

may sometimes have gathered so darkly around our own. And having this sympathy, and holding in our recollection and present thought those phases of our own and of other lives—which we know full well, but which we cannot reduce to words,—we shall be the better fitted to explore and unravel the whole series of phenomena which present themselves in the lower ranges of pathological investigation. The method of such physical research, as well as its results, will check us when we may be disposed to drift away into the mist or to soar into the clouds—will help us to cultivate exactness in all directions of inquiry, and so contribute to the science and art of Medicine, which, in spite of all its failures, misdirections, and missing links, is yet one of the greatest boons that man has been the means of conferring upon man, and which, we believe, will in the future far transcend, in its benefits to mankind, all that we have known of its doings in the past.

THE ADDRESS IN SURGERY,

Delivered before the Annual Meeting of the British Medical Association, at Norwich, in August, 1874.

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MR. PRESIDENT AND GENTLEMEN,—When, by the favour and at the suggestion of my local friends, and with the approval of the Council of this Association, I was chosen to address you to-day, I accepted the honourable responsibility, and, in doing so, took counsel rather of my vanity than of my discretion. To some, whose mental activity is great, and whose pen moves glibly, the opportunity would be esteemed, as, indeed, it is, a golden one. To me, with unready thoughts and with unpractised pen, who delight rather in reflection and contemplation than in speech or written words, the honour was—I may as well confess it—more oppressive than pleasing.

Having, however, accepted the duty, I shall, perhaps, best explain—I may almost say apologise for—the scope and object of my address, if I recount the thoughts which passed through my mind while in quest of a subject.

A retrospect of Surgery compassing the time during which I have been in active work came first to mind, but this has been so often, so ably, and so recently done, that the intention was dismissed almost as soon as it presented itself. I turned next to the records of my own experience, feeling sure that these must contain materials enough, if properly set forth, to furnish an hour of interesting commentary; but though, on looking through my notes, I found instructive illustrations of disease and curious and important cases in abundance, they seemed to display no special features, either of pathology or of treatment, worthy to occupy such an audience.

The novelties of surgical practice introduced during the last year or two are scarcely sufficient or scarcely important enough to constitute a theme. They are chiefly comprised in Esmarch's bloodless system of operating and Dittel's elastic ligature, concerning which I will only say that the first is not a novelty, having been practised by one of our members many years ago, and that the second is, in my opinion, more curious than useful, and not worthy of a place either in the records or in the practice of surgery.

One great subject there is which, if not exactly a novelty, is of recent time, and is still waiting for a solution, both as to its facts and as to the theories held to account for its facts; I mean the germ-theory of putrefaction, and antiseptic surgery. This subject—for I associate them—I deem to be of surpassing importance and interest. Underlying, if not undermining, much of the existing fabric of surgical pathology and practice, it cannot be too often brought to the bar of professional criticism, for on its right solution, whether it be true or not, depend a multitude of points in

daily practice, and even probably the lives of many of our fellow-creatures. This subject would certainly have been my choice but for two considerations. More than one influential member of the medical press proposed, at the commencement of the year, to make and carry out a full investigation of the entire question—a proposal which, however, still remains for fulfilment; and I felt, moreover, that in our sectional meetings, papers by most competent men would probably be forthcoming, and would lead to searching discussion.

Turning, then, from these topics, my thoughts reverted towards home, and fixed themselves on that subject which for every Norfolk surgeon possesses an undying interest, and which, for all practitioners from some point of view, may be presumed to have considerable attraction. The city in which we are now gathered is the centre of a district in which cases of renal and vesical calculus are supposed to be, and probably are, more frequent than in any other part of the world. The explanation of this frequency is so often demanded of one, both in professional and non-professional society, and is so difficult to give, that I propose to discuss the subject from this point of view, and this alone, not touching, except incidentally, on the question of treatment, about which overmuch has already been written. I propose further to narrow the question by limiting it to one form of stone—namely, that composed of lithic acid and its salts, which I need not say constitutes at least five-sixths, or more probably, so far as this district is concerned, nearly nine-tenths of all primary formations. While, however, I thus limit the inquiry to this one species, it will be understood to include not merely the accidental occurrence of vesical stone, but the diathesis out of which stone arises; indeed, I have now only to do with calculus in the bladder, in that it expresses, roughly and approximately, the relative frequency or rarity of the lithic diathesis, just as the mortality in any place or district may be taken to represent, roughly and approximately, the amount of sickness in that place or district. For one case of stone in the bladder which presents itself, there are at least ten met with in which the lithic diathesis, or as it may for convenience be termed "lithuria," is fully marked in the form of lithic deposit, sand, or gravel. Let us then inquire—(1) Is lithuria, as represented by cases of stone in the bladder, more common in this district than in any other part of the United Kingdom? and (2) If it be, what explanation can be given to account for the excess?

The subject has, on more than one occasion, undergone investigation. Just a hundred years ago,* Dr. Dobson, of Bath, in an inquiry on the disposition to stone in the cider counties, compared with some other parts of England, demonstrated that stone abounded most in the eastern, or Norfolk district; that the north-eastern, including Newcastle, York, Leeds, and Manchester, stood next in frequency; that the north-western, including Liverpool, Chester, Shrewsbury, and North Wales, had the fewest cases; and that the cider counties of Devon, Gloucester, Worcester, and Hereford, had nearly the same as the north-eastern. About fifty years ago Mr. Smith, of Bristol, went over the same ground, but more fully than Dobson, and, speaking generally, it may be said, he met with similar results—that stone abounded, above all other places, in Norfolk; that a larger proportion was found in the eastern than in the western district, and that Ireland and Scotland were comparatively free from the disease.†

Dr. Yelloly, in 1830, still further elucidated the subject, and found that, in Ireland, calculus was very rare, especially in its country population; that in many counties no operation for stone had been practised in any of its hospitals, and in some districts the disease was almost unknown. In Scotland, he found as much variation in frequency in different parts as in England: in the very northern counties it was very rare; in Aberdeenshire the proportion was more considerable; in the southern and south-western districts it was exceedingly rare; while both he and Mr. Copland Hutchinson‡ showed that, taking the whole country generally, stone was as frequent in Scotland as in England; and that in both it was much more frequent in town than in country populations.§

* Vide a Medical Commentary on Fixed Air, by Matthew Dobson, F.R.S., 1785.

† Vide Medico-Chirurgical Transactions, vol. ix.

‡ Ibid., vol. xvi, p. 94.

§ Vide Philosophical Transactions, 1829 and 1830.

