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Index. E. X. J. Thornton 6/12/46

31 Dublin Journal. Vol XXVIII - 1845

32. A Genral Index to the Dublin Medical Journal from Vol. I. to XXVIII. 1845
Thornton

33. The American Journal of Science and Arts. Silliman - 1846

THE

DUBLIN JOURNAL

OF

MEDICAL SCIENCE,

&c. &c.

THE

DUBLIN JOURNAL

OF

MEDICAL SCIENCE;

EXHIBITING

A COMPREHENSIVE VIEW

OF THE

LATEST DISCOVERIES

IN

MEDICINE, SURGERY, AND THE COLLATERAL SCIENCES.

VOL. XXVIII.

DUBLIN:
HODGES AND SMITH, GRAFTON-STREET,
LONGMAN AND CO., AND SIMPKIN, MARSHALL, AND CO., LONDON;
MACLACHLAN AND STEWART, EDINBURGH; AND
SMITH AND SON, GLASGOW.
MDCCCXLV.

DUBLIN:
PRINTED AT THE UNIVERSITY PRESS,
BY M. H. GILL.

THE

DUBLIN QUARTERLY JOURNAL

OF

MEDICAL SCIENCE;

INCLUDING THE LATEST DISCOVERIES IN MEDICINE, SURGERY, AND THE COLLATERAL SCIENCES, ETC., ETC.

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The Dublin Medical Journal was the first successful Periodical, either literary, medical, or scientific, which emanated from the Irish Press during the present century. It was commenced in March, 1832, and has now reached to twenty-eight volumes, in which will be found the best record of the modern School of Medicine in Dublin; for there is no Physician or Surgeon of eminence in this city who has not contributed to its pages. It has long enjoyed a European and an American reputation, chiefly arising from the great value of its Original Communications; and the volumes already published embody the largest collection of facts in Pathology, Practical Medicine, Surgery, and Midwifery, that can, in all probability, be found in any Journal in the British Empire. It is, besides, copiously embellished with Copperplates, Lithographs, and Wood Engravings. The great scarcity of some of the early Numbers has induced the Publishers to reprint several volumes. From this reprint an opportunity is now afforded, to those who wish it, of completing their sets at a moderate cost. They have also, with considerable labour and great expense, compiled and arranged a full and complete Index to the twenty-eight volumes, amounting to 126 pages, which they now issue with the eighty-third Number for the ensuing month.

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Dublin, 25th October, 1845.

Dublin : Hodges and Smith, Grafton-street ;
London : Longman and Co. ; Simpkin and Co. ; and W. Orr and Co.
Edinburgh : Maclachlan, Stewart, and Co. ; and Sutherland and Knox.
Glasgow : Smith and Son.

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2. On Cataract, and its appropriate Treatment by the Operation adapted for each peculiar Case. By Charles Gardiner Guthrie, Assistant Surgeon to the Royal Westminster Ophthalmic Hospital. London, Churchill, 1845. pp. 127. Plates.

3. The Chemistry of Vegetable and Animal Physiology. By Dr. G. S. Mulder, of Utrecht. Translated from the Dutch, by Dr. P. F. H. Fromberg, with an Introduction by James F. W. Johnston, F. R. L. S. Part II. Edinburgh, Blackwood and Sons, 1845.

4. Outlines of Chemistry, for the Use of Students. By William Gregory, M. D. Part II.—Organic Chemistry. London, 1845. 12mo. pp. 588.

5. The Cold Water Cure, its Use and Misuse, examined. By Robert Mayo, M. D., F. R. S. London, Henry Renshaw. 12mo. pp. 86.

6. A practical Treatise on Inflammation, Ulceration, and Induration of the neck of the Uterus; with Remarks on the Value of Leucorrhœa and Prolapsus Uteri, as Symptoms of Uterine Disease. By James Henry Bennett, M. D., &c. &c. London, Churchill, 1845. Small 8vo. pp. 212.

7. An Inquiry into the physiological and medicinal Properties of the Aconitum Napellus; to which are added Observations on several other Species of Aconitum. By Alexander Fleming, M. D., &c. London, Churchill, 1845. Small 8vo., pp. 160.

8. A System of Surgery. By G. M. Chilius, D. d. M. u. C. Heidelberg. Translated from the German by J. F. South, Surgeon to St. Thomas's Hospital. Part V. London, Renshaw, 1845. 8vo. pp. 385 to 480.

9. The Pharmaceutical Latin Grammar, being an easy Introduction to Medical Latin, the London Pharmacopœia, and the Perusal of Physicians' Prescriptions. By Arnold James Corley. London, Greombridge and Sons, 1845. 12mo. pp. 132.

10. Die Specielle Pathologie und Therapie, von Klinischen Standpuncte aus bearbited. Von Dr. C. Canstatt, Band Ueferung iii. 7. 8vo. Erlangen, 1844.

11. Zeitschrift der k.k. Gesellschaft der Aerzte zu Wien. Redakteur, Dr. Franz Zehetmayer. Juli, 1845.

12. The Medico-Chirurgical Review and Journal of Practical Medicine, for July, 1845.
13. The Edinburgh Medical and Surgical Journal, for July, 1845.
14. The London and Edinburgh Monthly Journal of Medical Science, for July, 1845.
15. The British and Foreign Medical Review, for July, 1845.
16. The Provincial Medical and Surgical Journal, for July and August, 1845.
17. The Medical Examiner and Record of Medical Science. No. 5. May, 1845. Philadelphia.
18. The Half-Yearly Abstract of the Medical Sciences. By W. H. RANKING, M. D., Cantab., Physician to the Suffolk General Hospital. Vol. I., January to June, 1845. London, Churchill, 1845. pp. 384.
19. The London Medical Gazette, for July and August.
20. Gazette Médicale de Paris.
21. Archives Générales de Médecine de Paris. Juillet, 1845.
22. The Pharmaceutical Journal and Transactions. Edited by JACOB BELL. No. 2, for August, 1845.
23. Cases in Surgery occurring in the Practice of P. D. Handyside, M. D. Extracted from the London and Edinburgh Monthly Journal of Medical Science. 8vo. pp. 28.
24. Observations on the Mechanism and diagnostic Value of the Friction Vibrations perceived by the Ear and Touch in Peritonitis. By ROBERT SPITTAL, M. D., F. R. S. E.; extracted from the London and Edinburgh Monthly Medical Journal. 8vo. pp. 19.
25. Report of the Montrose Lunatic Asylum, 1845. 8vo. pp. 26.
26. Report of the Medical Missionary Society in China. Macao, 1844. pp. 35.
27. The Vision of Objects on and in the Eye. By WILLIAM MACKENZIE, M. D.; from the Edinburgh Medical and Surgical Journal, No. 164. Edinburgh, Stark and Co., 1845. 8vo. pp. 62.

The communication of "A Member of the London College of Physicians," relative to Dr. Ramadge, has just been received, but we make it a rule never to insert anonymous contributions. If the writer will forward us his name and address, we will read his letter and take the matter into consideration.

We have to record the death of one of our eldest contributors, Dr. John Houston, M. R. I. A., ex-Curator to the Museum of the Royal College of Surgeons, and one of the Lecturers on Surgery in the School of Medicine, Park-street, which took place since the publication of our last Number. This talented member of the medical Profession had laboured for many years, and not in vain, to advance the cause of zoological and anatomical science, practical surgery, pathology, and general medical literature in Ireland. The recent date of the event precludes the possibility of a more extended notice; but we hope, in a future Number, to bring a short summary of his writings before our readers.

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4. Zeitschrift für die Gesammte-Medicine mit besonderer Rücksicht auf. Hospitalpraxis und Ausländische Literature. Von F. W. Oppenheim. For June, July, and August, 1845.

5. Zeitschrift der K. K. Gesellschaft der Aerzte zu Wien. Redakteur Dr. F. Zehetmayer. Juni, Juli, August, 1845.

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13. Ovariotomy. By George Southam, Surgeon to the Salford Royal Hospital and Dispensary, Manchester. Salford, 1845, 8vo. pp. 11.

14. A Report of the Opening of the Norwich and Norfolk Hospital Museum, on the 10th of September, 1845. Norwich, 12mo. pp. 16.

15. Provincial Medical and Surgical Journal. Nos. 35, 39, 40, 1845.

16. The British and Foreign Medical Review for October, 1845.

17. An Essay on the Use of Narcotics, and other remedial Agents calculated to produce Sleep, in the Treatment of Insanity, for which the Author obtained the Lord Chancellor's Prize in Ireland, awarded by the President and Fellows of the King and Queen's College of Physicians. By Joseph Williams, M. D. London, Churchill. Dublin, Fannin and Co. 1845. 8vo. pp. 120. (To be reviewed in our next.)

18. Reports of the Medical Officers of the Lunatic Asylum for the County of Lancaster, for 1844 and 1845.

19. An Introduction to the Study of Homœopathy. Edited by J. J. Drysdale, M. D., and J. Rutherford Russell, M. D. Edinburgh, Maclachlan and Co., 1845, 8vo. pp. 253. (To be reviewed in our next.)

20. An Inquiry into the Homœopathic Practice of Medicine. By W. Henderson, M. D., Professor of Medicine and General Pathology, and lately one of the Professors of Clinical Medicine in the University of Edinburgh. Edinburgh, Maclachlan and Co., 1845. 8vo. pp. 245. (To be reviewed in our next.)

21. Pulmonary Consumption successfully treated with Naphtha. Second Edition. By John Hastings, M. D., Senior Physician to the Blenheim-street Dispensary. London, Churchill, 1845. 8vo. pp. 260. (To be reviewed in our next.)

22. The Monthly Journal of Medical Science. Edited by J. R. Cormack, M. D. Edinburgh. No. 57, Sept. 1845.

23. The Medico-Chirurgical Review. No. 86, for October.

24. Elements of Materia Medica and Therapeutics. By Edward Bal-

LARD, M. D. and ALFRED BARING GARROD, M. D. London, 1845. Taylor and Walton. 8vo. pp. 447.

25. On Diseases of the Liver. By GEORGE BUDD, M. D., F. R. S., 8vo. pp. 401. London, Churchill, 1845. (To be reviewed in our next.)

26. On the Analysis of the Blood and Urine in Health and Disease; and on the Treatment of urinary Diseases. By G. OWEN REES, M. D., F. R. S., F. G. S., &c. Second Edition, 8vo. p. 218, London, Longman and Co.

The present Number concludes the twenty-eighth volume, and the first Series of the Dublin Journal of Medical Science, with which is also published a complete Index to the twenty-eight volumes, amounting to 126 pages, and which also includes the Index to the present volume.

The first Number of the new Series, under the title of the "Dublin Quarterly Journal of Medical Science," will be published on the 1st of February, 1846, for particulars of which see Prospectus.

ERRATUM.

Page 163, line 30, *for* "conium" *read* "tubers."

THE DUBLIN JOURNAL OF MEDICAL SCIENCE,

SEPTEMBER 1, 1845.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Illustrations of infantile Pathology*, No. III. *Ulceration of the Gums in Children occurring in an Epidemic Form.* By JAMES F. DUNCAN, A. M. M. B., Fellow of the King and Queen's College of Physicians in Ireland; Physician to the North Dublin Union Workhouse; Lecturer on the Theory and Practice of Physic in Park-street School of Medicine, &c.

[Read before the Medical Section of the British Association at Cambridge.]

IN bringing under the notice of the Medical Section of the British Association the following outline of a description of epidemic, which I have had the opportunity of witnessing last winter in Dublin, I think it right to mention that the Institution with which I am connected, and in which the cases about to be detailed occurred, besides accommodating a large number of other inmates, usually contains from sixty to eighty infants under two years of age, in itself a most interesting field of study. This will be easily understood, when it is recollected that they are all taken from the poorest and

most wretched of the population: that many of them are admitted in a state of actual disease, and that all are peculiarly exposed to the effects of contagion, from the continual introduction of strangers, who, in many instances, are but recently recovered from infectious disorders, and retain their peculiar poisons, though not perhaps their obvious symptoms. Added to all this, the fact of their living together in intimate intercourse at all times, occupying the same apartments, and eating at the same table, at a period of life too when the propagation of disease is most easy, cannot fail to render the development and spread of sickness among them unusually frequent, and difficult of prevention. In saying this I do not mean it to be understood that no care is bestowed upon the separation of the sick from the healthy, but it must be obvious to every one that the attempt, however carefully made, must be attended with peculiar difficulties, and must often fail under the circumstances I have described. In diseases of an infectious character there is always an interval of latency, during which its true nature cannot be positively determined. To remove every case of a doubtful aspect from the common ward would require a much larger amount of spare accommodation than can be commanded in an Institution like a workhouse, calculated to hold two thousand persons; to leave them till a positive opinion can be pronounced, is almost certain to ensure the propagation of the complaint.

It follows from this, that the amount of illness in such an Institution must necessarily be larger than the mere number of inmates would lead us to expect. But besides this, the workhouse physician has the opportunity of observing disease presenting itself in peculiar and novel forms, and assuming a character different from what is usual elsewhere. The state of the constitution seems to differ, and the remedies required for the proper treatment of the cases differ in a remarkable manner from what he finds it necessary to order to other patients. Thus tonics of various kinds are required

to a much larger amount, and are borne at an earlier stage of disease than would be considered justifiable in other circumstances. Diseases too, such as diphtherite, muguet, &c., which are but seldom met with in ordinary practice, are by no means unfrequent there. The example which is to form the subject of this paper, may be looked on as an illustration of this position. The disease to which I allude is a very severe and fatal ulceration of the gums and mouth of young children, attended with high fever, and apparently of an epidemic origin. At least I have never observed any case of the complaint in the workhouse, during the five years it has been opened, till the last winter, and since then I have met with eight or nine instances. The age of the patients varied from about a year and a half to five years. I have no reason to believe it infectious, but in more than one instance it attacked a second member of the same family. Generally speaking, the attack was preceded for some days by diarrhœa; but from the period of life corresponding often with the occurrence of dentition, this feature was not always sufficient to attract the attention of the mother, and little was done to arrest its progress till the condition of the mouth was observed. The children at first did not seem to suffer pain in the bowels, and could bear the usual pressure of manual examination without inconvenience. The alvine evacuations were usually unhealthy, but they differed in appearance in different cases. Sometimes they were thin and watery, but not deficient in bile; more generally they were whitish, and exceedingly offensive; and in almost all of them blood was discharged, either in a fluid state or mixed with jelly-like mucus. When this diarrhœa had continued a week or ten days, the mother would mention that the child had a sore mouth, and on examination it would be found that the gums were ulcerated, and the fangs of the teeth exposed, and covered with a yellowish white sordes. According as the disease advanced, the gums lost their pale flesh colour,

and became red, swelled, and spongy, and the margins exhibited a tendency to bleed, both spontaneously and on being touched. In one case, where the diseased condition of the mouth had not previously been noticed, hæmoptoe occurred in so marked a form as to be regarded by the anxious mother as confirmatory of her suspicions that the child was far gone in consumption, an opinion she had already formed, and not without reason, from the peculiar and long-continued delicacy of appearance of the child. On examining the mouth the true source of the sanguineous discharge was detected. The breath gradually became offensive, and the secretion of the salivary glands increased, so that the saliva used at times to flow from the mouth, and even to wet the pillow on which the patient lay. Partly from the attending fever, but principally from the tender and inflamed state of the gums, the children were unable to take food, but their thirst was often excessive. In no instance did I observe the teeth to fall out; probably because, in fatal cases, death took place, from the constitutional irritation running so high, before the local affection had time to produce its legitimate effects. I did not examine the teeth, to ascertain whether they were loosened in their sockets or not. At first the disease did not appear urgent, but as soon as the ulceration of the gums took place, and especially if appropriate means to arrest its progress were not adopted, it advanced with considerable rapidity to a fatal termination. When this event occurred it seemed due rather to the violence of the attending fever, or the intractable persistence of the diarrhœa, than to any peculiar changes effected in the condition of the mouth. In some of the cases the disease seemed to be arrested for a time, the diarrhœa being completely checked, the alvine evacuations improved, the appetite restored, and every symptom of a permanent convalescence being visible, when, after a time, the former symptoms would return in a severer form, and resisting all measures of a remedial nature, hurry the victim to

the grave. The condition of the gums, presenting a certain superficial resemblance to the usual effect of the administration of mercury on these organs, might easily lead to serious mistakes as to the real cause of this affection; and involve the attending practitioner in undeserved reproach. In the present instances I have no hesitation in saying that the disease originated in a constitutional condition, and not at all in the use of that mineral: an opinion in which I am sure the members of the section will agree when I mention that some of these children had been for months in the house previous to the attack, and had taken no medicine of any kind for a long period before; and that while I have always been in the habit of using mercurial preparations with the freedom that seemed necessary for the proper management of those important inflammations to which children are liable, I have never had an opportunity of witnessing the disease till the commencement of the last winter. It is true that in both cases we observe ulceration of the gums, fœtor of the breath, and increased secretion of saliva, but these symptoms differ in a remarkable manner in the idiopathic and mercurial gingivitis, as will be fully explained hereafter. Mercury, so far from having a tendency to produce the disease, I have found can be safely exhibited while it exists, and exerts rather a beneficial influence in checking its advance.

That an impaired state of the constitution is the true cause of this affection, may, I think, be inferred from a variety of circumstances connected with its history. I have already alluded to the fact of its having been found, in two instances, to attack two members of the same family, and this not depending so much on proximity of place, as on similarity of habit, either natural or acquired. The red and swollen and spongy condition of the gums, with their tendency to bleed, naturally points out some analogy between it and purpura hæmorrhagica, an opinion still further confirmed by the sanguineous discharges by stool that have been noticed

in every case I have met with. The following case, interesting as it is in itself, derives additional importance when viewed in connexion with this disease, as illustrating the opinion just broached.

Case I.—*Congestive Bronchitis; Measles; Purpura.*

Mary Kane, an infant 10 months old, enjoying excellent health, notwithstanding the unfavourable circumstance of her having been spoon-fed from birth, was admitted into hospital Nov. 8, 1844, labouring under congestive bronchitis in a very severe form, and which had nearly suffocated her before she was brought in. She was ordered a stimulating expectorant mixture, containing carbonate of ammonia and hippo wine, which agreed very well, and relieved the urgency of the symptoms. On the 17th she was attacked with diarrhœa, the usual prelude to an epidemic of measles, then raging in the house, which came out favourably on the 18th, though the bronchitis continued. This was treated by minute doses of calomel and ipecacuanha, and an ounce of wine, mixed with water, to be taken through the day. On the next day the eruption, though still out on parts of the body, had receded through its greater extent: but what excited considerable surprise was the appearance of several distinct spots of purpura in front of the neck, partly of a florid and partly of a dark colour. Unlike the eruption of measles, these spots were not elevated above the surface, nor did they disappear on pressure with the finger. The recession of the eruption of measles was not due, as might be supposed, to the exhibition of calomel and hippo irritating the intestinal mucous membrane, for the quantity ordered was very small, extending only to a quarter of a grain of the former, and one-sixth of a grain of the latter; nor had they acted on the bowels, which were reported to be slow. It was, in fact, a common occurrence in that epidemic of measles. The development of the purpura, which was subsequently noticed in several

other cases of measles about the same time, derives its interest and its connexion with the present subject from the fact that this child's brother was attacked with the ulceration of the gums, in a well-marked form, a short time previously. Under the use of an acidulated infusion of bark, this child rapidly improved in health; the spots of purpura became brighter and smaller, and ultimately disappeared. She was discharged perfectly well.

The importance of establishing a clear and satisfactory diagnosis between this disease and the common form of mercurial ulceration of the mouth is so self-evident, that I am sure it needs no apology on my part for dwelling on it more at large than would otherwise come within the purpose of the present paper. And as all the reasoning about to be produced in support of the opinion, that in no respect is mercury to be regarded as an exciting cause of the disease, applies with equal force to cancrum oris, I shall take the liberty of referring to it at some length, as being more generally known, and as being still the subject of dispute as to its real origin. Indeed I think it may be fairly inferred that the two affections differ only in intensity. The infant constitution in the one yielding to the violence of the fever, before the local gangrene has developed itself. This is confirmed by the circumstance that since this paper was read at Cambridge, another case has occurred in a child, and ran on to actual gangrene of the cheek. Many persons believe that although some cases of cancrum oris occur independently of mercury, the majority of those usually met with arise from the incautious use of this medicine, and that blame is of course to be attached to those persons who have been the agents of its administration. Were this opinion to be sanctioned by authority, we should be obliged to abandon the use of this most valuable class of medicines under all circumstances, for as no one can discover beforehand the existence of that peculiar idiosyncrasy which, according to this hypothesis, de-

termines the danger of using them, the only alternative that would be left to us would be the total disuse of mercurial preparations on the one hand, or the risk of occasionally producing this dangerous result. But if it can be shewn, as I think it can, that mercury has nothing whatever to say to the disease, that even when it has been administered conjointly with the occurrence of the affection, it is entirely beside the line of causation, all this unpleasant apprehension will necessarily vanish, and we shall be enabled, on fitting occasions, to avail ourselves of the assistance that these medicines are calculated to afford.

