emptying of some stomachs by their natural outlet—it is so impossible that it is simply fatuous to try to bring it about. Accuracy of diagnosis is not unattainable, and on such accuracy or inaccuracy the physician's prestige naturally depends. If he attempts to cure what correct diagnosis would tell him he cannot cure, and the patient is driven by force of his misery into the hands of the willing operator, only one result can follow—namely, discredit to himself and the art he professes.

REFERENCE.

¹ W. Russell: Gastric Hyperacidity—Hyperchlorhydria: Its Nature, Diagnosis, and Treatment. *BRITISH MEDICAL JOURNAL*, April 18th, 1903. ² Bolton, *Practitioner*, September, 1910, p. 297; *Journ. of Path. and Bact.*, April, 1910, p. 418.

THE SCIENCE COMMITTEE OF THE British Medical Association.

REPORT CXXIII.

THE DISTRIBUTION OF APPENDICITIS, WITH SOME OBSERVATIONS ON ITS RELATION TO DIET.

By OWEN T. WILLIAMS, M.D.LOND., B.Sc., M.R.C.P.,
HONORARY ASSISTANT PHYSICIAN, LIVERPOOL ROYAL INFIRMARY,
LECTURER IN PHARMACOLOGY AND DEMONSTRATOR OF
BIOCHEMISTRY, UNIVERSITY OF LIVERPOOL.

DURING the past few decades, while attention has been so forcibly focussed on appendicitis, much has been written and many theories advanced as to its etiology. While there can be no doubt that infection is the final cause of the clinical condition met with, the underlying factors predisposing to this infection are as yet undetermined. The influence of age and sex are well known, but opinion is divided as to the influence of nationality or diet. Accuracy of diagnosis has until recently considerably influenced the statistics which have been available, and, further, only within the past few years has the disease been mentioned in national statistics. Even yet in some countries such information is not obtainable. These conditions explain the diversity of opinion which is held as to its frequency.

Sporadic references are to be found in the textbooks, the American authors stating that it is comparatively rare in the negro.

Murphy¹ states "Lucas-Championnière (1904), in an analysis of 22,000 patients among Roumanian peasants, found but 'one case of appendicitis'; they live mostly on vegetables. The Roumanians living in the city, chiefly on animal diet, are frequently affected—1 case of appendicitis among every 221 patients. The vegetarian diet of the Japanese and of the Indians of India seems to protect them against appendicitis."

That these are not the only striking evidences of the influence of diet is shown in the evidence from other countries mentioned below.

Hare² of Philadelphia states that "appendicitis is more frequent in the well-to-do than in the poorer classes." A comparison of the Poor Law hospitals with others in this country shows the same difference in incidence.

In observations previously recorded³ I have shown that intestinal sand and appendix concretions are allied in chemical constitution, and also that abnormal bodies sometimes found in the intestine and producing symptoms of disease are formed of compounds of saturated fatty acids.

These observations led to the conclusions that there are conditions in the intestines in which certain soaps or other insoluble compounds of fatty acids are not absorbed, or are excreted by the intestinal mucous membrane, and that with the presence of these conditions certain diseases of the alimentary tract are related. The fats and soaps found in these conditions were compounds of saturated fatty acids. The richness of these bodies in calcium and fatty acids, which are constituents of the excretion of intestinal mucous membrane, point to their originating in the intestine as a result of some excess in excretion or defect in absorption.

These calcium soaps, when formed in the intestine in excess, produce intestinal sand, and associated with this there are symptoms of colic with, under some circumstances, an associated form of mucous colitis, or, as the French authors call it, muco membranous entero-colitis.

On examination of the concretions, the frequency of which in appendicitis is undoubted, I have found that they consist of the same calcium soaps of saturated fatty acids as occur in intestinal sand. They are unquestionably formed in the appendix.⁴ Kelly states⁵:

The histological examination shows that the most important factor in the formation of the calculus is the mucus secreted by the glands of the mucous membrane. The mucus which is deposited in layers round the central nucleus becomes desiccated, and the lime salts are deposited secondarily. Frequently fragments of epithelium, a few leucocytes, and altered blood are found in the different layers. Ribbert noted that in favourable specimens stained with Weigert's fibrin stain, the outer layers of mucus may be seen to be directly continuous with the glands of Lieberkuhn. In one case, besides the two large enteroliths in the canal of the appendix, I found three smaller bodies embedded in the mucous membrane, which had evidently developed within gland lumina.

By suitable methods of staining I have shown that the above-mentioned soaps are found in this so-called mucus in the appendix, and further that they are actually deposited in large quantity in the submucosa of the appendix, thus cutting off the blood supply to the mucous membrane, and so rendering the invasion by organisms an easy matter.