In my own investigation, I have consulted (1) the Registrar-General's reports for the last five years for the United Kingdom; (2) I have applied to one of the surgeons—generally to the senior surgeon—of nearly all county hospitals, and of all others having a considerable number of beds, or of those likely to admit and treat stone cases; and I desire now publicly to express my deep obligation and warmest thanks to those gentlemen—and they include nearly all to whom I applied—who have so promptly, so courteously, and so fully answered my inquiries. The information obtained will appear in a table comprising all the cases received into their various hospitals during the last five years; the number of children under 10; the average age; the number of beds and the proportion of stone cases to the whole number of in-patients, with incidental remarks by my various correspondents. I am aware that both these sources of information are open to criticism and objection, on the score of inaccuracy. The Registrar-General's reports, especially those from Ireland, are admitted to be faulty; the causes of death are often vaguely and carelessly stated; frequently no certificates are given, and the true causes of death are overlooked; but, where the numbers are large, and the statistical system on which the various data are constructed is the same from year to year, it is probable that a near approach to truth and comparative accuracy is really obtained. So far as hospital records are concerned, they are, doubtless, more nearly accurate in themselves; but the inferences to be drawn may be vitiated by various causes; thus eminent and successful operators may attract cases from great distances, so as to make it appear that a larger proportion of stone exists in some particular districts than is actually the case, and, therefore, a less proportion in others. This disturbing cause is, perhaps, chiefly found in the metropolis and in some of the large cities; but, so far as London is concerned, I have ascertained the locality from which each case was derived, so as to allocate each to its proper county, while out of London this vitiating cause does not probably materially affect the result; the result being that, in almost all cases, the returns from the various hospitals fairly represent the amount of stone, and therefore of lithuria, existing amongst the poorer classes of the population surrounding those hospitals. Another source of inaccuracy arises from the increase in number of hospitals, of cottage hospitals, and of dispensaries which contain a few beds, in all of which operations are occasionally performed. Further, there are many surgeons unconnected with hospitals who deal, and deal generally very successfully, with the cases occurring in their own immediate neighbourhood; but these, though they are many in the country at large, are but few in each county, and do not greatly disturb the hospital averages. In Norfolk, for instance, where stone cases are quickly detected and keenly watched, and where certainly there are plenty of capable and enterprising surgeons, I do not believe that more than six or eight cases are annually operated on in the county, while the various hospitals continue to maintain their full average numbers.

Taking, then, the mortality from stone, the Registrar-General tells us that, in England, there are more than twice as many deaths from stone as in Ireland in proportion to population.

Yearly average of Deaths from Stone for Five Years ending 1871, in proportion to Population and to whole number of Deaths.

| | Deaths from Stone. | Of Population. | Of all Deaths. |
|----------------------|--------------------|----------------|----------------|
| England and Wales... | 200 | 1 in 100,331 | 1 in 2467 |
| Scotland | 59 | 1 in 51,903 | 1 in 1200 |
| Ireland | 27 | 1 in 214,740 | 1 in 3354 |

In Scotland there are twice as many deaths in proportion to population as in England, and four times as many therefore as in Ireland. Further, it appears that in the northern counties of Scotland there are nearly four times as many deaths from stone as in the southern counties, the population being nearly equal. Similarly, in Ireland the mortality is three times as great in the northern counties as in the southern. In England the mortality from stone has increased during the last five years. For several quinquennial periods there was a steady decrease, which led to the belief that stone was really a diminishing disease; but this inference, I fear, was erroneous; all the evidence I have been

able to collect tends to show that it is just as frequent as ever, and that the apparent diminution was due rather to better treatment, more willingness to submit to operation

Mortality from Stone in England and Wales in five successive Quinquennial Periods.

| | | |
|--------------|---------------------------|-----|
| 1847 to 1851 | the average of deaths was | 232 |
| 1852 to 1856 | " " | 216 |
| 1857 to 1861 | " " | 184 |
| 1862 to 1866 | " " | 168 |
| 1867 to 1871 | " " | 200 |

since the introduction of anæsthetics, and especially to greater nicety and accuracy in discriminating the causes of death. For instance, in 1840 there were 303 deaths from stone and 132 from cystitis; while in 1870 there were 195 deaths from stone and 415 from cystitis. This remarkable discrepancy is due, not to any real difference in the relative proportion of the two diseases, but to the more exact appreciation of the real causes of death. As in Ireland and Scotland, so in England, the mortality varies greatly in the different registration districts. The northern and north-western counties show the smallest mortality and the eastern counties the greatest, being in the proportion of nearly 1 to 4. Next in amount of mortality to the eastern are the south-eastern and south midland counties. Yorkshire, Wales, and London show a medium mortality; and the west midland and south-western counties have almost as small a mortality as the north and north-western. These facts appear in a table showing the number of deaths in five years, and the proportion to population, and the whole number of deaths in each district.

Yearly average Mortality from Stone for Five Years in each Registration District in proportion to Population, and total number of Deaths.

| District. | Yearly Deaths. | Of Population. | Of total Deaths. |
|-------------------------|----------------|----------------|------------------|
| 1. London | 40 | 1 to 70,099 | 1 to 1904 |
| 2. South Eastern | 22 | 1 to 83,978 | 1 to 1829 |
| 3. South Midland | 15 | 1 to 86,367 | 1 to 1882 |
| 4. Eastern | 18 | 1 to 63,475 | 1 to 1319 |
| 5. South-Western | 9 | 1 to 203,985 | 1 to 4098 |
| 6. West Midland | 19 | 1 to 128,216 | 1 to 3028 |
| 7. North Midland | 15 | 1 to 85,959 | 1 to 1928 |
| 8. North-Western | 14 | 1 to 209,681 | 1 to 6187 |
| 9. Yorkshire | 26 | 1 to 77,520 | 1 to 2132 |
| 10. Northern | 6 | 1 to 191,895 | 1 to 5459 |
| 11. Monmouthsh. & Wales | 17 | 1 to 77,202 | 1 to 1721 |

Proceeding to further detail, I have ascertained the mortality in each county of England and in London and Wales, for five years, in proportion to population. This calculation, although accurate in the main, is open to this objection—that the number of deaths even in five years is too small in many of the counties to be above the reach of accidental fluctuation. Moreover, the deaths in London do not quite accurately represent the mortality for London proper, because the hospital population of the metropolis is drawn from various distances, and especially from the home counties, thus, at the same time, diminishing the mortality in those counties. Making, then, some small allowance for these slight sources of error, it appears that the greatest mortality obtained in these six counties, in the order named—viz., Norfolk, Huntingdonshire (a small population), Kent, Sussex, West Riding of Yorkshire, and Leicestershire; that the smallest mortality obtained in these six counties, in the order named—viz., Cheshire, Cornwall, Cumberland, Hampshire, Durham, and Devonshire; while the other counties hold a varying position between these extremes; the extremes being, that in Norfolk there is one death from stone yearly in 42,000 and odd, in Cheshire there is one in 425,000 and odd.

Mortality from Stone in Five Years, ending 1871, in the several Counties, and the Annual Death-rate in proportion to Population.

| | Deaths in 5 years. | Population. |
|-------------------------|--------------------|-------------|
| Norfolk | 50 | 1 in 42,744 |
| Huntingdonshire | 5 | 1 in 59,137 |
| Kent | 45 | 1 in 60,585 |
| Sussex | 30 | 1 in 61,139 |
| Buckinghamshire | 12 | 1 in 61,335 |
| Yorkshire (West Riding) | 94 | 1 in 61,405 |
| Leicestershire | 19 | 1 in 64,115 |