The importance of this point will be better understood when it is recollected how very frequently, even of late years, accusations have been brought against medical men of unskilful treatment, or even of causing the death of their patients by the exhibition of mercury, when the occurrence of cancrum oris was the real cause of the calamity. In many cases, it may be presumed, the unkind suspicion has been permitted to rankle silently in the breast of the surviving relatives, and to operate to the prejudice of the professional man in their subsequent intercourse with him. And in other instances, where less delicacy has been felt, the charge has been publicly preferred, and the unoffending physician has been dragged, on a coroner's warrant, into open court, to answer the accusation at the bar of public opinion. In these cases it is almost needless to add, that whatever may be the verdict of the jury, an unfavourable impression is apt to remain on the minds of the public; to be accused is tantamount to be convicted. Few persons take the trouble to inform themselves correctly of the true state of affairs, and of those who do few are candid enough to be convinced by the arguments they hear, in opposition to the weight of previous prejudices and long-cherished opinions. The following case, copied from Dr. Taylor's Manual of Medical Jurisprudence, illustrates this statement in a remarkable manner:

A boy, æt. 3 years, while suffering under an attack of measles, took small doses of mercury by the prescription of a physician. Soon after the administration of the medicine the child became worse, the mouth became inflamed, dark, and discoloured, and the teeth dropped out. He died in a few days. A practitioner who had been called in subsequently, pronounced that the child had been excessively salivated. Mercury had been undoubtedly taken, and it was proved that the person who dispensed the medicine did not weigh it. An inquest was held, and a verdict returned that the child had died from an overdose of mercury.

But a still stronger instance occurred to Dr. Marshall Hall, who was himself one of the first to bring the disease under the notice of the Profession, in the Edinburgh Medical Journal. It is put upon record in the Lancet for 1839–40. He there states that he was summoned as consulting physician to the Western Dispensary, London, to visit a little boy, in Nov. 1839, aged 4 years and 4 months, at No. 28, Charles-street, Lisson-grove. Two gentlemen met him in consultation there. On examination he found the boy affected with gangrena oris. He explained the nature of the case fully to both the parents at the time. What was his surprise to find, after the death of the boy, that the father had demanded an inquest, under the suspicion that the affection of the mouth and cheek was the effect of the calomel that had been prescribed for his son! He does not mention what was the verdict returned in the case, but it is easy to see, that had the gentlemen in attendance been ignorant of its real nature, or had they not taken the obvious precaution of explaining beforehand its probable result, they would have left themselves open to very unpleasant consequences. It is to be feared, that in many instances where a second practitioner is called in to cases of this kind, and the suspicion of improper management is raised in the mind of the distressed relatives,

the unjust accusation is to be traced to the unworthy motive unhappily to be found in dishonourable minds, of endeavouring to advance their own interests by the sacrifice of another's reputation. But however true this may be in certain cases, I think it is probable, that generally where such a charge is advanced, the real circumstance that has led to its adoption has been ignorance of the true nature of the disease, and confounding it with an affection to which it bears some resemblance, but from which it differs essentially.

It is quite plain, that in order to sustain such an opinion as that mercury is the real cause of cancrum oris, it would be necessary, on the part of the advocates of that opinion, to prove that it never occurs except in persons to whom that mineral has been administered, a proposition that is known to be decidedly erroneous. Many cases are upon record where not a single particle of mercury had been administered, in any form or shape, internally or externally. Dr. Taylor, in the work already quoted, gives an instance of a case which occurred in August, 1840, where a charge was brought against a medical practitioner of having caused the death of a child aged 4 years, by administering an over-dose of some mercurial preparation. The child had been labouring under hooping-cough, for which some medicine was prescribed. On the fourth day he complained of soreness of the mouth, the teeth became loose and fell out, the tongue and cheek were very much swollen, and the child died in the course of a few days from gangrene in the left cheek. The answer to the charge was, that not a particle of mercury had been exhibited, a fact clearly proved by the production of the prescription-book of the medical attendant.

But while it must be admitted that there are few members of the Profession who maintain that the use of mercury alone is the cause of the disease (although such an opinion is the only one that could justify the charge of *mala praxis* brought

forward in these cases), I think it will not be denied by any one conversant with the sentiments at present prevailing in the medical world, that a modification of this view is generally entertained, namely, that the use of mercury is sufficient to produce it in certain states of the constitution, either original or acquired.

The advocates of this opinion maintain that the development of the disease is due to a combination of causes, of which the untimely administration of mercury is one. They consider that the peculiar predisposition observed in these cases is one which tends to the production of gangrene from slight causes, and that the administration of mercury, from its natural tendency to excite the salivary organs, gives the requisite direction to the development of that gangrene in the gums and cheek.

Now while it is evident that such an hypothesis, however ingenious for the explanation of those cases in which the previous use of mercury can be clearly proved, will not enable us to understand how it happens that in others, where no mercury has been taken, the disease occupies the same situation, and presents the same symptoms. It must be admitted to be a matter of some consequence to determine the point, whether, in those cases in which mercury has been used, the mercury has had any thing to say to the production of the disease; for if so, it follows as a matter of course that all the preparations of that mineral must be excluded from the subsequent treatment of the case; and if otherwise, there will be nothing to prevent our resorting to their assistance, should there arise anything in the course of the case to warrant our doing so.

The principal arguments in favour of this hypothesis appear to me to be deduced from the situation of the affection and the symptoms it produces. Let us examine them a little more closely. In cancrum oris, as well as in mercurial action, we have ptyalism, fœtor of the breath, ulceration of the

gums, and loss of teeth; but these symptoms, when carefully examined, do not present the same appearances in the two cases.

In the first place, the salivation that attends cancrum oris, though distinct, is moderate in quantity, and altogether unlike that which attends the excessive use of mercury. Then the fœtor of the breath does not present the peculiar and characteristic odour by which we are enabled, even in doubtful cases, to recognize the incipient effects of this medicine. But the ulceration of the gums is, perhaps, the most satisfactory proof of all, because, unlike the ordinary appearances of mercurial ulceration, it is generally confined to *a part only* of the alveolar process. Usually it is found engaging both the upper and lower jaw upon one side of the mouth, while the other side is perfectly healthy; and occasionally it is not even so extensive as this, a few teeth only in one jaw being thus affected.

In support of this assertion, which, indeed, is too well known to require proof, I cannot adduce a more interesting instance than the one already quoted on the authority of Dr. Marshall Hall, which was made the subject of inquisitorial examination. The child had been labouring under pneumonia of the lower lobe of the right lung, for the cure of which the gentleman in attendance had been induced to order calomel. It took fifteen grains in about a fortnight, and the existence of the pneumonia was established in the *post mortem* examination. The condition of the mouth and gums was examined with the greatest care by Dr. M. Hall himself, and with a special reference to the question immediately before the coroner; and he reports that the tongue was perfectly free from tumefaction, ulceration, or other morbid condition; the gums and internal parts of the cheek, excepting those affected with gangrene, were also free from any morbid appearance, and the teeth were perfectly firm in their sockets: and he concludes his account with the following observations: "The facts last-mentioned are, in my opinion, definitive as to the question of this affection having arisen from calomel. Not to mention the extreme rarity of ptyalism in children, in cases in which many times more calomel has been given, it is well-known to every observer that the effect of calomel, when it does take place, is *uniformly diffused* over the gums, tongue, and internal parts of the cheek."

The arguments, therefore, in support of the opinion, that the development of the disease is due to the action of mercury upon an unhealthy constitution, are, I think, capable of being explained away easily, and without force. It remains for me to state those of an opposite tendency, and which, joined to the observations already made, will be sufficient to convince every candid mind of the truth of the view advocated in this Paper. In the first place, the disease is almost exclusively confined to children, who, it is well known, are scarcely at all susceptible of the ordinary effects of mercurial action: very few instances, indeed, have occurred in persons beyond the age of seven years; and even within this limit the frequency of the affection is by no means proportioned to the commonness of the use of mercury. Cancrum oris is to be looked upon as rather a rare disease, while the use of mercurial medicines in infantile affections is exceedingly common.

Again, it is well known that the existence of fever is quite sufficient to prevent the usual physiological effects of mercury developing themselves so long as the vascular excitement continues, and that the manifestation of ptyalism indicates, if nothing else does, a remission in the violence of the constitutional disturbance. Now it has been observed by the best writers on this disease, that it is always connected with this very state of the system, in which, under other circumstances, it is so difficult to salivate the patient; besides, it is a curious phenomenon connected

with the disease, and altogether different from what we should otherwise expect, were mercury its cause, that the violence of the symptoms is not by any means proportioned to the quantity of the mineral taken. The severest cases often occur where the smallest quantities have been administered, and *vice versâ*.

But perhaps the strongest and most important argument in support of this view is that which is derived from the effects of remedies. I have already stated, that if mercury be the exciting cause of the disease, it would be worse than useless to think of administering any of its preparations in the subsequent treatment. Now it is a remarkable fact, that many cases have been treated by a judicious use of those medicines, not only without injury, but, combined with other measures, with perfect success. Dr. Cuming, of Armagh, who has written an excellent Paper on the disease, at a time when it was less generally known than at present, in the fourth volume of the Dublin Hospital Reports, did not hesitate to use calomel, in combination with jalap, in a case which required the use of purgatives, and which ultimately succeeded. I have myself resorted to this practice in some of the few cases that have fallen under my notice, and, so far from observing any bad effects to follow, I have uniformly found them preferable to the other forms of purgative medicine in general use with children. Indeed, when proper attention is paid to the condition of the digestive organs in this affection, and to the character of the alvine evacuations, it will generally be found that they are either so deficient in bile, being usually of a whitish, clayey appearance, or so morbid otherwise as naturally to demand the use of those remedies which especially excite the action of the liver.

In the views we are led to form of different diseases the scientific physician will often avail himself of the assistance that analogy is capable of affording: he investigates them very much in the same way that a botanist or a natural historian examines the subjects of his peculiar study. He endeavours, by a careful investigation of their external characteristics, to group them into classes, not for the purpose of artificial distribution, but to enable him to form a more exact perception of their real nature, and to guide him to sound principles of successful treatment. When similarity of nature has been established, similarity of treatment follows as a matter of course. Now it is universally admitted that cancrum oris exhibits a very evident analogy to the gangrenous ulceration of the pudendum that occurs in young females. In their general appearance, and in the history and progress of the two affections, this analogy is sustained. Now Mr. Kinder Wood, whose paper in the seventh volume of the Medico-Chirurgical Transactions was the first to call attention to the subject, expressly points out the unhealthy condition of the digestive organs in the cases he had met with, and the necessity of correcting their secretions by mild alterative aperients. Now this, I conceive, on the principles already referred to, must be regarded as confirmatory of the opinion I have just advanced, namely, the safety of using mercurial preparations in the treatment of cancrum oris.

The occurrence of the following case of gangrenous ulceration of the pudendum, during the period of the epidemic which forms the subject of this Paper, may be thought to complete, in some measure, the chain of evidence upon which I wish to suspend the proof of a common origin to all these affections.

Case II.—*Measles; Prostration; Gangrena Pudendi.*

Sarah Finlay, 2½ years of age, was admitted into hospital Nov. 9th, 1844, labouring under an attack of measles, which was remarkable for the degree of diarrhœa which attended it, as well as for a severe and general bronchitis, which diminished under the treatment adopted.

On the 14th, five days after her admission, she com-

plained much of debility; her limbs were almost cold, and she had little appetite.

Vini ℥ ii.
M. Cinchon. c. acid. ℥ ss. ter.

Nov. 16. On making water this morning she passed some blood with great pain, and on examining the parts we found them red and swollen. On separating the labia the internal membrane was of a dark purple colour, and two ulcers appeared, one on either side of the clitoris, about the size of a split pea, black in the centre, surrounded by a whitish slough; a smaller one was situated on the free edge of the clitoris. Bowels were less purged; dejections watery, dark, and offensive; and there was complete loss of appetite. The ulcers were freely touched by Mr. Gordon with solid nitrate of silver, and a poultice of flaxseed meal subsequently applied. The quantity of wine was increased to four ounces, and she was directed to take half an ounce of the bark mixture every second hour.

The next day we found that she had slept better the preceding night than she had done for some time previously. There was a great diminution of the inflammation about the labia pudendi; the slough had come away from one sore, leaving a pale, indolent ulcer. She passed but little urine. The bowels were less purged. The tongue was still white; and the loss of appetite continued. Nothing tended to shew more plainly the manifest improvement that had taken place in the little patient than the change in her manner and appearance. Though suffering, as she did, from the application of the caustic with which the sore was again touched, and crying constantly, yet she voluntarily sat up in the bed, looked about, and was not peevish, as she had been before; for during the two days preceding the development of this attack, she lay in bed, unwilling to be stirred, and crying if any person went near her.

On the 18th the local symptoms continued to improve, as also her general state of health; but we found that she passed a very small proportion of urine, and that with great pain. Believing that the acidulated solution of bark might have some tendency to keep up this strangury, I substituted a mixture containing five drops of sweet spirits of nitre, in infusion of flaxseed, to be given to her every hour, with the external use of warm fomentations; and as the diarrhœa continued, I directed her to have three grains Hyd. c. Cretâ, with half a grain of Dover's Powder, three times a day.

On the 21st, the report states, she passed some blood from the bowels the preceding night; thus establishing, in an obvious manner, a point of resemblance with the other cases referred to in this paper. The diarrhœa continued, and the dejections were dark and offensive. She passed but little water: the parts were not quite so sore. The medicines were continued.

On the 24th the diarrhœa was healed; no blood came by stool. She passed water very freely. The appetite returned. The parts were healed, and her spirits cheerful. She was discharged cured on the 27th of December.

I might enlarge upon this subject by shewing that it is from the bold and persevering administration of tonics, in their simplest and most efficient forms, that we are principally to expect the cure of so formidable a disease as Cancrum oris, when it does admit of being arrested. I fully agree with the statement made by Dr. Elliotson in one of his published Clinical Lectures on this subject, where he says the proper treatment is to administer tonics, and to push them to the greatest extent possible. In all cases he is in the habit of giving quinine in the largest quantity he can exhibit it; good nourishing diet, such as strong beef tea, wine, porter, &c.: and I can, from my own observation, repeat that I have resorted to this practice with the happiest results; while I have been surprised at the quantity of sti-

mulants that young children in such circumstances have been able to bear.

I must, however, hasten to the conclusion of the proper subject of this Paper, merely repeating what I have already remarked, that the foregoing observations apply with equal force to the disease under consideration as to the more common form of Cancrum oris; and in speaking of the pathology of the disease which I have so hastily described, I would say that I believe it consists essentially in inflammation of the intestinal mucous membrane. The affection of the mouth is a part, and but a part, of a more general morbid state, without the due appreciation of which it will be impossible to have a correct idea of the local complication. It is this which gives it its real importance, enables us at once to estimate its pressing danger, and points out the proper mode in which its treatment is to be conducted. Whether it is to be regarded as a kind of sympathy between different members of the same system of structures, or merely as a wise provision of Nature, to enable us to recognize the morbid condition of what is beyond the range of our inspection, it is a curious general law prevailing in the economy, that a similar action is developed in those parts of the mucous membrane that are exposed to view, to what is found to exist in those which are more remote and hidden. In ordinary aphthæ, and in the condition of the tongue in gastric affections, we have examples of this general principle.

This view of the disease is, I think, established by a variety of proofs. The diarrhœa which usually preceded its development, and persisted, with greater or less obstinacy throughout, pointed to this condition as its origin; and in all those cases which terminated fatally I have found either decided ulceration of the intestinal mucous membrane, or enlargement and increased development of the follicular glands. In one case the whole colon was an immense sheet of minute, circular, and deep ulcers; while the portion of the mucous membrane which intervened was of a bright crimson hue. It

is also confirmed by the peculiar type of the diseases which prevailed at the same time, and which partook, to an unusual extent, of the gastric character.

Having satisfied ourselves as to the true nature of the affection, it follows, as a matter of course, that our principal attention is to be directed to the cure of this intestinal inflammation. So far as my observation went, I remarked that little benefit resulted from local treatment; I tried various astringent and other gargles and applications, borax and honey, muriatic acid and sulphate of copper, but found them to exert no appreciable influence upon the disease, while constitutional remedies certainly did. The ordinary astringents, such as chalk mixture, catechu, and acetate of lead, often failed to check the diarrhœa; and even opium, given in as large doses as I thought safe, to patients so young, did not appear more effectual. The best internal medicine for this purpose was an acidulated decoction of bark, or an infusion of columba and nitric acid. This controlled, in a remarkable degree, the diarrhœa which had resisted other remedies, was readily taken by the children, and did not appear to produce any unpleasant effects. I have already mentioned the fact of my having used mercurial preparations, in the form of Hyd. c. Cretâ, combined with Dover's Powder, with considerable encouragement. I was induced to resort to this class of medicines from observing the unhealthy condition of the alvine discharges. Of course I did not think of using this combination at the same time that the patient was taking any acidulated medicine. And the great benefit the patient uniformly experienced from this form of administering the bark, coupled with that hesitation which always must attend the use of a medicine in unusual circumstances, prevented me persevering very long in its administration, unless when I saw there was no immediate danger, or that it was decidedly agreeing.

But the most valuable agent I met with in the management of these cases was a speedy and decided counter-irri-

tation of the abdominal surface. The excitement of the capillaries here relieved, in a remarkable manner, the congestion that existed within. For many reasons I did not resort to what may appear a more appropriate plan of operation, namely, leeching. The peculiar constitution of the patients, the character of the prevailing diseases, and the observed effects of this mode of drawing blood in kindred affections, deterred me from their use. The best mode of producing a light, and at the same time a sufficiently enduring irritation of the surface, I found to be the laying on of a mustard poultice on the abdomen, till the skin was reddened, and the immediate application of a blister on the part for a single hour. Its action was speedy, safe, and effectual. It never failed to vesicate, and its subsequent management was altogether free from those unpleasant effects that are so often met with in blistering children. It was astonishing to find how instantaneously it acted in checking the progress of the disease. It controlled almost immediately the distressing and wasting diarrhœa, lowered the fever, and improved the condition of the mouth.

Throughout the progress of the disease it was necessary to support the patient's strength, and for this purpose wine was given very freely. In all cases its first administration was carefully watched, and where it seemed to disagree it was instantly laid aside. But in the majority of cases it harmonized admirably with our intentions, quenching the patient's thirst, supporting his strength, and diminishing the diarrhœa. Billard, the able French writer on the Diseases of Infancy, gives a correct view of the pathology of these affections of the mouth, both in his text and his illustrative cases; but he falls into the mistake, so common to his countrymen, of supposing that the presence of intestinal inflammation must be an insuperable barrier to the administration of stimulants, forgetting the important truth in practical medicine, that inflammation may be of opposite characters, and require either a stimulating or an antiphlogistic mode of

cure: and when we read the cases he has detailed in the work referred to, we cannot help thinking that had he adopted a more rational view upon this subject his treatment would have been more successful. Whenever we find the practical conclusions of direct experiment contradicting the apparently well-established doctrines of a favourite theory, we may be sure that the latter are at fault, and that the sooner they are modified or abandoned the better for the cause of science. Firmly believing as I do in the intestinal origin of this disease, I am equally persuaded of the safety and necessity of administering stimulants with due discretion, but with sufficient boldness, even at an early period, in the progress of the case.

Case III.—*Fever; Gangrenous Stomatitis; Recovery.*

John Kane, a fine, healthy infant, 2½ years of age, was admitted into hospital on the 3rd of September, 1844, labouring under high fever, with considerable symptoms of determination to the head. He had vomiting and purging; the alvine evacuations black, dirty, and offensive. He had startings in his sleep; was burning hot, and had excessive thirst. His mother had previously lost five children by convulsions. Under these circumstances I was naturally apprehensive that his disease might assume the character of acute hydrocephalus. His head was shaved; four leeches were applied to the temples; a cold wash ordered to the vertex; and four grains of Hyd. c. Cretâ directed to be taken three times a day.

Under this treatment he got rapidly better; but on the 9th his mother reported that his mouth was sore. On examination we found that his breath was fœtid, the gums of the upper jaw, on the right side, were ulcerated, a little swelled, red, and spongy, with some tendency to bleed. He was ordered a gargle of borax and honey, and the daily use of an ounce of infusion of senna: under which he improved so

much as to be discharged, nearly well, to the nursery on the 26th of September. Here he suffered a relapse, and was re-admitted on the 6th of November, presenting the following symptoms: the cheeks on both sides of the face were considerably swelled, and somewhat tense; the right cheek particularly so; it had a dusky coloured appearance on the external surface. There was a striking contrast in colour between the dark purple of this portion of the cheek, and the pale sickly hue of the rest of the face. No ulceration could be detected on the inside, but the gums of the front teeth were ulcerated at the roots. There was a bad smell from his breath; and running of saliva from his mouth, in small quantity, occasionally. The bowels were confined; the dejections whitish and offensive. The gums bled whenever touched. He was ordered to resume the use of senna tea, and syrup of quinine in doses of the one-eighth of a grain three times a day; and a gargle of dilute muriatic acid, in honey of roses, to wash his mouth.

On the 11th November, the report states, has been improving till to-day: face is rather more swelled; has been burning all night; excessive thirst. Bowels open; tongue foul; dejections as before; gums swelled, ulcerated, spongy, red, and bleeding.

He was ordered five grains of Hyd. c. Cretâ and five of rhubarb, at bed-time; the senna mixture in the morning, and to have two ounces of wine through the day.