The cause of these pathological changes is possibly an excess of saturated fats in the foodstuffs, giving rise to the formation of calcium soaps of more saturated fatty acid in the mucosa and submucosa than is normally the case. These soaps are not so easily absorbed or excreted as the soaps of the unsaturated fatty acids, and therefore act as foreign bodies in the wall, and at times in the appendix as a concretion.

The nature of the fat in the food determines to some extent the nature of the fats in the tissues. The absorbability of the various forms of fats is very different; for example, olive oil (containing unsaturated fatty acids) is absorbed to the extent of 98 per cent., while of stearin (saturated fatty acid) only from 9 to 14 per cent. is absorbed. Mixtures of the saturated and unsaturated compounds are absorbed in varying degree, depending upon the amount of unsaturated fatty acid present.⁶

In reference to the above investigations, I have endeavoured to find if the nature of the food fats has any relation to these pathological processes, whether an excess of saturated fat (as in animal fats, particularly beef and mutton) in the diet is associated with an increased incidence as compared with unsaturated fat (as in olive oil, butter, fish oil, etc.).

The difficulty of an inquiry such as this is obvious, and few deductions can be drawn from the statistics obtained. One point seems to be established, and that is, that diet plays a definite part in the production of the disease, and further, that animal food seems to be associated with an increased number of cases.

The following statistics and statements are quoted from a large mass of correspondence, and are of interest apart from any deductions which may be drawn from them. For comparison it may be stated that the death-rate in England from appendicitis is about 90 per million persons living. The names of the gentlemen to whom I am indebted for the information and statistics given below are mentioned in each case.

ABYSSINIA.

Dr. Frank Wakeman, Medical Officer to the British Legation, writes:

During a residence of eight years or so in this country and a practice among all classes of the population, I have never come across a single case of appendicitis, nor have my colleagues, with whom I have at one time and another discussed the subject, ever met with what could be described as authentic cases of the above malady. It is generally believed that this complaint, as well as enteric fever, does not exist in this country. Sporadic cases of gastric fever (so-called) are occasionally seen, but in no instance have the characteristic signs and symptoms peculiar to appendicitis ever been observed, and the disease usually runs a short course seldom attended with fatal results.

The staple article of diet in this country is a small-grain cereal, known as "teff" (*Poa abyssinica*). It consists mainly of carbohydrate material with a small percentage of proteid substance, but scarcely any fatty matter. Owing to this reason the Abyssinians are obliged to partake of large quantities of animal food at certain periods, beef being eaten in the raw state, while such dishes as are prepared by cooking from meat (mutton, chicken, and game) and leguminous vegetables, are richly charged with red pepper (chillies, dried and ground), together with various pungent and aromatic spices, and a considerable amount of melted butter,* the latter being the principal fatty constituent of their diet.

It is, perhaps, worthy of note that, owing to the universal prevalence of tapeworm (*Taenia mediocanellata*) among the people, the practice of drinking large doses of a cold infusion of "kouso" as an anthelmintic and purgative, is indulged in regularly every two months or so. As a result of the above, the intestinal tract received such a scouring as to produce a condition of acute gastro-intestinal catarrh, frequently attended with collapse. It may, therefore, be reasonable to assume that any faecal concretions which might accumulate as a result of tendency to obstinate constipation, caused in part by the diet, are thus swept away.

BELGIUM.

Dr. G. P. Nicholeb writes:

I have made inquiries in several directions, but regret to say I cannot get any data as to the frequency of appendicitis. There are no statistics here which could show how much appendicitis is frequent in the population.

I wrote to several physicians and surgeons who see a good many of the cases, but I have not been able to get the information.

As regards the second point—diet—I wrote to Dr. Stasse, of the Institute of Sociology and Physiology. He is making researches on the diet in the working classes, and will publish them shortly. He tells me that it is difficult to ascertain the exact quantities of the various articles of diet taken by the population, but he tells me that the quantity of fat taken is very great, chiefly in the form of butter, lard, and some margarine. Fat pork and bacon are eaten in comparatively great quantity.

My own impression is that appendicitis is not a frequent disease in Belgium. I have seen only three or four cases since I began practice here fifteen years ago. There are not many cases of appendicitis in the hospitals. The Belgians, as a rule, are fond of fat, and the working men eat a great deal of butter with bread. The very poor spread lard over their slices of bread.

CHINA.

Dr. Douglas Gray, Physician to H.B.M. Legation, Peking, writes:

1. Appendicitis is an extremely rare disease in China. Some time ago inquiries were made, through the *China Medical Journal*, among all the medical practitioners throughout the empire, with the following results:

- 44 said "Yes"—the disease is very rarely seen.
- 69 had seen a few cases, but the disease is uncommon among the Chinese.
- 49 had not seen any cases at all.

162

2. In China the only sick reports available are those published by medical missionaries, most of which are of a lay nature and do not give detailed tables of the disease treated. In eight reports I can find no mention of typhilitic trouble; these are the only reports so far for the past year.