| | Deaths in 5 years. | Population. |
|--------------------------------------|--------------------|--------------|
| Monmouthshire and Wales ... | 74 ... | 1 in 78,140 |
| Warwickshire ... | 48 ... | 1 in 65,670 |
| Shropshire ... | 20 ... | 1 in 66,750 |
| Suffolk ... | 25 ... | 1 in 67,081 |
| Hertfordshire ... | 13 ... | 1 in 68,250 |
| London ... | 201 ... | 1 in 69,500 |
| Cambridgeshire ... | 13 ... | 1 in 69,845 |
| Yorkshire (North & East Ridings) ... | 34 ... | 1 in 71,475 |
| Worcestershire ... | 23 ... | 1 in 73,100 |
| Staffordshire ... | 57 ... | 1 in 76,965 |
| Northamptonshire ... | 14 ... | 1 in 82,525 |
| Berkshire ... | 11 ... | 1 in 93,470 |
| Westmoreland ... | 3 ... | 1 in 101,575 |
| Middlesex ... | 9 ... | 1 in 104,065 |
| Lancashire ... | 61 ... | 1 in 108,145 |
| Derbyshire ... | 12 ... | 1 in 122,485 |
| Nottinghamshire ... | 13 ... | 1 in 124,530 |
| Gloucestershire ... | 18 ... | 1 in 135,765 |
| Bedfordshire ... | 5 ... | 1 in 140,479 |
| Oxfordshire ... | 6 ... | 1 in 142,690 |
| Northumberland ... | 12 ... | 1 in 142,925 |
| Wiltshire ... | 8 ... | 1 in 145,610 |
| Essex ... | 13 ... | 1 in 146,040 |
| Herefordshire ... | 4 ... | 1 in 150,900 |
| Dorsetshire ... | 6 ... | 1 in 151,825 |
| Surrey ... | 13 ... | 1 in 183,150 |
| Somersetshire ... | 12 ... | 1 in 193,070 |
| Devonshire ... | 15 ... | 1 in 196,426 |
| Hampshire ... | 11 ... | 1 in 207,570 |
| Durham ... | 11 ... | 1 in 246,420 |
| Cumberland ... | 3 ... | 1 in 342,125 |
| Cornwall ... | 5 ... | 1 in 364,846 |
| Cheshire ... | 8 ... | 1 in 425,520 |

Turning now to the hospital records, it appears that they agree fairly with the Registrar-General's returns, with one exception, to be presently mentioned. Application was made to between eighty and ninety hospitals in England, Scotland, Wales, and Ireland, and reports have been received from between seventy and eighty; and these reports, besides containing the number of cases admitted during the last five years and the respective ages of the patients, contain, also, in very many instances, results of treatment and practical remarks of great interest and value, which, however, I shall for the most part reserve for future use, merely quoting those which bear upon the present inquiry.

It would be impossible to read in detail the following abstract, but I will cull from it the most salient points, merely premising that the column expressing the proportion of stone cases to the whole number of in-patients has been constructed on the principle that the admissions of 1872 were assumed to be the average of the five years. It must also be borne in mind that all hospitals do not admit patients on the same grounds; a small hospital, having but few beds and narrow income, would admit all the stone cases belonging to its area, but would necessarily restrict the admission of general cases to the more urgent ones; hence the proportion of stone cases would appear greater in small than in large hospitals, and especially in stone districts. For instance, we have in this city a Children's Hospital containing twenty beds, in which the proportion of stone to other patients is one to thirty, and similarly, in the small hospitals of Yarmouth, Lowestoft, and Peterborough, there appears an undue proportion; but, taking the general run of county hospitals and hospitals in large towns, they are probably guided by the same method in their admission of cases, and the relative number of stone to general cases does in them give a fair picture of the amount of lithuria in each district.

Beginning, then, in this county, where undoubtedly there is the greatest amount of stone, permit me to say a few words specially of the Norfolk and Norwich Hospital, which has long held a position of authority in all matters in which this disease or diathesis is concerned. The hospital, which is now a trifle over one hundred years old, presents, in the accuracy with which its books have been kept, a model for all hospitals. From its opening to the present time, I have without difficulty ascertained the name, age, and residence of every stone case, and where any doubt existed, the doubt was in the mind of the surgeon; there

is no ambiguity in the records. Every stone which has been removed, either during life or after death, became the property of the hospital, and, to the number of about 1050, may be seen forming a noble contribution to the annual museum of this Association now on view in the adjacent room.

Including renal and urethral calculi, there have been admitted about 1270 males and 56 females. From this record it would, I think, be easy to show that, so far from stone being a diminishing malady, it is rather an increasing one, even beyond that which the increase of population would account for. In 1773 there were nine cases admitted, in 1873 there were twenty-five. In the earlier year there were barely half the present number of beds, it is true; on the other hand, Suffolk had no hospital then, and the patients were drawn from a vastly greater area than now. This record also goes far to show that the sanguine and somewhat romantic view that stone would come to be "stamped out," expressed by a distinguished friend of mine, has but little chance of fulfilment. During the last five years, the period chosen for comparison, there were 90 cases of stone admitted into the Norfolk and Norwich Hospital, or 1 to 55 of all in-patients; in the Lynn Hospital there were 20, or 1 to 124 in-patients; in the Yarmouth Hospital, 21, or 1 to 32 in-patients. Now let us compare this with one of the hospitals in the south-western district—the Devon and Exeter Hospital, in which were admitted six cases, or 1 to 1300 in-patients; or with the Taunton and Somerset Hospital, in which, with ninety-two beds, no stone case has been received in five years, and, my informant adds, only two in forty years. This, however, is an extreme instance; in very many hospitals fit for comparison with our own, the proportion of stone to general cases varies from 1 to 200, or 1 to 400; but there is a Midland district, having for its chief towns Birmingham and Wolverhampton, in which not only do stone cases prevail largely, but prevail especially in children. In the Wolverhampton Hospital, 50 cases have occurred in five years, or 1 to 101 admissions; of these 50 cases, 37 were in children under ten years. In the Birmingham Hospitals, the General, Queen's, and Children's Hospitals, 127 cases were received, of which 69 were under ten, and the same fact will appear in the report from other and smaller hospitals in the same district. Compare this with the Norwich cases; out of 90, only 18 were under ten years of age; but the contrast is greatest if we compare it with the Aberdeen Infirmary, which admitted 47 cases in the five years, of which only 3 were under ten. Some explanation of this singular contrast I will presently give.

The metropolitan hospitals will speak for themselves, so far, that is, as my information goes; but they scarcely come into comparison with ordinary provincial infirmaries. The hospital reports from Ireland, so far as they go, bear out the Registrar-General's reports as to the very small amount of lithuria in that happy land. Even in Dublin, a stone operation, my informant says, is an "event."

In Scotland, hospital experience does not seem to be in accord with the death-rate. The admissions to hospital would lead me to think that stone is less common there than in England, but the mortality would seem to be nearly double. This discrepancy is not easily to be accounted for, and I cannot help thinking either that imperfect discrimination of the causes of death has been made, or that, in the snatches of leisure during which I have compiled the table, some error on my part has crept in. I can conceive that, in the vast areas where population is small and surgeons are few and distant, many patients who in England would be cured in a hospital may in Scotland be allowed to languish and die of stone; but it is going too far to suppose that these considerations fully explain away the difficulty. Another mode of viewing the matter exhibits the discrepancy still further. Thus, in Scottish hospitals containing altogether 2151 beds, there were admitted in five years 171 stone cases. In English provincial hospitals, taken promiscuously (and not including Norwich), containing 2183 beds, there were admitted in five years 354 stone cases, or more than twice as many as in Scotland; while in seven London hospitals containing 1958 beds, there were admitted 229 stone cases: in other words, one stone case to about thirty beds in English provincial hospitals, one to forty in London, and one to sixty in Scottish hospitals. This matter, therefore, I leave for further and more careful investigation.

