupees, annas, and pies, and unless it can be proved that it is worth his while to go to the trouble and expense of dealing with disease among his herds it is extremely unlikely that the cattle-owner will take any measures whatever for prevention and cure.

2. There can be no doubt that *proper care of animals is in the long run much less expensive than neglect and inattention to their general health.* It is somewhat cheaper to give bad food than good, but the money does not come back again, nor give so good interest, for the stock is apt to die off from dysentery, stomach diseases, and numbers of other simple disorders, besides being liable, especially, to take rinderpest and other communicable diseases. Also, what is saved in food is lost in labour or in milk over and over again, or the stock fetches but a small price in fair or market. Further, badly fed cows breed small and weakly calves, and ill fed young stock remain small and weak. Again, the cost of sheds sufficient to shelter cattle in rough weather is not

considerable and yet proper shelter is considered a saving in nourishing value equal to two pounds of grain-food daily. It costs no more to keep sheds clean than to keep them dirty, and yet the latter is a constant cause of disease and often changes simple unimportant cases into severe, even fatal, ones. Clean water can be obtained, naturally filtered, by digging near tanks or along the courses of streams whenever there is any water whatever in those tanks or streams, often good clean water can be procured as easily as dirty water and yet cattle are allowed to drink the filthy stuff. Much of the severe diarrhœa seen among cattle in India is due to this cause.

3. *The diseases we are considering cause loss to the owner in several principal ways* :—

Firstly, his cattle die and he loses their value and their milk or work. Thus the owner has less money, less food for himself and children, and can raise less crops when cattle disease has been about.

Secondly, his cattle are thrown out of work for a time and are for a long period too weak to do any work or to give milk, even if they recover.

Thirdly, his cattle may be permanently lessened in value, even if they get better, as in foot and mouth disease by loss of part of the milk gland, and in "pleuro," by loss of a part of a lung.

Fourthly, as a rule females in young drop their calves when severely diseased. The losses from this source are very considerable, especially in rinderpest, and are specially serious as they affect the future race of cattle. Even when cows suffering from disease "go their full time" the calves they have been carrying are weak and sickly and liable to die soon or to be of little value if they grow up.

Fifthly, when cattle disease is about trade in cattle is slack and prices are lowered. It is thus very evident that communicable cattle diseases are a source of enormous loss; indeed we constantly meet with men who were rich but have been ruined by pestilence and plague among cattle.

4. *Anthrax* causes many deaths; indeed in some parts of India it is considered the most fatal of cattle diseases. It

can be conveyed to horses, men, and other animals, and thus still further loss results. Even the dried skins of cattle and the wool of sheep which have died of anthrax may convey the disease, and every carçass of an anthrax victim, when buried without special care, may poison the pasture around its grave and so prove a cause of cattle losses in future years.

Foot and mouth disease causes cows to give less milk for the time they are sick and often so destroys the milk gland that a cow may give only half as much after an attack as before. Also the milk in these cases should be thrown away, as it causes disease, and sometimes even death, of young animals and children. The soreness of the mouth prevents cattle which are suffering from this disease from feeding readily and soreness of the feet prevents them getting about to obtain grass; thus the cattle become very weak and in India many deaths occur, but when the sick are well taken care of and fed liberally they seldom die.

"*Pleuro*," is very fatal and may cause much loss of condition.

Rinderpest causes enormous losses as it is extremely fatal. Dried rinderpest skins can carry the disease from one country to another.

5. Thus the diseases themselves cause so much loss that every effort must be made to prevent them, in all cases "prevention is better than cure." When cure is attempted, we must consider whether the chance of success and the value after recovery is such as to make it worth while to spend time, labour, food, and medicine over the sick. In anthrax and rinderpest early death generally soon settles this question, but such cases as are inclined to recover are well worth care, for they will be increased in value as having passed through the attack. In "pleuro" there is a chance of recovery, but the sickness extends over a long time and is very dangerous to other cattle. In foot and mouth disease, all except very young animals should recover and thrive well after recovery.

We may conclude that in almost all cases treatment should be attempted, but we should always do our best for prevention, so as to render attempts to cure unnecessary. *Cure always means a certain amount of expense, prevention may*

cost a little, but the money thus spent is well invested, it is a sort of insurance fund against cattle disease. Much may be done in the direction of prevention and cure, even though no skilled cattle doctor is at hand The owner must by no means anticipate that cure can be accomplished in every case treated, no medicine, however skilfully used, can prevent a certain proportion of deaths.

SECTION VI.

TREATMENT.

1. In all cases of disease of any kind treatment is preventive or curative, and, as we have already seen, prevention is better than cure.

2. In order to lessen the loss from disease, we must have the following aims —

(*a*) To keep the neighbourhood free from disease.
(*b*) If disease gains entry into the neighbourhood, to prevent its spread
(*c*). Also to prevent fresh cases being brought constantly so as to render our efforts to get rid of it unsuccessful.
(*d*) If the disease prevails among a neighbour's cattle, to keep it away from one's own.
(*e*). Should it break out in one of our sheds to keep it away from the others.
(*f*.) To preserve unaffected cattle from attacks of the disease.
(*g*) To save as many of the affected cattle as possible.
(*h*) To prevent conveyance of the disease from our sick to healthy cattle of other people.
(*i*) On cessation of the disease to take all possible measures against its recurrence.

3. When it is well-known that cattle are being lost from some communicable disease a few miles off, the leading men of a village should meet and decide what to do to avoid receiving the disease. Some such conclusions as the following should be arrived at:—

(*a*.) That all cattle coming into the village shall be kept apart from the cattle already there : thus pack and draught cattle simply travelling through shall be allowed only on the road and on a certain piece of ground told off for them to camp on and they shall not drink of the water from which the village cattle drink, nor graze on their pastures.

(*b*) That the cattle in grazing shall not be allowed to mix with those of any village in which the disease prevails.

(*c.*) That any man in the village who has an animal sick shall, directly it becomes sick, inform the headman of the village, who shall have the animal put apart from other cattle.

(*d.*) All animals sick, or supposed to be sick, shall be at once removed from among the healthy and tied up in a place to leeward of the village and at least 300 feet from other cattle. This Hospital pound to be placed under care of a man experienced in cattle who shall not go among other cattle and who shall be assisted by a Chámár or Mhár. The pound should have two walls or stout fences, so that grazing cattle could not stray into it, nor sick cattle escape; and these two walls should be about 40 feet apart from one another. All drinking water, food, and medicines should be brought into the outer enclosure and carried in from there by the pound-keeper and his assistant.

4. *Isolation of the sick* is most essential, and yet is very seldom practised. It consists not only in separation of sick cattle from the healthy but in avoiding all contact whatever between the two; the same man must not tend them; they must not drink from the same tank, nor eat out of the same vessel. The doctor, in passing from the sick animals must disinfect himself before he goes to the healthy. Altogether there must be no communication whatever, either direct or indirect. It is important not only to isolate the *sick* but also the *suspected*, those which have been in contact with diseased animals or which may have in their bodies the disease in a state when it is not sufficiently developed for detection. This state is termed "Incubation" and is one of the greatest difficulties to be contended with in communicable diseases, a cattle doctor with his instruments should be able generally to detect any of these disorders one or two days before the owner, even though an experienced man, could do so.

5. *Disinfection* is very important as a means of destroying the disease poison. There are some drugs which have this action and it is important that the cattle-owner should know about them and know how to use them. Carbolic acid, Condy's fluid, chloride of lime, and MacDougall's red powder are such substances, but rather expensive for ordinary use

in large quantity. Sulphur, when burnt in a stable, is very effectual and clothes hung up in the fumes of it will be disinfected. Boiling water is also a disinfectant, consequently it is not necessary to destroy all clothes, ropes, &c., which have been used about sick animals, for they can be boiled and will then be harmless. The following are the *modes of disinfecting in cases of communicable disease of cattle* :—

(a.) All sheds in which sick cattle have been should have boiling water thrown over the floor, wood work, and walls, and then have plenty of sulphur burned in them.

(b.) All people who have been with sick cattle should change their clothes and wash carefully, and, if it can be got, put a little carbolic acid in the water in which they wash (a wine glass full in a bucket of water).

(c.) Clothes which have been worn by people taking care of sick cattle should be purified by boiling; shoes and other articles which cannot be boiled should be kept for a short time in sulphur fumes or painted with carbolic acid.

(d.) All dung, waste grass and other food, dressings, and other such substances from sick animals should be carefully burnt.

(e.) The carcasses of animals which die should be burnt or buried in quicklime. This may seem waste of skins, but it is very necessary, for we have seen that rinderpest and anthrax can be conveyed by the skins. The flesh in anthrax should not be eaten, but in the other diseases it is not known to do any harm. The carcasses should, if cut up, be dealt with in the Hospital pound and the flesh not brought through the village; the Mhárs should be advised to thoroughly boil it before eating.

(f.) Chains and other iron work about sick cattle should be made red hot to disinfect them.

All the measures suggested for prevention may not be possible in particular outbreaks of disease, but the more of them that are carried out by the cattle-owners and villagers the less will be the loss from these diseases. In every case, then, as much as can possibly be done of the abovementioned measures should be carried out; they are not expensive, but they require the owner to go to some little trouble to prevent spread of disease among his cattle and serious losses. *He should not look upon disease of any*

in over the animal's sides. After the first ten days, give chiretta, one ounce; hirakos (sulphate of iron), one tola, daily for a fortnight.

Foot and mouth disease —Give daily in a quart of strong congee the following :—Country spirit, two ounces, turpentine, one ounce; chiretta, one ounce; and half a tola of hirakos. Also wash the mouth out twice a day with strong salt and water. Clean the feet at least once every day, and if there are maggots in the sores dress with turpentine and oil mixed in equal parts. If there are no maggots, dress the sores well with common tar after washing them very clean and then cover them up with a cloth firmly tied on, or with a bandage, to keep the dirt out, prevent the animal licking them, and the flies or crows attacking them. If the animal is in very much pain, put hot poultices on the feet and cut away with a knife all loose horn of the hoof, also open any abscess that may be present in order to let out the matter. When the milk-bag of a cow becomes very hot and inflamed; bathe it carefully with hot water and draw off all milk and discharges frequently. Never apply quick lime to sore feet in this disease; if you can't get tar, simply keep them clean and covered up, bathe with salt and water and then dress them with sweet oil.

SECTION VII.

CONCLUSION.

1. We have written in this little book plain words on a subject of much importance. We have endeavoured to put ourselves in the place of the cattle-owner and to write down what he might know with advantage to himself so as to treat and protect his cattle, when, as is usually the case, he has no one except other villagers to advise him.

2 The work should first of all be carefully read through and it will be seen that only very simple words are used in it and only such measures recommended as the owner can easily carry out. The medicines suggested are those which can be obtained in any Bazár and the disinfectants are some, such as sulphur and hot water, to be obtained everywhere, others, such as carbolic acid, must be supplied from the larger towns, but when wanted in villages can be obtained on

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order; sulphur, tar, and hot water being used freely as suggested until they arrive. Owners generally have little faith in the remedies obtainable in the Bazár for cattle plagues, they have tried all and find them insufficient, but they should remember that drugs supplied from Europe and elsewhere are often so powerful as to be dangerous in the hands of every one except a properly educated doctor and so if given for use by owners would do more harm than good Thus it is better for owners to use the Bazár remedies suggested in the sixth section of this book but to *especially* adopt the preventive measures there suggested

3. We have tried to put on paper what all can understand and all should know. We want it to be clearly known that all of the few pages of this book should be read and understood, and that in villages the Primer should be read aloud for instruction of those who cannot themselves read what it advises. Let the reader start by working right through it, then when he wants to know at any time about cure, causes, symptoms, and so on, he will know where to look for what he wants.

4. As a simple book written by a practical man expressly for those who own, manage, and live among cattle, it is hoped this Primer will prove useful to cattle-owners of India.

NOTES

ON

SANITATION IN INDIA.

BY

Lt.-Col. G. F. YOUNG, 24th P. I.,

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NOTES ON SANITATION IN INDIA.

INTRODUCTION.

1. To attempt any improvement in the many unpleasant details which collectively make up a sound system of sanitation is a thankless task, beset with difficulties on every side. Not one Augean stable confronts him who would attack insanitation, but an interminable succession of them, while all around the desire is universal to hear as little as possible about the unpleasant subject, and above all to incur no avoidable expense on it.

But civilization has discovered that natural laws will not be treated in this way. Those disregarded laws *insist* on forcing sanitation again and again, and yet again upon the attention of an unwilling community, and they give but one alternative, *viz.*, to hear and obey (no matter the expense), or—*death*. This civilized Europe has very slowly, and very reluctantly, at length discovered, and this India has got to discover too.

The cheapest system, and the fewest possible establishments to work that system, has ever been the rule in India, and though prevention is, so far, far better than cure, it does not seem thought so in India. There, while the Medical Department (for the cure) is properly equipped, and has plenty of power to get all that is necessary, the Sanitary Department (for the prevention is an impalpable cloud, with no power of getting anything at all proportioned to its needs. But sanitary laws are hard unbending things, which will not be put off like this; they say in effect to any community which persists in trying to drive a sort of bargain with them by spending one rupee where two are necessary: "Very well, as you choose; spend your money on all the other things which you call public blessings, and push our needs into the background, but know that we will most surely revenge ourselves on you, and leave fewer of you to enjoy such things"

2. India so far before many civilized countries in some respects is very far behind them in sanitation. With a climate demanding that its sanitation should be more perfect than any, with a Government the equal of the very best in enlightened and large-minded views, and with (whatever be said) no lack of money for such a purpose, India ought to lead *all* nations in sanitary science and in adherence to its laws. Yet the actual state of its sanitation shows scarcely any sanitary science at all. Yet there is probably no work in India, and no expenditure in India, which can confer such a blessing. When, not to mention cholera

enteric fever is rapidly becoming a second curse to the land as bad as the first; and when one reflects that though to cure a man of such an illness is a very good thing, to prevent his ever getting it is ten times better,—then surely no amount of expense or attention can be considered too great in order to gain such prevention, and especially in the case of a disease whose existence in any civilized community, is a blot on their civilization, their common sense, and their humanity.

3. Were it once thoroughly realized that to give health is the greatest blessing you can give any community, and that real sustained effort in sanitation does this as an absolute certainty, then the interest, and attention, and determination of those whose influence is all-powerful would rapidly change the whole aspect of sanitary affairs At present it is no exaggeration to say that the whole sanitation of India is *starved to death*. The cause is not far to seek; it is not so much want of funds, as an entire failure hitherto to grasp the true financial aspect of the question, which aspect has been long since grasped in Europe. Village and district sanitation in India undoubtedly does meet with other difficulties, but where sanitation is most needed, *viz*, in the crowded communities of municipalities and cantonments, there it is reduced to a mere question of money; and money, too, which, ample in amount for all that is required, there is there no real difficulty in getting.

And until it is recognized in India, as it has been in Europe, that in sanitation there can be no question of "cutting one's coat according to one's cloth"; that sanitation, like everything else, has a fixed price and cannot be bought for less; and, therefore, that after providing for the protection of the community from its human enemies, the first charge on the funds must be an equally careful protection from its unseen enemies of disease (which kill so many more),—till then sanitation in India will continue an impossibility.

Moreover, as regards that portion of it which affects Military Cantonments, it must also be recognized that a military community (as compared with a trading community) can never, by the very conditions of things, have any real public income of its own from which to provide proper sanitation for itself; but must perforce always depend almost entirely on funds obtained outside itself, in fact, directly or indirectly, from those very trading communities, since it is towards them that all the money of the country necessarily flows. This latter is even already causing the sanitation of some Municipalities to be far superior to that of our Military Cantonments, a difference every year increasing, as these centres of trade grow yearly more prosperous. Yet the latter should be the pattern to the former.

4. Though equally applicable to the case of any Municipality, these rough notes have been put together with reference in particular to our *Cantonments*; and in the hope that the great evils in their sanitation, which are increasing in an alarming ratio year by year, and whose results are written in letters of fire, may be better appreciated, and their remedies, which are plain, be adopted before more harm is done.

Whether the necessary funds are to be provided entirely by the Government of India, or by Cantonment Funds, or by a Provincial Government for all Cantonments in its area, or in part by each and all of these, or even if failing all these, each inhabitant of a Cantonment were called upon to provide at the end of each month, half-year, or year, a proportional share of the expenses incurred in giving him protection from disease and death, matters nothing, and should not be allowed to affect the question in any one way. Let it first be laid down what is necessary to satisfy the demands of true sanitation, and let that be provided; this done, let the expense of doing it be adjusted as may be considered most equitable and just. But do not allow, as now, the former to depend upon the latter, and never commit the sin of suffering imperfect sanitation "for want of funds." Let it be an axiom that the funds must, and therefore shall be, found somehow, and turn the whole attention rather to seeing what is necessary.

No I.—CREMATION.

NOTES ON SANITATION IN INDIA.

NO. I.—CREMATION.

SECTION I.

The evils of our present method of disposal of fœcal matter by burying it.

1. Our existing mode of disposal of all fœcal matter is to bury it in the ground in trenches 1′ × 1′ in section.

Many high sanitary authorities hold that this method, even in theory, is scientifically unsound; that the fœcal matter, even if thoroughly intermixed with the surrounding soil is not rendered harmless; and hence that, in time, the subsoil becomes polluted, and typhoid fever and kindred diseases thereby produced. Moreover, that the evil is increasing rapidly from prolonged occupation of cantonments whose soil has been so treated.

2. It is now, I believe, almost an axiom in sanitary science that typhoid fever can be produced in no other way than by *Sewage poison.*

And one is strongly led to suspect that sewage poison can itself be produced in no other way than by putting fœcal matter under the ground.

If, for instance, we look at a place like Kashmir, we see a whole country with the most filthy conditions as regards fœcal matter, yet where typhoid is unknown Throughout the whole country there are no latrines, and no burying of fœcal matter anywhere, it pervades the towns and their surroundings, and all over the country mingled with every stream; the capital itself is utterly foul; the river Jhelum, which flows through the centre of the city, is used impartially as a general latrine, as a receiver of all matters washed down from the city on either bank, and as the general drinking water supply; the other principal towns have similar conditions, all being situated on this same river, lastly, the climate (in the actual valley) is in June, July and August very hot. Consequently we have all the conditions which one might suppose would produce typhoid, yet no typhoid; and I believe no (unimported) case has ever been known. On the other hand, cholera is as common and quite as severe as in other places.

From this and similar things to be observed around us in India, may one not infer that fœcal matter, left simply on the surface of

the ground, though it may produce cholera and other grave diseases, will never, even though it mix with the drinking water, produce typhoid: and that to cause this special disease it must be put *under the ground*, where (inaccessible to sun and air, but accessible to water and heat) certain unknown changes in it occur, and "sewage poison" results; that in fact, fœcal matter is one thing and sewage poison another *

But if this be so, then we are at present deliberately turning our cantonments into manufactories for this deadly poison!

3. If, then, fœcal matter cannot be left on the surface because it there probably produces cholera, and cannot be put under the surface because it there probably produces typhoid, where under difficult conditions of an eastern country, shall we seek for a satisfactory method? Before, however, considering this let us see what are the defects of our existing system, not merely (as above) in its theory, but also in its practice.

4. While our present method is thus considered unsound even in theory, it is far more unsound in practice.

There are three systems under which fœcal matter is at present buried in trenches: these are—

I. Trenches dug to receive that brought from the (fixed) latrines of British troops. The establishments for these are provided by the Government of India.

II. Similar trenches dug to receive that brought from all fixed latrines for natives which there may be in a cantonment, including (*a*) fixed public latrines, (*b*) private latrines in native houses, and (*c*) compound latrines of European residents. The establishments in this case are provided by Cantonment Funds.

III. Trenches dug to themselves form the latrine, moveable screens being placed over them for privacy. These are for use by natives in all cases where a fixed latrine has not been provided. The establishments are provided by Cantonment Funds.

The evils of all three classes are the same, but their circumstances being different they must be considered separately.

5. To obtain the result intended in theory three main points are absolutely essential, and these are, therefore, laid down by Government, and ordered to be strictly observed, in all the 3 classes alike; *viz*:—

(1) That the trenches are never to be larger than 1′ × 1′ in section; "if anything, less."

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* NOTE.—It will be curious to note, when in course of time civilization comes to cause fœcal matter in Kashmir to be buried, whether this is followed by any introduction of typhoid.