3. The best kept statistics of disease and mortality are those in Hong Kong. During the year ending December, 1906, out of a total of 8,379 deaths, 3 were due to appendicitis, and those, curiously enough, all occurred in one out of seventeen health districts. In the public mortuary, out of 2,140 *post-mortem* examinations made, appendicitis is not once mentioned as a cause of death, nor does it occur in the list of 215 surgical operations performed in the Government Civil Hospital.

4. Foreigners resident in China have no immunity from it, notwithstanding the apparent freedom of the native population. The only hospital dealing exclusively with

foreigners on a large scale is the Shanghai General Hospital, where out of a total of 1,203 admissions, 21 were for appendicitis, and of these 4 died.

5. Diseases of the alimentary system are more common among the Chinese than those of all the other systems. Dyspepsia, intestinal parasites, constipation, diarrhoea, dysentery, gastric ulcer, peritonitis (mostly tuberculous), hepatic abscess, in the order named, are the ailments most frequently met with.

6. The system of diet, bolting of food, system of solid and liquid manure used in the cultivation of vegetables, and causing a prevalence of intestinal parasites, the quantities of over-ripe or bad fruit eaten, are the main causes of the frequency of digestive troubles.

7. The usual diet of the Chinese is as follows:—Rice, one to three bowlfuls of which are eaten at each meal; relish—such as salted turnip, bean curd, salted fish, cabbages; occasionally a little pork or mutton. The poor and agricultural people rarely have any meat at all. Sugar is not much used—only on occasions such as feasts, or on the tables of the rich. On summing up this dietary, it will be seen that while starch is in excess, there is a deficiency of nitrogenous elements, fats and proteids.

8. It will thus be seen that there are two outstanding points of difference between the Chinese and European dietaries, namely, the lessened quantities of sugar and meat in the former scale.

(a) *Sugar*.—The native article is very different from the refined sugar in use at home. The former is simply the crystallized juice of the sugar cane got by passing it between stone rollers, while the modern refined sugar is the result of a highly specialized process in which milk of lime and sulphurous acid are used for clarifying. Concurrent with the improved manufacture and increased output, there has in recent years been an enormous increase in the consumption of sugar in Europe, while in China it appears to have been the same for ages past.

(b) *Meat*.—This is eaten fresh, and there is an entire absence of tinned and frozen meats, which, by their cheapness and adequate supply, have increased the consumption of meat per head during the past decade or two in Europe, especially in England.

9. No one here has been able to offer as yet any feasible explanation of the freedom from appendicitis, though most doctors think there must be a predisposing cause in the European diet. I am inclined to attribute it to an anatomical cause, namely, a racial tendency to a longer mesentery than is the case with the Anglo-Saxons, among whom, owing to the prevailing congenital shortness of the mesentery, the appendix is often to be found twisted and kinked on itself. The ban on human dissection by the Chinese Government, and the objection that relatives have to *post-mortem* examinations, make it impossible at present to prove this inference. During six years of medical work in a hospital for Chinese, in the course of which I have performed over thirty abdominal operations, I have not yet had occasion to do so for appendicitis.

10. I append some expressions of opinion by leading medical missionaries in China:

(a) Dr. W. F. Plummer, of Wenchow:

"... Insufficient mastication.—That insufficient mastication is a cause of indigestion there can be no doubt, and the Chinese, who are very guilty of this bad habit, are often victims of dyspepsia. The practice of helping themselves from common dishes in the centre of the table leads to rapid eating, as the tortoise would find all the titbits gone if he did not keep pace with the hares, for on these occasions the hares do not go to sleep. Yet, although so given to bolting their food, the Chinese apparently do not suffer from appendicitis to the extent that we do, so that this cause by itself seems insufficient.

(b) Dr. John MacGowan, of Amoy:

"Foreign physicians who have opened hospitals and treated large numbers of those who have consulted them, have come to the conclusion that the large majority of the population are below par, and are suffering from indigestion. Salted turnips, which is a popular condiment persistently eaten through all the months of the year, is very responsible for this latter ailment. But it is cheap, and so the evil has to be endured. It would be an interesting question to discuss what effect this general and widespread indigestion has upon the character of the people and upon the course of their history." Dr. MacGowan

* Butter contains a good deal of unsaturated fatty acid compounds.

speaks of the Southern Chinese, but his experience is borne out by Dr. D. Christie, of Mukden, in Manchuria, who, after 25 years' experience among the Chinese of the North, writing independently, says: "If dyspepsia, indigestible food, and bolting without masticating have any share in the causation of appendicitis, we should have plenty of it here."

(c) Dr. P. B. Cousland, of the London Mission:

"For twenty years I had charge of hospitals and dispensaries in the Swatow district, the beds in the former ranging from 60 to 180. I never operated on a case of appendicitis, nor saw any of my colleagues do so."

DENMARK.

The death-rate is about 12 per million.