Under this treatment, repeated occasionally, and assisted in the intervals by the use of an acidulated infusion of bark, he improved wonderfully; lost a great deal of the sickly aspect he had imbibed, and left the hospital on Nov. 27, 1844, with but few traces of the affection remaining, and has since continued well.

Remarks.—This case was one of the earliest which came under my observation, and occurred at a time when I had not had the opportunity of knowing the true pathology of the

disease. The costive habit of the child, and the tendency to head affections in his family, induced me to try the effect of moderate purging; but the greatest reliance was placed on the use of wine, bark, and tonics, to which I attribute the favourable termination of the case. The occurrence of the disease, after the use of mercurial medicines, seems to countenance the opinion of the latter being the cause of the former, but the *partial* extent of the ulceration, along with the other symptoms already treated of, prove this opinion to be incorrect.

CASE IV.—*Ulceration of the Gums; Recovery; Measles; Relapse; Death.*

Mary Anne Houghton, 2½ years of age, was admitted into hospital November 6, 1844, labouring under intense fever. She had been in a good state of health for a considerable time, and had not taken any medicine since her admission into the workhouse, a period of about six months. Her gums were ulcerated in front; they were in part whitish, and in part red, swelled, and soft. Her breath was fœtid. There was occasional running from the mouth, mixed with blood. The bowels costive; the dejections dark and offensive. She was ordered small doses of Hydrarg. c. Cretâ and rhubarb, and an acid gargle for the mouth.

On the 14th November, the report states, the treatment has been since continued: an occasional dose of mercurial medicine, followed up by senna and salts, with decided advantage. The ulceration, so far from continuing to spread, has been arrested. The bad smell has nearly disappeared. No running from the mouth, but it is still sore, and easily made to bleed. The alvine evacuations are variously coloured, but improved from what they were. She sleeps well; has a good appetite; thirst continues.

Habeat Mist. Cinchon. acid. ℥ss. ter.

Nov. 25th. Her mother reported that she passed a good

deal of blood by stool last night. It was mixed with unnatural discharges, not attended by much pain, but constant needing. Under the impression that it arose from a state of the constitution analogous to purpura hæmorrhagica, I ordered her to have some lemonade, which she took with much relish, and considerable apparent advantage. The blood by stool gradually subsided, the diarrhœa disappeared, and she was discharged to the nursery, in good health, on the 6th of December.

On the 18th December, nearly three weeks subsequently, she had an attack of measles. The eruption was of an unhealthy, dark colour, and the attending diarrhœa more intense than usual. The alvine evacuations were destitute of bile, and very offensive. She was ordered three grains of Hyd. c. Cretâ, and one of aromatic powder, three times daily. On the 20th this was changed for an equal quantity of Hyd. c. Cretâ, and one grain of Dover's Powder, every third hour, along with two ounces of wine in the day. On the 21st the affection of the mouth and gums returned, and presented the same symptoms as before. Two drachms of sulphate of copper were dissolved in four ounces of water, and used as a lotion for the mouth; and a small quantity of laudanum was given in chalk mixture, at short intervals, without effect. The diarrhœa continued uncontrollable; the child's strength sunk rapidly, and she died on the 27th. I regret that I have lost the memorandum book which contained the exact note of the post mortem appearances in detail, but I can say, from recollection, that the large intestines were one sheet of minute ulceration through their entire extent. This is the case to which I have already alluded when speaking of the pathology of the disease. It is scarcely to be credited, that such an extent of ulceration could have been produced in so short a period as elapsed from the commencement of the attack of measles; yet the intense vascularity of the mucous membrane in the intervening spaces,

and the freshness of appearance of the ulcers themselves, lead to this conclusion. It is probable that the lighting up of febrile action in an unhealthy constitution by the measles, revived the scarcely suppressed tendencies of the previous complaint, and made it act with increased rapidity and force.

CASE V.—*Gangrenous Stomatisis; Amendment; Diphtherite; Death.*

Louisa Geoghegan, æt. 4, an exceedingly delicate child, of a family which had already lost several members by consumption and hydrocephalus, had been ailing for a considerable period, but more particularly since January, 1845, with a defective appetite, a short frequent cough, and other symptoms, that led frequently to the apprehension of incipient phthisis, though no sign of its existence could be detected on examination. She had on several occasions spit up blood, and was subject to irregular attacks of diarrhœa. On the 17th March it was discovered that her mouth was sore, and the gums ulcerated. This was the real source of the hæmorrhagic sputa. She was ordered a solution of sulphate of copper to wash the mouth, and an acidulated infusion of calumba as a general tonic.

March 19th. Gums all ulcerated; ulcers on tongue and inside of mouth; constant diarrhœa of yellowish liquid, attended with pain; good appetite, but unable to eat; hæmoptoe; offensive breath.

Arrow-root.
Vini ʒiv.
Sinapisma abdomini. Vesic. per horam unam postea adhibendum.
℞ Tinct. Opii gtt. vi.
Aq. Cinnam. ʒiiss.
Sp. Am. Arom. ʒi.
Confect. Arom. ʒii.
Sumat coch. i. ampl. tertiis horis.

May 20th. Blister rose well in about an hour; suffered a great deal from it; diarrhœa checked yesterday, only two

motions this morning; more healthy, as well as consistent; not so much hæmoptoe; breath not so offensive; tongue cleaner at edges, and ulcers look better; pulse 96; unable to eat; craves an orange; to have one.

May 21st. Blisters in mouth much better, and the tongue is cleaning at the edges, but the gums are still ulcerated and bleed; bowels open three times; dejections liquid, but bilious and feculent; no fœtor from breath; got the night badly, but is better than before; dislikes every thing, but to-day calls for wine.

℞ Acid. Mur. dil. ʒi.
Mellis Rosar. ʒvi.
Fiat linctus gingivis ulcerat. adhibend.

22nd. Much better; tongue quite clean; ulcerated appearance of gums greatly improved; slept a good deal better than usual; bowels still purged, but the dejections are less unhealthy; the improvement in her mouth took place before using the linctus, which smarts her a good deal; pulse 100; the wine is almost the only thing she makes use of; cough better since she got ill.

May 23rd. Looks poorly, but her mouth is greatly improved; tongue clean; gums not so spongy nor ulcerated; bleed very little; bowels not purged; dejections rather white, solid; complete loss of appetite.

May 24th. Ordered.

℞ Acetat. Plumbi gr. vi.
Acetat. Morphiæ gr. ¼.
Aq. minth. pip. ʒiiiss.
Syrup Lingib. ʒss.
Coch. i. med. tertiis horis.

May 25th. Mouth almost quite well; bowels moved only once since yesterday; dejections bilious, more consistent, though still fluid; pulse 96; slept very well; medicine seems to make her sick.

Sumat Mist. coch. i. min. tertiis horis.
An egg daily.

May 27th. Continues to improve; pulse 92; slight bleeding from gums this morning; appetite returns; slept well.

May 28th. Gums more ulcerated and bleeding to-day; no motion from bowels, but griping.

℞ Infus. Cinchon. ʒiii.
Tinct. ejusd. C. ʒii.
Acid. Sulph. dil. gtt. vi.
Syrup. Zingib. ʒvi.
Coch. i. med. secundis horis. Linct. acid. Muriat. ut antea.

From this period she continued tolerably well, and seemed to be regaining strength and health, till the 7th April, when, after some undue exposure to the cold easterly wind that then prevailed, she was attacked with ulcerated sore throat, engaging both the tonsils and pharynx; the bowels were at this period quite well, and the gums healed; the fauces were freely touched with a strong solution of caustic.

April 8th. The bark mixture was repeated, and a blister applied between her shoulders.

℞ Hyd. c. Creta gr. ii.
Pulv. Ipecac.
Pulv. Arom. āā gr. i.
Fiat pulvis secundis vel tertiis horis sumend.

April 8th, 11 o'clock P. M. Pulse 112, very weak; respiration 24; both inspiration and exspiration accompanied with a dry, harsh sound; is sleeping quietly; powders made her throw up, but did not purge her; heavy perspiration, but not otherwise weak; took the four ounces of wine; blister pained her very much, but did not rise for two hours.

Cont.

April 9th. Powders both vomited and purged her; breathing is still accompanied with a hissing sound, both on inspiration and respiration; respiration 24; pulse 120, distinct; blister rose well; tonsils less swelled; some white patches on right side especially; can swallow to-day easily, but could not yesterday, or the day before.

Cont.

April 10th. Was so ill last night that Mr. Brown, the resident apothecary, did not expect her to survive, but she is now somewhat relieved; respiration still stridulous, 28; pulse 132, weak; cough is croupy, but not frequent; fauces are less swelled, but still have a dark, erysipelatous colour, and patches of lymph are visible on right tonsil; swallows quite well to-day; bowels not purged, but the dejections are dark coloured; eight powders of calom. gr. 1, Ipecac. gr. ii., and P. Aromat. gr. i. were given, and made her throw up; gums of upper jaw whitish; blue dressing to blister.

℞ Decoct. Polygalæ ʒ iii.
Ammon. Carb. ʒ i.
Tinct. Opii gtt. iv.
Syrupi Scillæ ʒ i.

Sumat coch. i. med. tertiis horis. Rep. Pulveris secundis horis. Lotio Caustica faucibus in.

April 11th. Was much better yesterday afternoon; able to walk about; slept well; the breathing relieved, the croupy sound lost; got a change for the worse about twelve o'clock at night; breathing is now oppressed, short and frequent; suffocating cough, ending in croupy respiration; pulse 106; respitation, when at rest, 28; Lips not peculiarly livid; gets up a good deal of thin phlegm, but with difficulty.

April 12th. Mortua.

Post Mortem Examination.—The external appearance was not remarkably wasted; the lungs were found perfectly healthy; the larynx completely closed up with an organized membrane adhering closely to it on all sides; the pharynx of a deep red colour, and some small patches of whitish lymph lay on the right tonsil; the liver was large, of an uneven tuberculated feel, and yellowish colour. The intestines, near the umbilicus, exhibited small patches of an oval form and about an inch in length, which could be seen through the peritoneal coat of the transparent intestines. On cutting into them we found they were the glandulæ agminatæ in a

state of irritation. The mesenteric glands were peculiarly white and slightly enlarged.

Case VI.—*Gangrenous Stomatitis; Erythema; Recovery.*

James Blundell, æt. 3, a delicate child, who had been in the workhouse for a very long period, was admitted into the hospital on the 5th of May, 1845, having been ill about five days with diarrhœa, accompanied by considerable fever. The alvine evacuations were brownish and of a highly offensive character; he complained much of pain in the belly before going to stool. On examining his mouth, it was found to present the symptoms of ulcerous stomatitis in a well-marked form; the gums of the front teeth were swelled, red and spongy; ulcerated at the insertion of the teeth, so as to leave the fangs somewhat denuded; at the margins there were reddish lines from a tendency to bleed, which immediately exhibited itself on the gums being touched by the finger, or by the mere effort to keep the mouth open. On the day preceding his admission there was slight hæmorrhage from the mouth; his breath also had a fœtid smell. He was ordered a mustard poultice over the abdomen, to be succeeded by a blister for one hour after the sinapism was taken off, and a desert-spoonful of the following mixture.

℞ Acid. Nitric. dil. gtt. xii.
Infusi Calumbæ ʒ ivss.
Tinct. Cinchon. C. ʒiv.
Syrupi Aurantii ʒ i.

May 6th. Blister rose well; diarrhœa diminished; dejections more healthy; thirst less; slept well; mouth nearly as yesterday.

℞ Mellis Boracis ʒ ss.
Dec. Hordei c. ʒ iiiss.
Fiat Gargar. sæpe in dies utend.

May 7th. No diarrhœa; bowels moved only once yesterday; dejections healthy; slept badly, probably from pain of

blister. A patch of dark-coloured erythema at left elbow; also an eruption of stigmata over body, resembling measles. Tongue whitish; very little appetite; great thirst; pulse 120; mouth as yesterday.

Adhib. Catap. Micæ panis parti vesicatæ.

May 8th. Some appetite to-day; mouth clearer. The erythema has spread a little, and changed its place.

Cont. Medicamina.

May 10th. Considerably improved. Fever diminished; appetite returns; gums improved in appearance; the lower one has lost its red and spongy condition, though the roots of the teeth are still exposed. The upper one is less swelled, and less disposed to bleed.

May 16th. An eruption of papulæ passing into pustules is out over surface of body. Was first observed three or four days previously, but was not persistent. It is very itchy, especially at night. The red and spongy appearance of the gums has disappeared, as well as the tendency to bleed, but the roots of the teeth are a good deal exposed, and the ulceration remains.

The treatment was now directed to cure this new disease, ordinary itch, and during its course, although the diarrhœa did not return, the evacuations from the bowels resumed their former unhealthy character, which led to the exhibition of mercurial alteratives in small doses, repeated two or three times a day, and continued for a considerable time. Under this treatment the alvine discharges became healthy, both in character and frequency; and all the symptoms of disease, except the exposure of the roots of the teeth, which remained unchanged throughout, completely disappeared. He continued free from fever; recovered his appetite and spirits; slept well, and regained flesh and strength; and was discharged well on the 9th of June.

ART. II.—*Cursory Remarks on the Use of Issues; with Cases.* By Henry Kennedy, A. B., Licentiate of the King and Queen's College of Physicians, and the Royal College of Surgeons, Ireland; one of the Medical Officers of St. Thomas's Dispensary.

[Read before the Obstetrical Society.]

REMEDIAL agents may be divided into two great classes: those which are capable of producing marked changes and effects in the animal economy, such as bleeding, purging, mercury, &c.; and those of which the effects are by no means so constant, and where, of course, a degree of uncertainty must ever attend their administration, such as tonics, diaphoretics, and nervous medicines. Amongst the former class may, I think, be fairly placed issues, to which, in what follows, I would very briefly direct the attention of the meeting.

The use of issues has been long recognized in practical medicine: the very earliest records of medicine we possess take notice of them. Nor is this so much to be wondered at, when we recollect how frequently Nature herself forms them, and evidently for the purpose of relieving the system. It would probably be quite within bounds to say that the great majority of persons are at one period or other of their lives indebted to natural issues for the preservation of their health. One might even go farther, and say that all the ordinary excretions of the body are nothing but healthy issues, by means of which materials are got rid of, which, retained, would be injurious to the system. But it is only of those states of the system in which some morbid outlet forms that I am at present speaking. Some might at first view be inclined to question the frequency of those issues which form of themselves, or might even doubt whether such act as issues at all: but if any one inquire closely into the matter I think they will satisfy themselves that Nature formed them

with an express object in view. As an example of what I mean, I would mention the very common occurrence of a purulent discharge from the ears during childhood; or the still more common occurrence of some form of eruption, generally of the nature of porrigo, on the head, or some other eruption over the body. Or if we look to more advanced life, we have examples enough in the existence of hæmorrhoids, subject at times to bleeding; or to epistaxis; or to the existence of a chronic bronchitis; or here, as in childhood, to the formation of a spot of some kind of eruption, which now, however, is more apt to form on one of the lower limbs. That all these act more or less as drains to the system, appears to myself to be self-evident. This view is confirmed too by the great obstinacy which any of these affections present to treatment, more particularly when they have existed for any considerable period; and above all, by the fact, which probably every one I have the honour of addressing is well aware of, namely, that their hasty cure is ever attended with risk, death being by no means an uncommon result. Did the occasion call for it I could myself detail a number of instances where serious results followed the sudden cure of the affections I have alluded to; but the fact is so well known as to require no farther notice here.

Of the various diseases in which issues have been used it is not my intention to speak. It may, I think, be very fairly questioned, however, whether there are not other diseases in which they may be used with good effect. Before concluding this Paper I shall detail three cases, in which, as far as I am aware, they are not generally employed, and yet in which the result was very striking. I may allude here, too, to a case, with the notes of which I have been favoured by my friend Dr. Travers: the case was brought before the Pathological Society by Dr. Stokes.

A man, æt. 39, of temperate habits, two years previous to applying for relief, was attacked suddenly with severe

pains in the lower part of back, and in the region of the false ribs. The pain ultimately became fixed about the eighth dorsal vertebra. No treatment was of any avail, till issues were opened on either side of the spine. This measure was adopted in consultation with Mr. Smyly and Dr. Cusack. Immediately on a discharge taking place the patient experienced the most marked relief, which continued for several months, when he became affected with spasmodic cough and dyspnœa, both of which were much increased by any exertion, or even by standing unsupported. When he used crutches, or leaned forwards, he got relief. There was also now dysphagia, though slight. Shortly after this physical signs were detected in the chest, which all but confirmed the opinion that thoracic aneurism existed. These symptoms, curious to say, soon after declined in a very marked degree. The chest became clear on percussion, the soufflet could not be heard, and the pulse returned to the left wrist. In this way he remained the entire winter, free from suffering, *except when the discharge from the issues became scanty.* In the succeeding spring, however, the dysphagia returned with great severity, and the patient sunk, partly from starvation, and partly from some slight bronchial affection. On examination of the body an aneurism of the arch of the aorta, where it becomes the descending aorta, was found. The aneurism was of large size, and the artery close to it much diseased. Four of the vertebræ corresponding to the tumour were eroded.

Now in this case the effects of the issues were very striking, and yet very few would guess what the disease turned out to be. Who is there that in such a disease would anticipate such a beneficial effect from the establishment of issues? and that it did depend on them is clear from the details of the case. With such a case as this before one's mind it requires very little reflection to carry the principle farther: thus it strikes me as being in the highest degree probable

that in cases of ovarian dropsy, the establishment of an issue would prevent the increase of the disease. Again, in those cases of cancer of the breast, in which surgeons differ so much as to the propriety or not of its removal, from the well-grounded fear of its return, it appears to me that it would be a very rational proceeding, after the part had been removed, to establish an issue. Possibly these ideas may have been acted on by others, but I am not aware of any thing of the sort having been done.*

During last session I had the honour of bringing before this Society a case in which all the symptoms of hydrocephalus were exceedingly well marked: the case ultimately got well, and, as I believe, because the boy had had an issue in his arm for some time before the attack. Two children of the same family had died previously of the disease. It was also mentioned, of two families, in each of which several children had died, one after the other, of water on the brain, but in which the use of issues in the succeeding children had the effect of averting the disease. Such facts as these, of which probably most present may have known similar ones, appear to me to put in a very strong light the great advantage which is likely to arise from a judicious use of issues.

In what manner issues act it is not very easy to determine. Their effects seem to be out of all proportion with the amount of discharge; otherwise we might be inclined to suppose that the system, by their means, got rid of morbid matter, which, if retained, would prove injurious. Possibly this may be true in part, but it is really curious to observe what a very trifling discharge, as regards quantity, will suffice to relieve the system: any one who has seen a case of phthisis complicated with fistula must have observed this; or the

* Marshall Hall, I believe, has recommended an issue in encysted dropsies. The French surgeons are in the habit, after removing a cancer, of leaving the wound open for some time. This, however, would not at all answer the end in view. To afford a reasonable prospect of success the drain should be permanent.

still more trifling discharge which takes place from a single spot of tetter situated on the front of the tibia, and which appears in itself sufficient to ward off apoplexy or paralysis, judging from the results if suddenly cured. It would appear, however, as if the formation of so small a quantity of pus as a drachm in the twenty-four hours is quite enough at times to strain, as it were, the constitution. So much is this the case that care should always be taken to see that the issue is not producing an undue effect, and thus is adding to the mischief it was intended to remove. Here, as in every thing else connected with medicine, a proper judgment must be exercised, and the practitioner must be guided by the peculiar circumstances of each individual case.

While alluding to the formation of artificial drains for the cure of disease, it must not be forgotten that objections stand in the way of their general use. In many minds a strong dislike exists to the very name of an issue, and they would rather submit to any thing else than this. Again, issues are chronic remedies, if I may use such an expression; they have to be continued weeks, months, years; and besides, they require daily attention. For these reasons, then, it is very probable that objections will still continue to be urged against them, no matter what benefit might be expected to arise from their use.

It would be very easy to prolong these remarks, but for the present I shall content myself by detailing very briefly three cases, in each of which the insertion of an issue was followed by very marked benefit.

Case I.—Five years since, a young lady, aged, at that time, six years, was put under my care. I was informed that from two years of age she had been subject to swellings forming in different parts of the body; on the lower limbs, the wrists, one elbow, but, above all, in the neck. This latter part was literally seamed from ear to ear. Though these swellings were always forming in one part or other of the

body, still they were particularly troublesome in the spring-time of each year: no matter what treatment was adopted they always went on to form abscesses, and ultimately to burst; and in this way it was that the neck had become so disfigured. She had had very good advice, and in the proper season had been sent to the sea-side for the bathing: but still there had been no change for the better. A glance was enough to tell any one that the patient was of the strongly-marked strumous diathesis. She had light hair, blue eyes, and a very fine clear skin; and her disease was evidently one of the hundred forms under which scrofula exhibits itself, when it affects the external parts of the body. Reflecting on all that had been done for the patient without benefit, I came to the conclusion that something which was capable of producing a decided change in the constitution was the only means likely to get rid of such an affection as has been described. With this impression I advised an issue to be put in the arm, and having got Mr. Carmichael's sanction to it, this was done. For about one year after this there was at times a tendency in some of the glands to swell, but none of them ever went on to suppurate; and for the last four years there has been a steady improvement in every respect. Any one who had seen the neck at the two intervals would scarcely have believed that such a change for the better could have taken place. It is scarcely necessary to add that other means besides the issue were attended to.