(2) That not more than a depth of 3″ of fœcal matter is ever to be allowed in each trench, covered by 9 inches of fresh earth.

(3) That the ground shall, after an interval of two months, be ploughed up and cultivated, at least one crop being taken off it before it is again used.

With these conditions it is practically not possible to conform. Omitting for a moment trenches of Class III, let us take each of these points in turn and see, with reference to the other two classes, how widely the practice of the system deviates from its theory.

6. First, then, as to the size of the trenches :

On this point at least it might be supposed that it would be easy to ensure all being right It is not so. Sweepers have discovered that a long and narrow trench involves greater labor in digging than a shorter one of larger section. Hence, left to themselves, they will always make the trenches larger than the 1′ × 1′ section laid down ; the Government order, be it observed, says " if anything, less " Again the section being a fixed quantity dictates the length to be dug, otherwise the 3″ depth of fœcal matter must be exceeded. With a 1′ × 1′ section in order to have only 3″ of fœcal matter when a cart load is emptied into it, what must this length be? I have found that (if the cart is *full*) this is 15 *yards of trench to each cart load ; i e.*, for each trip the cart makes. Supposing the cart makes three trips daily (they often make four) this means 45 yards of trench to be dug for each cart by each bildar daily (provided even there is one bildar for each cart) ; that is, a considerable amount of unremitting labor, even in ordinary soil, to be performed wet weather or dry, hot weather or cold, sick or well, holidays or working days, every day without a single exception the whole year through. In hard soils this labor may be double ; and with the fewer establishments, always the rule in Class II, it may be double that again.

Obviously, therefore, nothing will cause this unremitting and heavy toil to be regularly performed but supervision, which also to be any good in such a matter must be both European and constant, so constant that *nothing short of an European Non-Commissioned Officer being present at every trip a filth cart makes to the trenches* will ensure this length of trench being dug, or (what comes to the same thing), if previously dug under supervision, used. Yet trenches of Class II cannot, as a rule, be provided with any European supervision *at all*, or if any, than only the hurried visit once a day of a Conservancy Sergeant, who has numberless other places to visit as well.

7. Taking now the second point, *viz.*, the depth of fœcal matter in the trench.

Here, again, unless a trustworthy European is to be present, every time a cart is emptied into a trench, how is it expected that

this rule (on which all authorities insist as the main essential and to be most strictly observed) will be observed? Every increase of an inch in the depth of the fœcal matter means so much less of heavy labor to hard-worked establishments on the lowest rate of pay in the country. And 5 minutes afterwards, all being covered up, none can tell (*even if any one comes to see*) how much is beneath. Is it not certain then that the labor will be saved, and to the exact extent up to which it is thought this will not be detected? As a matter of fact, it is so saved, systematically and daily, and *everywhere*, and there is invariably a great deal more fœcal matter in the trench than could ever, under the most favorable circumstances, mix with the surrounding soil. It matters nothing whether it be 6, or 8, or 10 inches, or even *up to the brim of the trench* (cases even of which latter we have all of us seen, not at all rarely, in Class II); all are equally fatal to the system and hopelessly so.

Yet not to mention the utter impossibility in the case of Class II (which, be it observed, outnumbers Class I as at least 4 to 1), can even Class I find this great amount of strict and constant supervision, *i. e.*, can an European Non-Commissioned Officer be present (hot weather or cold) every time a cartload is emptied into its trench? Yet short of this, it is as certain as any thing can be that the main essential on which the system rests will not be observed.*

8. But we have yet a third point, *viz.*, the ploughing and cultivation of the ground.

Here at all events, it may be thought, is a point which, not requiring this enormous and impossible supervision, can at least be accomplished. But it is not so.

First, the ploughing to be any good at all in mixing the fœcal matter with the surrounding soil must, even if the trench is the *right* depth, obviously go at least a foot deep But ploughs in India will not reach this depth; consequently a compact bed of fœcal matter remains permanently buried untouched at the bottom of each trench. Here, then, again, we have the system breaking down utterly. Moreover, in the hard soils common in so many parts of India during a great part of the year, the corduroy-like alternation of intensely hard ridges with soft earth between will, in attempting to plough such ground, break any native plough to pieces In all such places, therefore, the cultivator

* After seeing hundreds of such trenches in many different stations, I can only call to mind *one* where the system was really carried out according to the theory. This was the case of a small station where the Officer Commanding the Station, being somewhat of an enthusiast, had the trenches dug *in his own garden* (!) in order that he might personally (all else failing) watch over the strict performance of the details If nothing short of the almost hourly personal supervision of an Officer Commanding a Station will produce success, this seems a sufficient condemnation of any system.

avoids letting his plough go even as deep as it otherwise would and merely scratches up the top of the ground, while this procedure is almost necessarily winked at.

9. Lastly, whether from such excess of fœcal matter in the soil, or from the difficulties in getting it thoroughly ploughed, or the impossibility of bringing water on to it, or the restrictions as to time of cropping, the cultivation is in nine cases out of ten either given up as hopeless, or is merely nominal, and in the large majority of cases no real crop is ever raised from this trenched ground.

10. It only remains to refer to special difficulties in certain seasons and places.

In (1) the hills and (2) places with very rocky soil (*e. g.*, Cherat) the system is even worse than elsewhere; in No. (2) trenches cannot be dug at all, and the fœcal matter therefore gets thrown into holes and merely covered with stones, while in No. (1) every shower of rain cuts its way into the trenches and spreads disease and death among all who live below.—(N B.—A rocky hill is therefore the most impossible place of all.)

Again in many parts of India, great additional difficulties are always experienced in the rains, when, except in the Upper Punjab, the trenches become filled with water as soon as dug and remain so for weeks. At such times it may be imagined how completely hopeless the whole matter becomes.

11. With regard to Class III all that need be said is that they have the same defects as the other two classes, only perhaps more intensified. Like them all depends for safety on European supervision, and in this case especially does it require that this be brought to bear at *all* hours in the day; yet this is even more impossible with these latrines than elsewhere. They also require, if the depth of fœcal matter is not to exceed 3″, at least one yard of trench to every 15 persons, and they are never given enough digging establishments for this; nor would any number of such establishments suffice without the above mentioned supervision.

12. Here, then, we have a system which, for preventing the most deadly harm, depends absolutely on a number of minute points, all being observed with the utmost strictness, and the failure of any *one* of which wrecks the whole concern from a sanitary point of view, and yet one which, not merely frequently, but invariably, breaks down in *every one* of these points hopelessly, and must ever do so. It is, in fact, a complete practical impossibility, to make its theory and its practice even approach each other.

Is it then necessary even to enquire at all into whether the method is sound *in theory*?

13. In India there will always be with any system a large amount of laziness and neglect, while European supervision can only

be occasional. Therefore our system should allow for this, and be such as no amount of neglect practically likely to occur can affect as far as essentials go The existing system for the disposal of fœcal matter is the very opposite of this, being one in which such neglects are absolutely *bound* to occur, as well as one where all neglects affect essentials to the last degree.

Hence the system must stand utterly and irremediably condemned. Meanwhile its evils are intensifying in an ever increasing ratio, the ground becoming more and more polluted from accumulations of successive years, while that ground is at the same time becoming more and more thickly populated every year.

Add to this its condemnation by many well qualified to judge as unsound even in theory, and we have surely enough upon which to urge its prompt and entire abandonment.

SECTION II.

General description of the system proposed, description of the Cremator, and results of experiments.

14 Our present system must thus be held to have absolutely failed. All over Europe typhoid is held to be directly consequent on imperfect modes of disposal of fœcal matter, and typhoid is rampant in every Cantonment, and increasing every year The causes are before our very eyes.

As regards, then, the remedy. The English system (large covered drains and a body of water which carries all away either to the sea or to a sewage farm) would appear to be utterly unsuitable and dangerous in India with its much hotter climate; all the dangers of "sewer gas" are here much greater, while sewage farms must be looked upon with great suspicion in this country, where reliable supervision is always a difficulty Setting, however, all this aside, the regular supply of water necessary could hardly ever be found in a Military Cantonment.

The system has latterly been introduced into our Presidency towns and one or two other large places; its dangers will, I have no doubt, make themselves felt hereafter.

15. I have long since come to the conclusion that *burning* is the only course suitable to India, and that we shall never have any sanitation worth the name till it is adopted The ashes produced ought to be valuable for agriculture, but this is quite a secondary consideration, and the system does not pretend to be a cheap one, and ought not to be expected to be so; no decent system of sanitation in any part of the world is cheap in that sense Though, however, burning is scarcely likely to become quite as cheap as burying, it need not be very costly, especially after a time—(Section IV)

16. Holding the above conviction, I have at length been induced to try whether such "cremation" was in reality so impracticable, and may I think say, have been thoroughly successful, since in every experiment *the fœcal matter has been reduced to a small quantity of absolutely harmless grey powder.*

After making numerous unsuccessful enquiries for any place where such a system had ever been tried, I was obliged to set to work unaided on my own unscientific ideas. I now give the results of various experiments and enquiries made into the whole matter during some 12 months at Peshawar and Cherat for what they are worth.

The objects to be (I considered) attained were:—

(*a*) To devise a "cremator" which would subject the fœcal matter to such a heat as would reduce it, not merely to a cake, but to an absolutely harmless *ash*.

(*b*) To do this with an amount of fuel which should not be prohibitive.

(*c*) To devise a working scheme for a Military Cantonment.

I also considered that (*d*) the more simple in construction and working the "cremator" could be made, and (*e*) the less change in our existing system for *removal* involved in the working scheme, the better; these, therefore, were secondary objects, to be kept in view.

17. After many experiments (some given below) the following points stood out:—

(1) That the best style of "cremator" of all those tried is as detailed below, and that it can be constructed by any native mistri for from Rs 30 to Rs. 40

(2) That all fœcal matter thrown into this is reduced (with ease and simplicity and without any skilled labor of any sort) in a short space of time to an absolutely harmless grey ash

(3) That no change need be made in the existing mode of *removal*, the fœcal matter can be removed to the crematoirs just as now to the trenches, and burnt there instead of buried.

(4) *That remarkably little supervision is required.*

(5) That the smoke being carried up high overhead no smell can be detected even when standing right alongside, and therefore, there is no reason for the cremators being placed at any great distance.

(6) That the fuel need not be all, or even chiefly firewood, but that a great part of the ordinary rubbish, dried in the sun, does perfectly for this purpose. As the whole expense of the system (over and above the initial cost) is the firewood, this is a most important point in regard to the cost

(7) That the ashes have a distinct value, which will at all events in part counterbalance the expense of the firewood.

I will now take each of these points in detail.

18. *The Cremator* (Appendix A).—This consists first of a double chimney 14′ high, one shaft (*c.f.*) extending right down to the ground and carrying off the smoke of the burning fuel, the other (*e h*) extending about two-thirds the way down and carrying off the smoke of the burning fœcal matter. Diameter of the shafts is 6″ × 4″, with 4″ between them. At the bottom of this chimney

and communicating with the main shaft (*c f*) by an archway is built the fireplace (*c d*); this is merely like a magnified native "chula," and is 5 feet long, 2 feet wide, and the side walls 1½ feet high, the latter being 1 foot thick. On this "chula" is placed the "dish" (*a b*) in which the cremation takes place; this consists of a plate of sheet iron ¼ inch thick, 5½ feet long, 2½ feet wide, having an upright rim of iron 8 inches high rivetted on to it on all four sides to form the "dish," whose depth is thus 8″. This rim is not placed flush with the edge of the plate of iron, but 3″ inside it all the way round; the object of this is that the plate shall rest with 3″ in the walls, with which the rim will then be flush. Thus the size of the actual "dish" is 5′ × 2′ × 8″.

The "dish" having been fixed in position the side walls are then continued upwards (*e a b*), and being sloped down towards the front both act as buttresses to the chimney, and also help to enclose the "dish." The iron rim of the "dish" is only in order to prevent the fœcal matter when first thrown in, perhaps in a semi-liquid state, from contaminating the side walls; 8 inches is considered ample for this, but if not it can always be increased.

Lastly, the "dish" is roofed over (either with an iron plate, or boards covered with mud), such roof (*e. g.*) resting on the two side walls; below the point "*g*" this roof becomes an iron door by which the fœcal matter is thrown in, and which by its own weight closes sufficiently to prevent any smoke from issuing; the latter is in fact all drawn off (by the slope given to the roof of the "dish") straight at once to its chimney (*e h*).

The size of the whole chimney at base is 4′ × 2′, but above the point "*e*" this is reduced to 2′ 9″ × 2′ (Fig. 2). The doorway of the furnace is arched, and made only 15″ wide, to prevent flames coming out towards the front and to assist the draught.

Over the whole is, if desired, added a light shed, to protect the sweeper and cremator from rain and sun, as well as afford a convenient place for a small quantity of fuel.

The above cremator can be built either of brick or of common sun-dried bricks; if the former, it will of course be more durable, but all those experimented with have been merely built of sun-dried bricks, and have answered so admirably that nothing more elaborate seems necessary. Their cost at Peshawar (where ironwork is expensive) is about Rs. 30 without shed, and Rs. 40 with the shed. They are most simple to construct, and can be built by the commonest mistri anywhere.

The following implements are required with each cremator:—

(1) A large light shovel with a long handle (about 7½′ long), for removing the ashes.

(2) A long handled rake (about 7½′ long), for stirring the matter when nearly consumed.

(3) A pole (7½′ long) with any old rags fastened at its top and forming a mop, for brushing out the cremator after work.

(4) An iron bucket (as described in Appendix B), for filling the cremator from the cart.

Such cremators are, of course, very rough compared with what a specialist would contrive, but rough as they are they have been most successful from a sanitary point, amply fulfilling point (*a*) of para. 16, as will be seen by the following trials among others :—

Trial I —Place, Cherat. Fire lighted with the ordinary brushwood from the hillside, and afterwards kept up partly with brushwood and partly with stable litter (not specially dried) from the transport lines The "dish" became red hot in three quarters of an hour; the contents of one hill pattern filth receptacle were then thrown in and spread over the whole surface of the dish ; the fire was kept up, and in about three quarters of an hour more the whole was reduced to about two double handfuls of finely powdered ashes of a light grey color. For the last quarter of an hour or so the mass was stirred about with a long rake until nothing remained but the pure ashes, and until no smoke whatever was given off. No smell was apparent, all being carried up high overhead by the tall chimney and thorough draught.

It will be noticed that in this instance *no* firewood was necessary, the brushwood from the hillside answering as well.

On the other hand, the climate was an exceptionally dry one.

The "dish" remained red hot for some time afterwards, and a second receptacle full would therefore not have required so much fuel.

Trial II.—Place, Peshawar. Cremator built at the trenches of a Native Infantry Regiment. The contents of one large barrack receptacle thrown in and reduced to powder in about two and a half hours. Fuel used was rubbish from the Cantonment rubbish carts (not specially dried) helped by about three quarters of a maund of firewood. (*Note.*—The climate of Peshawar being very damp the undried rubbish did not burn well at first, and required a lot of wood before a good fire was got up.)

Trial III.—Place, Peshawar. The same cremator. Contents of a hill pattern receptacle reduced to powder in one and a quarter hours Fuel, rubbish (not specially dried), helped by a small quantity of firewood.

Trial IV.—Place, Peshawar. A cremator built alongside a barrack latrine The fœcal matter from the latrine (equal to about one cartload) thrown during the day into the "dish" of his cremator instead of into any receptacle. At night the fire was lighted, and the whole burnt to ashes in about three to four hours. Fuel as before, helped by about 1 maund firewood.

Trial V.—Place, Peshawar. A small sized cremator, half the size of the others, and costing only Rs 15, built in a private compound alongside the latrine. All fœcal matter of the compound burnt regularly during two entire months in this cremator, the fuel being the stable litter and garden sweepings, &c., assisted by about ½ maund of firewood daily. The fuel was allowed to dry in sun during the day, and at night put in an empty hut near the cremator; it had thus only one day's drying. There was always more fuel than required, and a heavy fall of rain lasting three days caused no inconvenience. As in trial IV, this cremator was used during the day as a receptacle. The fire was lighted daily at about 6. A.M., and burnt slowly for about two hours; afterwards the ashes were taken on and placed ready for a contractor to take away, who in return for them gave the firewood required. This cremator was only 80 yards from the bungalow, but no smell from it could ever be detected. (*Note*.—This instance is useful in regard to burning *at the latrine*, a system which has certain definite advantages, though it cannot be proposed for general adoption, except in the case of the present trench latrines (para. 14.)

20. Turning now to other points in para. 17.—

(*a*) More fuel (and also more time) is consumed in isolated trials like these, where fires go out and cremators cool, than if cremators burnt more continuously. The general result, however, as regards amount of firewood required to assist the other fuel (and including other experiments besides those detailed), was that one maund of firewood would generally be required for each cartload of one of the ordinary Crowley's filth-carts. It was, however, very evident that the amount depended largely upon whether or not the other fuel was well or only partially dried, and whether stable litter formed a large proportion of it or not.

(*b*). When all is nearly burnt (evidenced by the small amount of smoke given out) the iron door is opened and the half burnt ashes stirred about with the rake until all is thoroughly reduced to a fine powder and no particle of smoke emitted. This stirring merely hastens the conclusion; if omitted (from laziness or carelessness, &c.,) no harm results, it merely takes longer.

(*c*) When no more smoke can be extracted from the ashes by any amount of raking they are shovelled out and placed in the iron ash-cart (which stands near) and the whole interior of the "dish" mopped out clean. Worn-out filth-carts would do well enough for ash-carts.

(*d*) The sweepers at the cremator are simply the same now employed for digging the trenches; each would have charge of two or three cremators, his work being to light his fires at the hour ordered and get his cremators pretty hot by the time the filth-cart arrived; to then keep up his fires for as long as required; finally, when the overseer arrived, to clear out the ashes.

(*e*) The ashes have a real market value. During the experiments a cultivator who had been watching them made an apparently *bona fide* suggestion that he should receive all the ashes in return for supplying all the fuel required. Nothing better could possibly be desired, and it is to be hoped that such an arrangement will be possible at many places.

(*f*) "*Nisada*"—Whether true or not I do not know, but it is said that from the smoke issuing at the mouth of the chimney "nisada" (*sal ammoniac*) can be obtained without additional expense. This is used in every town and bazar for various purposes, and is said to be got at present from the smoke (at brick-kilns) of burning refuse.

(*g*) A little practice is necessary to manage the fire properly. It must not be a smouldering one giving out nothing but smoke, but a good strong blazing fire, kept up by every now and then throwing in a few handfuls of the dried rubbish. The chief thing is to avoid putting in a lot of the rubbish at first, and to begin with a small fire of only firewood, gradually adding the other fuel after the fire is well under weigh.

(*h*) The ashes of the fuel are put into the ash-cart with those of the fœcal matter (the former greatly exceeding the latter in quantity) and both sold together.

(*i*) In the experiments the amount burnt was, except in trial IV, always half one of Crowley's filth-carts; but it is practically certain that a whole cartload will burn satisfactorily at a time.

21. The smoke of the burning fœcal matter has a very objectionable smell (though this is carried high up overhead by the tall chimney and great draught), but it would appear that such smoke, even if smelt, can have no harm in it, the fœcal matter being, when put into the cremator, quite fresh, and not having undergone those changes which later on take place in it when buried in the ground.

Subsequently it may be considered desirable to devise a cremator, which should pass this smoke back again into the furnace and consume it, but this would require the special knowledge of a sanitary

Engineer, and would be certain to involve an expensive style of cremator, whereas the one here proposed seems to fulfil all practical requirements.

22. If the sole fuel used were firewood, the expense would be very great. But this is not necessary; three-fourths of the ordinary "rubbish" taken out of a cantonment daily (stable litter, road sweepings, garden sweepings, dead leaves, and sticks, &c.) is very combustible, and has been found to answer perfectly, provided it is assisted by a small quantity of firewood; all that is necessary is that it should be spread out, sorted, and dried to a certain extent in the sun.

23. The offal and blood from slaughter-houses should apparently be treated in the same way as fœcal matter, and burnt in cremators. As regards all other refuse in a cantonment (*e.g.*, cook-house refuse, both solid and liquid) Medical authorities will decide what, being harmful, should be burnt in cremators, and what, being harmless, may be simply buried, made use of in tree plantations, &c.

All infected bedding and other materials desired to be burnt would be simply thrown into the nearest cremator.