It may be said, however, that the staple diet will be about the same as that of Great Britain, only that less meat and vegetables are eaten, whereas more potatoes, rice, and other starch-containing articles are consumed.

EGYPT.

H. B. Day, M.D., B.S., writes:

From the experience at Kasr-el-Ainy Hospital, Cairo, it appears that appendicitis is very much less common in Egypt than in England. The statistics of the last two years show 8 cases out of a total of 6,691 in-patients treated here in 1906. In 1907 there were only 6 cases among 6,980 in-patients.

The staple diet of the lower classes consists of bread and uncooked vegetables; meat is only eaten in small quantities. Cooked beans in oil form a common dish. The commonest articles of food which contain fat are, besides meat, cheese and goat's milk, which is drunk sour.

GREECE.

Dr. C. Savas, Physician to the Royal Household and Professor in the University of Athens, writes:

In order to establish the comparative incidence of appendicitis in Greece I have addressed myself to the leading surgeons of Athens. They very willingly have procured me the statistics, and they are of the opinion that this disease is very frequent in our country as elsewhere.

Concerning the diet, there is to state a difference between the poor classes and the upper class people. The former class nourish themselves especially with legumen in winter and with vegetables in summer, both prepared with olive oil. The upper classes, however, make use of meat and cook with butter. In the vicinity of the sea a great deal of fish is consumed. I add that pork is little, and bread and butter almost never, used. In conclusion, I think that the amount of fat in the diet of the Greeks is comparatively very limited according to our hot climate.

Out of 28,067 cases admitted to hospitals there were only 393 cases of appendicitis—a limited number compared with English hospitals.

ICELAND.

The Chief Physician of Iceland, Dr. G. Björnsson, writes:

The disease is, in my own and other medical officers' opinion, of the same comparative occurrence here as in other countries. The symptoms and course of the disease are the same here as elsewhere.

As to the staple article of diet, I beg to state that mutton, beef, milk, fish, and breadstuffs are the principal articles of food of the inhabitants.

Black bread is the most common breadstuff. Fats (butter and suet) are, in my opinion, consumed in a higher degree up here than among common people in most other countries. A good deal of potatoes is also consumed, but very little of other vegetables. Vegetables are not grown to any considerable extent, and the same is the case with fruit. Coffee is used to a high degree, but not much tea. Intoxicating drinks are less used than in any other country of Europe.

INDIA.

I have no statistics personally, but quote from the *Lancet*, April 18th, 1908, p. 1162: "It seems to be clear that appendicitis is rare in India." Mr. James Harris, the writer of the article, suggests the simple diet of the people as the cause of their comparative immunity. He further suggests the frequent habit of purgation and the mode of

defaecation as factors. Lewkowitsch states that linseed and rape oils are largely taken in India.

ITALY.

Dr. G. Sandison Brock writes:

Professor Bastianelli says that the disease is very prevalent in Rome, and that part of Italy is and always has been liable to the disease, but knows of no statistics which would give a precise idea of the actual number of cases.

An Italian doctor visiting the Royal Infirmary, Liverpool, stated that the disease was comparatively rare in Italy. The statistics of operation which Professor Bastianelli sends through Dr. Brock show that an average of 156 cases are operated on in Rome annually from a population of 500,000. This would give the incidence as far less than that of Liverpool and district.

As to the staple article of diet in Central Italy, I should say it was maize in the form of polenta. In the country, where appendicitis is quite common, a good deal of oil is used with the food. Meat is very little eaten even by people fairly well off, and, except in the form of oil, very little fat.

NETHERLANDS.

Dr. C. Eykman writes:

Respecting the incidence of appendicitis in the Netherlands . . . so far as is known, statistical data of the above-mentioned nature are only to be found in the *Statistiek van de Sterfte naar den leeftijd en naar de oorsaken van den Dood* (Statistics of deaths according to age and causes of death), published by the Central Bureau for Statistics. These statistics naturally give no statement of the number of cases of the disease, but only of the number of those which ended fatally. In the *Bydragen tot de Statistiek van Nederland* (Contributions to the statistics of the Netherlands), published annually under that title, statements relative to appendicitis have only been given since 1903, under No. 118 of the "extended list" of causes of death. Prior to that year the classification took place in accordance with the "short list," in which appendicitis was not mentioned separately but was included in heading No. 34, "other diseases," comprising no less than ninety causes of death. Meanwhile, in a recently published "contribution" of the said bureau (*Nieuwe volgreks* (new series), xcvi, 1908), figures, going slightly further back, are given in a table of deaths classified in accordance with the "extended list" for the years 1901 to 1904 inclusive.

As regards deaths from appendicitis (including phlegmon of the fossa iliaca), these are shown to have amounted to:

1. For the kingdom 8.88
2. For communes of more than 20,000 inhabitants 10.64
3. For communes of less than 20,000 inhabitants . . . 8.00

per 100,000 persons in the years 1901 to 1904 inclusive, thus in a period of four years.