This case appears to me to afford a very striking example of the good effects of the plan of treatment which it is the object of this Paper to direct attention to. It is the more worthy of notice, that the plan succeeded after other means had failed: and that though there had been more or less discharge going on from the beginning of the complaint, still it was insufficient to relieve the system, till the artificial drain was established. The case, too, would lead one to expect that beneficial results would arise in many analogous cases; and

cases of this description are very common. In the particular one which has been detailed, there is, I think, every reasonable hope that the patient will ultimately recover perfectly.

Case II.—It is now nearly six years since I was asked to prescribe for a boy who had been labouring for some time under asthma of a very severe form. He was then seven years old; of a full, plethoric habit, high complexion, and well-marked sanguineous temperament. An examination of the chest did not discover any cause for the complaint; but when the attacks were unusually severe there appeared to exist bronchitis affecting every part of the mucous membrane: I say *appeared*, for at times the bronchitis went off as rapidly as it had come on. The boy's breathing was always of that kind which is described by the word *thick*: but it was at night that the fits of dyspnœa were the most severe, and on several occasions they were so violent, that it was not expected the boy could survive them. Though the actual cause of the disease was unknown, still the parents soon came to learn what would aggravate the fits: thus it was found that any indiscretion in diet (and the boy was at an age and under circumstances where this was very likely to occur) was sure to increase or produce them; or any, even the slightest, exposure to wet or damp weather. This patient, like the last one, had been put under a variety of treatment: the only thing which appeared to be of any service was change of air, but even this had lost its effects when I saw him. After examining him very closely it struck me that possibly his disease was owing to worms: there did not appear to be any state of the lungs sufficient to account for the attacks of dyspnœa, and the intermitting nature of the bronchitis, I knew, often went hand in hand with their presence. Under this impression the boy was put on a course of medicine suited for the expulsion of worms, and he was also directed to get an emetic when the dyspnœa became severe. This plan was persevered in for more than a month,

but with no effect in the way of relieving the disease, nor were any worms seen. I then determined on trying an issue, and one was put in the arm. It had scarcely begun to discharge before the boy got relief, and with the single exception of one attack, which occurred about a year after the issue had been put in, and which the parents told me was not a severe one, he has remained free ever since, now a period of more than five years. He has grown very much. I need scarcely add, that when it is thought advisable to dry up the issue, it will be done with great caution.

In this case I am quite at a loss to explain the benefit which arose from the use of the issue. When I determined on it I knew it could do no harm, which, as the late Mr. Colles used to say, was an important rule to adhere to in medicine, and there was a possibility that it would produce such a change in the boy's constitution as would, in the end, afford him relief. It appears, however, to have acted sooner than any change could in reason be expected to occur: a single pea only was used, and the benefit was manifest within a month. It is possible it may have caused some change in the bronchial mucous membrane, but this is mere conjecture. This case was an example of one of those in which the quantity of discharge was out of all proportion with the relief afforded.

The third and last case to be detailed occurred in a grown-up female, and, as such, may be fairly brought under the notice of this Society.

Case III.—In the month of March, 1843, a servant applied at St. Thomas's Dispensary for relief. She was labouring under lupus, affecting not only the nose, but spreading over the greater part of the face. She was about 30 years of age, and was otherwise healthy. She stated it had commenced on one side of the nose, from which spot it had gradually spread, and that it had existed now upwards of two years. As it usually is, the disease was best marked on and

about the nose; in fact, on the cheeks and forehead it was of a different character. It might be described here as being of the nature of tubercular lupus; the entire skin was thickened and red, and it had lost its natural supple feel; besides this, a number of hard tubercles could be felt almost in every direction; and though no ulceration had taken place over them, still in several places there was an appearance of ugly cicatrices, disfiguring the entire countenance. She was directed a course of Plummer's pill, and to bathe the face assiduously with lukewarm water. This plan was pursued steadily for some time, but without any benefit, and she was then directed to take the solution known under the name of Donovan's solution. This also was persevered in, and continued till her health began to suffer. It was then given up, and an issue was put in the arm, the bathing being directed to be continued. In the course of a month a manifest improvement had taken place; the skin generally had assumed a more healthy appearance, and the tubercles had manifestly lessened in size. It is enough to add, that the issue was kept in seven months, when it was discontinued, all trace of the disease having disappeared. As a matter of precaution, however, she was again directed another course of the solution. She has since then continued quite free of the disease.

The use of the issue in this instance was not my own idea, but I am unable to state where I learned it; nor, from want of time, have I been able to ascertain whether it be a plan of treatment recommended in any of the standard works on diseases of the skin. I think it may be asserted, however, that it is not one in common use in such cases. The case detailed appears to me a very strong one in proof of the efficacy of this particular line of treatment. Every one knows the extreme obstinacy of many diseases of the skin, and particularly those which appear on the face and head. Some forms of porrigo, as also that form of ulceration which has

been described by Dr. Jacob, afford but too well-marked examples of this. The number of young females, too, which one sees disfigured by the more common form of lupus, is very considerable. In all these cases I cannot help thinking that an issue would form a most important part of the treatment; further experience, however, can only determine this point.

In conclusion, then, I would repeat again, that it appears highly probable there are a number of diseases in which issues might be used with advantage, but in which they have not yet been employed. From the general feeling against their use, however, it will always be advisable to try the more ordinary forms of treatment in the first instance.

P. S.—In the discussion which arose after the reading of the Paper, Dr. Churchill alluded to some instances he had seen of laryngismus stridulus, in which issues succeeded in arresting the attacks, after every other means of treatment, including change of air, had failed. An equally strong testimony in their favour, and in the same disease, was likewise given by my friend, Surgeon Neville, of Brunswick-street.

ART. III.—*Second Communication on the Preparation and Medicinal Properties of Cod-Liver Oil.* By M. DONOVAN, Esq.

IN the seventeenth volume of this Journal I inserted a communication relative to the preparation and medicinal effects of cod-liver oil, and pointed out the circumstances to be attended to in order to procure it in a state fit for exhibition as a remedy. According to that process I prepared a large supply for the use of the Profession: it has been extensively tried, and it has sustained the character attributed to it by physicians of eminence in various countries of Europe.

In the time of Dr. Percival, of Manchester, this oil was so largely employed in the hospital of the town, that nearly

a hogshead of it was annually consumed. It was given in obstinate chronic rheumatisms, in sciatica of long standing, and as a restorative in old age, when, from various causes, the muscles and tendons become rigid, and the flexibility of the joints is impaired. Dr. Percival compared its effects experimentally with those of guaiacum, in diseases for which the latter was proper, and found the oil always superior. In irritable habits he found the pulse sometimes accelerated by it: a glow of warmth was sometimes felt throughout the whole body after each dose, and a gentle perspiration was often produced. He varied the dose from one table-spoonful to three, twice, thrice, or four times a day. In many cases it was found serviceable to rub the parts affected with the oil during its internal exhibition. Either fever or inflammation, he says, forbids the use of it entirely. His mode of administration was, to form an emulsion of half an ounce with an equal quantity of peppermint-water, by means of forty drops of aqua potassæ, the draught being washed down with a tea-spoonful of lemon-juice, to liberate the oil in the stomach.

For a long time cod-oil, as a curative agent, fell into disuse in the British isles, but in Germany it has maintained its character up to the present day. Dr. Bennett, who speaks from personal knowledge, gives the following account.

He informs us that several kinds are met in commerce; that the German physicians employ chiefly those that vary between yellow and orange, the deep golden colour being preferred. Duhl says, the liver is allowed to putrefy, by which means the oil is separated. Geiger states that the light variety percolates by itself from the liver of the fish, but the brown kind is obtained by boiling the residuum, when no more of the former will flow out. Dr. Faye, of Christiana, says that at Bergen three kinds are prepared; by spontaneous percolation, by pressure, and by coction.

* Percival's Essays.

According to Marder, the light oil flows from the liver during the first few days merely by the action of the sun's heat; and the brown oil is procured afterwards from a period of eight to fourteen days, when it has become putrid. The merchant Balzer, of Cologne, says that both are obtained by the artificial application of heat, the lighter being the first portion skimmed off, and the brown by stronger heat, which induces a certain degree of decomposition. He says, the age of the fish, as well as the method and time of keeping the liver, exerts an influence on the product. The merchant Jobst, of Stuttgard, asserts that the lighter oil is obtained by boiling the liver, and the brown by boiling also the intestines, which are surrounded with fat. Dr. G. H. Richter, of Wiesbaden, says the light-coloured is obtained by the heat of the sun acting on the livers, in large cylindrical glasses: this is the most active, but too scarce and dear. When no more can thus be obtained, the residuum is exposed in tinned vessels to 40° Reaumur: this affords a considerable quantity of dark, less clear oil, of a strong, fishy smell, yet in virtue little inferior to the other. When no more is thus procurable, the residuum is placed in a kettle, cut in pieces, and roasted, whereby the third, or less pure train-oil is procured: it is thick and brown, and has a strong, burning, fishy taste and smell. This last contains the oily and fatty, but also the biliary ingredient of the liver, and is never used as a remedy in Sweden. Beside this, there is prepared, by chemical means, a fourth kind, which is quite clear, has a weak, fishy smell, is similar in appearance to olive-oil, but is never used in Sweden internally, being considered inert.

M. Tiedmann, a merchant at Bremen, says the liver of the dorse is exposed to the sun, in a cask standing upright, with three spigots, one above another. On opening the spigots the clearest and best for medicine flows from the first; the middle spigot is then removed, and then the last, a brown oil resulting. The residue, subjected to hot pressure, yields a very dark, thick oil for leather. M. Gowzée states that at Antwerp the oil is purified by repeated decantations.

Amidst this confliction of statements, it is difficult to arrive at any safe conclusion as to the process that ought to be employed for preparing the oil, or the quality that ought to be preferred. I think it is possible to reconcile them all, by taking into consideration a few facts which I have observed, and shall here state.

With regard to the colour, it is to be observed, that we can give the oil any desired hue, from the palest yellow to the deepest brown, by very simple means. I was long puzzled by the great variety of colours which the oil assumed when the process for obtaining it appeared to me the same. At length I observed that livers, even those that were perfectly white, gradually became red when exposed to air. When kept for a few days, a kind of flesh-coloured emulsion, consisting of oil and water, spontaneously oozed out; and the colour continually becoming more red, the contained colourless fluids appeared to undergo a process of sanguification, until at length a bloody water separated and left some detached oil. I therefore made the following experiment.

Out of a large supply I selected fifty livers that were perfectly and equally pale. These were divided into five parcels of ten each. The first parcel was subjected to the process of extraction immediately; the second on the third day after; the third on the sixth day; and so on to the tenth which was done on the thirtieth day. The resulting oils presented a series of colours, deep in proportion to the time, the first being very pale, and the last very brown. Thus the longer the livers have been exposed to air, the redder they become, and the greater will be the quantity of the newly elaborated colouring matter taken up by the oil. This will

* Bennett on Cod-Liver Oil, 1841.

happen whether the extraction has been hastened by heat or has proceeded in the cold; and by putrefaction of the livers the deepest colour will at length be obtained. Thus we understand the cause of the great differences in colour which the commercial oil presents; and it would be difficult to conceive how the solution of some colouring matter, derived from a kind of imperfect blood, reddened by contact of air, could impart curative powers, and thus sustain the preference claimed for the orange oil by the German physicians. I can only say, that the pale is the kind which for the three last years I have supplied abundantly to the Profession, and that its efficacy has been found in many cases surprising.

There is another ground on which the dark-coloured oil has been preferred by those who believe that its therapeutic agency depends on the presence of iodine. Iodine is soluble in cod-liver oil, and the solution is deep-coloured in proportion to the quantity dissolved: hence the notion naturally presented itself, that the brown oil may contain the greatest portion of iodine.

To obtain some information on this subject, I dissolved iodine in pale cod oil, and thus formed a deep orange solution, of exactly the same hue as a sample that was naturally so tinged, and in which I had not dissolved any iodine. To both oils I added an equal quantity of alcohol, and, after equal agitation, poured off the alcohol from both. The alcoholic washings of the oil to which iodine had been added rendered a mixture of water and starch purple; but the alcohol effused from the oil naturally orange, had no such effect: hence there was no iodine present, at least in the free state, and it is only in the free state that it could communicate colour.

It is to be observed, however, that for explanation of the assumed medicinal superiority of orange oil, recourse need not be had to the supposition that the curative principle is iodine, inasmuch as every known fact impugns that notion.

First, many of those patients who have been cured by cod oil were not in the least benefited by a previous course of iodine; this has been shown by Dr. Taufflied. Secondly, chemical analysis has discovered only minute traces of iodine in some specimens of cod oil, and others were entirely destitute of it.* Thirdly, the tendency of iodine is, to render the person thin who uses it, while the effect of cod oil is to fatten. Lastly, none of the oil prepared by me, when agitated with alcohol, communicated any impregnation of iodine, although the oil was eminently successful as a medicine, and its colour contra-indicated the presence of free iodine.

Since the publication of my former communication I have prepared this oil largely, and have made observations which it may be of use to record. I adhere to the opinion already expressed, that the lower the temperature at which the oil is obtained the better; the degree formerly specified (192°) is too high: its tendency is to communicate a rank, fishy smell, in place of the delicate odour of that which is quite recent, and has been procured by a very low temperature. A high heat affords the oil in greater quantity, but it has the rank smell of barrelled herrings, and will disgust and sicken the patient. A low heat, as 120° or 130°, gives a smaller product, but of a fine quality.

The proper season for preparing the oil is early in January, when the livers are plump, firm, large, white, and full of oil. It is necessary to mention that the cod is subject to diseases of the liver. Sometimes the liver is found flabby, apt to lie flat on a plane surface, like a bag half empty: sometimes it is specifically lighter than water, and those that float in water should be rejected. Good livers should cut smoothly under a sharp knife, and not tear: when cut, none

* We have an analysis of one oil, however, which contained 0.324 per cent.; and of another which afforded but 0.162: others, again, contained less. See *Bennett on Cod Oil.*

of the substance should flow out in a half liquid state. I have sometimes met livers that contained abscesses, and when cut into poured out a kind of whitish pus. I have also found them traversed with numerous red vessels, with a large protuberance at one side, which, when opened, disclosed a granular cavernous substance, of a blackish and greenish colour, from which was discharged a dark-brown water.

When the oil has been extracted, by a low heat, from sound, white, fresh, plump livers, it is an exceedingly nice article, which most people swallow without the least disgust, at least after the first two or three doses. Some take it with absolute liking: they compare its smell to that of the fish of a lobster's claw. Doctor Hastings, of London, describes the taste of some which I prepared for him as resembling that of an oyster:* and I have myself used it as an excellent sauce for cod-fish. Much of the ill repute which this oil has borne from some writers is, no doubt, attributable to the bad condition in which it was supplied.

Some direct the oil to be taken in emulsion: I believe it is more easily taken by itself, or floating on water or hot milk. The dose for an adult is a table-spoonful three times a day: for the first two or three doses a desert-spoonful may suffice.

The quantity of oil producible from livers depends on the period of the year. In the beginning of January I found that 1000 livers afforded thirty-seven imperial gallons: at the end of February the same number of livers produced only twenty-three imperial gallons of oil. In the beginning of January 1000 livers, of average size, weighed 900 pounds; while on the last day of March the same number weighed but 575 lbs. The oil was, in these different seasons, equally pale, and the livers equally white, although so much smaller and more flabby in the latter season.

* Essay on Consumption, second edition, p. 93.

The stearine of the oil is abundant, and of a pearl-white colour; it always separates as a white sediment in cool weather; when warmed, it melts into an oil in taste, colour, and smell the same as the oil itself; and there is no reason to doubt that it possesses the same medicinal properties.

The brownest oil may be rendered nearly yellow by long-continued exposure to the sun's rays.

There is a circumstance which deserves particular notice. It has happened to me three times, that when livers had been heated, with the view of separating the oil, and were left twelve hours soaked in their oil, a brisk effervescence took place, the contents of the vessel overflowed, a dreadful stench was emitted, and no oil separated.

When livers are held over for some days a putrescent smell issues from them, owing to the decomposition of the bloody water which they contain: they become inflated with fetid gas, and float on the oil, which at the same time pours out. But neither the livers nor the oil have this smell in their own nature, for it can be removed by washing. The oil that spontaneously flows is at the first moment pale, but soon deepens, and becomes brown in proportion to the time it has been in contact with the livers, now much reddened.

Cod livers, cut in pieces, are rendered very pale by immersion in cold water, and they might be thus preserved white for many days. But no advantage results: for livers which have absorbed even very little water, by being thus steeped, give little or no oil when heated, until all the water has been boiled out; and then the oil procured is scanty, ill-coloured, and ill-tasted. It is certainly proper to wash the livers from gall and filth before they are heated; but this should be hastily performed. The gall-bladder, which adheres to the liver, should, in the first instance, be removed. The gall is green, acidulous, and sweetish-bitter.

If the livers have been quite recent, and the heat rightly

managed, the oil will be fully as thin as water: but the case will be very much otherwise under opposite circumstances.

In the cod's liver the oil seems to exist combined with water, in the state of a natural emulsion: the pure oil, if violently shaken with water, will form a transitory emulsion. The natural emulsion in the liver is decomposed by heating: the water separates, and the detached oil appears.

I shall now state such facts as have come to my knowledge with regard to the medical efficacy of this oil in several diseases. I have endeavoured to obtain fuller information, but it is not easy to induce medical men to keep notes of their experience. When a practitioner has employed a new medicine with success in one or two instances, he prudently abstains from publishing his results, because inferences of real value can only be drawn from multiplied examples. It is on this account that I collect individual cases from every one who permits me; the accumulated evidence becomes worthy of publication; the medicine becomes better known; and its true value, be that more or less, is at length determined. The conclusions arrived at by Dr. Bennett, whose extensive knowledge and experience on this subject render him an excellent authority, will form a proper introduction.

He says the flaccid and phlegmatic bear the administration of cod-oil best, the plethoric worst. In scrofula, with torpidity, it is directly indicated; if irritation be present, its employment requires management and great care. The contra-indications are plethora, disposition to inflammation, profuse menstrual or hemorrhoidal discharges, total loss of appetite, nausea and vomiting, pain in the abdomen; and it is contra-indicated during the existence of epidemic diarrhœa, or dysentery. It should not be given in the morning fasting; for adults, the dose should be gradually increased to six table-spoonfuls: a fat animal diet supports the action of the oil.

Dr. Bennett says, that in general articular rheumatism

where the usual remedies failed, cod-oil cured speedily. A chronic lumbago of several years' standing was cured in seven months by the oil. A most intractable case of sciatica was also cured by four ounce doses taken every morning. In rachitis, and scrofulous caries of the bones, it was eminently successful. In no case, except rachitis, are the good effects of the oil so well established as in the atrophia mesenterica, the disease being cured by it often when every other remedy has failed; and even when all hopes of the patient's life have been abandoned. In tubercles of the lungs, which have not yet softened, or are in the first stage of softening, Dr. Häser says, that this oil is by far the most useful remedy. A young man labouring under the effects of a large vomica, attended with extreme emaciation, profuse night sweats, hectic fever, cough, loss of appetite and strength, was so far benefited by the oil, that his symptoms were almost entirely removed; but having taken a disgust to it, and it beginning to disagree with him, he relapsed and died.

A woman who laboured under all the constitutional, as well as physical signs of phthisis, with a cavern in the right lung, and other bad symptoms, was completely restored by the use of this oil. Several cases of chronic affections of the skin in scrofulous constitutions, have been completely cured by it, when all other remedies failed. The external use is also serviceable when hard, dry scabs exist. Brefeld relies altogether on its external application. Of its efficacy in skin diseases of various kinds, we have the testimony of Dr. Marshall Hall, Dr. Richter, and Dr. Nebel. In scrofulous diseases of the eye, the oil has been found of great benefit by Brefeld, Carron du Villards, Von Ammon, Pilford, Abendheimer, Gruby, and Dieffenbach.

Such is a summary of the statements of Dr. Bennett. The efficacy of cod-oil in consumption, when there were cavities, tubercles, purulent expectoration, and the whole train of miserable symptoms, has also been shewn by Dr. Emile

Pereyra, physician to the Hospital of St. André, Bordeaux, in an essay published two years since.

Dr. Hastings, speaking of this oil, says: "I observed some benefit to accrue from its employment, but in several cases I have been obliged to abandon its use, particularly where disease of the mucous membrane of the bowels existed; in these an uncontrollable diarrhœa set in, attended by great constitutional disturbance, which could only be allayed by suspending its use, and having recourse to opiates and other soothing treatment."—*Pulmonary Consumption successfully treated with Naphtha*, 2nd Edit. p. 93.

Out of a number of cases in which I have known cod-oil to prove successful in the hands of the medical practitioners of Dublin, I have been able to procure only the following written reports. Concerning all the rest, I shall say no more than to express my regret, that it has not been left in my power to lay them before the Profession.

Dr. Graves's first Case.