Table showing the Number of Stone Cases admitted into various Hospitals during Five Years, ending in 1873, with the average Age, Number of Cases under Ten Years, and the Proportion Yearly to whole Number of In-patients.

| HOSPITAL OR INFIRMARY. | No. of Cases in Five Years. | No. below Ten Years of Age. | Average Age. | No. of Beds. | Proportion of Stone Cases to whole number of In-patients. | REMARKS. |
|---|-----------------------------|-----------------------------|--------------|--------------|---|---|
| Yarmouth Hospital | 21 | 15 | 15 | 28 | 1 to 32 | Drinking-waters hard. |
| Peterborough Infirmary | 10 | 3 | 36 | 42 | 1 " 53 | |
| West Norfolk and Lynn | 20 | 10 | 24 | 48 | 1 " 124 | |
| Children's Hospital, Norwich... .. | 9 | 0 | 0 | 20 | 1 " 30 | |
| Norfolk and Norwich Hospital | 90 | 18 | 48 | 140 | 1 " 55 | A group of hospitals, in which a large proportion of cases are in young children; drinking-water very hard. |
| Lowestoft Infirmary | 10 | 5 | 29 | 30 | 1 " 77 | |
| Wolverhampton Hospital... .. | 50 | 37 | 11 | 200 | 1 " 101 | |
| Birmingham General Hospital | 61 | 18 | 32 | 256 | 1 " 229 | |
| " Queen's " | 30 | 15 | 23 | 198 | 1 " 286 | |
| " Children's " | 36 | All | 0 | 58 | 1 " 116 | |
| Coventry and Warwickshire | 10 | 7 | 12 | 62 | 1 " 110 | |
| Dudley: Guest's Hospital | 4 | 3 | 9 | 60 | 0 | |
| Dudley Dispensary | 13 | 10 | 6 | 0 | 0 | |
| Leicester | 44 | 17 | 32 | 210 | 1 " 236 | |
| Stafford | 7 | 3 | 10 | 120 | 1 " 518 | Water very hard. |
| Shrewsbury | 19 | 10 | 19 | 140 | 1 " 262 | Cases frequent on coal-formation; water hard. |
| Derby | 8 | 0 | 27 | 175 | 1 " 691 | Water hard in places, whence stone cases come. |
| Nottingham | 25 | 7 | 33 | 142 | 1 " 263 | Water variable; generally hard. |
| Lincoln | 11 | 4 | 32 | 100 | 1 " 339 | Water generally hard. |
| Stamford | 3 | 2 | 24 | 40 | 1 " 425 | Water decidedly hard. |
| Northampton | 19 | 8 | 27 | 138 | 1 " 402 | Many waters of considerable hardness. |
| Huntingdon | 10 | 3 | 36 | 42 | 1 " 118 | Drinking-waters unmistakably hard. |
| Cambridge | 33 | 14 | 30 | 120 | 1 " 122 | Waters hard, containing a good deal of lime. |
| Colchester | 4 | 1 | 38 | 94 | 0 | Town waters hard; in villages rather soft. |
| Hertford | 3 | 2 | 19 | 35 | 1 " 250 | Only five cases in twenty years. |
| Ipswich, Suffolk | 15 | 0 | 0 | 90 | 1 " 176 | Water very hard. |
| Bury St. Edmunds, Suffolk | 9 | 3 | 38 | 84 | 1 " 223 | Cases rare; water soft. |
| York | 8 | 3 | 31 | 90 | 1 " 412 | |
| Hull | 28 | 12 | 30 | 150 | 1 " 230 | |
| Leeds | 75 | 23 | 33 | 310 | 1 " 202 | |
| Halifax | 12 | 3 | 39 | 50 | 1 " 177 | Water soft; some cases imported from other places. |
| Bradford | 29 | 8 | 18 | 140 | 1 " 141 | Water not very hard. |
| Sheffield... .. | 17 | 7 | 23 | 160 | 1 " 369 | Not much stone; water soft. |
| Sunderland | 11 | 2 | 20 | 110 | 1 " 246 | Water of moderate hardness. |
| Manchester | 51 | 12 | 26 | 298 | 1 " 302 | Water of Manchester soft. |
| Liverpool Royal Infirmary | 31 | 8 | 26 | 270 | 1 " 564 | Water from various sources; generally soft. |
| " Southern Hospital | 6 | 1 | 38 | 200 | 1 " 1192 | |
| " Northern " | 4 | 3 | 6 | 146 | 1 " 2015 | |
| Lancaster | 0 | 0 | 0 | 70 | 0 | No case for five years; very rare; water soft and pure. |
| Preston | 6 | 1 | 47 | 76 | 1 " 230 | Stone cases rare; water soft. |
| Carlisle | 6 | 0 | 37 | 52 | 1 " 400 | Cases rarely presented themselves. |
| Devon and Exeter | 6 | 1 | 15 | 230 | 1 " 1298 | Water soft. |
| Barnstaple | 3 | 2 | 8 | 100 | 1 " 925 | Stone cases rare; water hard. |
| Taunton and Somerset | 0 | 0 | 0 | 92 | 0 | No case for five years; only two in forty years; waters pure and soft. |
| Bristol Royal Infirmary | 19 | 13 | 12 | 242 | 1 " 665 | Two in previous quinquennial period. |
| Hereford | 2 | 0 | 0 | 74 | 1 " 1560 | |
| Cheltenham | 7 | 4 | 13 | 90 | 1 " 395 | Water rather hard. |
| Bath | 12 | 8 | 14 | 120 | 1 " 448 | Water hard. |
| Dorchester | 3 | 0 | 12 | 60 | 1 " 661 | Water slightly hard. |
| Salisbury | 7 | 1 | 31 | 100 | 1 " 714 | Chalk and green sand; water not hard. |
| Ryde | 0 | 0 | 36 | 0 | 0 | No case in five years; only seven in twenty-five years. |
| Southampton | 12 | 6 | 22 | 100 | 1 " 379 | Water very hard from chalk. |
| Brighton | 22 | 7 | 32 | 165 | 0 | |
| Reading... .. | 17 | 5 | 18 | 140 | 1 " 298 | Water various; generally hard. |
| Guildford | 2 | 2 | 44 | 54 | 1 " 845 | Water hard. |
| Canterbury | 15 | 0 | 39 | 104 | 0 | Water generally hard. |
| Dover | 1 | 1 | 6 | 15 | 1 " 795 | Water hard. |
| Bartholomew's Hospital, Chatham | 15 | 9 | 16 | 68 | 1 " 156 | Stone common in Kent. |
| Edinburgh Royal Infirmary | 61 | 10 | 0 | 565 | 1 " 353 | Water generally soft and pure. |
| Glasgow Royal Infirmary... .. | 60 | 18 | 25 | 584 | 1 " 492 | |
| Paisley | 3 | 1 | 20 | 138 | 1 " 1703 | Calculus very rare; water soft. |
| Dumfries | 0 | 0 | 0 | 100 | 0 | None; only eleven in thirty years. |
| Aberdeen | 47 | 3 | 60 | 300 | 1 " 184 | Water generally soft. |
| Perth | 0 | 0 | 84 | 0 | 0 | None; stone very rare. |
| Dundee | 2 | 2 | 9 | 260 | 0 | Both operations on same patient; water soft. |
| Inverness | 0 | 0 | 0 | 120 | 0 | No case in five years. |
| South Charitable Infirmary, Cork... .. | 10 | 3 | 36 | 108 | 0 | None; only one in thirty-five years. |
| Monaghan | 0 | 0 | 0 | 60 | 0 | |
| Limerick | 0 | 0 | 0 | 100 | 0 | No stone case in either of the two hospitals for ten years; water hard. |
| Armagh... .. | 0 | 0 | 0 | 72 | 0 | No case for many years; water hard. |
| Roscommon | 0 | 0 | 0 | 85 | 0 | Only three cases in 27 years' practice; water hard. |
| Maryborough | 1 | 0 | 12 | 100 | 0 | Only three cases in 20 years' practice; water hard. |
| Carmarthen | 0 | 0 | 0 | 40 | 0 | Stone very rare; no case for more than 7 years; water soft. |
| Haverfordwest | 7 | 0 | 55 | 12 | 0 | See THE LANCET, April 19th, 1873. |
| Bangor | 2 | 0 | 12 | 14 | 1 to 172 | Stone rare. |
| Swansea... .. | 4 | 0 | 28 | 55 | 1 " 467 | Water pure and soft. |
| Eight London Hospitals—viz.: St. Bartholomew's, Guy's, University College, St. Thomas's, St. George's, Westminster, Charing-cross, and Middlesex. | 280 | 98 | 26 | 2866 | | |