The proportionately greater number of deaths in the larger communes is not attributable to the fact that patients from elsewhere are taken up in the hospitals; for since 1901, deaths—no matter where the death has taken place, are regarded for statistical purposes to have occurred in the actual place of residence of the deceased. However, the smaller number of deaths from appendicitis in communes of less than 20,000 inhabitants may have its origin in the circumstances that this disease has not been recognized, and has therefore been included in other headings.

It appears that in the kingdom there died of both sexes from appendicitis:

Years.	Men.	Women.
20-29	12.09	7.94
30-39	8.11	5.51
40-49	12.31	6.48
50-64	11.18	11.69
65-79	17.82	15.82
80 and older	62.55	40.39

According to the statistics, 11.3 men and 8.8 women died from appendicitis per 100,000 of the average population of both sexes in the quadrennial period 1903 to 1906 inclusive.

The question as to the principal article of diet in this country and the nature and amount of fats in the food, cannot be answered in a general way, as these vary greatly according to local circumstances, the season of the year, occupation, social position, personal taste, etc. However, it can be said that besides bread, potatoes, and a comparatively large variety of vegetables are taken very generally and that, as everywhere else, the diet of the well-to-do classes differs from that of the poorer classes in that the former consume a greater amount of meat, and, in that connexion, of albumen and fat. Accurate data on this subject are, however, not available, and still less respecting a possible connexion between diet and the incidence of appendicitis. Two clinical professors of this city, in reply to a question on this point, have stated that they have not noticed anything whatsoever of such a connexion.

NORWAY.

Professor Stron and Dr. Malthé, of Kristiania, write:

The disease is very frequent in this country. It seems to be the more so in the greater towns than in the rural districts. With more prosperous circumstances and a more liberal diet the frequency seems to increase. In many cases there has been a preceding catarrh of the intestine or liability to obstruction. Periods in which the acute appendicitis occurs more frequently than usual are not seldom met with.

PERSIA.

Dr. A. R. Neligan has very kindly sent me numerous statistics with a letter which I quote in full:

The facts collected may be summarized as follows:

1. Appendicitis is very uncommon among Persians.
2. It is proportionately much more common among Europeans resident in the country than among natives.
3. It is more common in Teheran, where the conditions more nearly approach those of the West than elsewhere.
4. Diseases of the digestive tract are common, and include: *Pyorrhoea alveolaris* (universal); *dyspepsia*, generally of a "sthenic" type; dilatation of the stomach;

intestinal worms are very common, especially *lumbri-coides*; enteric fever is common, but not of so severe a type as in Europe; dysentery; cholera, epidemics about every ten years; constipation is continually complained of, but is not really common, at any rate in an aggravated form; the Persian loves taking medicine, and a purge above all things.

5. The Persian is a gross eater, but his diet is simple and soft.

6. Fat is largely eaten by all classes.

The food eaten in Teheran is much the same as in the provinces, but is not of such good quality. The richer natives (Persians and Armenians) also go in for European dishes, tinned foods, etc. The Persian eats a large quantity at a sitting and bolts it; he has practically only two meals in the day, one at midday, the other just before bed.

Whole-meal bread is the staple article of diet; meat and rice are eaten largely by the richer classes only; large quantities of fruit are eaten in season, especially melons, grapes, pomegranates, and dates.

The most popular vegetables are lettuce, cucumber, and beetroot; cheese made from goats' milk is much eaten. In the spring Persians of all classes drink large quantities of curdled milk and of buttermilk.

Everything cooked is drowned in fat "roghan"; it is a form of "ghee," or clarified butter, made from sheep's and goat's milk; it varies in quality, but that generally used is very offensive in smell, taste, and appearance.

The meat eaten is almost entirely mutton of very poor quality. For those who cannot get meat, a broth made of simmering lumps of meat and fat in water for many hours is used. Animal fat is also eaten in large quantities by the richer classes in the form of "kabobs," which consists of alternate cubes of meat and fat grilled on a skewer over a brazier.

The Persian stomach delights in bitter and acid things, its owner cooks all sorts of bitter plums, fruits, and herbs with his food. Tea is a great drink; it is taken very weak.