"Miss B———, aged about 20, of a florid complexion, with a fair and delicate skin, and well-developed form: her two elder sisters died of pulmonary consumption; she has been several times under my care for colds, and in 1841 her general health was so much affected, that I advised her to spend the winter in Devonshire. She was often attacked with spitting of blood, and in 1840 my attention was directed to a relaxed sore throat, and a very much enlarged state of the amygdalæ. The latter I endeavoured to remove by the usual topical remedies, nitrate of silver, &c., but without much effect. In the summer of 1844, the amygdaloid glands were fully four times their natural size, and had been so many years in a morbid state, that but little hopes could be entertained of their cure; however, in order to leave no means untried, I recommended the internal use of cod liver oil: a two months' course of this medicine, to my great

surprise, reduced the amygdalæ to their natural size and structure."

Dr. Graves's second Case.

"Miss F., aged 10, had been fading in her looks, and falling away in flesh and strength for about six months, when a chain of enlarged glands formed on both sides of her neck. Many medicines were tried in vain by her attendant physician. Being consulted, I advised the exhibition of cod liver oil, which, in about two months, removed the glandular swellings, and produced a healthy state of the system."

Dr. Graves's third Case.

"Miss ——— applied to me in December, 1844. She was sixteen years old; had grown fast, and her catamenia were established; she had caught cold about seven weeks previously to my visit, and had been since that time much annoyed by a cough; she had fallen away rapidly in flesh and strength. Her relations were very much alarmed, and had consulted several medical men, among others a professor of homœopathy, but without any beneficial result. Her appearance was cachectic; she had lost the animation of youth, and was both feeble and drowsy; there was no stethoscopic evidence of tubercles, nor was it easy to determine the nature of the irritation which caused the incessant and harassing cough. Having tried the usual medicines for a week without success, her cachectic appearance induced me to exhibit the cod liver oil, in hopes that the pulmonary irritation would yield to the improvement in her general health and nutrition, which might perhaps be brought about by the use of this alterative remedy. The effects produced were favourable, far beyond my most sanguine expectations, and in less than three months, this young lady was restored to perfect health. It is necessary to observe, that she remained in the same house in Dublin during the whole period both of her previous illness, and of her convalescence."

Dr. Aickin's first Case.

"March, 1843. Miss J——, aged 16, had for three months been considerably annoyed by a small ulcer on her forehead. On examination I found a tubercle of the size of a garden pea, situated beneath the ulcerated integument; there was another sore presenting the same characters on her right arm, both being occasionally inflamed and painful, and discharging a small quantity of purulent matter, which was very prone to scab. Her general health was bad; she complained of pain in the right hypochondrium; the catamenia were irregular and deficient; she was considerably emaciated, and had a jaundiced look. She suffered frequently from nausea; had a capricious appetite, and the bowels were habitually constipated. I prescribed for her such medicines as were calculated to improve her general health.

"From this time till May, 1844, I, in a great measure lost sight of the case, when I was requested to see her, and found her labouring under the following symptoms:

"May 9th, 1844. Patient is much emaciated, countenance shrunken, jaundiced, and expressive of extreme suffering; the abdomen is very much swollen, and emits a tympanitic resonance, except over the right lumbar and umbilical regions: pressure over these regions gives much pain. On applying the fingers to one side of the abdomen, and percussing the opposite, fluctuation is quite perceptible. Bowels are constipated; urine scanty and high coloured; tongue slightly furred; pulse 80 (small). The sores on her forehead and arm, which have never healed, are inflamed and very painful.

"During several days I directed mercurial purgatives, turpentine draughts, turpentine stupes, squill, digitalis, spirit of juniper, mercurial frictions to the abdomen, enemata of turpentine, and assafœtida. Yet the jaundice increased; the abdominal distention and pain became very great; the night sweats continued; the urine was very scanty; and there was

considerable prostration. The sores were evidently scrofulous; her countenance was strikingly expressive of deep-seated organic disease. It should be remarked that the great distention and pain in the abdomen, in the present stage of the complaint, prevented my making an accurate examination of the liver and other abdominal viscera; the chest presented no morbid phenomena. Nitric acid, digitalis, mercurial frictions, and the enemata, were directed for her.

"20th. There has been no increase in the quantity of urine, scarcely an ounce being voided in the twenty-four hours; there is a strong urinous odour emitted from the surface of the body; night sweats still continue; emaciation proceeds rapidly; pulse 120; intellect is perfect; she appears to be sinking; ordered her some gin punch, and ʒi. Spt. Æther Nit. three times a day, and to continue the mercurial frictions. The bowels still inactive. Repeat the enema.

"In about a week the patient rallied somewhat; about a pint of urine is voided daily; abdominal swelling is subsiding; bowels are much constipated. Occasional purgatives ordered, and the mercurial frictions to be continued.

"30th. Swelling in abdomen has subsided very much; fluctuation is not perceptible; patient complains of pain and tenderness on pressure over the abdomen generally; a hard and resisting surface is distinctly felt occupying the right lumbar and umbilical regions. When the abdominal muscles are relaxed, the peritoneum is easily felt beneath them as a tense and resisting surface, over which the muscles move pretty freely, and the convolutions of the small intestines, as if matted together, are plainly perceptible. She complains of a feeling of tightness and weight in the abdomen, and lies constantly on her back, with her limbs drawn up; her countenance is haggard and contracted; the sores on her forehead and arm are suppurating freely; bowels are constipated, notwithstanding the frequent administration of enemata. Her gums have not been affected by the mercurial applications,

they were therefore continued; and after another week iodine frictions were substituted.

"12th. Patient has rallied a little; kidneys still continue to act. Flatus in the bowels causes her much annoyance; the abdomen has become much contracted, and the peritoneum presents the resisting feel before alluded to; pulse 90. A mixture of tincture of gentian, hydriodate of potash, and aqua potassæ was directed, along with the iodine frictions.

"24th. Patient has been suffering excruciating pain in the abdomen since last report, which has become so tender that the pressure of the bed-clothes causes much annoyance. Morphia and hyoscyamus exhibited in full doses failed to give relief or procure sleep. At this period I had the pleasure of meeting in consultation Mr. Ribton, who, after examining the patient most minutely, concurred with me in considering the case as one of tubercular peritonitis with hepatic disease. We therefore considered the case as almost hopeless; and merely prescribed some carminatives to relieve the flatulence, and ordered anodyne liniments to be applied to the abdomen.

"28th. The patient is losing ground rapidly; abdominal pain is not relieved by anodyne applications. Finding that the remedies hitherto employed were incapable of mitigating her sufferings, we agreed to try the effects of the cod liver oil, as we had both seen great benefit derived from its use in scrofulous affections. We directed her to take a dessert-spoonful three times a day, but for several days it had no good effect.

"After about a fortnight's use of the oil it was observed that there was less tenderness and pain of abdomen; that her appetite was improved, and she declared that she felt something stronger.

"In ten days more the pain and tenderness on pressure of abdomen were much diminished; she could sit up for a short time in bed, and at night enjoyed sound rest.

"From this period my patient continued to improve daily;

pain, tenderness, and hardness of abdomen gradually diminished; and in the beginning of August, 1844, she was able to leave her room. She continued to take the oil up to the middle of September, increasing the dose to a tablespoonful three times daily, and up to the present time she has been free from any return of the complaint. Is much increased in flesh; has had no return of night sweats; has a better appetite than she has had for some years, and the abdomen is perfectly soft and natural.

"Under the circumstances of this case but little could be expected from the use of the cod liver oil, and nothing *a priori*; nevertheless its effects were truly miraculous, the patient having obtained relief from pain in about six days from its first employment, and sufficient strength to be able to walk about her room in the space of three weeks. I was induced to make the trial, because I had seen several cases treated by the oil in the Vienna and Berlin hospitals, where it is in the highest repute as a remedy for scrofulous affections, whilst it is much lauded as a useful palliative in hopeless cases of malignant disease. I have heard M. Dieffenbach declare that he had seen more benefit accrue from its use in cancerous affections than from any other remedy. I had an opportunity of seeing a case of open cancer, in the Berlin Charité, treated with the oil, which certainly went far to prove the truth of this assertion."*

Dr. Aickin's second Case.

"I administered the oil of cod's liver to Mary Thompson, aged 17 years, suffering from scrofulous disease of the knee-joint, and the result was quite wonderful. She had suffered from the disease for many months, and was rapidly sinking from hectic. The knee was greatly enlarged, and the tibia

* Dr. Aickin's case affords another proof that the efficacy of cod oil does not depend on the presence of iodine; for the former succeeded when the latter failed.

partially dislocated backwards, while the leg was attenuated to the last degree. Amputation was recommended by two eminent surgeons in the beginning of February last, but the patient and her friends opposed it; she commenced the use of the oil at that time, taking a table-spoonful thrice daily. In about three weeks the pain in the joint was less, although that might be attributed to the use of cold lotions; an abscess which formed in the popliteal space gave way, and a considerable amount of scrofulous matter was discharged. She has since taken the oil regularly, never omitting a single day, and the result is, that she has greatly increased in flesh; there is no pain in the part; her appetite and sleep are natural; and she can walk up a flight of stairs without experiencing any uneasiness in the limb, although there is a slight flexion, and a considerable degree of swelling remaining."

Dr. Aickin's third Case.—Scrofulous Disease of the Testicles.

"The subject of this affection was twenty-one years of age, of a delicate constitution, and decidedly scrofulous diathesis.

"In February, 1843, he was attacked with severe pain in the left hip, which caused lameness, and sharp pain in the bowels recurring at variable intervals, but always extending along the cord into the left testicle. Soon after, the testis became enlarged and hardened; the testis gradually enlarged to the size of a moderate hen-egg; an abscess formed at its lower extremity, the matter discharged leaving a sinus which did not heal. In the spring of 1844, he put himself under my care, and after prescribing some general treatment to recruit his health, I had the benefit of a consultation with an eminent surgeon, who coincided with me in declaring the case to be of a scrofulous character. The patient was ordered Hydriod. Potassæ in solution, and Iodine ointment to act on the enlarged testis. This, with a removal to the sea coast, and a generous diet, was the only treatment adopted.

"In the month of September, same year, the left testicle was nearly as large and hard as ever. During the summer the right had enlarged, and was now as large as the other. He also suffered much from pain in the bowels.

"In November following I found both the testes very much enlarged and hardened, but not painful to the touch. He was much emaciated; had occasional attacks of bronchitis; and his digestive powers were very weak. Fearing to administer mercury for the removal of the local affection, I directed him to take a table-spoonful of cod liver oil, three times daily, to rub a small quantity into the scrotum night and morning, and to omit all other medicines. In the beginning of May, 1845, I had the gratification of finding this young man greatly improved; he had become more robust, and increased in height; the left testis was of the natural size, all hardness had disappeared, and the right had merely a little hardness remaining in its body, whilst the epididymis appeared also as large as before. He had consumed about five quarts of the oil; the sinus had healed; and he expressed himself as much satisfied with the great improvement in his health.

"72, *Marlborough-street.*"

Mr. Ribton's first Case.

"In the spring of 1843 I was desired to visit a lady about 11 years of age, who, I was informed, had suffered during several successive seasons from inflamed cervical glands, eventually terminating in ulcers extremely difficult to heal. At the period when I first saw her, she had a darkish-red tumour about the size of a wallnut, a little below, and anterior to the left external malleolus. Naturally disposed to plethora, her flesh had rapidly and wonderfully decreased of late; her countenance was unhealthy; pulse frequent and weak; and her appetite impaired; the white of her eyes pearly; cutaneous surface anserine; and considerable emaciation. I con-

cluded she would probably soon fall a victim to some tubercular disorganization. After some preliminary treatment not necessary to describe, I directed for her a table-spoonful of cod oil three times daily. In about three weeks she had derived much benefit, and her foot was healing. Being absent from Dublin, I heard nothing of her for three months, when I called to inquire for her, and, to my astonishment found her perfectly relieved from all evidences of disease, an almost ludicrous specimen of obesity, and a far too substantial proof of the fattening properties of cod oil.* The young lady continues in perfect health, and has had no return of the swelling of the glands of the neck. She took in all something more than four imperial quarts of this most alimentary remedy."

Mr. Ribton's second Case.

"In the early part of the year 1842, a gentleman's son, five years old, was placed under my care, having swollen cervical glands. He was a very frail and delicate creature, with large eyes, pale-yellow, muddy skin; constantly appeared as if chilled, and so weak that his neck seemed inadequate to the support of his head. He ate but scantily, and the most trifling cause induced diarrhœa. Hoping some advantage from the cod oil, I ordered him a dessert-spoonful of it three times daily. It worked a surprising revolution in the child's health. He gradually improved in strength; the disposition to diarrhœa no longer continues; he has a moderate appearance of health and fatness, and a fair probability of attaining ordinary longevity."

Mr. Ribton's third Case.

"In the summer of 1841, I was called to the relief of a very interesting female child, suffering from the eruption of

* The mother of this young lady informed me that in about ten minutes after taking each dose of the oil an appetite was created, during which she ate abundantly.—M. D.

a molar tooth. She had entered her eighth year; and until assailed by the grievance of the tooth, her health had been without interruption good. A few days previous to my visit, the gum over the ascending molaris was painful; a superficial, lymphatic gland anterior to the ear, became tender and swollen; and a hard tumour under the fascia occupied the left side of the face, from the zygoma to the angle of the inferior maxilla. I concluded that a lymphatic gland in the substance of the parotid gland had become inflamed, and had in its turn excited inflammation in the entire extent of the parotid gland, the limits of which were accurately defined by the swelling. The parents of this juvenile sufferer have a numerous family: two of their children had already died from difficult dentition, of whom one sunk from debility and emaciation. The other had an abscess in the side of the throat, near the os hyoides, which completely obstructed deglutition, and the wretched child perished from inanition. In this unhappy case I was not the medical adviser; but the child's parent detailed to me its terrific sufferings. He would grasp at a bowl of milk, and make the most strenuous efforts to swallow some of it; but all his eager exertions only eventuated in the imbibition of the fluid by his mouth, and its almost simultaneous ejection by his nose. A few years afterwards precisely the same train of symptoms occurred in another child of this same family, for which my assistance was desired; swallowing had become impeded; fluid received into the mouth returned through the nose, and there was an abscess in the left external fauces, between the inferior maxilla and the os hyoides. I immediately made a deep but cautious puncture into the swelling where I suspected fluctuation, a considerable flow of pus ensued, and deglutition was restored. This child eventually recovered. The aptitude to suppuration hitherto evidenced in this family, led me to fear that parotid abscess, with all its sad consequences, would probably occur in the present case. The little patient's countenance was

exceedingly anxious; her naturally florid complexion was now become bluish; she always seemed as if under the impression of a sudden chill, even in a warm room; and, finally, emaciation was in rapid advance. The distortion of her face was frightful; and I thought the occurrence of strumous abscess inevitable. Notwithstanding all these gloomy anticipations, this child recovered perfectly; the tumefaction was absorbed, and no suppuration ensued; and which happy termination I entirely ascribed to the invigorating influence of cod oil. A table-spoonful of this powerful restorative was directed for her every fourth hour: and even within twenty-four hours its salutary effects were visible. After some days, the little invalid was sufficiently convalescent to be removed to the country; and before a month had expired, there did not remain a trace of her formidable illness.*

"That cod oil possesses a powerful influence in the resolution of scrofulous swelling, checking emaciation and diarrhœa, and, at least, retarding the fatal course of tubercles, the cases here detailed, and some further evidences, do not permit me to doubt. In cases of difficult dentition, attended with great debility, I feel assured it will prove a most valuable addition to the Materia Medica. I have even known all the painful and distressing symptoms accompanying a strumous condition of the uterus, in the case of a married

* The mother of this patient informed me, in addition to Mr. Ribton's statement, that the child had, previously to the employment of cod oil, been put under a six weeks' course of iodine and other medicines, without any good effect; a fact which discountenances the notion that iodine is the active principle of cod oil. It is also useful to mention, that the first few doses of cod oil administered to the child, being old and rancid, destroyed her appetite, and she could only bear a dessert-spoonful on her stomach, while of the oil of good quality she easily bore a table-spoonful. It is worth remarking, that the child had been troubled with inflamed and raw tarsi, which speedily improved under the use of the oil, and ultimately got well. This effect has been often observed by Mr. Wilde to be produced by cod oil.—M. D.

lady, to be gradually removed by cod liver oil, after other remedies had been resisted.

"*5, Upper Gardiner-street.*"

Knowing that Mr. Wilde had used cod oil rather extensively at the Ophthalmic Dispensary, I requested him to give me the result of his experience, and received the following reply:

"Dear Mr. Donovan,—In answer to your inquiries as to my experience of the efficacy of the Ol. Jecoris Aselli, I beg to state that I have used it extensively in certain forms of ophthalmic affections, and in some cases with marked beneficial effects. In cases of pannus and long-continued chronic ophthalmia, attended with granular lids, &c., where the constitutional powers had fallen below par, shewn by diminution in volume, and increased quickness of pulse, pallor of countenance, coldness of the extremities, a clammy condition of the skin during the day, and heat and restlessness at night; together with loss of appetite, and a large, flabby, putty-coloured tongue, which is usually attendant on such broken down strumous patients, I have found it a most useful remedy; in fact in all cases in which tonics and nutrition were indicated. In Germany I have seen it used extensively in the treatment of strumous ophthalmia in children, even in the first or sthenic stage; but my own experience of it in such circumstances does not lead me to recommend its use until the patient has become debilitated by confinement, or the prolonged duration of the disease. In children labouring under strumous ophthalmia of long continuance, where bark or preparations of iodine would be indicated, I have generally found it useful; and it is often efficacious where that remedy is either inapplicable, or has been used without effect. In such cases, particularly where the abdomen has become hard and tumid, I look upon it as a most valuable remedy; but to

be of use it must be taken in some quantity, and persevered in for a considerable time.

"Without entering into a detail of its immediate effects, or mode of operation—subjects on which you yourself are so well informed—I may remark, that notwithstanding its being at first a very nauseous dose, it, when in good condition, is scarcely ever thrown off the stomach, even though that viscus should be in an irritable state at the time. It is undoubtedly one of the most fattening remedies with which I am acquainted; and, strange to say, although at first so difficult to be taken, patients, after a little time, say they prefer it to any other medicine.

"I remain your's, &c.,

"W. R. Wilde.

"*Westland-row*,

"*24th July*, 1845."

CONCLUSION.

From the cases reported in this Essay, as well as from the statements of those eminent persons who have already published their experience, it plainly appears that cod liver oil is a most useful addition to our Materia Medica: that it produces effects of which no other known medicine is capable: and that it is well worthy of the attention of the medical Profession.

Art. IV.—*On some unusual Complications and Sequelæ of Measles.* By Francis Battersby, M. B., F. R. C. S., Ireland; one of the Medical Attendants of the Institution for Diseases of Children, Pitt-street, and of the Sick Poor Institution.

As it is not only conducive to the interests of science, but useful to the practical physician, to have on record instances of unusual modifications of disease (more particularly if of

an epidemic nature), I think it may not be without advantage to detail some of the peculiarities of a severe epidemic of measles, which prevailed in Dublin at the close of last year, and which I had the opportunity of observing amongst the patients brought to the Institution for Diseases of Children. A further reason for doing this is, that during the beginning of the same year, measles, with very similar complications, prevailed in the South Dublin Union Workhouse, for an interesting account of which we are indebted to Dr. Lees.*

The epidemic in question is additionally remarkable, that most writers, from Sydenham downwards to the present day, agree in stating that measles usually commence in January or February, attain their *acmé* about the vernal equinox, gradually decline till midsummer, and become extinct in July; and also that they are milder in summer and autumn than in winter. The present instance forms no exception to these laws, and seems, as to the months it prevailed in, and its general character, to bear a close analogy to the epidemic of 1745 of Plymouth, as noticed by Huxham.†

Although cases of measles were, from time to time, brought to the Institution during the previous months, it was not until the end of July that they became numerous. In August the epidemic was at its height, and so continued until December, when it gradually disappeared. It was thus in full vigour for more than four months, during which the weather was very seasonable. At its commencement scarlatina was very general, but this declined as the former advanced.

Many patients were soon overpowered by an asthenic bronchitis, in which bloodletting afforded no relief, and was not well borne; they were affected with great dyspnœa and general debility; the pulse was rapid and oppressed; the skin was hot and dry, with cold extremities, or it was

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* Dublin Medical Journal, vol. xxv. p. 1.

† Med. Observations and Inquiries, vol. iv. p. 135.

bathed in perspiration without relief to the symptoms; copious mucous and subcrepitating rales could be heard all over the chest; congestion of the lungs, with dulness, ensued, and they died comatose at the end of a few days. The eruption in these cases was generally premature or imperfect, and if they survived long enough, it could often be observed at a later period than usual, in dusky confluent patches on the skin. It was not, on the other hand, unusual for others who had passed favourably through the exantheme, but were afterwards neglected, to be brought to the Institution in the course of three weeks or more, with cough, bronchitis, and dulness at the back of the chest; and many so affected, especially if they had been ill-nursed, wasted away and died at variable periods, sometimes not until after the lapse of some months.

The epidemic was, however, chiefly remarkable for the complications it presented of inflammations of the mouth, the pharynx and larynx, the great prevalence of diarrhœa and dysentery, and also for its destructive effects, in some instances, upon the eyes. These different complications will be best illustrated by the following cases, which occurred in my own practice, and were at different times seen by one or more of my colleagues, as well as by the pupils in attendance on the Institution.

PELLICULAR INFLAMMATION OF THE MOUTH; BRONCHO-PNEUMONIA.