The sources from which the patients admitted into the London hospitals came were:—

| | | | |
|--------------------------------|-----|-----------------------|---|
| From London and suburbs | 125 | From Bucks... .. | 8 |
| " Kent | 37 | " Hants... .. | 7 |
| " Surrey | 13 | " Yorkshire | 7 |
| " Essex... .. | 10 | " Sussex... .. | 4 |
| " Wales | 10 | " Lincolnshire | 6 |

Others from scattered places.

Passing now to the second branch of my subject, permit me, before considering the causes of the excess of lithuria in this district, briefly to allude to its etiology and pathology. Although it is safe to assume that when lithic acid deposit frequently occurs in the urine, there is probably excessive secretion, we must not forget that a diminution of the alkaline bases, or over-acidity of the urine, will lead to deposit, without any relative excess. The conditions of health and disease in which these circumstances obtain are too well known to need notice; but I would ask, as bearing on this inquiry, whence is lithic acid derived? and where is it fabricated? Admitting that it is derived from the disintegration of nitrogenised tissues, and from the transformation of the excess of albuminous food, it yet remains a question where, or by what agency, it is actually generated; whether by the operation of chemical or electro-chemical changes in the blood itself, or in the tissues undergoing change, or by some secreting gland-cells in the liver, spleen, or kidneys. The office of the kidney, with reference to lithic acid, is still a moot question; is its duty simply that of passive elimination? or has it the higher function of constructing and forming the lithic acid, urea, and other principles, out of the materials presented by the blood? Ever since the discovery of urate of soda in gouty blood by Dr. Garrod, there has been a disposition to degrade the function of the kidney, and to allow that it consisted in little more than mere osmosis, and that it simply removed that which already existed. Admitting that urea and uric acid may be formed independently of the kidney, it would seem probable, looking at the fact that healthy blood contains merely a trace of urea and uric acid, and also that, when the kidney is extirpated, these substances do not accumulate in the blood, it would, I say, seem probable that, in the ordinary healthy operations of nature, it is the proper function of the kidney to form as well as to eliminate the 10 grains of lithic acid and the 500 grains of urea which a healthy man voids daily. We know that, in certain diseased conditions of the kidney, the power of eliminating these nitrogenous principles is lost, or nearly so; is it not possible that, in certain other morbid states, the opposite conditions obtain; and that, out of the healthy blood, the morbid kidney may form and eliminate an excessive amount of urea or uric acid? Who has not seen, in persons prone to the deposit of lithic acid, an enormous quantity, almost a teaspoonful, voided in a day? and that without any excess of diet, or sign of extreme waste of tissue, or obvious dyspepsia, or ill-health of any kind. If this excess of lithic acid existed in the blood, *quoad* urate of soda, surely the phenomena of gout would be present; but I have so often and so keenly watched this occurrence, and, failing to detect any of the usual etiological causes, it has appeared to me probable that, just as other secreting organs vary in the quantity and quality of the fluid they secrete, so the kidneys, owing to some inherent morbid condition, may form and secrete, out of healthy blood, urine having one or other of its constituents in excess.

But if, as I have said, there be a tendency to reduce the function of the kidney to that of mere osmotic elimination, I must notice the attempted elevation of another organ, the liver, into what I may call universal supremacy over all the healthy and morbid processes of nutrition and secretion. Not only has it the important glycogenic function and the secretion of bile, but it is also credited with the conversion of albuminoid matters from the blood, the food, and the tissues, and the formation of urea and uric acid. Arguing from the fact that urea has been found in the liver, and from some doubtful and controverted experiments showing that rather more urea was to be found in the hepatic than in the portal vein, and forgetful of the other facts that urea has been also detected in the brain, the lungs, and the spleen, and that only a mere trace is found in healthy blood, we are asked to believe that, out of these three functions there flow, in chief part, oxidation, sanguification, animal heat, and the depuration of the blood. It makes one almost stand in awe of one's liver, and believe that, having a liver, we could dispense with all other organs of digestion.

But if the liver be thus comprehensive as to its physiology, what has not been said as to its pathology? Passing by the structural diseases of the liver, which are well recognised and understood, the list of diseases and symptoms arising from mere functional disorder, as set forth by Dr.

Murchison, the latest and stoutest champion of the pre-eminence of the liver in disease, is too long even for mention here; suffice it to say that it includes most of the disorders of all the systems of the body—of the nervous system, of the circulatory, respiratory, cutaneous, and urinary systems and organs; and even such acute diseases as pyæmia and the typhoid state are supposed to be frequently the result of functional disorder of the liver. In my student days it used to be said that he who understood the nature and treatment of inflammation had acquired half the knowledge necessary for a successful practitioner. Now it would be more correct to say that he who understands the nature and treatment of hepatic diseases has little more to learn.

On this view, gout, of course, is said to be a mere symptom of liver disorder, and the same is said of lithuria and all calculi composed of lithic acid or its salts; and the practical deduction inculcated by Dr. Murchison and also by Sir H. Thompson is that, in the treatment of gout and lithuria those remedies which are supposed to address themselves to the liver are to be preferred to those which diminish acidity and dissolve uric acid; that alkalies and alkaline waters are to be laid aside as inefficient, and, at the best, are but of temporary benefit, and that saline aperients and waters of that character are alone of real use. To this I would reply, judging from ample observation, that the saline aperient waters are not proved to act specially on the liver, that they probably act chiefly on the stomach and alimentary canal; that they are not so directly capable of removing gout or lithuria as the alkaline waters; and that, when they do so act, they, like the alkaline remedies, are evanescent in their effect. I have the conviction that this tendency to exaggerate the influence of the liver in health and in illness displays the drawbacks of specialism in the study of disease, narrows the view to one standpoint, and encourages the old but loose habit of attributing every obscure symptom to a "disordered or a torpid liver." On the whole, it is safer to attribute lithuria to dyspepsia and malassimilation, which probably concerns all the digestive organs, than to fix the fault mainly on one.

Undoubtedly, the general dyspeptic condition above mentioned, which, in the opulent classes of society, is generally caused by over-feeding and over-drinking, over-work, and deficient oxidation, and in the poorer classes by other sources of derangement, is the most fertile source of lithuria. This source, however, is common to all places and to most countries, certainly to all places of the United Kingdom; and yet, as I have shown, there is the greatest possible variation in the tendency to lithuria in various places. And this brings me to the concluding question—What explanation can be given of this variation, and especially of the excess of lithuria in this district?—and when I say excess, I desire to guard myself by admitting that, although there probably is excess, this is by no means proved. It may be that the abundance of stone in Norfolk is due, not to actual excess, but to circumstances which merely determine the precipitation and separation of lithic acid in the urinary tract. Whether it be so or not—and I know no means of deciding that point—the question equally remains. It has often been asked, but never answered, and never argued, except in a negative manner.