Town or District.	Physician.	No. of Cases of Appendicitis.	No. of Years.	No. of Patients Seen in No. of Years.	Remarks.
Teheran	Dr. Wishart, American Mission...	13	11	1,600	All in-patients; 7 were Mohammedans, 3 were Armenians, 2 were Jews, 1 was a Christian convert.
	Dr. Scott, Indo-European Telegraph Department	10	5	—	3 Europeans (see Dr. Neligan's second letter).
	Dr. Neligan, H.B.M. Legation ...	4	2	3,000	Seen in the legation dispensary and elsewhere; 2 were Europeans, 1 was a Mohammedan, 1 was an Armenian.
	Dr. Schulz, Persian Hospital ...	4	3	10,000	In and out-patients. During the past three years, out of 400 operations, only 2 for appendicitis. All Mohammedans.
Isfahan	Dr. Carr, Hospital of C.M.S. ...	4	13	5,298	In-patients.
Hamadan	Dr. Fank, American Mission Hospital	1	6	—	An Armenian.
Shiraz	Dr. Scott, Indo-European Telegraph Department	2	5	20,000	Seen in dispensary and elsewhere; 1 was a European, 1 was a Persian.
	Dr. Woolatt, Indo-European Telegraph Department	4	2½	—	
Yezd	Dr. White, Hospital of C.M.S. ...	0	10	2,000	
Bushire and Keimanshah	Captain Williams, I.M.S., Consular Hospital and Dispensary	4	4	—	1 was a Persian, 3 were Europeans.
Seistan	Captain Dalzell Hunter, I.M.S., Consular Hospital and Dispensary	0	3½	—	
Meashed... ..	Captain Battys, I.M.S., Consular Hospital and Dispensary	2	3½	—	No cases in the native hospital. Both cases were in Europeans and followed attacks of subacute dysentery.
Tabriz	Dr. Vanneman, American Missionary Society	—	—	—	Has had long experience of Persia: practice largely consulting, so that most serious cases are seen: thinks he may possibly see 1 case a year, but is certain more cases have occurred during his residence among the 100 odd Europeans than among the 200,000 of Persians in Tabriz.
Kerman	Dr. Dodson, Hospital of C.M.S. ...	5	5	—	All Persians.
Keimanshah	Captain Crossle, I.M.S., Consular Dispensary	0	2	—	
Kazoin	Dr. Laurence, American Mission Dispensary	4	6	12,000	All Persians.

A great deal of "arak"—a native spirit—is also drunk, and in the cities inferior European wines (in preference to the very heady native ones) and brandies.

I think I have given the main facts about appendicitis in Persia and the other subjects about which you desire information.

I hope your investigations will add much to our knowledge of the etiology of the disease; certainly the diet idea seems the most important, to judge from these short notes and from Indian experience.

The interesting statistics contained in the table on p. 2019 were sent me by Dr. Neligan.

ROUMANIA.

The statement of Lucas-Championnière is quoted above.

SPAIN.

Dr. Bryden Glendinning writes:

The facts are, first, that it is in comparison decidedly rare. In my occasional visits to various hospitals during the last year I have not seen a single case of appendicitis.

Secondly, it is slightly more common among the aristocratic classes; personally I have not seen a single case, but Dr. Gutierrez, who decidedly has much the largest consulting practice in Madrid, tells me that he has personally seen four cases in the last year and has heard of another three as being seen by colleagues.

As to literature, there is nothing of recent publication except review or abridgement of the publications of Paris, principally of the diagnosis between colitis and appendicitis.

On the question of case incidence, I am unable to find anything, but in a country such as this, where statistics are so difficult to obtain and when obtained regarded with such decided scepticism, it is scarcely surprising that little is done in that way. With regard to the explanation of the rarity of incidence on the supposition that diet is an oily one, it is I think, scarcely tenable, as the poor man's diet is a thin decoction of poor meat, rice, bread and water, boiled up day after day, with occasional additions of that which fortune may send, and of garbago. The more well-to-do persons live on practically a French cuisine. My information is limited solely to Madrid.

SWEDEN.

Rennel Rodd, Esq., H.B.M.'s Minister, kindly sent me the following letter, statistics, etc.:

I have endeavoured to obtain for you such statistics as are available on the subject of appendicitis in Sweden. The latest figures published are those for 1905. With the exception of the cases dealt with in the military hospitals, the figures issued are for *operations* and not for cases. There do not appear to be any statistics available as to actual or suspected cases.

Sweden.

Total population in 1905—5,377,055.

Cases of appendicitis recorded in the military hospitals at Stockholm and Karlsberg in 1905:

	Cases.	Deaths.
Stockholm	23	None.
Karlsberg	9	None.

Of these, 7 (aged between 15 and 50) were treated by operation.

Operations for perityphlitis or appendicitis in civil hospitals, nursing homes, etc., throughout Sweden during 1905:

In hospital	2,072
In private nursing homes	143
At home... ..	48
Total	2,263

Deaths from appendicitis in the various cities and towns of Sweden during 1905:

Age.	Male.	Female.
1 to 5	2	4
5 to 10	2	4
10 to 15	3	3
15 to 20	7	2
20 to 40	24	6
40 to 60	7	11
Over 60	1	5
	46	35

The death-rate is about 16 per million.

With regard to the diet of the people, I have made a few notes for you from such sources as are open to me. The statistics are, however, not of very recent date.

For consumption of meat no recent figures are available; for the years 1885-8 it was reckoned at about 28 kilograms—and has no doubt since increased—per inhabitant.