24. As regards the proper number of cremators. This depends on the number of cartloads to be disposed of daily, a cremator burning one cartload at a time and roughly in about four hours.

Cremators could, of course, be made to burn uninterruptedly for the whole 24 hours (when each would consume about six cartloads), or for any less period. But it must be remembered that one cremator burning 12 hours will consume as much fuel as two cremators burning for six hours, while in the former case efficient supervision will be much more difficult to arrange than in the latter, not to mention other difficulties. Again, it will not produce a sound result to divide either the supervision or the establishments into reliefs; the best result is got by putting two or three cremators under each sweeper, and making him solely responsible for them. In the same way two crematoria, each under its own overseer, will give a better result than a single crematorium with the two overseers, working in reliefs.

Each Crowley's cart maintained averages three trips daily, and will therefore bring an average of three cartloads to the crematorium for disposal. Three cremators would dispose of this working four hours; two cremators working six hours; and one cremator working 12 hours. Again, a cremator, if worked for eight hours, could burn two cartloads daily. But it is essential for efficient working that each cremator (or pair of cremators) should be attached to serve some particular cart; and this would not be possible if each cremator is to burn two cartloads daily while each cart brings three cartloads.

From a full consideration of the above, my opinion is, having regard to all the circumstances of the establishments and their

supervision, that for the best result there must be *two cremators to each Crowley's filth-cart;* each to burn ordinarily one and a half cartloads daily, but able to burn 2 cartloads, without increase of establishments, whenever from any cause the cart may bring four cartloads instead of three, as may often occur.

Such pair of cremators would burn two cartloads in the morning (about four hours) and one cartload in the evening (about two hours: half a cartload in each cremator); total six hours daily. If in any case the cart made four trips, the evening burning would simply be made the same as the morning (*viz.*, four hours: each cremator taking a full cartload); making in this case a total of eight hours. Thus each cremator in a crematorium would ordinarily burn one and a half cartloads daily, but with a margin of power available for exceptional cases.

In order to make the general supervision as easy as possible, the regular principle would be followed of massing as many cremators as possible in one crematorium. The only limit to this would be (1) that the radius up to which a crematorium collects should not ordinarily exceed a mile, otherwise the work of the carts becomes too heavy; and (2) that the size of a crematorium should never exceed that which a single overseer can supervise, probably about 30 cremators. An average Cantonment would have either two or three crematoria; a very large one, three or four. A Conservancy Overseer to each.

As no smell is detected even when standing close up to the cremator, there is no absolute necessity to place such crematoria very far away; but it will generally be most convenient to place them about as far off as the present trenches, nor will suitable ground be got much closer.

In thus placing a number of cremators together they would be built in a double row (back to back) with clear intervals laterally of about five feet, so that the ash-cart can be placed between any two cremators. The whole row would be covered by a single shed, the latter a simple roof open at both sides supported on old iron rails. Intervals not occupied by a cart would be useful for the day's supply of fuel.

26. As regards the position of crematoria at hill stations. There the inhabited area being at all sorts of elevations, an objectionable smell would be noticed unless the cremators are placed *on outlying spurs;* such situations can always be found by proper search; *viz.*, spurs, nearly as high as the station itself, where the wind always sets over such spurs and never from them towards the station. Cremators in the hills must therefore always be so placed.

Should, however, the improvements of a specialist (para. 28) hereafter enable the smoke to be brought round and passed a second time through the furnace, all smoke will be consumed, and cremators in the hills can then be placed anywhere.

In the hills a larger number of crematoria, and of smaller size, would be the rule, as compared with the plains.

27. Such, then, is the system proposed. Throughout its details the only possible harm which can occur (infinitesimal compared to that daily occurring in our existing system) would be if any part of the fœcal matter were removed to the fields before being *entirely* consumed. This is scarcely likely to happen, but as it might do so a Conservancy Overseer would be employed to see that it did not. The most cursory inspection either of the "dish" of the cremator or of the ash-cart, will show this at a glance, as there is no mistaking the very finely powdered light grey ash.

Therefore, it would be ordered that no ashes be removed from the "dish" until passed (as consumed) by the (European) Conservancy Overseer. This is easily arranged (Section III), but in reality the sweeper has not temptation to so remove them; it matters nothing to him whether all is consumed quickly or not.

As a second precaution no ash-cart to leave the depôt until passed out by the overseer, and any sweeper in whose ash-cart any unconsumed particles were found, to be fined. One such fine would stop any carelessness of the sort for good, as no *labor* is here involved.

These two provisos would make all absolutely safe, supposing that the overseer himself does not shirk his work. But supposing this did on some exceptional occasion happen, what results? Only that some unconsumed particles are, after being subjected to very great heat, disposed of *as now;* or rather in a better way, in that, instead of being buried beyond reach of any plough, they are ploughed into the upper portion of the soil.

Seeing then (1) the very small chance of this ever occurring, (2) the small amount of supervision which will prevent it absolutely, and (3) the very minor harm resulting even if it does occur, I think it may be taken that the system proposed is practically absolutely sound from a sanitary point of view.

28. In India success or failure in such things will always turn on the amount of European supervision needed, and that system will almost always be the best which attains the result most automatically. The great advantages of this system (of course after its theoretical one) are—(1) its great simplicity; (2) that there being no severe labor there is the less temptation to negligence; (3) that such negligence is very easily detected; and (4) that no ordinary amount of negligence which is practically possible to occur can work much harm.

These things always depend in the end on the man on the lowest rung of the ladder and on what he has to do; and here the attendant sweeper has only to fill the cremator and keep up a good fire. Let even the fire be allowed to go out, still no harm happens;

it only remains waiting until the man returns and starts it again. Let even the overseer neglect his duties, still the sweeper has not much temptation to take out the ashes before they are all consumed, while he also knows that (unlike our existing system, where similar neglects cannot be brought home to him) any one who may see the ashes at any time before they reach the fields (*i.e.*, any time during the next 24 hours, or perhaps more, for the ash-cart may take several days to fill) will at once detect his neglect.

29. The technical knowledge of specialists will of course gradually devise many improvements in the above rough cremator and system generally, and should of course be brought to bear as time goes on. But the important point to bear in mind is that this will take time, and that *there is not the slightest reason (very much the reverse) for waiting for this*, as it can scarcely produce much increased *sanitary* effect; that the system as it stands is apparently perfectly sound from a sanitary point of view, and pending such future improvements (which will only be learnt gradually) can be brought into force to-morrow without any fear, and with the knowledge that it is at any rate immeasurably superior to the existing one.

SECTION III.

Scheme for working the System.

30. Having shown what the proposed cremator is like, what it is able to do, what points have been brought out by experiment and enquiry, and the general basis on which any working scheme must rest, I will now state how I think it might be worked in any Cantonment. The same can be done in any Municipality, *and with at least equal advantage.*

The scheme supposes an ordinary Cantonment in Northern India; its outline is thus—

(1) To set apart one or more drying grounds where all "rubbish" would be spread out, sorted, dried in the sun, and stored in sheds

(2) To build at each drying ground cremators, in which all fœcal matter in the Cantonment should be daily burnt.

(3) The chief parts of the fuel to be the dried rubbish, but this to be assisted by a proportion of firewood.

31. First, a large piece of (culturable) ground would be set apart as a "drying ground", in the centre of this the required number of cremators would be built; and in any convenient spot (or spots) the required number of fuel-sheds (para. 35), the latter at some distance from the cremators on account of fire. The above together form the crematorium. Whether one, two, or three, or more crematoria were required would depend on the size of the Cantonment (para 25).

As the whole of the drying ground can be (and should be) regularly cultivated just like any other Cantonment land, there is no need to limit its size, and the more ground thus set apart round the cremators the better.

32. To the drying ground would be brought the whole of the "rubbish" of the Cantonment, (or section of the Cantonment), whether it be the ordinary rubbish, sweepings of roads and compounds, &c, or stable litter from horse line of mounted corps and transport lines. An enormous amount of combustible material is carried out of every Cantonment daily, and often realizes nothing at all; while it never realizes so much as would represent its value for this particular purpose. In some stations (*e. g.*, Simla) money has even to be paid for its removal.

33. Stable litter is the most valuable part of this "rubbish," producing a greater amount of heat than any other, and less affected by wet weather but at present hardly any of this finds its way to the Cantonment rubbish-carts. As regards British Cavalry and

Artillery and Transport Lines, there can be no doubt that this litter is the property of Government; as regards private compounds, if it has to be removed by Cantonment carts, it becomes equally the property of Government; while as regards Native Cavalry corps, it should be paid for. With the latter exception only, all "rubbish" (including stable litter) should be declared to be (as it is) the property of Government; and all, with no exception at all, should be taken to the Cantonment crematoria.

34. On arrival at the drying ground the rubbish should be well spread out and sorted, the non-combustible portion (dust, ashes bones, &c), if saleable, collected on one side for removal by a contractor; if unsaleable, then simply left spread over the ground to be ploughed into it at the proper time. The remainder (the combustible portion) would remain spread out on the ground until thoroughly dry (in ordinary weather one day or two) when it would be collected and placed in fuel-sheds.

35. The sheds for the dried fuel should be of the very simplest and cheapest kind, the roof the same as any native hut in the vicinity, and the whole either without walls, or with only the commonest mud filling in the spaces between roof supports (the latter, probably wooden beams). In these the dried fuel is stored, and carried thence to the cremators twice daily.

36. As the non-combustible refuse should not be everlastingly put on one spot (as now generally done), only a fraction of the ground would be used at a time. The whole area would be divided into as many plots as sanitary authorities might recommend, each plot being used for one, two, three, four, or six months; the rest being let out for cultivation as usual, and the plots used in rotation.

37. Every change in the weather will, unless it is stable litter, affect the dryness of the fuel; and on this latter depends the amount of firewood necessary, and with it the whole expense of the system. The rough average amount of firewood required seems generally to be about *one maund for every cart-load of fæcal matter*, but it varies greatly. The lopping of Cantonment trees, if they do not fetch their full value as firewood, should be reserved for this purpose and stacked at the drying ground.

38. Cremation is specially needed at hill stations, and there the conditions are different, the rain being much more continuous, while stable litter will form but a very small portion of the fuel. On the other hand, wood is cheaper, and also the whole hillsides are clothed with brush-wood (the very best fuel, see Trial I), and again under this with great quantities of combustible matter (dead sticks and leaves, &c.), all which a little ingenuity will utilize. In such stations, the cremators being on the crest of the spur (para. 26), the drying grounds would be on the slopes on either side, that which gets most sun for choice.

The conditions of each place can alone determine how best to utilize the combustible material available, and each must work this out for itself; it has only been shown how it would be done in a Cantonment in the plains and in Northern India. It may, however, be noted that the company cooks of a Native Infantry Regiment have to find, wherever the regiment goes, enough of similar combustible material ("balan") to keep the company cook-house fires going, and that even in the wettest weather they manage to do this. What they can do in a small way, unassisted and under every sort of difficulty, a Cantonment or Municipality, with all its resources, can certainly do too, if it only determines to do so with equal energy.

39. The amount of shed accommodation depends so entirely on climate that each place must settle this for itself. In the plains in Northern India enough to hold a ten days' supply of fuel would generally suffice; in the hills much more than this would be necessary, but at the same time sheds will there be far cheaper to construct, and there should be no difficulty in providing any number. If a station underestimates in this respect, it will sooner or later find its fuel-sheds empty and have to buy large quantities of firewood temporarily until the sun reappears, so that it will be very shortsighted to stint the number of sheds.

In the experiments at Peshawar (a comparatively damp climate, and one where the sun in the cold weather has very little power) no difficulty was experienced in drying the fuel quite sufficiently for the purpose. Once the fire is well under weigh all that is thrown in burns, even if not previously very dry.

40 To the cremators standing in the centre of the drying ground would be brought the whole of the fœcal matter of the Cantonment (or section of the Cantonment), irrespective of whether from lines of British Corps, of Native Corps, or of bazaars and compounds, &c., each cart taking its contents to one or other of its own two cremators.

41. At the commencement, if found that a whole cartload does not burn *thoroughly*, then the amount must be reduced to half a cartload (which is *known* by frequent experiment to burn well), the cart remaining at the cremator until a second burning can take place, or else the other half being put into a second cremator.

In any case when starting the system only half cartloads should be put in for the first day or so, until the establishments understand how to keep up a good fire and how to ensure all being *thoroughly* consumed. Any excess can be taken to the trenches as usual (paragraph 56 *f*).

42. Each filth-cart generally makes three trips daily, two in the morning and one in the evening. Supposing that each cremator can burn efficiently a cartload at a time, the two cremators

(A and B) for each cart would work thus. Cremator A (its "dish" still full of the night's ashes) has its fire lighted a good hour before the cart arrives on its first trip: about half an hour before the carts arrive the overseer would be there, and would inspect the night's supply of ashes (see below) and see them removed from both A and B. The cart on arrival fills A and returns for its second trip; meanwhile B's fire is lighted, and when the cart arrives a second time it is emptied into B. The overseer then leaves, the fires burn on for as long as required, two, three or four hours, and when all is consumed are allowed to die down (they will not be found to go out) until the evening, the ashes of the fœcal matter remaining where they are (in the "dish") In the evening the fires are got up again; the carts make their third trip, preceded, as before, by the overseer, who inspects the results of the morning's burning, and has the ashes removed and the cremators refilled. This time A and B each receive only *half* a cartload. This is then left to burn, and when consumed the fires to die down, the ashes remaining where they are until the overseer arrives in the morning. The cremators must be fully heated by the time the overseer makes his inspections of the ashes (fires being lighted sufficiently early for this), so that he may have them raked about a little and satisfy himself that no more smoke can be extracted from them before ordering them to be removed.

43. The above scheme necessitates no increase of establishment.

(*a*) The same carts and establishments which now collect and take the fœcal matter to the trenches would then take it to the crematorium instead.

(*b*) The sweeper bildars now employed at the trenches would instead, part attend to the cremators and part to spreading out and sorting the rubbish Even if one or two more men were required here the difference is not worth notice.

(*c*) The ashes would be removed from crematoria in carts belonging to the Cantonment, but by bullocks and drivers belonging to those who bought the ashes.

Thus the expense of the system would be confined to two items; *viz.*, (*a*) the initial cost of the cremators and sheds, and (*b*) the firewood (Section IV).

44. *Existing Trench Latrines*.—With the burying system must obviously stand or fall all trench latrines.

At some stations (Sialkot, I believe, for one) trench latrines have been already abandoned, the whole of the fœcal matter being thus removed outside the station. But in many stations they are still in force, and wherever this is so it will be necessary to abandon them, and therefore to see what should take their place.

Of course this *may* be by simply constructing ordinary latrines and providing these with carts, receptacles, and pans. But better

than this can be done, and money saved with an actual gain in sanitary efficiency. *All* latrines for natives should be able to be periodically moved, and the ground on which they have stood ploughed up and cultivated. No fixed latrine for natives should ever be allowed; it is an abomination, always and everywhere. Therefore for all places where trench latrines are in force, I recommend the following plan, *viz*, to discontinue the digging of trenches, but to retain the existing screens as a latrine, providing this with the necessary receptacles and pans, but no carts; and to construct in the centre of the ground one, two or three cremators, according to the number of persons using the latrine, namely, *one cremator* to every 500 persons* Such cremators would burn perhaps 12 hours daily, and in them the sweepers would deposit the fœcal matter instead of into carts. A shed to be constructed over or alongside the cremators,and a due proportion of the dried fuel brought there daily from the nearest drying ground by one of the rubbish-carts on its return journey thence. Such cremators might perhaps require one additional sweeper.

This plan would get rid of all the expense of haulage entailed by removing the fœcal matter elsewhere to be burnt, and also of the sanitary objections to any unnecessary carrying about of fœcal matter. The cost of the haulage saved would almost entirely cover that of the firewood.

This plan is rendered here possible by the fact that trench latrines are always placed at a certain distance from habitations, and *amply* far enough to prevent all chance of smell from the smoke. In trials II and III it will be noticed the cremator was actually placed in just such a position, and though many experiments were there conducted, never, from first to last, was any smell detected thence either in or near the lines, or in the adjacent trench latrine.

I would, therefore, strongly urge this plan in the case of all existing trench latrines. The screens would, of course, no longer require to be moved as now (a foot a day), but they should still be moved, say, once a week, and the ground ploughed and cultivated, since the surface pollution, which will always occur, will thereby be rendered harmless. This power of constantly repurifying the site by exposure to the sun, air, and ploughing is, in fact, the strong argument in favor of having all latrines for natives moveable.

45. *Cholera Camps.*—For cholera camps and troops on the line of march trench latrines must continue, but I would most strongly

* As these cremators would burn 12 hours half the usual number has been estimated for this case.

urge that (1) no trenches be ever allowed to exceed 6 inches in depth; (2) that the Civil authorities should arrange that such ground be well ploughed up within a reasonable and safe time afterwards; and (3) that the site of all such should be carefully marked by the local Civil authority, and the next party of troops shown distinctly its position.

46. It may be convenient if I here collect in one place the several data which have been mentioned, or on which the various points depend. They have all been obtained after very long and searching enquiry, and represent in each case the minimum which will produce sanitation; anything less will produce, sooner or later, insanitation. They are—

(*In the burying system.*)

(*a*) There must, if the orders are to be fulfilled, be 15 yards of trench for each cartload of fœcal matter buried: each cart averages three such loads daily, but many take four such.

(*b*) There must be at least one sweeper bildar to every filth-cart maintained.

(*c*) In trench latrines there must be one yard of trench for every 15 persons.

(*d*) There must be one compartment in a latrine to every 15 persons, and a latrine to every 500 persons.

N.B.—Latrines beyond this size are inconvenient to supervise and work properly.

(*e*) There must be two receptacles for every 100 persons.

(*f*) There must *on no account be less than one latrine sweeper to every 100 persons.* This of course, irrespective of the bildars (*b*).

(*g*) There must be one iron filth-cart to every 500 persons. In the hills three carrying sweepers in lieu.

(*In the burying system.*)

(*b*) As before. These work the crematorium.

(*d*) As before.
(*c*) As before.
(*f*) As before.
(*g*) As before.
} Same in both systems.

(*h*) There must be two Cremators to each filth-cart employed.

(*i*) For the latrines which are to replace the existing trench latrines one cremator per 500 persons will suffice if built *at the latrine* (see para. 44). Otherwise then as per (*h*) above.

(*k*) One cartload of fœcal matter can probably be disposed of at one burning; and certainly (by numerous successful experiments) half a cartload.

(*l*) Firewood required roughly at one maund per cartload of fœcal matter consumed, but this very fluctuating.

(*m*) Shed accommodation should apparently be for a reserve of dried fuel equal to ten days' consumption. In the hills—a month's.

SECTION IV.

The probable expense; and the steps necessary to start the system in any Cantonment.

47. Though the expense cannot possibly be estimated with nicety of starting a system so entirely new, and so affected by conditions which can only become accurately known on actual trial over a whole Cantonment, still a sufficient number of data have been arrived at for a quite near enough approximation for all practical purposes.

It has been shown that the expense, if the matter is worked on the lines given in Section III, will be reduced to two items only, *viz.*—

(A) The initial cost of the cremators and sheds.

(B) The monthly cost of the firewood required to assist the other fuel.

48 As regards (A) we have first to find the proper number of cremators for a given population. This obviously depends on the number of cartloads (Crowley's pattern filth-cart, to be disposed of daily (para. 24). We shall, however, arrive at the proper number of cremators for any given case with less chance of error *practically* if we calculate by the number of carts to be served (two cremators per cart) rather than by the number of cartloads, though theoretically it would appear the reverse.

49. How many carts then ought a given population to have? On this point very long and exhaustive enquiries have been conducted, since it governs the whole question. After the most searching enquiry in every direction the result stands out with almost positive certainty thus.—

(1) That eliminating British troops, there must be for the rest of the population *one-fifth cart to every 500 persons.*

(2) That for the compounds of European residents a certain addition must be made, since these involve (*a*) more work on the carts where the population is thus scattered and (*b*) allowance for a considerable amount of cook-house refuse as well. That this addition is found to be equal to 20 per cent. on the whole number of carts required under (1).

(3) That British troops do really require a larger number than No. (1), in that these carts have to remove not

only fœcal matter, but also a large quantity of cook-house refuse; that the scale given by Government is sufficient, yet not excessive. The number for any particular case can always be found with exactness by reference to the Barrack Regulations, but for general purposes of calculation can be taken at four filth-carts per 1,000 men.