Anne Dara, a very fine-looking child, four years of age, brought to the Institution July 5th, 1844. The eruption of measles appeared this day week, and was of a dark purplish colour; traces of it are still apparent in the dark patches scattered over the skin, which is generally of a dusky colour. Both surfaces of the tongue, and the inside of the lips, are occupied by thick laminæ of ash-coloured lymph, some of them nearly the size of a fourpenny piece. The mucous membrane of the mouth is of a dark purple colour, and very

tender, and readily bleeds when the exudations are touched; tonsils slightly swollen: dysphagia; voice hoarse; the angles of the mouth are red and excoriated, as also are the openings of the nares, from which there is an ichorous discharge. There is much irritative fever, with great restlessness; countenance tumefied and anxious; bronchitis extensive, with copious secretion into the larger tubes at the postero-inferior parts of both lungs. Bowels confined.

The mouth was touched with a strong solution of Argent. Nitrat. Hirud. ii. pectori.

℞ Mist. Expect. ℥ii.
Vini Ipecac. ʒss.
Tinct. Hyosci. ʒss. M.
Sumat ʒi. secundis horis.

℞ Hydrarg. c. Creta. Pulv. Rhei, āā gr. xv. M.
Fiant Pulv. vi. Sumat i. quartis horis.

6th. Exudation less; voice extinct. Bowels have been freed but once.

8th. Voice returning; tongue cleaning; mucous and subcrepitating rales very extensive, as before, with dulness on percussion at postero-inferior part of left lung. Cough troublesome, hoarse, and laryngeal; face flushed.

Hirud. ii. Empl. Vesicat. Ung. Hydrarg. ℥ss. in part. vi. div. infricetur i. ter die.

15th. Debility and restlessness very great; pulse very quick and feeble; cough teasing and laryngeal; mouth well. Diarrhœa since yesterday.

℞ Mist. Expect. ℥iss.
Vini Ipecac. Syr. Scillæ, āā ʒii.
Tinct. Opii Camph. ℈i.
Carb. Ammon. gr. x. M.
Sumat ʒi. secundis horis.

℞ Pulv. Calomel. c. Creta, gr. x.
Ipecac. gr. iv. M.
Divide in part. iv. Sumat i. 4tis horis.

17th. State of bowels improved, but the debility remains great; pectoral symptoms as before. After consultation with Dr. Croker, we ordered the following:

℞ Tinct. Acetat. Ferri, ℥i.
Tinct. Digitalis, ℥ss.
Aq. Fœnic. d. ℥x. M.
Sumat ℥i. quartis horis.
Iodine ointment to be rubbed to the chest.

This patient did not again return.

In another case, that of a female child aged eleven months, there was, the day preceding the eruption, a white, curdy exudation, in the form of dots on the gums and tongue, attended with bronchitis and confined bowels. The eruption ran a regular course. On the sixth day the entire mouth and fauces were much inflamed, and of a dark red colour, and the exudation had then assumed the form of large patches, similar to, but not so thick as those in the former case. The voice also was hoarse, and the cough distressing and croupy. The bronchitis became of a congestive character, diarrhœa set in, and carried off the little patient.

According to Dr. Copland,* asthenic acute laryngitis is one of the most fatal complications of eruptive fever; and Dr. Cheyne† remarks of the epidemic of 1808, in Edinburgh, "which resembled the putrid measles of Sir W. Watson, that the larynx was in several instances inflamed after the rash had disappeared; in all which cases, to the best of my recollection, the patients died. Bleeding was useful at the beginning of the epidemic. After it had continued some time, and had become more fatal, the attending fever being typhoid, bleeding appeared injurious; indeed, we then observed, that scarcely a child recovered which had been bled, so that bleeding was not had recourse to when the larynx became inflamed."

* Dictionary of Med., Art. Laryngitis.
† Cyclop. of Med., Art. Laryngitis.

In none of the cases I observed was an unfavourable termination induced by the inflammation of the larynx‡; the chief danger resided in the thoracic affection. When this was combated successfully, as in the following cases, the other symptoms, also, improved proportionately. Large depletions were quite unsuited to them, but the repeated application of leeches seemed to produce the happiest effects, in conjunction with other remedies, amongst which, the frequent use of the warm bath seemed not the least effectual. The constant state of irritation of the integuments of the thorax, kept up by the frequent application of the Acetum Cantharidis, seemed likewise of eminent service; and one child owed, I think, his recovery to a copious eruption of small boils produced by it.

PHARYNGO-LARYNGITIS.—BRONCHITIS.

Terence Fitzimons, æt. 4 years, brought to the Institution Nov. 7th. The measles appeared ten days ago, and passed off regularly. Had scarlatina a short time previously. He is affected with low fever; skin dry and burning; face pallid and tumid, with appearance of much depression and anxiety. His voice is very indistinct; he is distressed by a constant single, hoarse, barking cough. The gums and inside of the cheeks seem as if streaked by milk; tonsils swelled and of deep red colour. The epiglottis can be felt enlarged and rounded. Inspiration sibilous. Dyspnœa. Hoarse bronchial rales on both sides of chest posteriorly, mixed with a fine subcrepitating rale, heard, on full respiration, at right side. No dulness is perceptible, but rather

‡ The experience of Dr. Lombard, in an epidemic he observed at Geneva, in 1832, agrees nearly with my own on this head. He says: "Malgré une grande complication de symptomes effrayans et prolongés je n'ai pas perdu un seul malade au suite de cette affection du larynx, d'ou il faut conclure que la laryngite seule est insuffisante pour amener la mort."—*Gazette Medicale*, 1833, No. 15.

a degree of tympanitic resonance on percussion. Bowels confined. The skin is generally of a dusky colour, and there is extensive defurfuration of the cuticle in branny scales; grinds his teeth in sleep; tongue foul.

Hirud. ii. pectori.
℞ Pulv. Cal. c. Ipecac. ʒiss.
Fiant part. 8. Sumat i. quartis horis.

℞ Mist. Expect. ʒiss.
Vini Antim. ʒss. M.
ʒi. tertiis horis. Baln. tepid. h. s.

8th. The cough was much easier after the leeching, and is now much softer. Slept unusually well; fever is less; face flushed; countenance not so inanimate or oppressed; appearance of mouth remains the same. Bowels freed but once.

Hirud. ii. pectori.
℞ Addatur Misturæ præced.
Muriat. Ammon. ʒss.
Sumat Pulv. Rhei c. Ipecac. gr. vi. h. s.
Baln. Tep. vespere.

9th. Cough much improved; pellicular appearance of mouth gone; tongue cleaning; symptoms of bronchitis nearly as before.

Hirud. ii. pectori.
℞ Mist. Expect. ʒii.
Mur. Ammon. ʒi.
Vin. Antim. Vin. Ipecac. aa. ʒ ii. M.
Sumat ʒi. tertiis horis.
℞ Pulv. Cal. c. Ipecac. ʒ ss.
Fiant part. 8. Sumat i. 4tis horis.
Baln. tep.

11th: Great deal better; tongue clean and natural; coughed none during the night; subcrepitating rales scarcely perceptible.

16th. Convalescent.

℞ Pulv. Rhei ℈i. Sod. Bicarb. ℈i.
P. Arom. gr. iv.
Divide in part. 6. Sumat i. omni nocte.
Habeat Syr. Iod. Ferri ʒ i. ter in die.

This child recovered perfectly, and has lately passed through hooping-cough complicated with bad bronchitis.

John Byrne, æt. 2 years and 3 months, was brought to the Dispensary, November 14, 1844, by Dr. W. Moore, of Anne-street, under whose care he had previously been. Ten days ago the eruption of measles appeared, after five days' previous illness: it was of a purple colour, and remained out two days. I found the skin of a brownish hue, mottled with dark patches, face pallid and puffed, and expressive of great anxiety. He was very irritable and restless, voice completely gone since second day of eruption; cough hoarse and croupy. Fauces were inflamed and of deep-red colour; and, at every effort to drink, the fluid returned by the mouth or nose. The epiglottis felt rounded and enlarged. There was extensive congestive bronchitis and dulness on both sides posteriorly. Pulse rapid, but pretty firm.

The fauces were touched with a strong solution of nitrate of silver. Three leeches to the chest. Warm bath at night.

℞ Mist. Expect. ʒiss.
Liq. Ant. Tart. ℥ss.
Muriat. Ammon. ʒss. M.
Sumat ʒi. 2dis horis.
℞ Pulv. Cal. c. Ipecac. ʒss.
Div. in partes 6. Sumat i. ter in die.

15th. Can now swallow without difficulty. Is in every way much improved.

Repet. omnia.

25th. Has been improving ever since. Skin cool. Counter-irritation of the chest has been kept up by the repeated application of Acetum Cantharidis.

℞ Pulv. Rhei c. Ipecac. ʒss.
Div. in partes 6. Sumat i. ter in die.
Syr. Iod. Ferri ʒi. ter in die.

This child recovered perfectly.

PNEUMONIA—SLOUGHING.

Francis Barnes, a fine-looking child, æt. 13 months, and still unweaned, brought to the Institution August 29th. Measles appeared ten days ago: three other children of the same family went through them favourably. The eruption, in his case, remained out the usual time, but the skin is of a dusky colour, and mottled, and he has never got rid of the cough. Face puffed and leaden-coloured; lips pallid; lungs loaded with secretion; copious mucous and subcrepitating rales on both sides of chest posteriorly; cough hoarse and laryngeal; bowels too free. Six days ago a purple-coloured vesicle appeared on the back of the index-finger of left hand. The integuments of that part of the second phalanx are black and sphacelated, and the entire finger is much swollen. There is a large pustule, with a red inflamed base, on the upper lip. Skin hot and dry.

Hirud. ii. pectori.
℞ Pulv. Calomel. c. Ipecac. ʒss.
P. Cretæ gr. xii. M. Div. in part. 8. Sumat i. 4tis horis.
℞ Mist. Expect. ʒiss.
Vini Antim. ℥ss.
Tincturæ Hyos. ʒss. M.
Sumat ʒi. 2dis horis.
Baln. tep. h. s.

30th. Fine crepitus very distinct on right side posteriorly and inferiorly; dulness on percussion very extensive; heat of skin unabated.

Hirud. ii. pectori.

31st. Face livid; skin cooler, and perspiring; great dyspnœa; no improvement in the pectoral symptoms; debility very great. The cuticle is desquamating in large scales.

℞ Decoct. Senegæ ℥vi.
Syr. Scillæ V. Ipecac. ãã. ʒii.
Carb. Amm. ʒss. M.
Sumat ʒi. omni horâ.
Powders to be continued.

The child did not return, but I learned that he died in four days after last visit.

Diarrhœa, more or less severe, occurred in the majority of cases; in some it was attended with bloody and mucopurulent stools and tenesmus. It usually commenced about the period of the decline of the eruption, and was readily controlled if the chest was not seriously affected; the coincidence of the two was an unfavourable omen.

November 7th. Margaret Clarke, æt. 5 years. Eruption of measles appeared five days since; is badly purged for three last days; stools bloody and mucous; tenesmus; abdomen tender; tongue covered with white coating; cough, with slight bronchitis.

℞ Pulv. Cretæ comp. ϑi.
P. Doveri gr. iii.
Ipecac. gr. ii. M.
Div. in part. 6. Sumat i. ter in die.

9th. Dysentery bad.

℞ Pulv. Cretæ Comp. c. Oplo gr. xii.
Pulv. Cretæ c. ϑi.
Ipecac. gr. iv. M.
Div. in part. 8. Sum. i. ter in die.
Acet. Canth. abdomini affricand.

She recovered rapidly.

The patient was always in great danger when these symptoms preceded the eruption.

December 5th, 1844. Maria Bernel, æt. 3½ years. Sickened six days ago, and has had sneezing, coryza, and cough. For five days has been affected with very severe purging;

passes blood during last three days; tenesmus. There appeared to-day a measly rash on the face, in large, red, elevated patches; small papulæ on legs; cough distressing; great debility and oppression; copious mucous rales over the chest.

℞ Pulv. Cretæ c. ℈i.
P. Doveri gr. iv. M.
Div. in part. 6. Sum. i. 4tis horis.
Hirud. iii. pectori.

℞ Aq. Carui ʒiss.
Syrup. Simpl. ʒss.
Vini Ipecac. ʒiss.
Tincturæ Opii gtt. ii. M. Sumat ʒi. omni horâ.

The diarrhœa was checked, but the bronchitis, attended with low fever, great debility, rapid and feeble pulse, increased; congestion of the lungs ensued. The parents, desponding of her recovery, became unwilling to disturb her by administering medicine—too often the case with the poor—and she at length sank at the end of a fortnight.

The following case was very remarkable, on account of the perfect recovery of the little patient from the nearly hopeless condition to which she was reduced by long protracted diarrhœa.

October 29th, 1844. Sarah Kearns, ætat. 1½ years. Was weaned when one year old. The mother states that she was a fine plump child until attacked by measles in July last. She has had diarrhœa ever since, and is now wasted to an uncommon degree, the integuments of the limbs hanging in bags; and the face is shrunk up to such a degree, combined with the aged look, as to bear a great resemblance to a monkey's, especially when she cries. The abdomen is flat and soft; tongue red and dry. Thirst, and desire for cold water, excessive. Is extremely irritable. Has been under the care of many persons before coming here. Stools very frequent; green, fœtid, and shreddy.

℞ Mist. Cretæ, ℥ii.
Tinct. Catechu, ʒii.
Tinct. Opii gtt. ii. M.
Sumat ʒi. post sing. sed. liq.
Lime water and milk for drink; arrow-root for food.

November 4th. No improvement. Stools whitish, very numerous; tenderness of abdomen.

Application of Acet. Canth. to abdomen.

℞ Pulv. Cretæ comp. c. Opio, gr. viii.
P. Cretæ c. gr. xii.
P. Arom. gr. iii. M.
Divide in part. 6. Sumat i. ter die.

℞ Spt. Terebinth. ʒss.
Sacch. alb. ʒii.
Mucilag. ʒss.
Aq. Carui. ʒiss.
Tinct. Opii, gtt. ii. M.
Sumat ʒi. 4ter die.

12th. Is much less irritable; rests quietly; bowels much improved; stools more solid.

She continued to use this mixture for a fortnight, and is now a large and fat, though flabby, child.

Another case of protracted diarrhœa and dysentery is remarkable from recovery having speedily followed the rejection of a large ascaris lumbricoides by vomiting.

December 16th, 1844. John Colgan, ætat. 5½ years. Had measles six months ago, and has been affected with diarrhœa nearly ever since. The stools are now very frequent, mucopurulent and bloody; passes most blood about 8 or 9 o'clock in the evening. Sometimes the stool is partly natural, and partly morbid. Abdomen swelled and tender. Tongue rather dry, with thick, yellowish coating. Thirst. Urine sometimes white and thick. Very little appetite.

℞ Pulv. Cretæ comp. ℈i.
Hydr. c. Cretâ, gr. iv.
P. Rhei, gr. x. M.
Div. in partes 6. Sumat i. ter die.
Warm bath. Blister to the abdomen.

18th. Stools less frequent, and of brownish colour, and without blood. No abdominal tenderness. Tongue cleaning. Looks are improved. Continue powders.

℞ Infusi Gentianæ, ℥vi.
Tinct. Rhei, ʒii.
Tinct. Mur. Ferri, ʒss. M.
Sumat ℥ss. ter in die.

22nd. Purging again bad. Tongue red, and raw looking. Slight fever.

℞ Spt. Tereb. ʒi.
Mucilag. ℥ss.
Sacch. albi, ʒii.
Aq. Carui, ℥iss. M.
Sumat ʒi. ter indie.

23rd. After having taken the first dose of the bottle, he vomited a large ascaris lumbricoides. He now looks lively and much improved. Abdomen soft and natural. In a few days he recovered perfectly.

I omit to notice many instances of chronic glandular enlargements and eruptions so frequently observed to follow measles. Parotid inflammation, however, though said to be sometimes consequent on scarlatina, has not, I believe, been noticed as a sequela of the former. I observed a few cases of this; for the following one in which this occurred I am indebted to the kindness of Dr. Hughes, who was in attendance along with Sir Henry Marsh.

MEASLES, SECOND ATTACK—SEVERE FORM.

"A young lady, 19 years of age, was visited by Dr. Hughes, January 21st, 1845. She had been suffering for the last few days from frequent rigors and headach. Hot, dry skin;

short, dry cough; suffused eyes, and acrid discharge from the nose. The pulse was 104, weak; extremities cold. On inquiry, it was found that at 3 years of age she had had measles, for which she was treated by a very intelligent gentleman of this city; and that within the last four years she had suffered from a very severe attack of scarlatina in Paris.

"Ordered acetate of ammonia mixture. Fomentations to the extremities.

"Evening. An ill-marked eruption has made its appearance on the forehead and face, the pulmonary irritation is much increased; profuse coryza; pulse 100, weak; stomach irritable.

"22nd. Slept none. The eruption is now somewhat better marked on the face; it presents a dark purple measly hue on a dusky-coloured skin; cough incessant; complains of sore throat, which on examination is found studded over with patches of the eruption; headach; pulse 108, very weak; extremities cold.

"24th. Has been affected with much irritability of the stomach and bowels, but is now better; eruption fading; catamenia present; complains much of her throat, which has a very irritable appearance; cough still frequent.

"The recovery in this case was extremely tedious. The eruption was followed by a severe attack of parotid inflammation. The mucous surfaces did not regain their tone for a considerable time. The bronchial irritation continued for weeks; at times the sputa was deeply tinged with blood. A crop of small and painful boils made their appearance at the end of the second week."

ULCER OF CORNEA.—PROLAPSUS IRIDIS.—STAPHYLOMA.

The affection of the eyes in measles is generally of a very mild description, consisting merely in vascular congestion of the conjunctiva and sclerotica, with tenderness on exposure to light, and increased lachrymal discharge; all which symptoms gradually subside, without treatment, with the eruption.

One of the peculiarities of the epidemic was that its effects upon these organs was more than usually severe. The period of danger was either just after the decline of the eruption, or at the end of two weeks or more from that time; in the first instance, owing to destructive ulceration of the cornea, in the latter, to sloughing of that part. The danger of the former was readily obviated by timely and appropriate treatment; but if neglected, the consequences were very injurious, as in the following case.

Susanna Ray, a stout child, four years of age, brought to the Institution Nov. 9th. Had measles three or four weeks ago. In four or five days after the eruption had gone away the left eye became inflamed. No advice has been sought for till now. Her countenance is pallid. There is a deep ulcer, with opaque edges, at the lower part of the cornea. There is scarcely any appearance of inflammation about the eye, nor does she seem to suffer from it. Eczema of scalp. The ulcer touched with strong solution of Nitrat. Argent.

22nd. The ulcer again touched, and she was placed on alteratives, with tonics.

Dec. 9th. Has been absent since 22nd of last month. The iris is now prolapsed in the form of a brownish speck at bottom of ulcer; pupil irregular at lower part.

After the 10th I lost sight of her until April 17th of this year, when she returned with a very prominent partial staphyloma of the cornea, to which the lower part of the pupil was adherent. The upper part alone of the cornea was transparent, and the corresponding portion of the pupil was regular.

This secondary ophthalmia was always of a strumous nature, and I invariably treated it as such with success. The lids were simultaneously everted, by means of the finger and thumb, and lightly brushed with a strong solution of Argent. Nitrat. (℈i. ad ʒi.) with almost immediate relief to the symptoms, this application being combined with the use

of alteratives and tonics, among which latter, the Syrup. Proto-Iod. Ferri seemed most appropriate; its agreeable taste is not its least recommendation as a children's medicine, as there is no difficulty in getting them to take it, which cannot be said of most other remedies of similar properties.

MEASLES—SLOUGHING OF BOTH CORNEÆ.

Charles Doyle, ætat. 3 years, Oct. 21st, 1844. Had measles fourteen days since. A week ago the eyes and mouth became inflamed. This child presents a most wretched appearance, being pallid and wasted. Extensive red excoriations of the nares and mouth; the lips covered with bloody crusts, at which he is continually picking. Pellicular inflammation of the tongue and inside of lips; tonsils red and inflamed; perfect aphonia. Bowels confined. The centre of both corneæ, to the extent of about one-third of the entire, presents a dirty, yellowish, shrivelled appearance, and is apparently sphacelated. Hypopion of both anterior chambers; the lymph of a dull yellowish colour. There is no conjunctivitis; but several straight, pale-coloured, vessels run from the sclerotics to the corneæ, which are themselves vascular as far as the sloughs. Eyelids kept forcibly closed.

I was not able to learn the fate of this child; but from his debilitated and wretched condition, which nearly resembled that of the following one, I conclude both cases terminated similarly.

Sept. 12th. Eliza Sloane, æt. 1 year, the child of a fishwoman living in a dirty, crowded room in Pill-lane; had measles seven weeks ago, along with two others of the same family; was previously healthy; has been affected with vomiting and purging ever since; emaciation very great; features collapsed, and eyeballs sunken; extremities cold and blue; the skin is of a dusky colour, and petechiæ are thickly scattered over it. There has been some discharge of blood from the nose and gums; lips are encrusted; nares excoriated; tongue parched and smooth; aphonia. The eyes have been affected

a week; they never were very red; fully one-third of the centre of each cornea seems to have partially sloughed away, and the inner layers project forwards, being of a greyish colour; there is scarcely any increased vascularity of the eyes, just a few straight, deep-seated vessels converge to the cornea. The eyelids, as in the former case, are kept closed, and the child opposes their being opened.