The consumption of milk about the same time was reckoned at 183 litres per head. (Much more milk is now devoted to making butter, and skimmed milk is largely consumed.)

The consumption of butter was reckoned about the same time at some 5½ kilograms per inhabitant.

Rye is still more largely used than wheat, and in some districts rye and oats mixed. A favourite form is a sort of rye biscuit, something resembling oat cake, only harder in consistency.

The people consume very largely smoked, salted, and dried animal food as a relish with their butter and hard bread.

In the long winters potatoes are practically the only vegetable obtainable by a great proportion of the population.

The consumption of sugar has probably increased considerably since the table given above was issued, owing to the cheapening of sugar by the introduction of the beet industry.

CONCLUSION.

It would be unwise to draw any broad deductions from the above incomplete statistics, except that appendicitis has a markedly different incidence in various countries, and that this different incidence may be very largely a question of diet.

Many theses have been advanced to explain this relationship to diet. The above statistics, if they show anything, show that where there is a large meat-eating population there appendicitis is a common disease, whereas in those countries where little meat is eaten appendicitis is rare if not almost unknown.

There is no doubt, according to most people, that apart from improved diagnosis appendicitis has greatly increased in the British Isles in the last few decades. Very little evidence has so far been advanced to any explanation of this. The greatest change in the diet of the people has undoubtedly been the marked increase in meat eating. With the amount of foreign meat and canned food the poorer classes even are now able to supply themselves in fair quantity with meat of varying kinds, more particularly mutton.

The fat of meat, more particularly of mutton and beef, is characterized by the small amount of unsaturated fatty acid they contain.* That the fat in the food determines the nature of the fat in the tissues is well known. From the clinical and chemical work quoted above it would seem that this factor determines the nature of the soaps to be found in the wall of the intestinal tract (probably as a manifestation of their excretion), and where these soaps are the calcium soaps of saturated fatty acids there is usually some evidence of disease, either a mucous colitis or an intestinal lithiasis. In appendicitis, with which these two conditions are clinically associated,² there is the same occurrence of these calcium soaps in the wall or in the lumen.

In my opinion, therefore, there is some evidence to connect the nature of the fat in the food with the incidence of the disease.

Further observations are being made on the lines indicated at the beginning of this paper, and investigations are being carried out as to the nature of the fats in the food, the tissues, and, more particularly, in the intestinal tract. Experiments which have been recorded³ show that the fats in the tissues are not neutral fats but complex phosphatides, the fatty acid radicles of which are largely unsaturated, and evidence is being obtained which would tend to show that these unsaturated fatty acid radicles are those which are used for the immediate use of the body, and it is possible that the calcium soaps above-mentioned are evidences of some excreting process of the intestinal tract for the purpose of eliminating either the calcium or saturated fatty acid radicle.

My thanks are due to the gentlemen mentioned for the time and trouble they have taken in collecting and forwarding the above statistics and observations, to Sir James Barr for assisting in obtaining them, and to

* The iodine value of beef and mutton fats are about 40.

Professor Benjamin Moore for his constant advice during the conduction of the chemical investigations.

REFERENCES.

- ¹ *Keen's Surgery*, vol. iv, 1908, p. 737. ² *Textbook of Medicine*, 1907, p. 617. ³ *Abnormal Fat Assimilation*, etc., *BRITISH MEDICAL JOURNAL*, July 27th, 1907; *Bio-Chemical Journal*, vol. ii, p. 395, 1907. ⁴ *Abnormal Fat Assimilation*, loc. cit. ⁵ *Kelly, Vermiform Appendix and its Diseases*, p. 300. ⁶ *Schmidt and Strasburger, Die Faeces der Menschen*, p. 156. ⁷ *Chemical Technology of Oils and Fats*, vol. ii, 1904. ⁸ *Bio-Chemical Journal*, vol. iv, No. 10, p. 455.

A CONTRIBUTION TO THE CLINICAL STUDY OF CHRONIC MOVABLE KIDNEY.

BY

PHILIP HICKS, M.D. CANTAB.,

LEAMINGTON.

THE object of this paper is to plead for more general patient investigation into the effects of chronic movable kidneys upon general health—particularly as regards their influence upon neurasthenic and mental conditions.

It is therefore unnecessary for me to discuss in any way the more acute cases; such are usually obvious enough, and they have been already dealt with in a recent monograph by Wilson and Howell.

Etiology and anatomy are also beyond my scope here; and pathology need only be mentioned to introduce the question of toxæmic states resulting from the more chronic displacements.

Abdominal (and perhaps cardiac) symptoms are mostly due to various alterations in the relation of the parts, to dragging upon connexions, and to disturbances of the nerve plexuses concerned.

The case is not so simple with regard to toxic conditions.