50. Thus supposing a Cantonment of 12,000 persons, of whom 2,000 are British troops, this would have carts as follows :—

	Carts.
(*a*) 10,000 (excluding British troops) require $\frac{1000}{500}$ ...	20
(*b*) Add special addition for compounds @ 20 per cent.	4
Total Cantonment carts ...	24*
(*c*) And 2,000 British troops would have $\frac{2000}{1000} \times 4$ ...	8
Total for the whole Cantonment ...	32

Hence 64 cremators required.

This is supposing the number of carts is complete up to the abovementioned scale. But as insufficient establishments are the almost universal rule in that part of the provision watched over by the Cantonment Committees, it must be here noted that *if this number of carts is not complete it should be completed quite irrespective of Cremation*, for no sanitation can be hoped for, however perfect the system of (1) disposal be made, if the means of (2) removal are insufficient. Thus any additional carts required to complete are not to be included in the cost of *Cremation;* such completion of the only scale which will give sanitation should take place just the same, even if our existing method of disposal were to continue.

51. Say that each of these 64 cremators costs Rs 40; this gives a total for the Cantonment of 64 × 40 = Rs. 2,560. This

* The number of cremators to each crematorium (of which in such a Cantonment there might probably be three) would not necessarily be uniform, being somewhat affected by the distribution made of these Cantonment carts. In this case such distribution would probably be somewhat thus :—

	Carts.
(1) For, say, 2,750 Native troops living (compactly) in lines	6
(2) For, say, 4,750 persons living (compactly) in a Sudder Bazaar	10
(3) For, say, 800 persons living in bazaars of British Corps	2 to 3
(4) For, say, 1,700 others (Europeans and Native) living scattered in compounds	...4 to 5
Total persons ... 10,000	Total Carts ... 24

at any rate is not very ruinous! For what is an initial cost of some £180 to set off against such an object? Absolutely nothing in the balance. There would, of course, be the sheds in addition, but while impossible, without a few weeks' actual trial, to guess at all what ten days' supply of the dried fuel represents in shed space, the cost of these, seeing they are to be restricted strictly to the cheapest simple roof that will keep off rain, would be too small to make serious addition to the estimate.

Of course, it may be determined to build the cremators of brick, and in that case they may cost double (more if done by the Public Works Department); but supposing it all came even to, say, £400, the whole thing is too utterly out of proportion to the immense gain which is aimed at to be felt as an expense at all.

52 As regards (B) the firewood. This is the real cost of the system. It may, as stated, be expected under ordinary circumstances to average (after the first few days*) about one maund per cart load (Crowley's filth-cart), but will vary with every change in the quality of the other fuel or in the weather.

Taking the same Cantonment as before for an example, this would give, supposing each of the 32 carts employed brings 3 cartloads daily, 96 cartloads=96 maunds of firewood a day. This at three maunds per rupee will give a cost of Rs. 32 a day, or Rs. 960 a month, for the whole 12,000 persons, including British troops; *i. e.*, about 1¼ annas per head per month. And if the British troops are excluded, the cost on the remaining 10,000 for their 72 cartloads a day is still less.

Whether this were contributed by Government, or by Local Funds, or by each individual for himself, a sum of a little more than a penny a month per head would be little indeed to pay for such a system of disposal, *even were there nothing at all to be set off against it.* I will, however, endeavour to show that there is a very great deal to be set off against it, and a very fair prospect of the large majority of this expense, if not all of it, being covered by the sale of the ashes.

53. Experiment only can decide what the ashes will fetch. But at certain stations in Bombay (Poona for one) similar but probably less valuable material already fetches a high price (see below). In Northern India the market has as yet to be created; at the same time it has been shown (para. 20 (*e*) and trial V) that this should not be difficult; and it may even turn out that, when their value becomes known, the ashes sold may pay the whole cost of the firewood, which would mean that the greatly-to-be-desired system would be as cheap as our present condemned one.

* NOTE.—During the first few days this is sure to be largely exceeded, until all concerned begin to understand how to get the best results out of the other fuel, how best to sort and dry it, and how to make it go furthest in working the fires.

54. To show that this is not oversanguine, I will refer to the system pursued by the Poona Municipality. This is to burn the rubbish to ashes, and then to mix these (in large reservoirs) with the fœcal matter, the mixture produced being styled "poudrette." This "poudrette," the Collector of the district in his annual report states, brings in Rs 43,000 in the year, and also that "the price will rise, for the demand is increasing and the competition at the sales is keen."

That there are not decided sanitary objections to the Poona system it seems hard to believe; but it is with its financial result only that we are here concerned, nor does it apparently aim at any sanitary advantage

The Sanitary Commissioner with the Government of Bombay, criticising the process in his annual report, conclusively proves that it is not the fœcal matter, but *the ashes* which are mixed with it which give this "poudrette" its great value in the eyes of the cultivators for as much as 12 miles round Poona.

If, therefore, instead of merely burning our rubbish in order to convert it into ashes, we make use of it while burning to convert the fœcal matter also into ashes, and sell the two together; and if at the same time we gain a great sanitary advantage (instead of the sanitary disadvantages, or at any rate absence of advantages of the Poona "poudrette" depot), shall we not have attained a system far ahead of the Poona one, and thoroughly satisfactory, not only from a sanitary, but even from a financial point of view?

55. It may be said that in many districts the prejudices of the people would destroy our chance of a market. To this I have only to say—look at Poona There the Collector reports that "what the cultivators would not look at seven years ago, they now gladly purchase for Rs. 43,000." There, again, the Secretary to the Municipality reports that "seven years ago the agriculturists would not touch the 'poudrette' and could not be induced to take it away even at a nominal charge, at the present moment the outturn is not enough to keep pace with the demand." There, also, the Sanitary Commissioner "desires to place on record that, as an instance of conscientious duty, it deserves to be recorded that work so offensive (the 'poudrette' depot) was in all its details supervised by a Brahmin, Mr. Mahadeo Yeshvant Paranjpe, Health Officer to the City of Poona, until his death, and he was ably assisted by another Brahmin, Mr. Narsu Ramchandra, now Municipal Secretary."

Moreover a cultivator might easily object to "poudrette" who would not do so to the cremation ashes.

56. From a review, therefore, of all the above, it would appear that, without taking too sanguine a view, one may fairly assume

that after a little time the price of the ashes, &c., will cover at least two-thirds of the cost of the firewood (para. 52), and so reduce the expense of the latter (and with it of cremation) to something like *half an anna per head per month!*

57. The steps necessary to start the system would be somewhat as follows:—

(*a*) Select two Cantonments* in the Punjab to start with. Let those chosen be where there is some one officer who will take sufficient interest in the subject to give the system a fair and proper trial; and put the entire management under him solely, and uninterfered with.

(*b*) Do not launch out at once into enough cremators to burn for the whole Cantonment. Ofcourse no opinion can be formed until it is working throughout the *entire* Cantonment, but at the start limit it to one section only (half or a third) of the Cantonment.

(*c*) For this section let a single drying ground be set apart, and let a proportionate amount of the rubbish, or as much as may be found necessary, be taken thither daily. At this ground run up one or two sheds to protect the fuel when dried and, as found necessary, gradually add more up to a total of ten days' consumption. If there are any horse lines in the station their stable litter (or that of one of them, if there be more than one) must be obtained for this drying ground. This is specially important in starting, so as to get rid of avoidable difficulties at a time when there will, no doubt, be plenty that are unavoidable.

(*d*) Do not attempt at first to work even the whole of the allotted section. The latter should include the lines of one British regiment; therefore begin with that alone, cremating for the three carts of that one regiment only. Construct at the drying ground six cremators for these, and allow the rest of the carts of the allotted section to continue going to the trenches for, say, a week or so.

(*e*) Meanwhile construct six, eight, ten, or twelve more cremators at the same place, and at the end of, say, a week order the remaining three, four, five, or six carts (whatever the number belonging to the section) to take their contents there likewise.

NOTE.—* *Two* Cantonments will give opportunities for comparison of results attained.

(*f*) As the trench bildars cannot at first be taken off the existing trenches, engage, temporarily, two or three extra men to sort and collect the fuel and two or three more to work the cremators (*i*).

(*h*) After a week or two more—all going on well—extend the process to the rest of the Cantonment in the same way, step by step; first building a few cremators and cremating only for a few carts, then a few more, and so on, until at last every cart in the Cantonment is depositing its contents at the crematorium (or crematoria) instead of at the trenches. These can then be closed, and their bildars sent to the crematorium and the temporary men discharged.

(*h*) As soon as the cremators at the first drying ground reach to about 24 (para 25 and note to para. 50), select a second, and commence building others there. Each crematorium must have a Conservancy sergeant of its own with no other work.

(*i*) As soon as the whole Cantonment has been included, it can be seen whether any extra men are wanted beyond the existing bildars. If the proper number of bildars is complete (para. 46), there will be a bildar for every cart. Each would have to look after two cremators, but these only burn for about six hours, and during another three or four hours the same man might be busied on the adjacent drying ground in spreading, sorting, and collecting the rubbish. Possibly one or two more men will be required to assist here, but only a few. The officer in charge must look into all these details with his own eyes, and see (1) that every man is given his due amount of work, and (2) that none is given more than he can do thoroughly

(*k*) The whole of the bildars at the crematorium should be under one authority; therefore the few now paid by Government for the British portion of the troops should be transferred to Cantonment establishments.

(*l*) The cremators should not be set at work until each is properly equipped (para 18); and there should be a preliminary canter or two beforehand (with only half cartloads), so that all may get to understand the work before beginning in earnest.

58. The best way of arranging the financial portion of the question can only be glanced at here; but all will, I think, work with least confusion if a special grant or loan is made to the Cantonment

to start the process (as was done when starting the grass farm scheme), the whole being kept entirely distinct from other Cantonment expenditure, so as to show all incomings and outgoings. Of course, at the start, it will be mainly expenditure and no incomings; but simultaneously with the rest of the work every effort must be made (enlisting also the help of the Civil authorities) to create a market for the ashes; contracts for the latter must at first be only given out for very short periods. It must be remembered (1) that at the start all expenditure on firewood will be sure to be greater than after all have learnt the various ways in which it may be husbanded, and (2) that, if the scheme is starved for want of liberal funds while it is taking root, it can never reach a healthy growth. Apparently, therefore, the amount of any such loan for a Cantonment of the size taken above, *viz*, 12,000 persons, employing 32 carts, and requiring 64 crematoirs, should be about Rs. 10,000. This would keep the thing going in firewood for nearly a year, before the end of which time an income might have commenced by the sale of ashes, and the financial outlook be better seen. The Cantonment Fund might find the Rs. 2,100 for constructing the crematoirs, unless it were desired that they should be built by the Public Works Department.

The officer entrusted with inaugurating such an important new departure must be given full liberty of action in regard to expenditure. At the end of the first year what he has done could be reviewed, and improvements, if necessary, suggested.

59. Supposing that at the end of the first year no market for the ashes has been created, and the Government loan is all expended. It would then be for consideration whether the expenditure for carrying on the system should be borne—one-third by the Government of India, one-third by the Local Government, and one-third by the population of the Cantonment itself, or whether the latter must bear the whole. Supposing even that the latter decision is arrived at, then the amount to be provided is we have seen (para. 42), equal to about 1¼ annas per head per month This should be certainly found by a special conservancy tax, and the fund so created be *kept entirely distinct from the whole of the rest of the canonment Fund.*

There is no need to go into the details of such a tax here, but it would be based on the general lines of the richer paying for the poorer, the very poor escaping altogether.

60. Meanwhile, *though the inauguration of the system should on no account wait for this,* the services of some practical Sanitary Engineer of known ability should be secured, and he should be sent to Europe or America to make full enquiry into the best mode of

conducting such a system *under the conditions obtaining in India*. He would, of course, study how to improve the rough style of cremator herein proposed for inaugurating the system; but, at the same time, he should be warned against anything elaborate or that is not perfectly simple in design and easy of execution. This portion of the matter would take time before it is worked out in all its details, and it would be unfortunate, indeed, if the system were to be delayed until this is done, seeing that the rough cremator noted will do perfectly well for the present, and that the system, as it stands, is thoroughly able to give our Cantonments entire present relief from the evils in question.

61. No one who has once grasped the true financial aspect of sanitation, will be able to feel its price (detailed above) as an *expense* in the ordinary sense; it is rather an insurance, and one that no civilized community dare leave unpaid.

Of the great sanitary boon such a system would be to our Military Cantonments (and I should hope many Municipalities also), it is for medical authorities to speak.

GEORGE F. YOUNG, CAPTAIN,

PESHAWAR: *5th May 1884.*

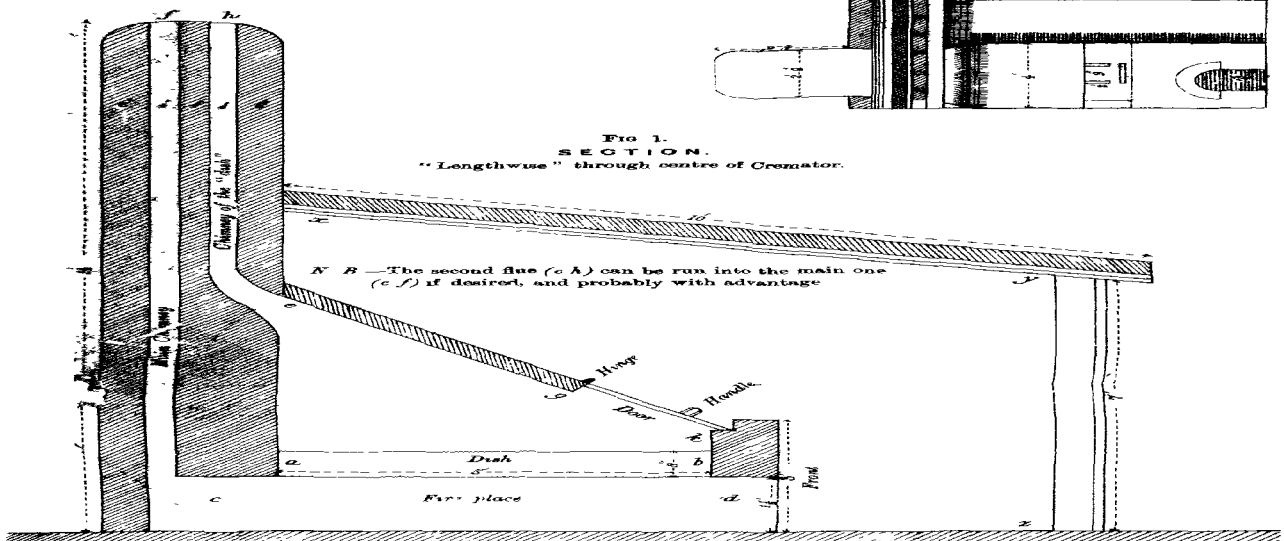
D. A. Qr.-Mr.-Genl., Peshawar District.

APPENDIX A.

THE CREMATOR.

FIG 4.

FIG 1.
SECTION.
"Lengthwise" through centre of Cremator.



REFERENCES.

a b	The dish.
c d.	The fireplace
e, a, b	Space enclosed by the side walls
e f.	Main Chimney
g.	Roof of the "dish."
g k.	Door of do.
e h.	Chimney of do.
x, y, z.	Shed covering the whole

APPENDIX B.

[The Filth-cart.]

No change is necessary in the existing system of *removal* to the place of *disposal*.

But, as time goes on, there is one modification which would be an improvement. Though an iron receptacle (even of the very largest "plains" pattern) can be raised and emptied direct into the cremator, a filth-cart cannot; therefore, so long as the existing filth-cart continues to be used, each cremator (except those in the hills, or other places where carts are not used) must have an iron bucket fitted with a hinged handle (like the handle of a lantern, for instance), which bucket is used as a ladle to empty the fœcal matter from the cart into the cremator.

As, however, the existing carts wear out (and all that are at all old should be at once set aside for use as ash-carts), I would suggest that, instead of new carts, the large pattern receptacles be provided with wheels and shafts and the receptacle itself dragged to the cremator. The receptacle could easily be made detachable from its wheels at the cremator. The extra wheels and shafts would not cost so much as the present cart, the chief expense of which is the body of the cart.

To save bullock-hire, such receptacles should be able to be "limbered up" in pairs together, so that two would form the ordinary load. It would be easy to devise a simple arrangement by which the shafts of the rear one should pass over and fasten to the middle or lower end of the shafts of the leading one; the yoke of all such to be made detachable, and only bolted on to the shafts when the receptacle was the leading one of a pair.

This arrangement of taking the receptacle itself to the cremator would also avoid the emptying of receptacles into carts in the centre of barracks (with chances of spilling, unpleasant smells about the barracks, &c.), while it would also admit of each receptacle being thoroughly cleansed at the cremator before returning, and everything used in the process emptied straight into the cremator at once.

No. II.—"MOVING LATRINES."

NOTES ON SANITATION IN INDIA.

No. II.—A "MOVING LATRINE" SYSTEM OF CONSERVANCY.

1. Typhoid fever is still, month by month, sweeping away the flower of our young men, whose deaths may thus all be styled preventable. It, therefore, behoves everyone, who sees any way of attacking this great and universal enemy, to press it unceasingly on public attention.

2. Sanitation is pre-eminently a matter which concerns everybody, yet of all public matters there is none so persistently regarded by everyone as somebody else's concern.

Again, in sanitation above all things, half measures are utter waste of money, and to provide, for instance, one cart or one sweeper where two are necessary is but to try to trifle with nature's laws, while the money might just as well be thrown into the sea. Often even better so. Yet this is done every day in every Cantonment.

3. It is now well recognized by all European authorities that the cause of typhoid fever is invariably some local insanitary condition, which either (1) produces sewage poison, or (2) provides it with an entrance into the human body, through water, food, or air.

Insanitary conditions may be classed thus :—

I. An unscientific method of disposal of the fœcal matter, resulting in the production of sewage poison.

II. An unscientific type of latrine, with insufficient means for the removal of fœcal matter, resulting in the same.

III. Adulteration of articles of food and drink, in such ways that sewage poison becomes introduced into these.

IV Insanitary dwellings, with a similar introduction of the poison into the air.

In a former paper I dealt with No I, urging disposal by cremation.

The present paper deals with No II, *viz.*, the certain pollution of the subsoil with sewage poison by our existing type of native latrine and its equipment.

4. There are in India two systems of latrines. These are—

(1) *Fixed Latrines.*—In this case the fœcal matter is removed to a distance and there buried in trenches.

(2) *"Moveable Trench Latrines."*—In this case the trenches are themselves the latrine, the surrounding screens being moved periodically on to fresh ground.

The evils of No. (2) are those of the whole system of disposal of the fœcal matter by burying it, and these latrines, therefore, must stand or fall with that system. This part of the subject I have already dealt with as above mentioned. The remedy is to abolish all such latrines, remove their fœcal matter to a cremator, and there burn it.

In this paper I wish to deal solely with No. (1), *viz.*, our existing fixed latrines, and to show that, with the single exception perhaps of those of British troops, these latrines just as surely poison the subsoil as does our system of burying the fœcal matter in the ground; and this also at points much closer to the inhabited area and to wells. Thus we may spend large sums of money on the most perfect system for the ultimate disposal of the fœcal matter, and may yet leave the danger in our midst, if at a hundred centres all over the cantonment a bad type of latrine is daily and hourly polluting the soil under it and suffering poisonous matters to go on for years sinking steadily into the subsoil. That such is the case *universally* I will show, as well as suggest a different arrangement which will effect a complete remedy, and this without any increased cost whatsoever.

5. Fixed latrines may be classed thus—

(*a*) The barrack latrines of British troops.

(*b*) Public latrines for Natives in bazars, and for Native troops in the many places where trench latrines have already been abolished.

(*c*) Private latrines for Natives inside Native houses.

(*d*) Latrines in compounds for servants of European residents.

6. As regards class (*a*), these are well built, well provided with all necessary utensils, and above all well furnished with European supervision. This latter is the main point in all conservancy arrangements in this country, and upon no other class of latrines can there be brought one-tenth of the supervision which is daily and systematically brought to bear upon this class.