This child did not return, but on making a visit two days afterwards, I found that she had just died, and that before death there had been partial separation of the sloughs and evacuation of the aqueous humour.

No writer that I am aware of has noticed any instance of destruction of the eyes in consequence of measles, occurring in the manner it did in the two foregoing cases. There was a striking resemblance, however, between them and the rapid disorganization of these organs, which my friend Dr. Osbrey has remarked in connexion with scarlatina. Dr. Osbrey observed "one case, in which, simultaneously with the gangrene of the neck, sloughs formed on both corneæ, which rapidly extended, involving all the other textures of the eyes,"* and were followed by dissolution in two days: the inflammatory appearances, also, were very slight, for "the conjunctiva was not even red."† Some, perhaps, from this resemblance, might be led to suppose that the children, whose cases I have given, may have had scarlatina, and not measles, as reported by their mothers, for I had not an opportunity of seeing the eruption. Such an assumption would, I think, in the absence of the more unequivocal signs of the former disease, be not altogether warranted, for although there was great depression of the vital powers, excoriation of, and sanious discharge from the nose and lips, with inflammatory appearance of the mouth and throat, these symptoms were nothing

* See Paper by Dr. Osbrey, on Diffuse Inflammation occurring in Scarlatina, in Dr. Graves's "Clinical Medicine," p. 530.

† Dublin Med. Journal, vol. xxv. p. 136.

more than what was frequently observed during the epidemic, and in cases which were certainly not scarlatina; but neither were they instances of regular measles. They seemed to partake of the characters of both these exanthemata, and to correspond very closely to that described by German authors under the name of Rötheln* which Schönlein says is "an acute exanthema of a hybrid form, partaking of the nature of measles and scarlatina, whose essence consists in there being a contradiction (*widerspruch*) between the cutaneous and mucous symptoms; thus, where the mucous symptoms resemble those of scarlatina, the exanthema is like measles, and *vice versa*."† It is said to occur when measles and scarlatina arise simultaneously, or follow hard on one another. The eruption is not, as in measles, lenticular, and it comes out on the second or third day in dark-red papulæ, which rapidly take on the appearance of large, irregular, elevated patches; these are of a deeper colour, and more raised in the centre than at the edges; they are often confluent, and are frequently succeeded by small vesicles resembling the miliary of scarlatina. Soreness of the throat is looked on as one of the most characteristic features of this disease. The eruption generally appears over the entire body at once, but more sparingly on the extremities, and presents many varieties. The desqua-

* German writers themselves are not agreed in opinion as to the nature of this disease. Some consider it as a variety of scarlatina; others, a mixture of scarlatina and measles; while a third party, amongst whom is Schönlein, look on it as a special eruptive disorder which does not recur in the same individual, and affords no protection against either of the former. The second opinion above stated seems to me the most probable. That some may have confounded Roseola with Rötheln, as has been supposed, is possible, although the distinction is attended with no difficulty, unless, as Dr. Thompson has done, we are called on to consider as such cases similar to those detailed by Bateman, which the latter regarded as different from any of the species described by Willan, and which appear to have been instances of the disease in question.—See *Bateman on Cutaneous Diseases*, seventh edition, by A. T. Thompson, M. D., p. 143.

† *Allgem. und Speciel. Pathologie und Therapie*, bd. 2, s. 311.

mation which follows is intermediate between that of measles and scarlatina, and the sequelæ resemble most those of the latter disease.*

The degree of influence the extreme poverty of their parents, and the unwholesome atmosphere in which they lived, may have had in deciding the fate of these two children, it is not easy to determine. I have seen instances of sloughing of the cornea, in wasted and ill-nursed infants, induced, to all appearance, by their miserable condition, but never in both eyes together, or of a kind at all approaching in extent or rapidity to what occurred in these cases. And as to the probability of the previous eruptive disease having been the cause, together with the influences just mentioned, of the sloughing of the eyes, there can be small doubt, from the fact that gangrene of the mouth, an acknowledged sequela of measles, does also appear at an equally advanced period after the eruption.†

* Vide Ed. Med. and Surg. Journal, vol. liii. p. 381.

† FORMULÆ REFERRED TO IN THE PRECEDING PAGES.

Mistura Expectorans.

℞ Mucilag. ʒxiv.
Liquor. Antim. Tart.
Sacchari duri, ää ʒi.
Tinct. Opii, gtt. xvi. M.

Pulvis Calomel. c. Ipecacuanhâ.

℞ Submur. Hydrarg.
Pulv. Ipecacuan. ää ʒi.
Sacchari duri, ʒii. M.

Pulvis Rhei c. Ipecacuanhâ.

℞ Pulv. Rhei, ʒiii.
P. Ipecacuan. ʒss.
Sodæ siccatæ, ʒss. M.

Pulvis Calomel. c. Cretâ.

℞ Submur. Hydrarg.
Cretæ prepar. ää ʒi.
Sacchari duri, ʒii. M.

ART. V.—*An Essay upon the Malformations and congenital Diseases of the Organs of Sight.* By W. R. WILDE, F. R. C. S., M. R. I. A., Surgeon to St. Mark's Ophthalmic Hospital, and Lecturer on Diseases of the Eye and Ear in the School of Medicine, Park-street, &c., &c. Illustrated with wood engravings.

[Continued from Vol. XXVII., page 42.]

HAVING considered the varieties in size, form, and position of the globe as a whole, we now arrive at the examination of the changes of structure and the malformations of its various tunics.

The principal deformities of the conjunctiva palpebrarum have been already disposed of under the head of the eye-lids and lachrymal appendages; and those of that which invests the globe now claim our attention: but so intimately is this delicate membrane connected with the structure on which it rests, and such is the extreme tenuity of its corneal portion, that it would not be possible, even were it advantageous, to separate all its diseases, and those morbid growths which it sometimes presents at birth, from the same affections occurring in the cornea and the sclerotic coat beneath it.

MALFORMATIONS OF THE CONJUNCTIVA.

ALTERATIONS IN COLOUR.—The *conjunctiva bulbi* presents many preternatural appearances at birth, in colour and vascularity, in structural alteration, and in growths of various kinds. Nævi, unconnected with either the sclerotic or the eyelids, have been observed to have their seat in the conjunctiva covering the globe. A rare case of this form of *Telangiektasie* has been recorded by Von Ammon in his *Zeitschrift für Ophthalmologie* (Bd. v. p. 84), and also in his great work, the *Klinische Darstellungen* (Bd. iii. taf. vi. fig. vii.), occurring on the inner side of the right eye in a girl whose

father and mother were both born with a similar peculiarity, but in a much less degree. It presented the characters of a simple ecchymosis in the centre, and of a vascular network round its margin.

This membrane assumes different hues in the various races of mankind; from light pearl colour to dark yellow, and even orange, as in some of the dark varieties; and among ourselves of the Caucasian family it is susceptible of various colours, the result of disease, or the application of chemical agents, such as the salts of silver, &c. &c. But there are instances on record in which the conjunctiva has been observed of a deep blue tint in the white races; and Professor Vanzetti has furnished me with the particulars of a very remarkable case, seen by him at Scharkoff, in which this tunic, both lining the lids and on the globe, was of a dark *black* colour. In this man, who was a native of the north of Russia, the iris was also dark, but vision was quite perfect.

Morbid Growths.—Tumours of various kinds, fatty and sarcomatous, with and without hairs growing from their surface, have been found upon the conjunctiva bulbi, both of cornea and sclerotic, at birth; and from the days of Mr. Wardrop to the present, instances have been multiplied of locks of hair growing from the surface of the eye itself. In the remarkable case of *Lipoma crinosum*, related by this eminent authority, "the patient was upwards of 50 years old, and the tumour had been observed from birth. It was about the bulk of a horse bean, and only a small portion of it adhered, and seemed to grow from the cornea; the other part was situated on the white of the eye, next the temporal edge of the orbit. But the singularity in this case was, that a considerable number of very long and strong hairs, upwards of twelve in number, grew from the middle part of it, passed through the eyelids, and hung over the cheek. The patient remarked that these hairs did not appear until he advanced to his 16th year, at which time also his beard grew."* Sir Philip Crampton, in his valuable "Essay on the Entropeon," records an instance of "a tuft of very strong hairs proceeding from the sclerotica."† Cases of a single hair growing from the conjunctiva, covering the tunica albuginea, and unaccompanied by any tumour, have also been met with. Excrescences have been seen on all parts of the globe; but the true *Lipoma crinosum* most frequently occurs over the junction of the cornea and sclerotic; and in some of the cases related in the Journals, it was remarked that although the eyelashes were fine, thin, and light-coloured, the abnormal hair, or hairs, were thick, strong, and of a dark colour. Dr. Monteath mentions a case of one strong hair, which grew from the conjunctiva lining the lower lid; and Mr. Guthrie removed three hairs which were attached to the external angle of the conjunctiva of a new-born infant.

Dr. Mackenzie, who extirpated one of these tumours, says: "it was so incorporated with the sclerotic that its root was left, but died away under the use of nitrate of silver solution."‡

These congenital morbid growths are not confined to the human species, they have been frequently observed in the lower animals. The first volume of Wardrop's "Essays on the Morbid Anatomy of the Human Eye," published in 1808 (p. 33), contains the description of the eye of an ox, in which a "thick tuft of black hair" grew from and covered about one-third of the cornea, and which appeared to be congenital. Dr. Prinz, in Von Ammon's *Zeitschrift*, affords us an instance of a pencil of hairs growing from the outer side of the conjunctiva and sclerotic in a pointer dog; and the accompanying

* Wardrop,—*Essays on the morbid Anatomy of the human Eye.* Edinburgh, 1808. *Lancet* for 1834–5, vol. i. November 29, p. 344.

† Crampton,—*Essay on the Entropeon.* London, 1805.

‡ Mackenzie,—*A Practical Treatise*, &c., third edition, p. 236. London, 1840.

illustration is copied from an original afforded by the same author, and figured by Von Ammon. It represents the eye of a sheep, from the junction of the cornea and sclerotic of which a long silky lock of wool* depended. Ryba of Prague instances another case of the growth of hair from the eye of an ox.†

Mr. W. Cooper has laid before the Profession the case of a fibrous corneal tumour, about the size of a pea, triangular in shape, and covered by the conjunctiva, which was there of a pale pink colour, and studded over with minute hairs that grew from the junction of cornea and sclerotic on the outer side of the left eye in a lad of nineteen years of age. A similar growth, and also congenital, but of a smaller size, occupied a like position on the inner side of the same eye; and a small one of the same character was situated on the right eye: they are figured in the *London Medical Gazette*, (vol. xxix. p. 278). Ryba has described a case precisely similar in Von Ammon's *Monatsschrift* (Bd. i. s. 657.) Middlemore, likewise details some cases of this description (vol. i. p. 540, and vol. ii. p. 510), but those I have related are sufficient for the present purpose.

Xeroma.—In 1834 Mr. Wardrop published an account of "A remarkable Lusus of the Lachrymal Organs and Conjunctiva" in a female, then in her twentieth year. "About three days after birth, it was observed that her eyes had not the usual lustre of those of other infants, and that they looked opaque

* Prinz,—Von Ammon's *Zeitschrift*. Bd. ii. s. 114, taf. i. fig. 3 und 4.

† Ryba,—*Dusenty Schrift über die Krankheiten der Cornea*. Prag. 1830.

and dry, being completely deprived of tears, even when the child was labouring under the most violent passion or affliction." When Mr. Wardrop examined them, he says, that "instead of finding the eyeballs moistened with tears, the whole conjunctiva appeared to be converted into a dry cuticle, resembling a thin dried bladder, sufficiently transparent to permit the sclerotic and cornea to shine through it, and to be distinguished from one another, but so opaque as to destroy vision, as she was able to see merely the outline of large objects.

"On tracing the conjunctiva from the eyeball over the palpebræ, it presented the same shrivelled and dried appearance, but instead of extending posteriorly, as in the natural eye, there was a deficiency in the prolongation of the membrane, so that the eyelids adhered to the globe, and neither could be separated far from it, nor could the edges of the eyelids be brought sufficiently together to cover the eyeball. She was observed always to sleep with her eyelids open, and when she attempted to shut them, she experienced a good deal of uneasiness, while the frequent endeavours to do so produced a tendency to entropium of the upper eyelid. The natural sensibility of the corneal and sclerotic conjunctiva was so much diminished, that the surface of the eye, when touched, gave but very slight uneasiness. The lachrymal punctæ of each eye were open, and I could squeeze through them, from the lachrymal sac, a small quantity of a sebaceous fluid."

These congenital peculiarities would appear to be the result of some adhesive inflammatory action between the lids and globe going on *in utero*, and producing partial symblepharon at the same time that it obliterated the openings of the lachrymal gland.

"Both eyeballs appeared of the natural form, and to have that rolling motion which is so common in the eyes of per-

sons born blind. The sense of smell was sufficiently acute, but though the application of stimulants produced the usual effect on the olfactory nerve, they had not the least influence in moistening the conjunctiva of either of the eyes."

This very curious, and, I believe, unique case of congenital *xeroma*, or cuticular conjunctiva, is one of exceeding interest, not only on account of the peculiarity of the affection itself, as illustrating in a very remarkable manner the functions of the tears, and affording a beautiful demonstration of the extension of the conjunctiva over the cornea, but also from the result of an operation which Mr. Wardrop performed for its relief, by making an artificial opening into the lachrymal gland from the point of junction of the conjunctiva bulbi and that lining the lids, when a most remarkable change took place "between the lachrymal gland and those organs which are supplied with nerves from the third branch of the fifth pair. Stimulating substances, when applied to the nostrils, and which formerly acted alone on the Schneiderian membrane, on the evening of the operation gave her severe pain in the site of the lachrymal gland and adjacent part of the head, followed by convulsive coughing. The repetition of the use of vapour of ammonia on the day following seemed to occasion great distress; besides, she also complained of a severe pain in the right ear, which was much increased when smelling the ammonia."

ALTERATIONS IN THE STRUCTURE, SIZE, AND SHAPE OF THE CORNEA.

The cornea alone may by altered in transparency, thickness, size, form, and curvature; but morbid conditions, or malformations of this portion of the visual apparatus seldom occur singly, but are generally in connexion with microphthalmus, and often with defects of the iris and pupil; yet the congenital, abnormal characters of this part resemble

more those that occur as the result of accidental disease in after life, than those of any other structure in the eye.

Opacities, partial or total, varying in intensity from that seen in keratite or of mere nebulæ, to that resembling the characters which a leucoma or an albugo present, have not unfrequently been observed at birth. They have almost invariably been found occupying the periphery of this membrane, making it look as if the sclerotic had partially grown over and dimmed its surface. A reference to the mode of growth of this structure, as I have explained it at page 28 of the former part of this Essay, will easily account for its congenital opacities; and the knowledge that its transparency commences at its central part, and proceeds gradually to its sclerotic border, tells us why the arrest occupies the situation it usually does. To this form of disease, the *Hornhauttrübung* of the Germans, Keiser has given the name of *Sclerophthalmus*.

Writers have divided this abnormal condition into partial and total, according to the extent of surface occupied by the opacity. Independent of this arbitrary division, it would appear that two forms of corneal opacity have presented at birth, not distinguishable according to their intensity, but differing in their appearance from the difference of their causes. One is the true congenital opacity, the result of an arrest of development at that period (probably from the third to the fourth month), when the cornea has not yet become transparent, but looks like muffed glass, and has a pearl-coloured aspect. This appearance it sometimes retains in whole or in part at birth, frequently to such an extent as to intercept our view of the pupil, and gives an idea of a general muddiness of the aqueous chamber. In such cases (the form and size of the cornea being natural), the opacity appears to arise from an interstitial deposit in the laminated portion of this membrane, and which is usually

absorbed after birth, leaving the front of the eye clear, and the organ unimpaired: and this form of malformation the practitioner should be well acquainted with, as in such a case his diagnosis may in general be favourable. And here I may remark, that, exclusive of the originality of some of the cases detailed, and quite independent of all literary interest in an essay of this description, a practical benefit, of no mean importance, is at least intended, if not carried out, by summing up and collecting together the present state of knowledge on a subject on which all who practise medicine in any shape may be called on to give an opinion.

In illustration of this, the true malformation, the result of some impediment in the absorbent vascularity of the cornea, I quote the following satisfactorily recorded case, out of many with which I am acquainted, which has been published during the present year by Surgeon Maclagan, of the Canadian Rifle Corps. His narrative informs us that he was called to see a female infant, said to be born blind, on the 7th of October, 1844. It was the fourth child, and the three others, "all girls, bore evident marks of a dropsical constitution, but at the same time were healthy, good-looking children. The state of the eyes at this time, i. e. about fourteen hours after its birth, was as follows: on neither was there the slightest trace of vascularity or purulent discharge; the left cornea was completely opaque; the right was in the same condition on its inferior two-thirds, but the upper third was clear, the opacity terminating by a tolerably defined edge. At first I thought that I could perceive this edge to change its position as the child's head was inclined to one side or the other, which led me to suppose the opacity resided in the aqueous humour, but this I found to be a mistake. Never having seen such a case, and not being able to hear of one, I was led to form an unfavourable prognosis, but in

this I was agreeably disappointed; for in a few weeks the edge of the opacity on the right cornea began to thin off, to become less defined, and at length to recede, so that a part of the pupil could be seen on looking straight at the eye, while at first it could only be observed by looking from above. It was long before any change could be perceived on the left eye, but about the beginning of January, i. e. three months after birth, it too began to improve, the opacity at the upper part of the cornea becoming more diluted-looking, and by degrees disappearing."

Mr. Maclagan was removed from the locality where this case occurred, in March, 1845, when he says: "The improvement was gradually progressing. There is now only a small portion of the right cornea opaque, and the upper half of the left is tolerably clear, so that the child directs the eyes forwards, and not, as formerly, downwards; and I have great hopes that the opacity may disappear entirely, or at least so far as to leave vision unimpeded."*

Sometimes an opaque ring, exactly resembling the *arcus senilis*, is observed at birth. I have lately seen an instance of this peculiarity in a young gentleman from the Isle of Man; in one eye the opacity completely encircled the cornea, in the other it was interrupted. It may be recognized from *microcornea* by the remains of the general congenital opacity; and from the overlapping of the sclerotic which we sometimes meet with at birth, by its defined edge, and by a diaphanous ring external to the opaque one; and in general, it is more complete than the *arcus senilis*. This malformation, to which we may with propriety apply the term of *annulus juvenilis*, was noticed, though not accurately described, by Wardrop, in 1808.† I do not find it alluded to

* Maclagan,—*The London and Edinburgh Monthly Journal of Medical Science*, No. LV. July, 1845, p. 493. Edinburgh.

† Wardrop,—*Essays on the Morbid Eye*, vol. i. p. 85. London, 1808.

as frequently as other congenital appearances in the writings of the Germans. Sybil, however, alludes to this *Macula Arcuata*;* but it has yet to be determined whether in the annulus of youth, as in that of old age, a similar opaque ring encircles the margin of the lens.†

Von Ammon's observations would lead us to the conclusion that these corneal defects are, to a certain extent, hereditary: he says he knew them to occur in several of the same family in both eyes, and also in a single eye. Sometimes malformation of the lids, and frequently nystagmus, have accompanied these congenital deformities.

Of the total darkening of the cornea, not the result of evident inflammatory action and disease *in utero*, I find many well-authenticated instances in English literature; for instance, that of the left eye in Mr. Maclagan's case; one or two mentioned by Mr. Walker, and some by the late Mr. Ware. Two very remarkable cases of it recorded by Von Ammon, whose work is very explicit on this subject; but the originality of the discovery of this disease is due to an English surgeon, Mr. Samuel Farar, of Deptford, who on the 2nd of March, 1790, detailed to the London Society for promoting Medical Knowledge "an Account of a very uncommon Blindness in the Eyes of newly-born Children."

In one of the cases related by Von Ammon the entire cornea, both periphery and centre, were opaque, and of a whitish pearl colour, polished like a mirror (*Spiegelglatt*); very much vaulted, apparently hypertrophied, and approaching a staphylomatous metamorphose;—giving the entire bulb a more globular form than it presents naturally, such, for instance, as is represented in figure 2, page 31, of the foregoing portion of his essay. The cornea was so much larger than natural, that when the lids were drawn asunder it com-

* Sybil.—*Dissertatio formæ aberrationibus a Statu normali.* Halæ, 1799.

† Von Ammon,—*Gräfe und Walther's Journal der Chirurgie und Augenheilkunde*, bd. xiii. p. 114, Berlin, 1829.

pletely filled the rima palpebrarum;—its insertion into the sclerotic was not marked by a defined line, but was irregular and zig-zag; and between the cornea and sclerotic there was a band of deeper colour than the rest; the eyes were turned upwards, and rolled constantly from side to side, and at first it was not possible to distinguish the pupils. Ammon had an opportunity of accurately observing the case from the second week to the end of the fourth year, and has noted all the changes it underwent during that period with the greatest care. He has moreover increased the value of this contribution to science, by illustrating his remarks by eight coloured engravings, shewing the process of clearing which took place in the eyes of this child during the period of his observations.* A few weeks after birth the pupils could be faintly distinguished, shewing through the clearing cornea, of a small size, and situated in the upper portion of the iris, as in the right eye of the case of Peter Curry, which I have represented further on under the head of malformations of the iris and pupil. In this case of Ammon's, the right cornea cleared entirely, but in the left a remarkable dark bluish opacity of a somewhat crescentic form and accurately defined margin, permanently remained, situated transversely, and nearly in the centre, but consequently below the lower edge of the pupil.