One thing appears to me clear and indisputable—the abundance or rarity of the diathesis must depend mainly on local and endemic causes, aided by another agency, which, however, grows out of the endemic cause. Further, these endemic causes must be due to the physical geography of the district, by which is meant the soil, food, and climate; and, when we call to mind how powerful is the effect of the physical geography of a country on the mental character, and on the civilisation even, of its inhabitants, we may well appreciate, if we cannot always explain, its laws in the production and spread of various diseases. This vast field of investigation has been cultivated by many distinguished labourers of late years, chiefly in the tracing of general constitutional diseases; but its capabilities for the elucidation of particular local diseases is not even now fully recognised; and yet it seems probable that further knowledge in this direction will not only demonstrate the etiology of many local diseases, but will direct into fresh and more accurate lines the study of their pathology, and even lead to more rational means of prevention and cure.

Taking these causes *seriatim*, the climate of Norfolk has

by many authorities been thought to be a powerful factor of lithuria. A glance at the map will show how much this county is projected, as it were, into the sea. From Yarmouth to King's Lynn is a very long coast-line, not less than seventy miles. During the winter and spring months, there is a great prevalence of north and east winds; and it is held that these bleak cold winds, by checking cutaneous secretion and deranging delicate digestion, cast additional work on the kidneys and liver, and so derange their functions and lead to lithuria. Dr. Prout somewhat favoured this view, and the late Mr. Crosse had a strong belief in it. Rigid investigation, however, will show that climate can have but the very smallest influence. Admitting that cold drying winds do prevail and are keenly felt in this county to a most unpleasant extent, it is not proved that they exceed those of other places. In the north of Scotland and in many of the exposed parts of Ireland the temperature must be as cold as it is here, and yet it has been shown that we have almost as many cases of stone as in all Ireland. Moreover, in hot climates, such as India, and in some parts of China, stone is not uncommon, while in Sweden and Norway and some other very cold countries it is very rare. Again, although it is the fact that we pass more lithic acid in winter than in summer, this is probably due to the greater muscular activity we use in the cold season, and to the consequent greater amount of tissue-metamorphosis. The natural effect of arresting cutaneous secretion must be to increase the amount of the water of the urine by which lithic acid and other solid constituents would be better held in solution, and so the liability to calculous deposit would be diminished; and, *per contra*, the increased cutaneous secretion from summer heat may be supposed to lead to concentration of the urine, and consequently to the liability of lithic deposit. The effect of cold is to diminish the acidity of the urine, and prolonged immersion of the body in cold water is said to render it alkaline. Observation, based on the localisation of 1500 stone cases in Norfolk, shows that fewer have come from the villages on the coast, where the exposure to cold is greatest, than from places more inland. These and other considerations which might be adduced did time permit, prove, I think, that climate alone has but little influence in producing lithuria.

The food of the poorer classes in this district, consisting as it does chiefly of good bread, cheese, and a small modicum of meat, chiefly pork, has, however, a speciality which has attracted attention, and has been assigned by many, notably by Prout, as a helping cause of stone. It consists of dumplings made of flour, water, and yeast, which may be described as boiled bread, and are universally consumed by the poorer classes with dripping or treacle. Those who think this article of diet conduces to stone give no other reason for their opinion than that it is apt to disagree with the stomach and lead to malassimilation. I cannot, however, admit the impeachment against the popular dumpling, for I do not believe that it is hostile to good digestion; it is never referred to by patients as a probable cause; and, when stone cases are admitted into the hospital, although in all instances remedies are prescribed of a nature likely to check lithic deposit, I never heard that the dumpling, which is a part of our hospital dietary, was forbidden. There is, however, one article of food—namely, milk—the want of which, in my opinion, does influence the development of lithuria very largely. More than twenty years ago it attracted my attention, and I dare say that of others, that stone in the bladder, which in the young children of the poor is so common as to constitute more than half the whole number of cases, is seldom or never met with in the more opulent classes of society. In some hundreds of cases of stone which have passed under my own observation, I have met with but one occurring in a child under five years whose parents were well-to-do in the world; and this experience has been corroborated by all those surgeons of whom I have made inquiry. To what is this marked contrast due? Mr. Thomas Smith, in a paper on the subject (*British Medical Journal*, vol. i., 1869, p. 442), summed up the probable explanation by attributing it to “insufficient and almost arrested cutaneous excretion from imperfect clothing and uncleanness, tending to disturb the due proportion of the normal constituents of the urine, and lead to a relative or absolute excess of some one constituent; while the digestive organs of poor children are constantly liable to disarrangement from unsuitable food

or from irregularities in their mothers' diet.” Agreeing in the main with this account, I would go further, and say, that the prevalence of stone amongst the children of the poor is largely due to the impossibility of their obtaining a proper and sufficient supply of sound milk; the insufficient clothing and uncleanness referred to probably exist everywhere, in Ireland and Scotland as much as in England, and yet Ireland has but little stone as compared with England. Again, in the table of hospital cases which I have compiled, the most remarkable differences with regard to stone in children appear. In the Midland Counties, a large majority of the cases are in young children, while in Aberdeenshire, where stone in the adult is common, there are but very few cases in children. In Yarmouth, a town on the east coast, 15 out of 21 were under ten years of age, while in Aberdeen, which is similarly situated, there were only 3 cases out of 47 under ten years. Referring to Dr. Edward Smith's report to the Privy Council on the food of the labouring classes, it appears that in Ireland, Wales, and Scotland, the poor obtain an abundance of milk, while in Warwickshire, Norfolk, Suffolk, Kent, and other places, very little is obtained. I am warned by time that I may not go more into particulars on this subject; but I affirm that strict inquiry shows that the abundance of stone in children of urban over rural populations, and of one district over another, will be found in strict accordance with the difficulty of procuring milk. The one exception mentioned is very corroborative of this view. A few years ago, after removing a stone from a child of well-to-do parents, I was remarking to one of my assistants that this was the first instance in my practice, and that I attributed the general absence of stone to milk; the mother volunteered the statement that, in a large family, this was her only child who never could take milk, and who, therefore, never had any. To this lamentable want is chiefly due not only this disease of stone, but probably a vast many of the diseases which attend the early years of childhood; which are prolonged into after years of imperfect development and early decrepitude. If ever true wisdom was combined with much false political economy, it was when John Stuart Mill maintained that those who live and labour on the soil have rights in the products of the soil beyond that of mere wage. It would, indeed, be a glorious result of statecraft if, instead of the futile wrangling over the sale of fermented liquors, which has wrecked one powerful Government, and, by the disappointment of greedy expectants, has gone far to sap the popularity of its successor; if, I say, by some equitable enactment, those who possess and those who occupy the land should be held responsible for the production, in sufficient abundance for the wants of the poor, of that which is now a costly luxury, but which nature points out to be the chief, I may say the only, need of early childhood.

One other fact connected with the food and beverage of this district deserves mention. The light but fertile soil of Norfolk is peculiarly adapted to the growth of barley, and I believe I am right in assuming that this is one of the greatest malt-making districts of the kingdom. One effect of this is, that beer is the common beverage of all classes. The labourer seldom touches spirits of any kind, but his libations of strong, sweet, new beer are liberal and often deep. The effect of malt liquor in provoking gout and lithuria is undoubtedly great, and, if we contrast the beer-drinking Norfolk peasant with the milk and whisky-drinking Irishman, we shall probably be right in attributing somewhat of the prevailing lithuria to this habit.