These may, therefore, be dismissed from further notice as fairly safe, though even with this class the danger of all fixed latrines, *viz.*, pollution of the site, must ever remain a possibility. This should always be borne in mind by all responsible in any way for their cleanliness, and inspections should be made at all hours of the day, and not (as often occurs) always at one time.

Undoubtedly the only fully satisfactory type of fixed latrine is one (used, I believe, in Paris in 1871) in which the filth-cart acts at once as pan, receptacle, and cart, and it is much to be wished that

some such pattern could be adopted for British troops' latrines in this country.

7. Turning now to the other three classes of fixed latrines, we find a very different state of things. These are, in my opinion, (after having inspected hundreds of them) nothing less than the most villainous invention for both the manufacture of sewage poison, and the dissemination about a Cantonment of poisonous matters, that could be devised; and fully capable by themselves alone of accounting for all the enteric fever from which we are suffering.

But let us look a little closer at them and see what their defects really are, more praticularly those of classes (*b*) and (*d*), and with special reference to the former, because these provide for the great mass of the people

Such a latrine is, one may say, *invariably*, utterly deficient and defective in every thing; in the amount of its accommodation, in its utensils, in its establishments, and its means for removal of the fœcal matter from it.

It has generally a plain earth floor, not even made of rammed earth, the floor often rises to a sort of hill, due (in course of time) to the belief among sweepers that a dirty floor is made all right by sprinkling fresh earth over it, and hence a solid bed often a foot or two thick of thoroughly poisoned earth. The pans are generally (not glazed) but plain earthenware, and instead of being renewed monthly are always very old and completely saturated with fœcal matter. The iron receptacles (if it even has these) are seldom able to be properly closed, and even if so able the lids are always open; they are so seldom renewed that they *constantly leak*, and being never cleansed with tar are always perfectly foul outwardly. The filth-cart from a similar reason (age) *constantly leaks*, dropping the fœcal matter all along its route at every trip, as well as for hours together at the latrine while standing there; like the receptacles its outside is never tarred, and so poisons the air all along its course.

The fœcal matter, from want of a due number of carts, is only removed once in the 24 hours, remaining accumulated (in the above-mentioned faulty receptacles) during the other 23. There is probably only one over-worked sweeper, and even he cannot be there always. Dry earth is unknown. The water with which those using the latrine wash themselves is generally allowed to fall on the ground all round; while the rain also enters freely, washing fœcal matter from the dirty receptacles, carts, and pans into the soil. Flies settle in crowds on these open and filthy receptacles and carts, and thence on articles of food in the adjacent bazars. Lastly, the latrine is made to serve for about five times the number of people that its accommodation or

equipment is suited for*, while as to supervision, if such a latrine is ever entered at all by any European Officer, it is so certainly not oftener than once a week, whereas once every six hours could scarcely keep clean one so imperfectly equipped.

8. Those who not endure the great unpleasantness and trouble of enquiring into such things with their own eyes may think the above exaggerated *It is not.* Not only have I myself seen all the above, and worse, in numberless cases and in every variety of Cantonment from Peshawar to Dinapore, but one might say that such conditions are the rule in three-fourths of the native latrines in any Cantonment. Nay more, bad as these things are, none could expect them to be one atom better with the present scanty money provision made.

Such being the normal state of things on the surface, it may easily be imagined how in months and years of such surface pollution poisonous matters must sink into and permeate the subsoil below. No one can say to what radius or to what depth such pollution may not extend. It would differ, of course, in different soils; but this much is certain, that given this daily and prolonged pollution of the surface at one particular point, and anything is possible below The water bearing stratum can, in fact, scarcely escape being penetrated by the poison from such latrines at numerous points in a Cantonment.

We do not know, and we cannot know, the course our drinking water takes under the surface before entering our wells and reservoirs: and a festering sore of this sort a mile away may easily be the origin of all the disease in a set of European barracks.

9. It is sometimes argued that some of these dangers are remedied by the removal of the earth of the floor for a foot or two, fresh earth being supplied. But I would ask—

(1) Even in the one case per hundred or so in which this is done, how often it is done? And can it be proved that it is done often enough to prevent the evil extending beyond the limits removed.

(2) Even where done, is not the part most likely to be affected that near the walls, especially the wall against which the pans are placed, and not the centre of the floor? Yet removal of the earth cannot take place even right up to the walls, much less under and beyond them.

(3) Lastly, is not all such removal of earth from the floors of these latrines quite the rare exception? and are there not thousands of such latrines everywhere, where even this so-called

*The number of carts generally ranges from one-third to even one-fourth (!) that which will alone produce sanitation.

remedy, which is no remedy, has never been applied since the day they were built?

Moreover, this only deals with a very small portion of the evils mentioned.

10. That pollution of the subsoil must be the normal state of things under all such latrines can scarcely be denied.

I have seen a large and well built bazaar latrine whose whole interior, as far as the surface was concerned, was clean as if just built, yet in and around which such an effluvium was being given out from the soil (the consequence of long continued pollution of the site) that it was almost impossible to go near it. This latrine was used daily by more than 600 persons, and had evidently been made a "whited sepulchre" for my expected visit. The result of a fall of rain percolating through such a stratum may be imagined.

I have seen a large bazaar latrine, filthy beyond description which was actually built against the dead wall of a row of houses in the centre of a most crowded locality. The filth-cart of this latrine stood alongside it and *was leaking*, and had evidently, from the ground, long been in this condition

I have seen an officer's compound in which the servants' latrine was no more than 15 yards from the verandah of the bungalow and not more than eight yards from the compound well; about the same distance on the other side of the well were the stables, the floors of which were thoroughly contaminated with horse dung, urine, &c. This compound was a particularly small one, and (as is very common since polo became the fashion) the number of syces, their families and their relations made the place almost like a small village.—(*N.B.*—The tenant of this bungalow had enteric fever at the time.)

I have seen, countless times, compound latrines and compound wells placed *close* together, with scarcely ten yards even between them. In fact, so common is this in almost every Cantonment that, in whatever corner of a compound a well is placed, there in that same direction, as though there were some strange magnetic attraction between the two: one is certain, nine times out of ten, to find the latrine planted, instead of being placed, as it ought, in the very opposite direction.

But of what use to multiply instances: they can be seen by any one who will go and look for himself in the right way. Of what practical use then is it to take so much trouble regarding the sanitary arrangements of the barracks of our British troops when conditions like these are allowed to exist all round them?

11. All the above evils, terrible as they are, are due to one sole cause—an irrational and unscientific economy. And natural laws are revenging themselves for the theory, which has persistently

been acted upon, that a smaller (even fractional) provision will suffice in the case of natives than for the same number of Europeans. Whence this idea arose it is hard to say. Sanitation takes no account of the color of a man's skin; therefore in making conservancy arrangements obviously the same *scale* (though not necessarily the same *style*) of provision is indispensable in both cases. That is to say, the same number of receptacles, and pans, and latrine sweepers, and (except for cook-house refuse) of carts will be wanted in either case. Yet a Cantonment Committee, who know that for a given number of British soldiers a certain minimum number of such things is necessary, will complacently provide one-sixth or even one-eighth that amount for the same number of natives, and yet expect the boon of sanitation to be theirs!

12. Regarding the small fixed latrines of class (*c*) in native houses, all that need be said is that they have generally all the defects of classes (*b*) and (*d*), with the addition of being very seldom inspected at all; while they are even still more defective as to proper receptacles and pans, and are more often within a few feet of a well, the water of which may, of course, get introduced into all sorts of articles of European food. Their sole redeeming feature (such as it is) as compared with the other two classes is that, being used by so many fewer persons, it takes much longer in their case to produce a like result

13. Such being the general state of things with the native fixed latrines in a Cantonment, and there being probably 200 or more of these, irrespective of those in native houses of bazars, is it not at least highly probable that sewage poison steadily finds its way into the subsoil at numerous points, and thence, by means of water or otherwise, directly or indirectly, into vegetables, milk, bread, ice, fruit, aerated waters—in fact into almost every sort of article of food or drink? As previously stated, I firmly believe this to be so, and that these latrines are the cause of a very large proportion of the enteric fever that originates in a Cantonment; and that if we rest content with merely discontinuing the burying of fœcal matter, we only deal with a part of the evil, and leave a still greater part untouched and in our very midst. We must, therefore, not only adopt (1) a more scientific disposal of fœcal matter, but also (2) a more sanitary type of native latrine.

14. As regards, then, a more sanitary type of latrine. We might of course go in for latrines like the Paris ones mentioned in para. 6; or, failing these, for some variety of the iron latrines made by several firms in Bombay. But while an universal adoption throughout our Cantonments of such latrines as these would cost a very great amount of money (money urgently required for other parts of our conservancy system), I think I can suggest a style

of latrine which, not costing a penny of increased expenditure, will at the same time more thoroughly fulfil the requirements of true sanitation than even the expensive patterns above mentioned. This latrine, though it would not suit large native towns like our Presidency towns (requiring, as it does, a certain, though not large, amount of space) admirably suits the conditions of our Cantonments, even in the case of the largest bazaars. Briefly, the plan is to provide moveable screens similar to those used with existing trench latrines; to place them on the plain ground in *any* open space (from the wide space afforded by adjacent fields down to quite a small plot of ground in a crowded locality); to equip them with the same pans, receptacles, carts, and establishments as for a fixed latrine; to work them on the same method, removing all fœcal matter to a distance, but once a week, fortnight, or month, according to the ground; to move the screens forward a few feet, bringing the latrine on to fresh ground; and to regularly plough up, and at the proper season cultivate, the ground vacated.

15. Thus the remedy for the grave evils above noted is to abolish all fixed latrines of every sort for natives (except private latrines, *vide* para 21), and *to insist on all Native latrines being moving ones*. This style of latrine would do away at once and for ever with the chance of pollution of the site. The amount of surface pollution which, even with the utmost neglect, can occur in a week, fortnight, or even a month is very small, and could not penetrate more than an inch or two at most, and all such would be rendered perfectly innocuous by the constant exposure to the sun and air and by the regular ploughing up of each site as soon as vacated. The ordinary Indian surface ploughing would be amply sufficient in this case.

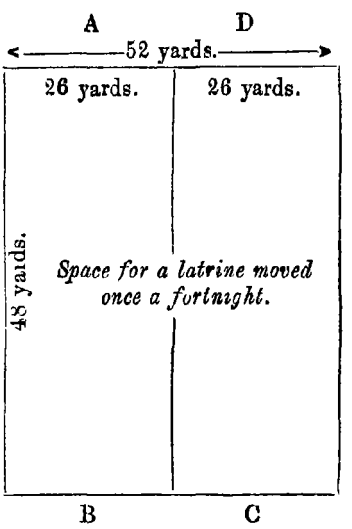
Pollution to some extent there will always be in any native latrine. Therefore the main point is to allow for this, as well as for a certain amount of neglect, and to so arrange matters that when these occur they shall be powerless to do harm; and this I maintain, that the system here proposed of having moving latrines, but worked on the principle of fixed ones (by the removal of everything to a distance) would undoubtedly accomplish. This system is, in my opinion, the best of all for any place in the East, and it is only in large towns like our Presidency Towns that it cannot be adopted, while as regards our Military Cantonments, at any rate, it is exactly suited to the circumstances, and there is not the slightest difficulty whatever.

16. So far as regards the system.

It will be necessary, however, to go more into detail on some of its points, especially as to the amount of ground required.

(1) First, as regards the public latrines (class (*b*) of para. 5) and in the case of a bazaar of ordinary size. Taking a latrine of the

proper size—for, say, 400 persons as an instance,—the length of such a latrine (if it have, as it ought, 26 compartments arranged in a single row,* see para. 17) will be about 26 yards; its breadth will generally be about 4 yards, including in this the sweepers' passage at the back; consequently it will require for each site it occupies a space 26 yards × 4 yards. If such a latrine be moved *once a fortnight* during a whole year, first from A to B and then from C to D, it will require a space 52 yards × 48 yards. Where plenty of ground is available within a convenient distance of the people as in any ordinary bazaar, such a latrine would be placed in the adjacent fields and moved *every week*, thus covering in a year double the above (say 104 yards × 48 yards or 78 yards × 64 yards). The more frequently moved and the more ground passed over the better, and there is in this, the most common case, no need to restrict either



(2). But in the more exceptional case of a very large bazaar there may not be so much ground to be got within a convenient distance of the people. Nevertheless there will almost certainly be a certain number of small open plots, and any such will generally be quite sufficient for the purpose † It must throughout be remembered that we are not now arranging for a moveable trench latrine, but for a latrine which, though moving, is worked on the principles of a fixed latrine, and, therefore, that there can be no more objection in the case of any particular plot of ground, to placing a moving latrine there, than there would to placing a fixed latrine in the same spot; on the contrary, far less objection, since the site will be kept purified. Thus any site considered too small for a moving latrine is equally condemned *ipso facto* for a fixed latrine.

Therefore, where we have to deal with these sort of cases, we must be satisfied with a less frequent change of site, say once in every month, or even two months, and make up for it by increased care as to cleanliness. As a matter of fact, even if a latrine can

* Double rows of compartments must never be allowed; they curtail a proper perflation of air.

† In such cases one might have two latrines each for 200 people instead of one for 400; this would make the length 13 yards instead of 26 yards.

only be moved five or six times in a year, there will be no great harm done, provided always that the old site is invariably well ploughed up as soon as vacated and, if possible, cultivated. It will, at any rate, be far better than a fixed latrine even so.

(3) The above is equally applicable to the case of the latrines for servants of European residents (class (*d*) of para. 5). In many cantonments such servants are provided for by means of general public latrines, each providing for a group of compounds; and wherever this plan can be carried out, it is much the best, as it makes the question far easier to deal with and gets rid of having a latrine in every compound. But, even where this latter is a necessity, still it by no means follows that a moving latrine is impossible, since at most stations compounds are sufficiently large to allow these latrines (which are very small) being moved now and then, and the old site ploughed and cultivated These latrines are used by such a small number of people compared to the large public latrines that a move three or four times a year would suffice in their case, and a narrow strip of ground large enough for this, down one side of a compound, means so little more than the existing fixed latrine covers that it should, in nearly all cases, be insisted upon. It will, moreover, be far cheaper for the landlord (para. 21). Of course, there is no need to restrict the moves to three or four times a year; the more frequent they can be made the better.

17. There are besides the above some other matters of detail which it will be desirable to deal with.

I have said that these moving latrines will not cost any more than fixed latrines; nor will they: almost any moving latrine will cost less than almost any fixed latrine to construct, *and far less than the only type of fixed latrine permissible.* And both are worked with exactly the same apparatus and establishments. But there is a point here to be noticed, *viz.*, that the practice is so common of working the present latrines with utterly insufficient apparatus and establishments that the same amount of these will not suffice for the new system any more than it does for the present one, and the benefit of the change would thus be but small. Therefore, wherever such apparatus and establishments are at present below the scale which has been found the lowest on which sanitation can be obtained, they must *first be completed up to that scale.* Any such expense, however, is no part of the system proposed, and is equally demanded even if the present system of latrines be continued.

In Appendix C. I have given, as the result of very long and careful enquiry for several years, what this minimum scale is, and I would here again impress the fact that sanitation pays no heed to race, and that if the view be persisted in that we can do with less than this for these latrines because they are for natives,

then natural laws will most certainly continue to revenge themselves, as now, on the whole community, British and native together.

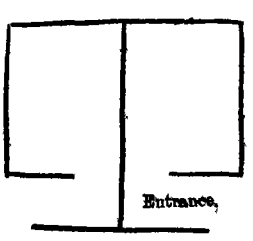
In Appendix D. I have also given, for convenient reference, the average monthly working cost of this minimum scale (*viz*, Rs. 45 per month for every 500 persons), below which, if attempted, nothing will be attained except insanitation.

18. It will be an assistance if I also give some details regarding the screens and general arrangements of these moving latrines, since all such matters have an indirect bearing on their sanitary success. The sanitary efficiency of any latrine depends much on the way it is arranged, and in a moving latrine especially so. Two points should always be borne in mind in arranging for such: (1) that everything which conduces to the comfort or convenience of the people who are to use it assists sanitation in that they are less likely to resort elsewhere; (2) that every thing which makes the work of the establishments easier assists sanitation, in that the work is less likely to be neglected. Unless latrines are made to afford a due amount to privacy and convenience, the people will, no matter what precautions are taken, resort to other localities which they find better in this respect; insufficient accommodation, want of privacy, insufficient apparatus and establishments all have this effect. This fact is by no means properly recognized, and in consequence great hardship is often entailed on our native soldiers (in particular) by their being forced under military penalties to resort to latrines which by their defects are a standing disgrace to the Cantonment Committee which provided them.

19. First then, as to *the screens*. Of these there are several *different patterns suiting different climates*:

(I). There is the heavy and somewhat cumbersome pattern mounted on wheels, which is in use in many places where trench latrines are still in force. These, where they exist, will do perfectly for the new latrines, but there is in other cases no need to have so massive a style which again involves wheels.

(II). A very good pattern is in use at Sealkote of this shape in plan. These are at present used as fixed latrines, but would do perfectly if their supports, now placed in the ground, were cut off. They are made entirely of galvanized iron, and in sets of two compartments, and will last for years. Cost Rs. 38 per set, or Rs. 18 per compartment. They have no roof but a light "Sirkee"; one can, if necessary, be put on in wet weather. This pattern is perfectly suited for



the dry climate of the upper Punjab, but for the hills or stations with more rain the want of a roof would probably render this pattern unsuitable unless a detachable roof could be added.

(III). Good moveable screens were made up some years ago in the Allahabad and Oudh commands having sheet iron back and roof, and the partitions of tarred canvas; a canvas purdah for the door, each purdah having a pole at bottom which, being fastened, as required, with a strap and button closed the doorway. Made up in sets of four compartments at a cost of about Rs 20 per compartment. Size of compartments $3' \times 2\frac{1}{2}'$. These, though heavy, could be moved by four men.

(IV) Another good pattern made up by the Executive Engineer at Meean Meer, specially light for the hills, had its framework entirely of 1" wrought iron gas piping; the partitions, back, and sides were all of tarred canvas with a thin sheet iron roof; made in sets of four compartments with projecting handles at the ends about 3 feet from the ground. Cost about Rs. 10 per compartment. Easily lifted by two men Here durability was purposely disregarded in order to obtain lightness, which, together with a roof, is essential for the hills. It would, however, have been better to obtain that object by having sets of only two compartments. and so have made the whole of a more durable style.

In selecting a pattern of screen each cantonment must be guided by its climate and conditions. The result of many experiments on the best style of screen for a moving latrine shows—

(*a*) That those for all stations, except in the Upper Punjab, must have a roof.

(*b*) That those which have a roof cannot have iron partitions as well as they become too heavy, consequently tarred canvas partitions become necessary, involving periodical repairs.

(*c*) That those for the hills must be light enough to be moved, by two men; those for the plains by four men.

(*d*). That consequently it is better everywhere to make them in sets of only two compartments.

Any of the firms at Bombay, Allahabad, and other places, who are accustomed to make up such things, will turn out a better result, if given the necessary conditions, than will amateur experimentalists. They should not be unnecessarily light so as constantly to blow over; and can also be fastened at the foot to long iron tent pegs.

20. (*a*) *Outer Screen.*—The moveable screens will suffice alone if necessary; and in many places are so used at present. But it will much increase the privacy and comfort of the latrine if an outside screen wall of some sort be added, either simply along the front (at a distance of some two or three yards) or on all four sides. This can be made of anything most convenient locality (old tatties,

mat screens, bamboo lattice work, &c.); it matters little even if blown down in heavy wind as it can always be put up again. If the enclosure is pretty big it will not have to be shifted so often as the latrine itself, and also the cart will be able to go inside.

(*b*) *Intervals.*—Where there is plenty of ground the compartments should not be all placed touching each other, but spaces be left between every four compartments so that people need not go all along the front in entering and leaving the latrine.

(*c*). *Ploughing up.*—As soon as the latrine shifts to a fresh site the old one to be at once well ploughed up (twice over and at right angles). At the proper season the same to be again ploughed, and, if possible, cultivated with any suitable crop. If worked in two halves (*vide* para. 16) one side can be cultivated while the other is being used.

Where there is plenty of cultivated ground available the latrine would simply be placed anywhere in the fields, and moved about freely over them (without any special marking off of ground), care only being taken that each time it moves, the site vacated gets a special ploughing up, and is not used again for a long time.