Most chronic movable kidneys are probably the seat of some degree of hydronephrosis, not acute enough in its incidence or condition to cause pain. It is a fact that in acute cases, where hydronephrosis is believed to exist, it is difficult to estimate its extent by palpation through the abdominal walls, operation often revealing a much more extensive collection of fluid than had been suspected.

The inevitable "kinking" of the ureter must always, or almost always, produce retention of urine in the kidney pelvis; and the degree of pressure upon renal substance of this retained urine must depend directly upon the degree of ureteric obstruction.

The inevitable result of long-continued pressure, aided perhaps by some interference with nerve supply and with blood circulation, must be to impair the renal function, and it is probable that many sufferers from this condition live in a state of mild uræmia.

It is not certain whether any direct absorption of toxins from the retained urine can occur; such absorption probably depends upon tension.

Some such explanation is necessary if it be accepted that various general symptoms (neurasthenic, etc.) can be caused by movable kidneys; for it is plain that such conditions cannot be explained by the effect of long-continued pain, or by the wasting influence of dyspepsia alone, since they occur in many patients who present no abdominal symptoms whatever, yet in whom examination reveals definite displacement.

This is, after all, a question of pathology; and it leaves untouched the fact that certain morbid conditions are frequently found to be associated with movable kidneys.

This association, known to be common, is probably far more so than many practitioners suppose; and if it shall be proved that readjustment of the kidneys cures or materially benefits the patients, then the order of cause and effect must be accepted.

To-day the most divergent views on this question are held in the profession. We are all agreed that where the displacement is associated with the usual obvious symptoms—pain, dyspepsia, etc.—measures should be taken to support the kidney in its proper position. Here the sequence of cause and effect are plain, and no dispute can arise.

But it has been asserted that these kidneys are capable of causing many other symptoms, mostly of a nervous character—symptoms which are not necessarily accompanied by any abdominal disturbance whatever, and where

the actual discovery of the kidney condition may be an incident of a routine examination.

It has been further asserted that such cases are exceedingly common; that all chronic downward displacements of the kidneys, however free from local symptoms, are almost certain to be, sooner or later, the cause of consequences the most serious and most diverse, covering a very wide range of neurasthenic and mental disease.

Many physicians are honestly of opinion that these painless displacements are quite harmless; that they are "anatomical peculiarities," such as are known to exist commonly enough in many domestic animals; that no good will result from treatment; and that it is in the patient's best interests that nothing should be said about the discovery.

The most advanced views as to the effects produced upon health by movable kidney have probably been presented in this country by Suckling. It is hardly going too far to say that his conclusions, as exhibited in writings and practice, are nowhere accepted in their entirety; yet it is likely that, for certain reasons, neither fair examination nor due value have been accorded to his work.

I may at once admit that my own experience during the last few years has convinced me that there exists a large number of cases that support Suckling's contentions.

I have had no experience of asylum cases, nor has any definite case of melancholia with movable kidney come into my hands; but I have seen certain cases of marked neurasthenic and minor mental symptoms in which the discovery and support of movable kidneys have been followed by most remarkable improvement. I have been anxious to maintain an open mind and level judgement, and for a long time I distrusted my growing conviction in this matter. But I am now satisfied that there exists, at any rate, a case for careful and continued inquiry. Such inquiry should be upon the broadest lines, conducted with independent intelligence, and the final verdict must depend upon the results of treatment; whilst I am strongly of opinion that the proper and fittest tribunal can only consist of general practitioners throughout the country. Time and opportunity are both theirs, and it is by them rather than in hospital or consulting work that the range of symptoms can be studied in their origin and in their development; it is by them, who know the life-history and the environment of their patients, that the value of nervous symptoms can be best estimated; moreover, they have the better chance of discovering these cases in the earlier stages, when treatment is most likely to be successful.

Any inquiry as to the effect of movable kidneys upon the production of more serious mental disease—for example, melancholia—is, of course, the province of the alienist.

Now, the alienist has already admitted the probable toxic origin of certain morbid mental states, and it is surely worthy of careful determination whether the toxic results of movable kidneys may contribute towards filling our asylums.

The difficulties of any such investigation are apparent; but they make it none the less worth carrying out.

SYMPTOMATOLOGY.

The following symptoms of chronic movable kidney have occurred in my recent experience, and I shall not amplify my remarks with regard to such as are well known.

Pain.—This varies widely in character; it may consist of aching, dragging, or neuralgic sensations, and it may radiate over any part of the abdomen into the back and occasionally down the thighs; in my cases the common type of pain has been felt in the sacral region. It is generally aggravated by walking, by any active exertion, or by motoring, and usually soon ceases when the patient lies down.

Dyspepsia.—Generally atonic, characterized by uneasiness and flatulence, anorexia, foul tongue, and constipation.

Nausea and Vomiting are often prominent, especially after the patient has been up for some hours.

Urinary symptoms are uncommon, unless any unusual degree of hydronephrosis is present. Urine is occasionally