Associated with the soil is the geological structure. Stretching diagonally across the south-eastern part of the kingdom is the great chalk-formation, and Norfolk may be considered almost its centre. Close beneath where we now stand there is a thousand feet in thickness of chalk; it crops out on the surface, is visible in every pit, and impregnates the superjacent deposits where itself dips deep. Corresponding to this south-eastern chalk-district there will be found a large amount of lithuria; both the death-rate and the hospital records combine to prove this, and I have the conviction that a more minute inquiry than I have been able to make would demonstrate even a still closer relation than I have been able to show. What reason can be assigned for this striking correspondence? The only probable cause that I can discover lies in the character of the drinking-water, and the only peculiarity of the drinking-water is its excessive hardness. That there is an excessive

amount of carbonate of lime in water derived from the chalk will probably be readily allowed. Mr. Sutton, the eminent chemist of this city, has given me the analysis of eighty different sources of water, chiefly well-water, from various villages of Norfolk, and I find that the average hardness is 33° of Clark's scale; while, from forty Government analyses of water from different towns, the average hardness is 11° , and from sixty-five different sources supplied to Government by Dr. Letheby the average hardness is 9.2° . I am aware that water supplied by public companies is generally less hard than that derived from wells; and I admit that we are not in possession of sufficiently detailed analyses of local sources of drinking-water to justify very close deductions. Still the broad fact remains, and I know no other peculiarity likely to act as a probable cause. The drinking of hard water has long and often been held to influence the production and growth of stone; but I know of no explanation or argument in favour of it, except that of Prout, who says, "that hard waters, in conjunction with other favourable circumstances, have a great influence in producing stone, I have no doubt; they derange delicate stomachs very considerably, and have a tendency to produce lithic sediments, though they generally act by causing a deposit of the crystallised sediments or gravel in those disposed to them." I am not competent to discuss the chemical action of lime-salts in leading to lithic acid deposit; but I note the fact, that both lime and lithic acid are exceedingly insoluble; that there is no chemical affinity between them; and that, although lithate of lime has been said to exist in the mixed lithates so often seen, no calculus has ever contained it. Is it not, therefore, possible that the constant filtration of lime in excess through the system may encourage the separation and deposit of lithic acid in the urinary passages? In seeking information on this point, I inquired of all my correspondents as to the hardness of the drinking-water in the various districts, and I found very varying statements: many were sceptical as to its having any influence; but the balance of evidence was in favour of stone cases being connected with hard drinking-water. I have seen so many instances of persons who have come to reside in Norfolk rapidly acquiring the lithic diathesis; of others who lose the tendency immediately they leave the county, and of others whose tendency varied with their residence even in the district while the habits of living have remained the same; that I know not how to doubt the effect of the drinking-water on them. Against this view, it has been urged that, if hard waters had any effect, they would show it in males and females equally; that hard waters prevail largely over soft in most places, and that the drinking of hard waters predisposes rather to the oxalic and phosphatic than to the lithic diathesis. In reply to the first objection, it may be said that all influences act more powerfully on men than on women, and that renal, if not vesical, calculus is frequent among women; that, although three-fourths of all drinking-waters may be hard, the waters coming from the chalk may have some special peculiarity, and that, in other places, as in Ireland, the hard waters may be counteracted by other favourable circumstances of food or drink. Moreover, in the midland districts, where, I believe, the water is very hard, I have shown that stone is also very prevalent. As to the effect of hard water in leading to the oxalic or phosphatic diathesis, as described by Dr. G. Harley and Dr. Murray, I can only say that, in my experience, it is not the fact in this district. I have now operated for stone in nearly two hundred cases, and I can only call to mind three cases in which oxalate-of-lime calculi were removed from adults, and these were curious: in one the central half of the stone is pure uric acid and the outer half oxalate of lime, and this patient left Norfolk, probably with a uric-acid stone in his bladder, to reside in North Wales, and immediately the uric acid became covered with oxalate of lime; the second case was in a Norfolk man who also had resided out of the county; and the third was a private in a Dragoon regiment who had very recently come to live here.

I leave this question of the effect of hard waters, therefore, as an undecided one, requiring fuller investigation, and especially the tracing the absence or prevalence of stone in other countries and connecting it with local influences or endemic causes.

Lastly, I have to say a few words on hereditary tendency and family predisposition as a cause of stone in this country;

and here I cannot help believing we have an influence acting slowly but potently. I can understand, and would maintain, that the hereditary influence must be slight as to its immediate effects, and must probably require the other favouring influences mentioned to act at all; but with them, in the course of generations and centuries, it would probably so grow and develop as to create in part the admitted abundance. Let me put the proposition in another way. Could we remove the present population of Norfolk into Ireland, and import the same number of Irish into Norfolk, it is probable that no great change would quickly follow in the respective manifestations of the lithic diathesis, but it is most probable that, in course of time, owing to the absence of endemic influences, the Norfolk diathesis would not maintain itself in Ireland, and the Irish substitutes here would as certainly acquire our tendency. I cannot appeal to statistics on this point, and therefore I may be excused for again referring to my own experience. I have never operated on a father and son, but I have very often traced the disease back to father and grandfather. In five instances I have operated on brothers, and in four other instances I have operated on one brother and other surgeons on another. Mr. Clubbe of Lowestoft has given us a curious history of a stone family. Three brothers were cut for stone by Mr. Clubbe; a fourth passed a stone; a fifth child died, aged three months, with every symptom of stone; a female child now has vesical irritation and bloody urine. The father and mother are constantly passing large quantities of lithic acid; the grandfather passed one stone, and the grandmother seven; a great-uncle was cut for stone, and six uncles and four aunts all suffer either with fits of gravel or from lithic deposits; and, to finish, a cousin passes calculi.*

There is considerable historical testimony in favour of this hypothesis. We know that Montaigne and his father both died of stone in the bladder, and we remember how he moralises on the incomprehensible wonders of the hereditary transmission of mental and bodily resemblances and infirmities. The celebrated minister, Sir Robert Walpole, and his brother Horace (who once represented this city in Parliament) were both afflicted with stone, and both resided in this county; and their mother also had stone.

What we know of the genesis and growth of stone would lead us to acknowledge both constitutional and local causes; and there is surely as much inherent probability in favour of its hereditary transmission as in that of gout, of cancer, or of scrofula. The difficulties in the way of admitting this influence in one case equally, or nearly equally, exist in the others, and are principally those which beset the whole question of inherited predisposition to disease. Dr. Richardson, indeed, objects to this theory, on the ground that stone is far less frequent in females than in males; whereas the tendency, he says, from the parent should pass alike to male and female. To this it may be replied, that the same influences which govern the transmission of gout chiefly in the male issue are equally dominant in the case of stone; and these influences consist in the harder living and the harder life, the greater exposure, and the rougher work of men beyond women. Besides, although the relative proportion of vesical stone in males and females is about 25 to 1, it is far less disproportionate as regards renal stone. I cannot, of course, give the relative proportion in the latter case; but it is unquestionably the fact that renal calculus in the female is common in this district.