(*d*) *Sweepers.*—There must on no account be less than one latrine sweeper to every 100 persons, male or female. Women's latrines must have female sweepers and no interior partitions.

(*e*) *Shelter.*—Shelter for sweepers must be provided, otherwise in wet weather they will not be present. Failing anything else a rough hut of old tatties will do.

(*f*) *Dry Earth and Lime.*—Dry earth and lime must be provided, and a shed must be constructed at one side of the ground for these; a small quantity for immediate use being kept in the double compartment (*h*) set apart for receptacles

(*g*) *Pans.*—In each compartment there must be one large sized pan, if possible of iron, but failing this of *glazed* earthenware. Earthen pans not glazed or of too small a size to be absolutely prohibited.

(*h*) *Receptacles.*—(Two to every 100 persons.) One double compartment in the latrine, without any centre partition, to be set apart for these, which, for sanitation, must be under cover from rain. All receptacles must be *frequently* tarred on the outside so as to be *always* clean, and must be so tarred as often as is necessary to produce this result, even if that be daily. And all must close properly and be *kept closed.* Receptacles require frequent renewal.

(*i*) *Carts.*—(One to every 500 persons.) No cart must ever be allowed to go about cantonments in a dirty condition outwardly, as at present so common. All must be regularly tarred outside as often as is necessary to keep them perfectly clean, even if that be

daily. If there is any smell on meeting a cart, that cart or its sweeper is in fault in some way, which should be promptly put an end to. The ground on which such carts stand must be shifted, ploughed and cultivated in the same way as that for the latrines. Carts will not last beyond six years.

21. *Exceptional cases.*—With reference to paras. 5 and 16 there may perhaps be a few cases where a fixed latrine is unavoidable.

(*b*) Though I have never seen a bazaar (and I have seen some of the largest) where the open ground outside was so far off as to render a fixed latrine in the centre of such bazaar a necessity, still there may be such a case

(*d*) As regards compounds of European residents. These are seldom so small as to obviate a moving latrine being established, while where they are so, this is the last place in the world for a fixed latrine, and just the case where a servants' public latrine for a group of compounds should be considered a necessity.

(*c*) As regards native houses in bazaars, these cannot have moving latrines, and must, therefore, be allowed to be the one exception to the general rule, and special measures be taken to counteract their evils

If, then, in any particular case it is considered that (*b*) a bazaar or (*d*) a compound must, as an absolute necessity of its circumstances, have a fixed latrine, this should only be allowed *on condition that it is one of the most perfect construction*; that is to say, that it ensures absolutely that, no matter what the neglect, the floor cannot become polluted, or harmful matters be washed by rain into the soil to poison future generations; and that all fæcal matter, urine, and washing water (including that with which any vessels are washed) *falls either direct into a receptacle on wheels, or into an iron "shoot," and thence into an iron bucket* (as in the Bombay latrines).

It should, therefore, be ruled absolutely that on no plea or pretext whatever will a fixed latrine be permitted to be placed anywhere on cantonment soil other than one of a pattern for all such latrines to be approved by the Government of India itself.

Such a latrine will obviously be expensive to construct, and hence landlords and others will think carefully before asking for permission to construct a fixed latrine, which is just what is greatly to be desired.

22. *Native House Latrines.*—As regards (*c*) latrines in native houses. These are very numerous, yet cannot be prevented from being fixed latrines; they might, however, be considerably reduced in number. It should be remembered that such a latrine is a distinct luxury, which ought only to be allowed to those who are fairly well off, and so really able to pay for a style of latrine which shall be satisfactory and properly equipped. No others should be allowed to have them, and this would reduce largely the number

now existing. At the same time there must, of course, be a proper and complete provision of women's public latrines, a matter too often at present entirely overlooked

As regards those house latrines which are to be permitted, the only pattern allowed should be one which fulfils the following conditions :—

(1) It must have an iron "shoot" and bucket (Bombay pattern) ; and these must be so arranged that all fœcal matter, urine, and washing water (including that used to wash any vessels) falls therein. If desired, a receptacle on wheels may take the place of the bucket, but in this case there must be two such receptacles as one will be often away.

(2) It must have a proper "hill pattern" closed iron receptacle. This must be kept under cover, and always tarred and perfectly clean outwardly.

The whole thing would cost about Rs. 15, and nothing else should on any plea be allowed. The latrine must be open to frequent inspection, and on any evidence that anything is allowed to fall on the ground it should be closed

23. *Offensive smells* —The common idea that such places and things must inevitably have an offensive smell is merely a tribute to the ingrained laziness of human nature. There is not the slightest reason for anything of the sort, and none should ever be permitted. Moreover, where any smell is detected one may feel tolerably sure that it is nature's signal that harm of some sort is happening.

Throughout all latrines and conservancy details of a cantonment, if there is the very slightest smell anywhere, either in the latrines themselves or in the vicinity of their carts or receptacles, there no peace whatever should be allowed to any single individual concerned, however remotely, therewith, until a remedy has been applied.

24. In every cantonment the conservancy fund should be entirely separated from all other portions of the general Cantonment Fund, and show its own income and expenditure, as in no other way than this will a due expenditure on this important matter ever be ensured?

25. I have in this paper endeavoured to show how a reform in one important part of this great question of sanitation may be carried out without any extra expense; but the question of expense ought not to be allowed ever to enter into the question at all. And I would say, if it were necessary (which it is not), let a cantonment go without metalled roads, go without lamps, go without gardens, go without every single thing rather than suffer these vile festering sores to exist all over its soil, hidden away in corners,

it is true, from the general eye, but none the less there all the same, and steadily poisoning, hour after hour, earth, air, and water all around.

In all matters of conservancy it is not only no use, but an absolute sin against the community in general, to attempt the impossibility of trying to do with a less provision than sanitation demands. This is done every day all over India, and is, as I have said, merely a culpable foolish endeavour to drive a bargain with nature. Expenditure on conservancy differs radically from all other expenditure, in that it can never be any case of "cutting the coat according to the cloth." The laws of nature are immutable, and if the necessary provision be not made in each case, will assuredly punish some one for its non-provision. And the result of all such attempts to evade such full and complete provision is invariably the same, and as certain as anything in the universe, *viz.*, that nature revenges itself on the short-sighted community concerned by bringing in sanitation, sickness and death.

SIMLA: *26th April 1886.*

GEORGE F. YOUNG, MAJOR,
Asst. Quartermaster-General.

APPENDIX C.

Data for estimating the requirements of any latrine which is to be worked on the principle of removal of the fœcal matter to a distance; whether such be a fixed latrine (as now used), or a moving one (as proposed). These data, compiled after the fullest possible enquiry, represent the *absolute minimum* for sanitation The population of any given locality will at once show how many latrines (both for men and women) will be required, and what apparatus and establishments:—

(*a*) *Compartments.*—There must be one compartment for every 20 persons.

(*b*) *Sweepers.*—*There must on no account be less than one latrine sweeper to every 100 persons.*

(*c*) *Receptacles.*—Two large plains pattern ones to every 100 persons. In the hills (and in forts) four small hill pattern ones. (*Receptacles are no use if they leak*).

For narrow lanes in a large bazaar or town, small iron filth barrows or receptacles on wheels will be required.

(*d*) *Carts.*—There must not be less than one filth-cart to every 500 persons, *and it must be remembered that Carts require renewal after six years' use.*

(*e*) *Pans.*—An iron pan, or a large *glazed* earthenware one to each compartment. The earthenware ones require renewals at 25 per cent. per month.

(*f*) *Bildars.*—There must be one sweeper bildar to every filth-cart employed, irrespective of the latrine sweepers.

(*g*) *Tar* —All iron receptacles and carts *must* be kept clean outwardly, and therefore regularly tarred, and as this may even have often to be done almost daily, a liberal supply of tar must be given.

(*h*) Lime and dry earth must be provided and kept under shelter.

(*i*) Women's latrines must be given exactly the same scale, except that they should not have separate compartments They must have female sweepers.

Therefore a latrine for, say, 500 persons requires as follows:—

Note.—This is the largest size to be ever allowed, and latrines for 200, 300, or 400 would be better.

(*a*) Compartments. $\frac{500}{20}$ = 25 compartments (In a single row.)
(*b*) Sweepers. $\frac{500}{100}$ = 5 latrine sweepers.
(*c*) Receptacles. $\frac{500}{50}$ = 10 plains pattern (20 hill pattern)
(*d*) Carts. $\frac{500}{500}$ = 1 filth cart (in hills 3 carrying sweepers)
(*e*) Pans. $\frac{25}{1}$ = 25 large iron; or 30 large *glazed* earthenware ones.
(*f*) Bildars. $\frac{500}{500}$ = 1 bildar sweeper
(*g*) A liberal allowance of tar.
(*h*) Lime and dry earth.

APPENDIX D.

Average monthly cost of working any latrine which is worked on the principle of removal of the fœcal matter to a distance (*i.e.*, which is not a trench latrine), whether such be a fixed latrine or a moving one.

As in Appendix A, a latrine for 500 persons is taken, the largest size permissible; two latrines for 200 and 300, respectively, would, of course, cost just the same, requiring exactly the same establishments and apparatus:—

	Rs.	A.	P.
5 Latrine Sweepers at Rs. 5 ...	25	0	0
1 Bullock with Driver (for the cart) ...	7	8	0
1 Bildar Sweeper	5	0	0
Tar, say Rs. 5; renewing pans, say Rs. 2-8	7	8	0
TOTAL ...	45	0	0

(Or only about one and a half annas per head.)

No. III.—THE SPREAD OF ENTERIC, AND WHAT CAN BE DONE.

NOTES ON SANITATION IN INDIA.

No. III.—THE SPREAD OF ENTERIC, AND WHAT CAN BE DONE?

SECTION I—GENERAL.

1. Statistics will show how largely enteric fever has extended its borders during the past five years, and is still extending them: there is, therefore, no need to enlarge here upon that. Presuming, therefore, that all are impressed that something must be done, it may assist matters to state briefly what appears feasible.

In a paper written, in 1884 (No. I "Cremation"), I urged the abandonment of our existing system of disposal, and the substitution of "Cremation."

In a second paper written in 1886 (No. II "Moving Latrines"), leaving the question of disposal on one side, I dealt with the great evils of fixed latrines for natives and urged a system of "moving latrines."

In this third paper I propose showing, with reference to the still increasing spread of enteric, both what action seems feasible as regards the foregoing portions of the subject, and also as regards (III) the closing up of the many avenues by which the poison manufactured under I and II finds at present free entrance to human bodies (*see* para. 3 of paper II).

The urgent importance of prompt and firm action such as shall go right to the root of the evil is, I should imagine, sufficiently manifest.

2. Cantonment sanitation may be subdivided thus:—

(*A*) Conservancy affairs.

(*B*) The various other matters, outside conservancy, in which sanitary laws are generally disobeyed: especially as to adulteration of food and drink.

(*C*) Arrangements to ensure that rules made for (*a*) and (*B*) are observed.

As regards (*A*), I have dealt fully in the two papers abovementioned, and can only again urge that in all cantonments (1) the method of *disposal* shall be by cremation, (2) that for *removal* a proper scale of such things as carts, receptacles, and sweepers shall, in all cases, *be insisted upon by Government* as an absolute minimum, and (3) that fixed latrines for natives be abolished and moving latrines substituted

As regards (*B*), the action to be pursued is of a totally different character. We have not here to deal with a difficult question involving care, and forethought, and science, and above all, money. It is here merely a question of making certain plain definite rules *by a firm central authority*, each rule aimed at some one particular practice, which either does, or may, admit poisonous matters to the human body.

As regards (*C*), this is simply the complement of (*B*) : for it is obviously useless to make even the most excellent rules unless there be also provided a simple, prompt, and effective method of ensuring their observance.

3. Leaving questions of expense to be dealt with separately (Section IV), the procedure required is as follows :

Let the Government of India first lay down in plain terms (as a foundation) ten broad main principles which include all the vital points in (*A*), (*B*) and (*C*), and must form the basis of any sound system of sanitation :—

(I) That *all* fœcal matter in a Cantonment is to be removed outside the inhabited area, all trench latrines being abolished.

(II) That it is to be there disposed of, either by cremation, or by whatever other method may hereafter be laid down, so as to become perfectly innocuous to health.

(III) That a certain fixed scale of latrine and removal establishments and apparatus, per thousand of the population (other than British troops), shall be the absolute minimum to be in any case permitted.

(IV) That all latrines for use by natives (except private ones in native houses) shall be moveable, and shall be so moved periodically, the vacated site being ploughed and cultivated.

(V) That where in any case an exception to No. IV is unavoidable, the only fixed latrine allowed to be placed on cantonment soil shall be a pattern to be approved by the Government of India for all such.

(VI) That no milk or meat shall be sold in a cantonment except from animals which have been for a fixed period subject, as regards their fodder and surroundings, to the daily inspection of the Health Officer ; and that it shall be a criminal offence to feed such animals on any prohibited refuse, or to graze them on any prohibited locality.

(VII) That it shall be a criminal offence to put into any article of food or drink, water which has not itself been passed by Health Officer as fit for drinking purposes.

(VIII) That it shall be a criminal offence knowingly to do any thing plainly calculated to contaminate drinking water.

(IX) That it shall be a criminal offence to be guilty of conduct to the prejudice of health with full knowledge of the fact.

(X) That to every Cantonment where British troops (over two companies) are quartered, a Health Officer shall be appointed, charged with ensuring that all sanitary rules are observed, as well as with the whole executive working of the sanitation; and that such officer shall have no other work.

4. The above cover the whole field of Cantonment sanitation, and would form a firm framework on which to construct the detailed sanitary rules which will be required. Nos. I, II, III, IV, and V, refer to heading (A) of para. 2, and provide for an improved conservancy, Nos. VI, VII and VIII refer to heading (B), and deal in general terms with the three most dangerous classes of insanitary practices which at present form vehicles for the entrance of poisonous matters, but which cannot practically be grappled with under existing conditions. No. IX is a general clause covering offences not otherwise particularized, while by the concluding words it provides at all events for offenders brought up a second time for the same offence. No. X refers to heading (C), providing a special responsible officer charged with ensuring the observance of the whole, and without which appointment all the rest is useless.

It is necessary that such practices as come under heading (B) be criminal offences, and not ordinarily punished by fines. All such practices are with the object of making money, and if punished merely by a fine can never be stopped, since a fine, representing probably a week's unlawful profits, is not of much account out of six months' or a year's unlawful profits, while even so it can always be covered *by increasing slightly the amount of adulteration!*

5. On the above framework detailed sanitary rules must be drawn up, dealing in a set of "*Sanitary Regulations for Cantonments*" with all details under the heads (A), (B), and (C) of para. 2, *see* Section II).

Thus, to embrace the whole vast field at one glance, we may express the matter thus—

That sewage poison is manufactured by (A), introduced into human bodies by (B), and prevented, from either being manufactured or introduced, by (C); the weapon with which it is prevented being a set of "Sanitary Regulations" wielded by a special officer, styled a Health Officer.

SECTION II.

The "Sanitary Regulations" required.

6. Such a set of Sanitary Regulations would include rules under the following heads:—

(*A*) *Conservancy rules*, laying down in general terms what is to be the system of disposal; what are the essential points therein which are to be carefully observed; what kind of latrines are to be alone permitted; what essential points are to be observed in their management and supervision; and what scale of establishments and apparatus per hundred or per thousand of the population (other than British troops) is to be observed as the *minimum*, both for the working of latrines and for removal from the Cantonment of fœcal matter.

(*B*) Rules prohibiting, in plain and brief terms, such practices as are well known to be dangerous to the health of the community, by furnishing a vehicle for poisonous matters to enter the human body either through water, food, or air; especially the two former.

(*C*) Rules defining briefly the duties of the Health Officer; his powers, and the means by which he is to ensure observance of the foregoing; and his position with reference to other authorities.

7. As regards (A), it will be necessary first to determine whether (1) the present mode of disposal by burying is to continue, or (2) cremation to be adopted, or (3) some other system. If cremation be the system adopted, I have in paper (I) given full details whence it is easy to lay down the few essential points.

In the same way as regards latrines, their management and establishments, and the due means of removal, full details will be found in Paper II from which is easy to lay down (1) what kind of latrines can be permitted, (2) what are the essential points as to their management and supervision, and (3) what establishments ought to form the minimum for any given population.

8. As regards (B), many rules will (1) originate from general principles VI, VII, and VIII; then there are also (2) various kindred matters to be extracted from the present Cantonment Rules, and lastly (3) many minor offences against the purity of articles of food and drink which are at present unprovided for, such as the "blowing" of meat by butchers, using lead in tinning cooking utensils, washing vegetables in foul water, washing clothes in the same, selling ice made from the same, putting condemned flour into bread, with dozens more, all of which could be enumerated by any Cantonment Magistrate of experience.

Each practice which forms, or is considered by the Surgeon-General as being able to form, a vehicle for the introduction of any

poisonous matters into the human body should be particularized, and *on no account form part of a general clause.* This is most important, otherwise the procedure for stopping any particular practice becomes so cumbersome that only when the above has reached unusual dimensions will it be put in force, and even then will frequently fail. For instance, if a clause prohibits the sale of articles "unfit for human food," then on each occasion a Medical Officer must attend the court and swear absolutely that the article is unfit for human food; yet though it may be very *dangerous* (as a possible vehicle for admission of sewage or other poison) the Medical Officer may not feel able to swear that it is absolutely unfit. What is wanted in such a case is the prohibition from sale of all those articles which are *known* (by those best qualified to judge) to be "unfit for human food," and having specified these then a general clause should be added to cover cases not specified.

Such cumbersome procedure as that at present necessary, inevitably suffers most of the avenues for the entrance of poisonous matters to remain permanently open. At present a man who sells milk may put the foulest water into such milk with impunity, the Medical Officer, though able to detect the presence of water, being unable to swear what sort of water.

It would be simple enough to merely state that "the following practices being calculated to render such articles dangerous to health or unfit for food are prohibited," and then detail briefly all such as are known, with a general clause at the end to cover any other cases.

9. The rules required under (*C*) are dealt with separately in Section III.

10. These sanitary rules must issue from a *firm central authority* directing all cantonments alike, *i.e.*, they must have the sole and direct authority of the Government of India itself, and pass through no lesser authority; and must be declared by the issuing authority to be applicable to all cantonments. Thus only will they have the necessary force and directness, any other course always tending to make it easier for offenders to evade the rules. What is wanted, in fact, is a set of plain sanitary rules emanating direct from the central authority, and for the observance of which those in charge are responsible direct to that central authority. They must be drawn up in the very shortest and plainest terms, such as the most illiterate can understand.

11. Thus all matters affecting public *health* would be placed in an entirely different category from those affecting merely public *convenience*, and would be entirely separated from the latter, and from details of general Cantonment administration, all which would remain as now.

SECTION III.

The Cantonment Health Officer.

12. The absolute necessity of some one officer charged exclusively with the whole executive working of the sanitation will be borne withness to by everyone who has had to do with Cantonment matters. At present, while the procedure to stop any firmly-rooted insanitary practice is cumbersome and ineffective to the last degree, and eminently calculated to allow such offences to flourish unchecked, there is also no one authority directly charged with preventing such practices, especially those which are lucrative. Moreover, a proper conservancy system, even for the most ordinary sized Cantonment, is one man's full work; in fact, such an officer, if he did his work well, would be the hardest worked man in the station. There is, of course, one officer who is *supposed* to do all this, but, as though to prevent even the most energetic from doing much, he is saddled in addition with the whole magisterial work of the community (quite enough for one man by itself), while he also has, of course, no special knowledge of the subject, and most probably feels no sort of interest in it either. To crown all, this officer's pay and promotion rest with the Civil Department, who can scarcely be expected to take a very deep interest in the sanitation of a Military Cantonment, and may *fairly* argue that there are plenty of other authorities to see to that

13. The whole thing is, in fact, clothed in *supposition*; the Officer Commanding the Station (who must and ought to delegate details to those under him) almost necessarily *supposes* that the Cantonment Magistrate looks after these "festering sores"; the Cantonment Magistrate unable to give up his whole time to such things, has almost perforce to *suppose* that his Cantonment Overseers supervise them properly, the Overseer (an ignorant man, whose ideas on such things are of the most primitive description), in far too many cases, *supposes* that the Jemadar sweeper will see that all is able to pass muster when occasionally a big man may come round; and it is, in practice, only on this latter official, the Jemadar Sweeper, that the whole of this important matter in reality rests. Again, the trenches are *supposed* by all who ever think about it, to be dug and filled according to the theory, the latrine equipment and establishment allowed are supposed to be enough, and the number of carts allowed is *supposed* to be capable of removing all that has to be removed; but

from top to bottom anybody who will go through the drudgery of looking into the details, with the object of saving these scores of valuable lives now perishing wrongfully, will see at a glance that all these things both are, *and must be*, suppositions almost wholly.