Time warns me to conclude. Permit me to sum up by saying that in every part of the British Isles there is, so to say, a film of lithuria; that constitutional and individual causes act everywhere; that, in some places, local and endemic influences co-operate to thicken the film into a decided layer; in others, the constitutional tendency is counteracted by the local conditions. In this particular district, the local favouring influences consist, to a very trivial degree, in the cold climate; in the universal consumption of malt-liquor; possibly, I will even say probably, in the constant daily use of exceedingly hard drinking-water; and, lastly, in the accumulated effect of hereditary predisposition.

I cannot, however, pretend, in what I have written and read to-day, that a full and complete explanation of a very interesting and important fact is to be found. The subject is so abstruse in itself, so mixed up with profound physiological and chemico-vital processes, so intimately associated

* See THE LANCET, July, 1872.

with what essentially we know so little about—viz., the nutrition, the growth, and the decay of tissues and organs—that, in the present state of knowledge, we must, I fear, admit our darkness, and search and strive for increased light. I may, however, hope that I have stimulated, if I have not satisfied, the desire for fuller information; and if, by the help of such additional facts as have been adduced, and by the exposure of some errors and vague theories, the future search for truth may be made easier, I am content to believe that towards this end I have made a slight contribution, and have not wholly wasted a golden opportunity, or overtaxed your indulgent patience.

REPORT ON THE ISSUE OF A SPIRIT RATION DURING THE MARCH TO COOMASSIE.

By E. A. PARKES, M.D., F.R.S.,

PROFESSOR OF MILITARY HYGIENE IN THE ARMY MEDICAL SCHOOL.

(Communicated by the DIRECTOR-GENERAL OF THE ARMY
MEDICAL DEPARTMENT.)

IN accordance with the desire of the Director-General, I have brought together the evidence I have been able to collect on the issue of a spirit ration in the late Ashantee campaign. I need not refer to the gravity of the question whether, under the particular circumstances of the Gold Coast campaign, the issue of rum was desirable or the reverse. If the question could be completely answered, which is unfortunately not the case, it would be of great military importance.

Sir Garnet Wolseley adopted in this brilliant campaign the following plan:—Rum was carried with the troops, but was only issued on the recommendation of the medical regimental officers during the march from the coast to the Prah, and on the recommendation of the principal medical officer with the forces after the Prah was crossed. When issued, the quantity was half a gill (equal to $2\frac{1}{2}$ fluid ounces), and it was given in the evening after the fatigues of the day.

In seeking for evidence on the effect of this issue, I thought that the most reliable opinions would be given by those medical officers who had actually marched with their men to Coomassie, and on whom the responsibility of the issue was at first thrown; and I therefore applied to Dr. Troup, surgeon of the 42nd Regiment; to Mr. Wiles, surgeon-major of the 2nd Batt. Rifle Brigade; and to Dr. Allen N. Fox, who marched with the part of the 23rd Regiment which landed,—for information on this point.* And I have to thank these gentlemen very cordially for the information they have kindly put at my disposal.

The points on which I particularly requested information were as follows:—1. If any teetotalers were with the regiment, how did they compare with their comrades in marching power and in resistance to malaria? 2. In the case of the men who were not teetotalers, how did the issue or the non-issue of rum affect them? And what was the general conclusion as to the desirability, or not, of a rum ration which the history of the march led to?

I also asked, as a matter of course, for the opinion of Sir Anthony Home, who, though prevented by illness from marching to Coomassie, made all the medical arrangements, and who studied with the greatest care all the points connected with the preservation of the health of the men. My friend Dr. Kynsey, who was with the 1st Field Hospital, has also given me some important evidence, and has forwarded also the valuable opinion of Surgeon-Major Jackson.

I also thought it desirable to take down the evidence of some intelligent non-commissioned officers who made the march, and I shall give their evidence in their own words. I took the non-commissioned officers whom I found at Netley, and who were mentioned to me as intelligent and trustworthy.

* Dr. Fegan, who marched with the Naval Brigade, being on service on the coast, I have been unable to obtain his evidence.

The evidence is arranged in the following order:—

From Dr. Troup, 42nd Highlanders.

„ Mr. Wiles, 2nd Batt. Rifle Brigade.

„ Dr. A. N. Fox, 23rd Welsh Fusiliers.

„ Sir Anthony Home, Deputy Surgeon-General.

„ Dr. Kynsey, 1st Field Hospital.

„ Sergeant-Major Barclay, 42nd Rifles.

„ Sergeant Kemp, 2nd Batt. Rifle Brigade.

„ Sergeant Baker, „ „

„ Sergeant Perrin, Army Hospital Corps.

„ Corporal Rose, „ „

„ Corporal Haidley, „ „

After adducing this evidence, I shall venture to state the impression it has made upon me.

EVIDENCE FROM THE 42ND REGIMENT.

Letter from Dr. TROUP.

Portsmouth, May 8th, 1874.

Having instituted inquiries regarding the number and health of the teetotalers of the 42nd Regiment while engaged in the late campaign of 1874 to Africa, I have compiled the enclosed table. I have brought together all the information I can, taking their previous medical history from the Medical History Sheets. This table shows a very favourable state of health, even under very adverse circumstances, there having been but little sickness amongst them. A large proportion of them have served in India, and suffered there from tropical ailments. I cannot overlook the fact that, taking the life of the soldier under every circumstance, the total abstainer or temperate man has the advantage, preserving his health better, and performing his duty better, and in his older years withstanding climatic influences which, as a younger man, upset him. Some of the soldiers recorded in the return have displayed wonderful health on the West Coast of Africa even under extreme fatigue and exposure. I hope this table may corroborate in some degree the good that may be effected by temperance. Most of the men recorded are personally known to me. A large proportion are men of exceptionally good physique, and I feel quite sure that, with their good intentions and actions, personal good has followed, and a proportionate advantage to the State.

My opinion all along has been the same, and our little war of 1874 has corroborated it, that while men are careful to be temperate they are more careful in other respects, and not so open to those abuses on the line of march which in many cases open the door for disease, and, in the end, give rise to so much mortality and invaliding in the service. This table shows a large proportion of non-commissioned officers and old soldiers, whose experience is worthy of being recognised—and who have taken to teetotalism, some from the want of control, others from the opinion that indulgence in alcohol is hurtful, while others have taken to it from their great susceptibility to its influence, when taken even in moderation. The influence and example of such men must be all-powerful in regulating the conduct of the young men who are drafted into the service, a large number of whom, in the 42nd, come from country avocations in Scotland, born of respectable people, and many of whom on first joining have never indulged to any extent in drinking, and some of whom have never even smoked. This class of recruit, who has never tasted of the dissipation of a town life, can at once be recognised on the primary inspection, presenting alike a good physique and purity of respiratory and circulatory systems, and far superior in every particular to the generally dissipated townsman, with his bloodshot eye and his throbbing and over-excited heart. To such, then, coming from his country home to a life so new to him, a continuance of temperate habits, aided by the example of his superiors, would be fraught with the greatest possible advantage both to himself and the State. During my service I have often had to lament the results of incipient drinking in the young soldier, crime generally commencing with it, and in company, or soon after, disease, the two, as it were, joining hands together; whereas the young and temperate recruit is but seldom seen by the medical officer either in confinement or in hospital. It is a recognised fact that the Medical History Sheet will tell what the Defaulter Sheet is, and if we trace the cause we generally find it to be intemperance. While, however, supporting total abstinence, or at least abstinence from alcoholic stimulants, as rum &c., as part of the soldier's allowance in ordinary times and under favour-