14. It would be strange indeed, under such conditions, if Cantonment sanitation were not (as it is, in fact) fair perhaps on the outside, but rotten, to an appalling depth of rottenness, at the core.

And the remedy is, besides a more scientific method of disposal, besides a sufficient (instead of an insufficient) scale of latrine establishments and means of removal, besides an improved type of native latrine, and besides a set of proper sanitary regulations for Cantonments, that without which all the rest will be of little effect, *viz.*, the appointment of a Cantonment Health Officer to see that supposition in such matters ends, and to be wholly and solely responsible if it does not.

15. It matters little what such officer is styled, and "Health Officer" seems as good a name as any; but he must be paid by the Military Department and responsible (through the regular channels) to the Commander-in-Chief, and appointed or removed by him like any other Staff Officer. Such officers would, as an almost invariable rule, be medical officers, but the rule need not be absolute. Pending their passing a simple special examination, the only other qualifications necessary are (1) common sense, (2) tact, and (3) a slight knowledge of the language of the country and the ways of the people. Suitable officers could be selected and appointed at once, subject to their qualifying as regards the sanitary examination at some future time; and it may be remarked that even the most ignorant officer conceivable would, placed in such a position and with no other work, do an enormous amount of good even in six months.

16. There must, for any good, be one such officer to every Cantonment where British troops (over two companies) are quartered; and the rule must be absolute that such officer holds no other appointment.

A senior Officer should be placed over the whole as Sanitary Commissioner for Cantonments; he is required in exactly the same way as is, for those arms, an Inspector-General of Artillery, or of Cavalry, and for similar reasons; such officer's first work would be to proceed to either Europe or America and study the details of the method of disposal determined on, and on his return to regularly visit all Cantonments in the Presidency, instructing the Cantonment Health Officers and reporting on their work.

17. The pay of a "Health Officer" should be a fair rate, probably not less than Rs. 600 a month; on any such officer proceeding

on leave the officer acting for him might be either a medical or any other officer, but, in like manner, should ordinarily be relieved of all other duties.

18. The duties of a "Health Officer" would be simply the entire charge of the whole sanitary working of the Cantonment, together with charge of the Sanitary Fund (para. 23).

The ordinary means by which he would enforce observance of the Sanitary Regulations would be by prosecuting offenders* before the Cantonment Magistrate. As, however, sweepers and others of the menial classes would not obey his orders unless he were given some powers of his own, he should be given, for breaches of the rules, power to award minor punishments to menial classes. The mere knowledge that he has such powers will generally suffice.

As regards his position, he would be directly responsible to the Officer Commanding the station as the Executive Officer of the Cantonment for all sanitary matters.

* Other than soldiers, in the very unlikely case of an offence of this sort by the latter a report to Commanding Officers will suffice.

SECTION IV.

The expense; and how to be met.

19. Notwithstanding that cost should never affect the matter, some idea of the extent of the expense is of course necessary, if only to know how to make provision for it. Sufficient data have now been arrived at in the foregoing notes to do this, and I will, therefore, attempt a fair estimate of this "*price of sanitation.*" The same sized Cantonment as before will be taken for example, *viz.*, one with a total population of 12,000 persons, of whom (*a*) 2,000 are British troops (with 1,000 Regimental followers); (*b*) 3,000 are native troops with also 1,000 Regimental followers; and (*c*) the remaining 5,000 are made up chiefly of natives, but including some 200 European Officers and Civil Residents.

20. The expenses embrace the following items (para. 3):—

(*a*) Cost of cremating. This we have seen (Paper I) is for such a Cantonment an *initial cost* of Rs. 2,560, and a *monthly cost* of (supposing no ashes at all are sold) Rs. 960, or about 1 anna 3 pies per head.

(*b*) Cost of completing the scale of latrine and removal apparatus from the present insufficient scale to the proper one. This is the *initial cost* of the necessary carts and receptacles to complete. It is, of course, impossible to tell how great may be the shortcomings of each Cantonment in this respect; one which has been properly administered will vary greatly from one which has been badly so; but it may, I think, be estimated that a Cantonment of the size taken will have to spend about Rs. 2,000 to make up its deficiencies in this respect *deficiencies of course which ought never to have been allowed to occur and have nothing to do with any reformed system of latrines or of disposal.*

(*c*) The *monthly cost* of working the proper number of latrines on the new scale. This we have seen (Paper II) is Rs. 45 per month for every 500 persons, or about 1 anna 6 pies per head.

(*d*) The *monthly cost* of the Health Officer's pay. They would be required for about 48 Cantonments in Bengal (including hill Cantonments), but the best way is to charge each to his own Cantonment. Supposing their pay to be Rs. 600, this gives (for a Cantonment of the size taken) another 9 pies per head. For a very large Cantonment it would of course be rather less, for a smaller one, rather more.

(*e*) The *initial cost* of pulling down existing fixed latrines and constructing moveable screens in their place. This is impossible to

estimate, but it would not be very much; moreover, [as with (δ)] the latrine accommodation if completed (as it should be in any case) to the proper scale, without making this change, would cost a very great deal more.

The initial expenses are of course comparatively unimportant as compared with the monthly working expenses.

21. Thus it appears that the whole monthly cost of working this improved system of conservancy is nothing so very formidable after all, and for a Cantonment of the size taken resolves itself into the following :—

MONTHLY WORKING EXPENSE. (For a Cantonment of 12,000, including 2,000 British troops)	Total per month. Rs	A	P	Per head per month Rs	A.	P.
(X) Cost of cremating for 12,000 persons, *viz*, 32 carts (including 8 of British troops) = 96 cart loads = 96 maunds firewood = Rs 32 daily. (*Vide* para 50 No. 1 "Cremation".)	960	0	0	0	1	3
(Y) Cost of working the required number of native latrines for 10,000 persons, including carts, sweepers, bildars and all other expenses, and including additional carts for compounds of European Residents.						
(1) $\frac{8000}{500}$ = 16 latrines for 8,000 people living in bazaars and lines @ Rs 45 = Rs 720						
(2) 8 carts for 2,000 people living in compounds and not requiring the other establishments from the public funds, at Rs. 7-8 each = Rs. 60	780	0	0	0	1	3
(*Vide* Appendix B, No II "Moving Latrines.")						
(Z) Cost of Health Officer's pay, say	600	0	0	0	0	9
Grand Total for Cantonment of 12,000 persons; and supposing the cremation ashes fetch nothing at all.	2,340	0	0	0	3	3

The above includes all Cantonment conservancy with the exception, of course, of the rubbish carts, and sweepers for sweeping of roads.

22. Thus the total monthly expenditure for (1) an improved method of disposal, (2) a proper provision of latrine and removal establishments, and (3) a Cantonment Health Officer, will amount to Rs. 2,340 a month, supposing always that the cremation ashes fetch even nothing at all, *i. e.*, a total expenditure of about 3 annas 3 pies per head. Let us allow a margin of Rs. 660 more for unforeseen contingencies, and say even that the Sanitary Fund (para. 25) must have an income equal to four annas per head of the population, *i. e.*, Rs. 3,000. In what proportion this four annas per head should be distributed on the various sets of shoulders concerned must be now considered.

First, apparently in any case, the Imperial Government would bear a proportion of items, (X) and (Z), on behalf of the 2,000 British troops. As regards that portion required for the 3,000 Native troops, there is more to be considered. As has been said, the circumstances of a Military Cantonment differ altogether from those of any other community, and will necessarily always preclude such a community from having a public income at all commensurate with such a thing as a proper system of sanitation. An octroi tax levied on a trading community will always bring in enough for their needs in such respects; but how could it ever be supposed for a moment that such a tax levied on a mere body of troops and their followers (especially when all that the private soldier uses is exempt) could bring in an income even approaching the due and proper requirements of the whole community in this respect, not to mention large charges for the maintenance of police, the maintenance of roads and gardens, and the many other general expenses of a large and well kept Cantonment in addition! And this view is made even stronger, if it be remembered that the natural desire of Government would be that its Military Cantonment should be patterns to the whole of the rest of the country of what perfect sanitation should be; yet, at present, the regular growth of income of the large centres of trade is producing an exactly opposite effect.

Since, then, every body of troops ought rightly to depend on funds obtained outside itself, it would not appear out of the way to expect that the trade of the Province, towards which all the money of the country steadily flows, should contribute (or the Local Government on its behalf) a proportion of the expense, and thus three sets of shoulders should bear the burden thus: Imperial Government one-third, Provincial Government one-third, Cantonment itself one-third. Another mode would be for the Imperial Government to bear the portion incurred for the British portion of the troops (and their Regimental followers), the Local Government to bear that for the Native troops (and their Regimental followers), and the rest of the Cantonment for themselves (see Appendix E). Or the Imperial Government might bear the whole for the troops (and

their Regimental followers), and the rest of the Cantonment for themselves.

23. In Appendix E, I have shown in what proportions the expense is incurred, respectively, for *(a)* British troops, *(b)* Native troops, and *(c)* the rest of the community. As regards Government bearing the cost incurred for the Native troops, and for the purely Regimental followers of all troops, there is something more to be noted. Whatever amount is found by Government, there will be a large sum remaining to be met by the Cantonment itself; part of this will, of course, be the sum the Cantonment Fund now spends on the same purpose, and which it will hand over to the Sanitary Fund monthly; but there will generally be a balance still to be met, and this must be by a direct sanitary or conservancy tax. Now, taking the given Cantonment, and eliminating the British troops, there remain 10,000 persons of whom 3,000 are Native troops, at least 3,000 more are persons too poor to pay anything (and in these may be included the whole of the purely Regimental followers of corps), while of the remaining 4,000, certainly 3,750 may be taken as petty traders and others of very small incomes, not able to do more than pay *their own* conservancy share (four annas per head); leaving only some 250 (mainly officers of the troops) who could pay more than this. So that to saddle such a community with finding the funds for the conservancy of the whole means that 4,000 persons, mostly of very small incomes, are to pay, not only for their own conservancy, but also (1) for 3,000 Native troops and (2) for 3,000 others unable to pay anything, *i.e.*, that this 4,000 are to bear the cost of the whole 10,000.

Hence, it appears that in starting an improved system of conservancy, Government might fairly find the funds to meet the expenses of—

(1) 3,000 Native troops, and

(2) 2,000 followers of all troops (para 19),

leaving the remaining 5,000 persons (including about 1,000 unable to pay any share) to find the rest.

A reference to Appendix E will show that, if this be done, the Government share will, in the given Cantonment, amount to Rs. 705 + Rs. 1,020 = Rs. 1,725, and the Cantonment share to Rs. 1,275, and this would seem a fair proportion.

24. It may be noted that a heavier taxation would be none the less an advantage if it caused a portion of the population to remove elsewhere, the lightness of Cantonment taxation, combined with the greater opportunities for petty gain, having a distinct tendency at present to induce large numbers of people who have no particular connection with the troops to flock thither and overcrowd Cantonments quite unnecessarily.

It would also have a good sanitary effect if each master had to pay the full share of the conservancy expenses* for each inhabitant of his compound, as it would tend to reduce the enormous numbers of relatives and friends whom native servants collect and who frequently overcrowd compounds in a most dangerous manner, conservancy arrangements intended for perhaps a dozen persons having to do for fifty or more.

25. There should be a *separate* fund for all such matters called the "*Sanitary Fund,*" *kept altogether distinct from the Cantonment Fund,* and in charge of the Health Officer as Secretary. It is most important that a system of conservancy, which is to be worked on sound sanitary principles, should not run the danger at every turn of being starved for the benefit of the general funds of the Cantonment—a danger ever present when the two are mixed up together. That, in fact, several filth-carts are not to be reduced in order that the cantonment may make a soldiers' garden for instance!

26. Though kept separate from the Cantonment Fund, the Sanitary Fund would form a component part of the latter, and Government advances, &c., would be made to the Cantonment Fund as usual, and only pass through it to the Sanitary Fund.

Into the Sanitary Fund the Cantonment Fund would pay monthly (1) the amount it now spends on a similar purpose, (2) the Government share of the expenses, and (3) the amount brought in by any small conservancy tax levied for this purpose. The latter should be assessed by Cantonment Committee by classes and be roughly in proportion to income as near as the latter can be estimated. It should be allowed to exceed rather than fall below what is required to complete the whole income required, so that the Sanitary Fund may always have a fair balance in hand against a "rainy day" in the matter of firewood. Anything which the cremation ashes may fetch will also assist this, as they have not been calculated. Each Sanitary Fund should endeavour to first get a good balance in hand after paying all expenses, so that it may be thoroughly secure against any such "rainy days;" this done, any taxation not required should of course be reduced.

27. I have in the Introduction to these notes, dwelt strongly on the hopelessness of thinking to obtain a sound system of sanitation for less than its fair price, as well as on the necessity of grasping the true financial view of this whole question. And, in concluding, I can but repeat this, and urge, as strongly as possible, that the necessary action (whose cost and details have been shown in these notes) be no longer delayed. From long occupation, joined to a system opposed to all that sanitary science in Europe considers

* NOTE—The full share is four annas per head. This does not imply that any conservancy tax levied would be so much, on the contrary, it would, to all except the wealthy, be two annas or less.

necessary, the soil of our Cantonments is becoming annually more poisoned, while other sanitary laws are also defied with almost entire impunity for want of the necessary machinery to ensure their observance; and should enteric fever continue increasing in the same ratio year by year as it is now doing, it does not seem impossible that a time may come when an entire abandonment of some of the worst Cantonments may be forced upon Government, and of course at a far greater cost than the remedies here proposed; moreover, new Cantonments are being started in several places whose soil will, otherwise, undergo the same process.

Does not, then, everything urge that the few and easy steps necessary to effect a remedy be taken without further delay, and in a strong, determined, and vigorous manner, such as is certain to *create* success.

SIALKOT :
17th November 1889.

GEORGE F. YOUNG, LIEUT.-COL.,
24th Punjab Infantry.

APPENDIX E.

Distribution of the expenses of the given Cantonment between—

(*a*) British troops, with their Regimental followers ;
(*b*) Native troops, with their Regimental followers ;
(*c*) The rest of the community,

including a margin for contingencies of Rs. 660.

Distribution.	Each			Total.		
(*a*) British Troops	Rs.	A.	P.	Rs.	A.	P.
(1) Cremating for 2,000 British (8 carts), and 1,000 followers (2 carts) = 10 carts = 30 cartloads = 30 maunds firewood = Rs. 10 daily	300	0	0			
(2) $\frac{1000}{500}$ = 2 latrines for Followers @ Rs 45 ...	90	0	0			
(3) $\frac{3}{1\frac{1}{2}}$ share of Health Officer	150	0	0			
(4) $\frac{3}{1\frac{1}{2}}$ share of margin (Rs. 660)	165	0	0			
				705	0	0
(*b*) Native Troops.						
(1) Cremating for 3,000 Troops and 1,000 Followers = 6+2 = 8 carts = 24 cartloads = Rs. 8 daily ...	240	0	0			
(2) $\frac{4000}{500}$ = 8 latrines @ Rs. 45	360	0	0			
(3) $\frac{3}{1\frac{1}{2}}$ share of Health Officer	200	0	0			
(4) $\frac{4}{1\frac{1}{2}}$ share of margin (Rs. 660)	220	0	0			
				1,020	0	0
(*c*) The Rest of Community.						
(1) Cremating for 5,000 persons, and including the 4 additional carts for compounds = 14 carts = 42 cartloads = Rs. 14 daily	420	0	0			
(2) $\frac{3000}{500}$ = 6 latrines @ 45... ... ... Rs. 270 Also 8 carts for 2,000 in compounds 60 * At Rs 7-8 per cart and driver	330	0	0			
(3) $\frac{5}{1\frac{1}{2}}$ share of Health Officer...	250	0	0			
(4) $\frac{5}{1\frac{1}{2}}$ share of margin (Rs. 660)	275	0	0			
				1,275	0	0
Grand Total, including margin of Rs. 660 ...	...	...	...	3,000	0	0

N. B.—This is supposing the cremation ashes fetch nothing at all.

* appendix D, Paper II.

At a time when the Sanitation of Madras, as reported upon by the Sanitary Commissioner, is about to be discussed by the Municipal Commissioners "by order of Government," apology for the reprint in a handy form of the following four articles from the *Madras Mail* seems hardly necessary. Even if the opinions expressed in them are not one and all accepted, the various phases of the question which they touch upon must be acknowledged to be phases which require the earliest consideration. It will be seen that in the absence of Mr. Cousens's long-expected Report on the water-supply and drainage schemes, those two very important matters have been referred to only incidentally; but, as the Sanitary Commissioner has pointed out, there are many other important problems besides these which require solution, and in the following pages the greater number of them will be found enumerated and discussed.

The Editor, "Madras Mail."

Madras, 27*th March*, 1893.

THE SANITATION OF MADRAS.

I.

[*From the "Madras Mail," published on the 28th February, and 6th, 13th and 21st March*, 1893]:—

THE sanitation of Madras has been so much discussed, and, it may be added, so little has come of its discussion, that did we not feel how truly important it is, in the interests of human life, we would not trouble anybody with fresh dissertations. Indeed, we doubt if much that is fresh can be said. The matter has been well threshed out in successive Reports; and it may be in consequence of this that the last addition to its literature, a Report by Surgeon-Lieutenant Colonel LAING, which by Order of Government is about to be considered by the Municipality, has a family resemblance to those already before the public, and, unless it be in the production of modifications, exhibits no original matter.

In connection with this Report, the Health Officer of the Municipality, Dr. NIELD COOK, also furnishes interesting remarks of practical import. Presumably, in deference to the silent expert, Mr. COUSENS, no reference is made to either the drainage or the water supply of the city. Now, it seems to us a pity that the influence of this long-deferred Report has been hitherto either to have trammelled all action, or have formed a ready-made excuse for doing nothing. Thus, the important question of overcrowding, which is urged upon the attention of the Municipality, is a matter for the due remedy of which it certainly does not need the existence, in the first place, of either a water-supply or drainage scheme. Indeed, the recognition of the fact that these would come shortly into existence should form a good reason for the exhibition of activity. If the alignment of the streets is to be altered, or certain houses are to be thrown

down that others may benefit, it is well that the configuration of the city should be changed before the engineers commence their labours If the Municipality be in earnest as to sanitation, one of its first acts should be to regulate the dwellings of the lower classes by obtaining power from Government in close imitation of the Artizan's and Labourer's Dwellings Improvement Act of England This would facilitate removal, on fair compensation being paid, not only of individual houses unfit for dwellings, but of all within any specified unhealthy area, and even of houses in themselves in good sanitary condition, provided the execution of any general scheme of improvement was likely to be interfered with by their presence Again, by obtaining legislative powers controlling lodging houses, as permitted under the Public Health Act of England, without further outlay an enormous amount of benefit might accrue So far as we are aware, there is no return showing the number of lodging houses existing in Madras. It would serve a good purpose were this seen to. Their number would doubtless depend upon the method of classification, but we believe that if a lodging house were defined as "any dwelling in which the residents do not belong to a single family and pay as rent Rs 2 and less," the majority could at once be brought under a law that would demand frequent sanitary inspection, and that would enforce sanitary discipline amongst the poorest and dirtiest classes of this town This measure was pressed upon the attention of the Municipality in 1882 in the Report of the Special Sanitary Officer of that period, but failed to evoke any attention, yet the Health Officer of Calcutta had not held his office a longer time than was sufficient to enable him to ascertain the native habits of sub letting houses and the insanitary conditions resulting therefrom, than he began at once to suggest the same course to his Municipality Similarly the suggestion to obtain a Building Act of the same scope has been urged by him

That the necessity for such measures may be more readily appearent we would remind our readers that one of the most common type of houses in the crowded parts of Madras is that of a square enclosure. From the street aspect there is nothing to lead one to believe but that the area covered by the roof as seen from the street represents the total space occupied by the house. But in passing through this front portion it is discovered that there

is behind a square enclosure, with numerous small rooms, occupied by different families, with roofs lower than can be seen externally. In the front house resides the owner of the whole, to whom the sub let rooms frequently form the chief source of livelihood. They constitute, in short, lodging houses. Besides this difficulty as to structure of dwellings for the poorer classes, there are others which are dignified by the Madras native with the title of "hotels." These are places where the unmarried and strangers residing temporarily in Madras chiefly congregate. It need hardly be added that in the former description of buildings, irrespective of over crowding, correct sanitary conditions are not obtainable, as a result of structural form which the Municipality should insist upon being modified, whilst in the latter this is complicated by a likelihood of travellers being the bearers of epidemic diseases, to the spread of which their insanitary surroundings especially lend their influence. In some of the worst parts of Madras the question of rectifying sanitary errors is constantly frustrated because the ground dealt with is private property Why, may we ask, in view of facts which no one would feel inclined to dispute, and which must be apparent to the most casual observer of sanitary conditions, has no action been taken upon these important points? Is it possible that the people of Madras are so enamoured of the presumable results of their future water and drainage schemes, that they believe that the improvement of dwellings can be safely ignored? Again, what measures have been adopted for the prevention of adulteration of food, of the sale of milk from diseased, especially of tuberculous cows, or for the enforcing of sanitary regulations regarding cowsheds, and prevention of cattle diseases? With the grosser insanitary conditions still unremedied, and in the absence of any apparent effort to accomplish the end, it savours of the tendency to strain at a gnat and yet to swallow a camel to find the Municipality entering into a legal squabble as to the streets being contaminated with the drippings from cans that it was not contended were derived from animals dead of any specific disease!

Nor does the excuse of waiting till the submission of Mr. COUSENS'S scheme warrant the neglect of undertaking to secure a complete sanitary survey of the banks of the Kortalayar, whence is derived the supply of the Red Hills Tank. On representations

made in 1882, some improvements were effected in the conservancy of the water-shed of the tank itself, but no systematic effort has been put forth for the purpose of ascertaining to what extent there exist sources of contamination from cultivated lands, small streams, and villages on the banks of the river supplying it. Power over the whole area whence this water is obtained to its utmost ramifications should by this time have been sought from Government, and should have been jealously applied So far, Madras has been extremely fortunate; it has not been possible to ascribe to the use of this source a single case of typhoid or cholera. This fact should not, however, cause the Health Department to forget possibilities of the future. Water may be brought into the town under the most scientific system feasible with full advantage of skilfully worked filtration; yet, should this precaution of the protection of the complete water shed not be taken, so far as freedom from epidemics is concerned, the money thus expended may be regarded as thrown away. It is popularly assumed that a mass of water, such as is found in the Red Hills Tank, must make the chances of poison being conveyed to the population using it so remote that it may be safely ignored. Whilst this may be true of simple organic matter, it is not so as to that which is disease, bearing and of human origin. A single instance of contamination, by methods of every day occurrence in this country, have resulted in rivers many miles long and water-works large enough to provide towns of the first rank being sufficiently charged with poison-bearing matter to produce grave epidemics. It is a foregone conclusion that notwithstanding the bulk of the water in the Red Hills Tank, should a single streamlet bring the poison of cholera or typhoid in its midst, both high and low in Madras would have cause to repent the temporising which neglects the application of a simple and inexpensive measure.

II.

Above we have attempted to show that there was no excuse for the delays which have occurred on the part of the Madras Municipality in taking some very obviously required steps for the improvement of sanitation here. Those who would temporise furnish us with the retort that it is of little use to obtain legislative power for new measures when it is unsettled to what extent

funds may be required for their performance, especially when there looms in what, we are afraid, must be correctly described as the far distance, Mr. COUSENS's water and drainage schemes. As a fact, most of the measures we briefly referred to can be effected at no greater expenditure than is implied in the due strengthening of the Health Officer's hands, and by furnishing him with a sanitary staff suitable for the task in numbers and training; whilst other measures would cost the Municipality nothing, except the trouble of acquiring the necessary power from Government. Thus improvements in houses classed as lodgings could be effected at the owners' cost, by his choosing either to adapt his house to the purpose, or give up his vocation of sub-letting. In improvements of large areas under a Building Act, too, if the Municipality acquired the land upon which insanitary dwellings stood, it need not be long, or largely, out of pocket. There is the prospect of selling or letting the land for a better class of buildings, or even of building on the Municipality's own account; with the result of so improving localities that greater taxation of the neighbourhood would become feasible.

There is, we are inclined to think, a tendency in all sanitary laws in this country to throw too much responsibility upon official agency, to the neglect of the liability of individual members of the community; and it would be well if this were carefully kept in mind in further legislation. For example, the new drainage and water-supply schemes will be of little real use unless the Municipality be given powers to compel owners under certain circumstances to take advantage of the proximity of the works to their houses. It is owing to the uncertainty of house connections being made that much of the trouble in Bombay, Calcutta and Rangoon has arisen with regard to the sewerage works. It is one thing for an Engineer to calculate that such and such an amount of sewage shall be accommodated in his sewers, and quite another for it to be received. This being so, it is not to be wondered at that sewers do not at all times in this country meet with unqualified approval. Then again, in the matter of rudimentary precautions as to the existing water-supply, the Municipality exhibits extraordinary apathy. It has been alleged that the system inaugurated by Mr. JONES to flush the Black Town drains is dangerous, because pipes are placed directly over and in the drains; and

because at times, as a result of the cutting off of the supply from near the point of flushing, foul air can enter the water-pipes, to say nothing of the possibility of sewage being sucked up in the event of a drain overflowing. It has also been asserted that the distribution pipes are made to cross under the old pervious brick drains, when it is apparent that a leak caused by corrosion of the iron pipe, or otherwise, would, on the water-supply being cut off, facilitate contamination by the sucking up of impurities. Indeed, it has been shown by actual experiment that following the conditions of varying pressure of the water-supply, of the presence of angles in the pipe, &c., entrance of impurities from the surrounding soil may occur. It has been recorded in the Report of the Committee of Three of 1891, to which we have referred for certain of these details, that at least one large water pipe runs direct through a sewer. Then, think of the pipes that have been taken to the more elevated houses in Madras, in the neighbourhood of rooms used for inferior domestic purposes, which pipes are only of service at certain hours of the day, because during the hours of large consumption by the population there is insufficient pressure to retain them full. Should their taps be left open, as is very frequent in native houses, air that may be loaded with disease products may be brought into the water-supply and receive wide distribution. These facts are not the off spring of mere theoretical fussiness, but are truths that demand special action.

With the probable advent of scarcity of water-supply, it would also be well that more supervision were exercised by the Municipality upon the fittings of distribution pipes, leakage being not infrequent. In a series of experiments conducted some years back in Liverpool, it was proved that a town may lose by leakage at taps many thousands of gallons daily. Again, in the matter of slaughter houses, it has been long recognised, more especially with regard to arrangements of water-supply and of fittings generally, that there exists much room for improvement. On one point, particularly, we think the Municipality is blameworthy, namely, in extending the spot near the large slaughter house at the Monegar Choultry as the depôt for conservancy carts. Surely, it cannot improve the keeping qualities or the wholesomeness of meat to be exposed to air charged with matter wafted from carts that daily fulfil the filthiest of functions! We trust that the Commissioners

will see their way to adopting the proposal urged by Mr. LOVERY of securing a new General Market for Madras by aid of a Company. The present place is certainly a structure that would disgrace a Municipality of very much less pretensions than that of Madras. We have no doubt also that were the principle advocated by Mr. LOVERY of obtaining Companies to undertake the work, a profitable investment could be secured by erecting public washhouses—the arrangements in Madras as to washing clothing being abominable.

In the matter of rubbish disposal, Dr. NIELD COOK has drawn attention in an earnest manner to the desirability of incineration. With generosity he ascribes this suggestion to Colonel PENNYCUICK, the late President of the Committee of Three In that Committee's Report it is recorded that Mr JONES undertook to report upon rubbish disposal. Colonel PENNYCUICK'S recommendation occurs as a rider to Mr. JONES'S suggestion to utilise tramways for removal. At the time the Committee sat we ascertained that information received from Calcutta showed HARRINGTON'S incinerators to be still upon trial, and the Calcutta Health Officer therefore declined to give any definite opinion. Dr. COOK, in supporting his recommendation, lays special stress upon the opinion of Sir SPENCER WELLS as to prevalence of tetanus, he having pointed to the probability of air reaching Calcutta tainted from the Salt Lake tracts, where the rubbish of that city is transported. It must, however, be remembered that the conditions are not strictly analogous. Calcutta has used much of the rubbish for the filling up of marshy ground and tanks in the neighbourhood of the Salt Lake To deposit rubbish in a wet soil, and, as Mr. JONES contemplated in the case of Madras, namely, in correctly earth-covered sections on efficiently drained ground, are very different matters. With filth in the presence of moisture, such as provided in the case of Calcutta, decomposition of a most offensive variety supervenes; but this is not so where this proceeds in ordinarily well drained soil. Incineration is decidedly the sanitarily safe method of disposal; but at the same time, if under Mr. JONES'S arrangement the rubbish be removed with regularity, and be correctly disposed of as suggested by him, there is little to choose between the two methods. It becomes almost strictly a question of rupees. Dr. NIELD COOK, in support-

ing his arguments, throws doubt upon Mr. JONES's estimate; but, in doing so, he does not state where the doubt should rest, and we cannot, therefore, regard his objection on the financial aspect of the matter as authoritative. Mr. JONES will, doubtless, be shortly in Madras, and it would be well before the Municipality comes to any decision to obtain from its quondam servant any further information it may require on the financial aspect of the question Should incinerators prove either about as cheap or not cost decidedly more, their employment would be justified; but they must be provided in sufficient number to secure without doubt that every load of rubbish can be received into the incinerator as fast as it is collected.

Should incinerators be selected, we trust the Municipality will take advantage of a constant source of heat to render it available for disinfecting chambers, in the absence of which Madras is in a worse position to combat epidemics than most petty boroughs in Great Britain. It is a curious corollary to this matter to have to point out that the useful information which is now available to the Municipality of Madras concerning lately formed destructors is due to Dr SIMPSON'S Report to the Calcutta Municipality, which, again, would not have been drawn up had not that Corporation the sound discretion to allow him to go to Europe during the International Sanitary Congress. On his arrival in Europe, Dr. SIMPSON took care, in the interests of Calcutta, to see for himself as to this and other sanitary matters of importance, which have already been of benefit to the Calcutta Municipality, which has since not grudged giving him six months leave. We bear in mind that although the Mysore, Bengal, and Nizam's Government sent delegates to the Congress, both the Madras Government and Madras Municipality remained unrepresented, on the grounds solely of economy. It may be questioned if this policy is really economical. So long as it is intended that sanitation shall be represented by endless Reports, which can duly be pigeonholed it may be correct; but the moment sanitation is to become practically applied, it is the business of Government and of important Municipalities to give facilities to their advisers to see with their own eyes how far rival methods of practical sanitation are applicable. To attend as its delegate the International Sanitary Congress, the Calcutta Municipality allowed Dr.

SIMPSON Rs. 6,000. Had Dr. SIMPSON gone into this question of rubbish disposal alone, and as a result of his visit to Europe been in a position to give the positive statements he has done since, it is indubitable that the cost of his delegation would soon have been recouped a thousandfold.

III.

The heavy mortality in Madras necessarily receives attention at the hands of both the Sanitary Commissioner and the Health Officer. As to the gravity of this part of the subject we think all are agreed, and this being so, there can be no difference of opinion that filth of soil, filth of air, filth of buildings sufficiently abound to account for the death-rate of both infants and adults. The corresponding heavy birth-rate of infants must be regarded (under other than very severe conditions) as the necessary sequel —the natural sign —in a population of heavy infant mortality and demands no special investigation; although the Army Sanitary Commissioners advise that the step be taken of ascertaining the proportion of children in the cities of Calcutta and Madras. When, however, Dr. NIELD COOK applies himself to suggesting the cause and a remedy for the prevalence of fever and bowel complaints in Black Town, we cannot help thinking that he shoots considerably at random. As we have endeavoured to show, it is not safe for him to assume on Calcutta experience as to the disposal of rubbish by deposit in soil; so also it does not follow that because the sewers of Calcutta have been proved to leak, as a result of bad structure, that those of Black Town "where a system [?] of sewers has been introduced," are causative of the mortality which all deplore. We know that Sewer No. 1 did, and perhaps does, leak; and it may be that the only other modern sewer, No. 2, does the same. In the case of Sewer No. 1 no other result could have been expected by the Engineering Department *in laying it down* in such soil, which required that special methods should have been adopted. Dr. NIELD COOK evidently refers to the new sewer of Black Town. Had he considered in this connection the old Main Drain—a structure of the worst possible type, but without which the Black Town drainage scheme, which should have been complete in itself, is incapable of its task—he would have had more grounds for his assertions; and to this he might well have

added the influence of similar ancient structures which poison the subsoil in Triplicane, and being in uninterrupted communication with the houses, serve the inhabitants with a large ration of sewer gas. If any further evidence were required to prove existence of subsoil contamination, he need not have omitted reference to underground drains, which are at times met during excavation in Black Town, but whose true route is unknown to Municipality. Nor can he be ignorant of the fact that, in spite of warnings to the contrary, many of the tanks of Madras which exposed the subsoil water were in recent days filled by the Municipality with town sweepings—and occasionally something worse. Nor is it only under Municipal rule that the subsoil has been carelessly contaminated. Captain TULLOCH, in his trial borings in certain parts of Madras, proved that there existed great deposits of filth in the subsoil; and the condition of the surroundings of some houses show that the soil has been raised in level by long accumulation of filth.

Is all the rubbish of Madras removed to this day; is all the nightsoil removed? Undoubtedly not. We do not require to look to leaking sewers *below* the soil to find sewage doing its work. Do the Black Town drains, for which so many lakhs have been paid, fulfil their functions? Most certainly they do not. That it is within the bounds of possibility to work an open drainage system, as these are designed, we confess; but it must be most difficult in practice at all times; and, as practised in Madras, it is impossible. Such drains should remove household refuse water only. Is this, however, their sole function? All latrines in Black Town are arranged so that their washings shall proceed direct to the drains, and it must be well known to the Sanitary Staff that washings alone do not reach these. On very good grounds the drains are designed to deal with only a portion of rainfall, a matter as to which, with false ideas of what is necessary, most of the inhabitants grumble. Overflow of a drain in the streets is, therefore, a not infrequent matter. If this be so, considering the nature of the contents of the drains, of what sanitary advantage are they to the inhabitants? They must necessarily serve, under these conditions, as very good media for the distribution of choleraic and typhoidal matter upon the street surfaces. But the Municipality does not wait for the overflow of the drains to contaminate the soil. Being

open, they are subjected to constant stoppages of the current, in spite of extensive expenditure of water in flushing. The deposited material must be removed, and this is accomplished by raking out the drain and placing the contents on the side of the roads! Indeed, on some roads in Madras may be found little hillocks, which mark the daily accumulations to the surface of this concentrated form of vile matter. The object of a system of sewerage is to prevent contamination of soil. Instead of accomplishing this, the open drains of Black Town represent an unnecessarily complicated and expensive method by which the circulation of sewage is performed on communistic principles. Did these drains not exist, each house would, within certain bounds, have the monopoly of its own dangers; but, at present, the health of the few inhabitants of Black Town who are most conscientiously observant of sanitary requirements, is imperilled by having the soil opposite their doors defiled by transfer of the insanitary products of their negligent neighbours of two streets off. Surely, under these circumstances, we need not go to Calcutta for an analogy, and offer unproved suggestions as to the leaking of sewers.

IV.

The International Commission which lately sat on the question of the sewerage of Cairo has been reading the Egyptian authorities a lesson as to the rate of mortality they may be expected to acquire if they further neglect sanitation, and has judiciously thrust the matter home to the Egyptian imagination by quoting Madras as an example. It may be some consolation to those persons who have resigned themselves to taking their very bad chances of life in this city with the population generally, to know that Cairo is almost as filth-laden as Madras, and has, consequently, a mortality almost as bad. It is well that Madras should not be absolutely singular in its fame. The fact that a notoriously insanitary town inhabited by a notoriously insanitary people, who have hitherto known nothing of Municipal rule, has in its long years of neglect managed to attain a rate of mortality that cannot equal that of Madras blessed with a Municipality, water and drainage works of a sort, should serve to impress the outside world with the grandeur of the apathy with which our Townsmen have died,—a willing sacrifice, if they

but proved in death a warning to the Egyptian. Many a kingdom has been won at a less sacrifice of human life than Madras incurs each decade from preventible diseases, so that its name may serve as a scarecrow to the insanitary. The International Commission states that "in 1882, the year of the last census, there were 17,283 deaths in Cairo, giving a mortality of 46 1 upon the population of 400,000. This is an excessively high figure, when compared with that of foreign towns. On the list of 33 towns in Europe, America and India cited in the Report of 1889, there is but a single town where the mortality exceeds 40 per 1,000, that is Madras, where there die annually an average of 48 persons per 1,000. There are but three towns where the mortality is greater man 30 per 1,000 In London it is but 17·4 ; in Paris 23·5 ; in Berlin 23·7 ; at Marseilles, where the population is about equal with that of Cairo, it is 29·7 per 1,000 In England, they spent, from 1879 to 1887, more than 600 millions of francs for special works of sanitation, of which 103½ millions were for London only , at Berlin, more than 80 millions, and at Marseilles, they actually expended 34 millions. The town of Cairo, the capital of Egypt, might be rendered healthy by an expenditure that need not exceed one-third part of this sum In the towns of Europe where sanitary works have been *conceived and executed upon a rational system*, in course of time, the rate of mortality has decreased to one quarter of the original amount; towns of which the mortality ranged above 28 and 29 per 1,000, have seen the rate decreased proportionally with the advancement of their sanitary works, and finally descend to 20 per 1,000 by the time the works were completed. The results obtained in London, Berlin and Brussels are particularly remarkable. From 1861 to 1870 the mortality in London was 28 7, but that in 1889 was not more than 17·4 per 1,000. At Berlin in 1871, the rate was 39 per 1,000; in 1889, it had decreased to 28·7."

We think it worth while drawing attention to the portion of the sentence in the report which we have italicised. There has been much wonder amongst the inhabitants of Madras that, considering the heavy expenditure they have undergone, there has been no demonstrable sanitary result from the introduction of drainage works in Black Town. Seeing that these works receive matter for which they are not destined, and are capable of overflow

in the streets during rainfall, that an old pervious brick drain is used for the passage of a certain amount of sewage, and that another part flows into the Cooum in spite of the existence of a special sewer and pumping machinery meant to carry it in exactly the opposite direction, it is not to be wondered that sanitary results are looked for in vain, and then we blame—the Cooum! It is possible that many of the inhabitants of Madras would willingly vote a large sum of money for a scheme rendering the Cooum less offensive. With them the striking odours emitted are indissolubly connected with the insanitary state of Madras and the consequent appalling death rate. If the Cooum did not smell so loudly Madras might, it is believed, rejoice in health. From this point of view the Cooum fills a distinctly happy function; it draws the attention of the wealthier and more powerful part of the community to the mortality which in reality chiefly affects certain classes in special localities, and which from living in the less crowded parts of Madras, they might consider with less concern. But beyond this, it is questionable whether this huge cesspool is a factor of any great importance as affecting the high death rate of Madras. That it has an abominable odour, and that tax-payers in its neighbourhood who have to pass its vicinity urgently require relief from this nuisance, no one has more constantly represented than ourselves. But we certainly deprecate the prevalent opinion that in removing the Cooum evil lies the salvation of Madras, and we trust that Mr. COUSENS'S delay is not the result of working out on an experimental basis, as we suspect, problems connected with Cooum circulation *et genus hoc*. What is required is that neither in the neighbourhood of dwellings nor in the Cooum shall there be allowed to rest sewage, which can only be secured by a complete and efficient drainage scheme that shall serve not portions, but the whole of the thickly populated parts of Madras. In this connection we may note that of thirty drainage schemes offered to them, the Cairo Commission did not elect one which gave effect to the supposed virtues in hot climates of exposure of the sewage to view, and the action of air and light throughout its course—according to the so-called sanitary principles involved in the open drain system as adopted in Madras—but decided that the system of "everything to the sewer," "*système du tout à l'égout*," was at once the "most rational and economical."