Dr. F. Battersby has just assured me that he knows a lady in the country who has a *central* opacity of the cornea, which was congenital, and states that one of her children was born with a similar defect. Mr. Farar has related three cases of this peculiar malformation, which, as they are so very opposite, as he was the original describer of the affection, and as his views have been lately called in question, I here quote at length, as they are perspicuously, though briefly, detailed in the "Medical Communications."

* Ammon,—*Klinische Darstell. d. Angebornen Krankh*, p. 10, taf. vii.

"About nine years since, I was desired to see a child, who was about a month old, and apparently blind, having the corneæ of both eyes opaque, so that not the least of the iris was to be seen. My opinion was, that nothing could be done in this case, and that the child would for ever be blind.

"About a month afterwards the parents informed me there was some alteration in the child's eyes, and requested I would examine them again. I then perceived the opacity to be so much lessened, that I could faintly discern the iris. In two months more the child could perceive light, and from that period, the sight progressively increased; and before it was ten months old the recovery was complete.

"About three years after, another child was born of the same parents, with exactly the same appearance. Having seen the progress of the first case, I concluded that in this the event would be nearly the same, and indeed so it happened, in much about the same space of time.

"The manner in which the cornea acquired its transparency was, in these cases, remarkably curious: the external edge, first growing thin, soon after became clear and transparent; and after this manner the whole surface of the cornea brightened up, the centre being the last spot that recovered its transparency.

"Two years ago the same persons had a third child born with the same appearances, except that the opaque part seemed thicker, and that a short, round ligament, about three-eighths of an inch long, and of the thickness of a probe, arose from the inner part of the upper eyelid, was attached to the inferior edge of the cornea, and when the eyelid lifted up, acted in some measure like an additional muscle, by partly raising the globe of the eye. This ligament soon began to waste, and in about three weeks quite vanished.*

* Here it would appear that there was a congenital pterygium;—a disease of which I have not in any other work met an instance as being present at birth.

"From having seen the two preceding instances of sight restored, and from the disappearance of this ligament, I thought the opacity of the cornea in this child, too, would soon begin to give way, but in this I was deceived, a whole year having elapsed before the smallest alteration took place. At the end of a year the child seemed to be much diverted by passing its hand perpetually with the fingers extended before its eyes; and this has been its constant amusement from that time. The opacity has slowly diminished, but much of it yet remains. The child is now two years of age, but as it can find its way about the house, and distinguishes colours and different objects, by holding its head in a particular direction, I think in time the opacity will entirely disappear."*

In 1835 this Essay was quoted by Mr. Middlemore in his elaborate Treatise on Diseases of the Eyes, as a "very curious blunder;"—this learned author conceiving these cases to have been the result of *ophthalmia neonatorum*. In 1840 Mr. Crompton of Manchester, when publishing in the Medical Gazette some cases of congenital opacity of the cornea, to which I shall presently allude, took occasion to criticise the "curious blunder" of Mr. Middlemore, and entered into a lengthened refutation of his views. His notice, however, savours somewhat more of special pleading and hypercriticism than we think the occasion demanded. The investigations of the last ten years have added many new facts to this section of ocular pathology, and we are sure that Mr. Middlemore will, in the subsequent editions of his work, agree with the opinions of Mr. Farar, who must have been a most accurate observer of eye diseases.

Most modern authors, with the exception of Mr. Laurence, have overlooked the valuable observations of Mr. James Ware on this subject, originally communicated to the

† Farar,—*Medical Communications*, vol. ii. p. 463. London, 1790.

London Medical Society in May, 1810, and afterwards reprinted from their Transactions and published by his son in his "Tracts on the Eye" in 1818. This authority says he had "seen several instances, three of which happened in the same family." Three of these children who were affected with congenital opacity of the cornea, accompanied by unusual enlargement and prominence of the eyes, were those originally described by Farar; but of this Mr. Laurence, who is generally so accurate, does not seem to be aware. They were all short-sighted, and had very prominent corneæ; and, adds Mr. Ware, who, it would appear, had frequently examined them, "Mr. Farar does not mention any particular prominence in the eyes of these children; but, having seen two of them shortly after the time when Mr. Farar drew up the account of the cases, I find, by a minute I then made, that the corneæ appeared to me remarkably prominent." In a fourth case, mentioned by Mr. Ware as occurring in his own practice, where the corneæ were large, prominent, and completely opaque, one cornea cleared in three years, the other became transparent at its circumference, like that spoken of by Von Ammon, but remained clouded in the centre. The same work details a fifth case of a like nature, and attended by like results. In Mr. Ware's two cases there was likewise prominence and enlargement of the corneæ; but, he continues, "in all these instances, the enlargement of the eye was not sufficient to be of serious consequence, independent of the opacity of the cornea; and, when this opacity was dissipated, the power of vision was restored. But when, on the contrary, the enlargement is not confined to the cornea, but extends to the sclerotica, and is so considerable that the eyelids cannot be closed without difficulty, the patient being not only blind, but unable to sleep without the aid of opiates; the prospect of restoring sight is wholly lost, and the only question is, in what way ease may be obtained, and

deformity obviated."* Mr. Laurence himself says: "I have seen two or three similar cases, in which the corneal opacity has diminished after birth; but the progress has been very slow, and I have not known the ultimate result."†

I have seen some years ago, in the west of Ireland, a congenital opacity of both corneæ, but although the corneæ cleared, vision was totally deficient, apparently however from other causes; there was, besides, manifest megalophthalmus, and dropsy of the eyes. I understood lately from the child's father, that the globes had very much increased in size, and had become irregular in form, probably from general staphyloma. In Von Ammon's case the iris was drawn inwards, like an inverted funnel; the person was in after-life short-sighted, squinted outwards, and had nystagmus. It would not be possible by woodcuts to represent accurately any of these malformations. Mr. Walker, in his Lectures, writes: "Some few years ago I saw a child, then only two or three days old, the cornea of each of whose eyes was opaque throughout, and unusually large and prominent, so that very little of the sclerotic was discernable. The opacity was of a bluish white colour; there was scarcely any irritation about either eye; nothing like inflammation. This child, however, when about two years old, was again brought to me on account of some slight inflammatory condition of the eyes, and I was surprised to find that they had assumed a perfectly healthy appearance, the cornea having become quite transparent and of the normal size."‡

The second form of congenital opacity to which I alluded

* Ware.—*Observations on the treatment of the Epiphora or Watery Eye, and on the Fistula Lacrymalis, &c. &c.*, generally styled "Ware's Tracts on the Eye," London, 1818. See the article "Staphyloma Hydrophthalmia and Carcinoma of the Eye." Mr. Crompton does not appear to have been aware of these observations when writing his article in the Medical Gazette.

† Laurence,—*A Treatise on Diseases of the Eye*, p. 361. London, 1841.

‡ Walker,—*The Lancet*, July 8th, 1840, p. 713.

at page 87 is that where it is obviously caused by disease *in utero*, in which the same process of inflammation, ulceration, lymphy deposits, sloughing, prolapsus iridis, synechia, and staphyloma, may and does take place as in ordinary extra-uterine ophthalmia. An instance of this kind has been related by Mr. Walker, who saw the child six months after, and the mother, a very intelligent person, informed him that the eyes exhibited the same appearance at birth as they did when he examined them. "The disease," he says "had run through its entire course previously to birth, for, according to her account, there was no puriform discharge, inflammation, or intolerance of light, noticed at any time subsequently. The cornea of one eye had completely sloughed, the eye-ball had sunk, and, of course, not the slightest vision existed. More than one-half of the cornea of the other eye was opaque; through the remaining transparent portion a part of the pupil could be discerned, and the iris and cornea appeared almost in contact. The transparency gradually extended, and more of the pupil became accessible to light; hence, though vision was very imperfect when I last saw the child, yet it appeared to be gradually improving."* The elder Himly mentions having seen a case of *synechia anterior*, in a new born infant, in which the anterior chamber was completely obliterated owing to the iris being in close contact with the corneæ; and the same authority relates a similar instance occurring in a microphthalmus.†

Mr. Crompton relates the case of "two brothers in Manchester who are commonly supposed to have been born with opaque corneæ. The elder boy is eighteen years old; the younger three; and they are the second and tenth of a family of ten children of the same parents: the eyes of the rest being perfect." The youngest of these boys is, we find, the person referred to by Mr. Walker in the case just quoted.

* Walker,—*The Lancet*, July 8th, 1840, p. 713.

† Himly's,—*Augenheilkunde*, bd. ii. p. 100. Berlin, 1843.

"The right eyes of both brothers are staphylomatous; the staphyloma being much more prominent in the eldest boy. Their left eyes agree in the following particulars: They are very small, and soft to the touch; the line of union of the sclerotica and cornea is irregular, and less distinct than is natural. The irides are blue, and very convex. The eye-balls are wanting in plumpness and rotundity, and look unfinished. In the younger boy's left eye, an opacity of the cornea keeps a part of the pupil out of sight; and, at the "upper part, there is an irregularity in the outline of as much of it as is visible. But the elder boy has a regular pupil, and the whole of his cornea is quite transparent, saving a small portion of the lower part of it at its junction with the sclerotica, and I am not sure whether this opacity is not from an encroachment of the sclerotica at this point, and a result of the irregular line of union of the cornea and sclerotica, of which I have already spoken."

The mother "states that on the day after he was born, she discovered that the eyes of the elder of these two boys were 'not right.' She was led to examine them by observing, when he was asleep, a prominence of the upper eyelid of the right eye. On looking at this eyeball, she discovered that it was far from being as it ought to be. It projected at that time as it does now, but not so far. The front of the left eye was partly covered by a 'pearl.' This opacity grew thin first of all at the outer edge of the cornea; that portion of it which was at the nasal margin of the cornea, being the last to gain its transparency."*

Mr. Braithwaite, when quoting these cases in his valuable Retrospect, says most judiciously: "We give these two cases because it may happen, at some time or other, for any practitioner to meet with similar ones which he may not be able to account for; and if he were not able to refer to well-

* Crompton,—*Medical Gazette*, December 11, 1840, p. 432.

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* Crompton,—*Medical Gazette*, December 11, 1840, p. 432.

marked cases of congenital disease, it would be at once supposed that the disease producing the opacity had been progressing after the birth of the child, while he had neglected to notice it."*

In the same communication, Mr. Crompton says, Mr. Barton pointed out to him "a case from Ripon, in Yorkshire, in which there was a like imperfect formation of the eyeballs: in this case the cornea was transparent, but the lens opaque. The eyes were particularly small, and it was said that the child was born with these appearances." It is to be regretted that no further particulars of this case were recorded. Beer observed cases of congenital leucoma, and considered them the result of too great sharpness of the liquor amnii.

Preternatural enlargement of the cornea, while its curvature and transparency are unimpared, is, I believe, very rare; but both it and a diminutive condition of the part, that is, in proportion to the other structures of the eye, have been frequently observed, and have been recounted among the cases of megalophthalmus and microphthalmus, detailed by authors, some of which I have related when discussing that division of the subject, as well as the one we have just been engaged on. In all the cases that I have heard or read of, when the other parts were normal, and the cornea too large, its setting on to the sclerotic was circular and well-defined, while in all the instances of *microcornea*, its edge was irregular, ill-defined, puckered, and looked as if it had been overlapped by the sclerotic.

Microcornea.—As instances of *microcornea*, or diminution of this portion of the external tunies, with a natural-sized globe, and unaccompanied by any other malformation, are exceeding scarce, I am glad to have an opportunity of

* Braithwaite,—*Retrospect of Medicine and Surgery*, vol. iii. p. 128. 1841. London.

presenting my readers with one of which this engraving gives a tolerably correct idea. It represents the eyes of Mary Anne Warren, of this city, aged 11 in January last, when the original drawing was made. On first seeing this child one is at once struck with the wide staring look of the eyes; this, however, proceeds from the diminutive size of the corneæ allowing the white sclerotic to appear above and below their circumferences; whereas, in an ordinary, natural eye, the upper lid overhangs the superior edge of the cornea, and the lower slightly overlaps its inferior margin.

The rest of this girl's family are perfectly healthy, and undeformed: she herself is, however, a *seventh month child*, but in every other respect is well developed. The irides are very peculiar; in colour they are very brilliant, the orange hue of the inner circle predominating much more than is usual, and the substance of each iris has a plaited appearance, as if compressed towards its pupillary margin by the diminutive size of the cornea and the encroachment of the sclerotic: it is likewise rather funnel-shaped, the pupil, which is slightly irregular, being drawn backwards toward the lens. There is very severe myopia in this case, though the corneæ are unusually flat. At present the girl cannot read, except with the print within six inches of the eyes; and reading, or looking at any minute object for fifteen minutes at a time, causes pain, particularly in the right eye, which squints very slightly inwards.

In most cases of this peculiarity the cornea is either oval

or of an irregular shape, and has a zig-zag margin, looking as if the sclerotic grew into or over it. The reader will always bear in mind, that it is only in the third month the distinction between the cornea and sclerotic is completed.

Mr. Middlemore says: "When the cornea is small from birth, it usually happens that the other parts of the eye exist in a corresponding diminished size; but I have lately seen two instances in which the cornea was scarcely at all developed, the other parts of the eye being apparently perfectly well-formed; I have also seen two examples of undue development of the cornea."

Seiler, of Dresden, recites a number of cases of both *microcornea* and *megalacornea*. On the former subject Mohrenheim and Kieser are quoted as authorities by the German writers, particularly Himly, and as far as my researches have led me, all their observations tend to confirm the idea of these affections being family peculiarities, and likewise hereditary. The former oculist mentions a case of peripheral opacity of the cornea in a child whose mother had a remarkable development of the *arcus senilis* in corresponding segments of the cornea. To this peculiarity Keiser has given the name of *Klarophthalmos*.

The cases of Ware, Von Ammon, and Walker, previously quoted, afford us examples of MEGALACORNEA; to which may be added that in which there is a preternatural development of this structure presenting at birth, and unattended by opacity. To this the term CORNEA GLOBOSA has been applied. Here the insertion of the cornea into the sclerotic is round and defined; but the cornea itself is larger, and more vaulted than natural, giving to the eye that peculiar glancing, metallic appearance observed in the *staphyloma pellucida*, a disease with which it has been frequently confounded. In this case, however, the cornea retains its spherical form, and possesses neither the conical shape nor the central opacity so often seen in the hyperkeratosis. The iris is also drawn backwards, so that the anterior chamber is very much increased in magnitude, and the eyes appear to be affected with dropsy of this cavity, though the sclerotic is unaffected, and there is no general hydrophthalmus. Weller was, I think, one of the first to figure this disease.* Since the day in which he wrote, many cases have been recorded. There can be no doubt of its being sometimes a congenital deformity, though it is frequently an effect of disease in after life: as, for instance, in pannus and keratite, where the cornea clears, it often assumes this enlarged form by becoming a portion of a smaller sphere than in the healthy normal state, and in certain forms of choroid disease I have likewise observed it. Sometimes it would appear to be caused by gradual and general distention from increase of the aqueous fluid, and here the eye feels to the touch hard and unyielding. In one case of congenital *cornea globosa* which I have seen, the pupil, which is generally drawn toward the interior of the eye, was abnormal, being small, immoveable, and situated upward and outward in the iris; and a case precisely similar has been figured by Von Ammon (Taf. vii. fig. xiii. and xv.) In all cases of this affection, vision is more or less impaired, and extreme short-sightedness is always a consequence.

CORNEA CONICA, known under the different appellations of *Hyperkeratosis*, *Ochlodes*, *Staphyloma Pellucida*, *Conical Cornea*, *&c. &c.* This disease, consisting of a conical projection of the cornea, in whole or in part, generally in the centre, but sometimes at one side, while its transparency remains unaffected, is now tolerably well known to the Profession, and although it usually occurs after birth, and often as the result of other diseases, it is at times, and, I believe, more frequently than is suspected, a congenital affection. I have had many instances of this peculiarity under my care, three of which, I have every reason to suppose, were congenital,

* C. H. Weller,—*Die Krankheiten der Menschlichen Auges*, &c. &c. (Taf. ii. fig. 9.) Berlin, 1819.

and one was, undoubtedly so; two of these were in females. In every instance that I have heard of, where the conical condition of the cornea existed at birth, it increased subsequently.

Levéillé is said to be the original describer of this disease, but John Taylor mentions it in his *Nova Nosographica Ophthalmia*, printed at Leipsic, in 1766; Von Ammon was, however, the first to state that it is ever congenital, and he has published an account of its appearance in three sisters, of the same family. Seiler and Gescheidt witnessed this peculiarity in a child of two months old. During the last thirty years this affection has received a good deal of attention both from physiologists and practical oculists. Ware, Wardrop, Lyall, Adams, and Demours, as well as all the modern writers on ophthalmology, have described it accurately; and the present state of knowledge on this subject has been lately summed up by Dr. Pickford, in a very learned and elaborate essay published in this Journal about eighteen months ago, to which I may confidently refer the reader, as containing the best information on Conical Cornea. This latter authority describes its appearance so graphically, that I here transcribe his words. "In the disease under consideration the normal convexity of the cornea is lost; a transparent conical structure, apparently differing in no particular from the natural texture of the cornea, unpreceded and unattended by pain or inflammation, supplies its place; the cornea is prolonged forwards, and presents to the observer a peculiar dazzling, sparkling point of brilliancy, a dew-drop, or gem-like radiance, as though a piece of solid crystal were embedded in its centre."*

The true pathology of this affection has, however, been explained by Mr. Middlemore and Professor Jaeger, of Erlangen, who, from actual dissection after death, shewed that the circumference of the cornea remains in its natural healthy state, but that the apex has become thinned; and to me it always appeared as if the laminated cornea had gradually given way, allowing the elastic cornea to bulge out through its layers. In some cases there is also an opacity at the apex, supposed by writers to be caused by its rubbing against the upper lid. The iris is generally flat, and in every respect natural; and on the surface of the cornea Sir D. Brewster discovered a number of small spherical elevations and depressions: but of these minute details, and their effects on vision, it is not my province, in the present essay, to deal, it being sufficient to shew that at times it appears at birth. With this peculiar formation of cornea, exceedingly defective and myopic vision must be the consequence.

* Pickford,—*The Dublin Journal of Medical Science*, vol. xxiv., p. 357, January, 1844.

Drs. Wimmer and Ammon, the former of whom has written an ingenious little work on the subject, have taken up the idea that when this malady is congenital it is accompanied with a peculiar sugar-loaf form of head (*Spitzkopf*). In connexion with this view of the case, I may remark, that on looking over the last "Report of the Medical Missionary Society in China," where the heads of the inhabitants partake very much of this character,* I was particularly struck with the great number of cases of conical cornea, recorded among the affections of the eyes treated at Chusan, Ningpo, and Shanghia. In the two former places, among nine hundred and fifty cases of diseases of the eye, there occurred eight cases of conical cornea; and at the latter nineteen in 2366, or altogether, about one in every 122, in round numbers, which is a very much greater proportion than has ever been noticed among a similar number in Europe. The Germans think that the English and French

* These peculiarly formed crania, which are much more common in Germany than with us, are well represented in the collection of Dr. Tiedeman, of Heidelberg.

people have a greater predisposition to this peculiarity than themselves, and Radius conceived that the greatest proportion of persons so affected were to be met with in England. The two Demours say they saw one hundred cases in France.

The only disease with which this is likely to be confounded is the preceding, but in the Cornea Globosa the conical form is absent, and there is no central opacity, such as is sometimes seen in this affection; besides, in this globular form the cornea is said to be peculiarly thickened throughout; but at all events its thickness is equal at all parts, whereas in the conical it is more prone to thin at its apex than elsewhere. I am inclined to believe that when it is congenital, the axis of the cone is seldom in the middle of the cornea, but is either above or below the centre, or to one side. In the case which, from the history, I am most certain of its congenital nature, this was so, and likewise in two of the patients mentioned and figured by Von Ammon. Moreover, when congenital, both eyes are usually affected, whereas when it occurs in after life it is very frequently in but one. I have two cases of boys who have conical corneæ now under my care. One, whom I have every reason to believe was born with the affection, has a sharp, crystal-like projection in both corneæ; the other, where it is evidently the result of recent disease, and is less conical, has it in but one eye, and has an opacity on the apex of the cone.

In cases of Cornea Globosa, and Conica Cornea also, where they occur as the sequel to inflammatory action, the sclerotic is often implicated in the disease. In such instances the abnormal curvature commences in the sclerotic, about the place of insertion of the four straight muscles, and then the front of the globe very much resembles that of some birds (the raptores), where the peculiarity is formed by a circle of bony plates; while in the true congenital globular, or conical-shaped cornea, the curvature of the sclerotic is unaffected. This appearance has not been sufficiently noticed by writers on the pathology of these diseases.

I am strongly disposed to believe, both from the hereditary nature and the early development of some cases of MYOPIA which I have seen, that the peculiarity of the cornea which produces this defect is occasionally congenital, but the short-sightedness may be induced or warded off by the treatment and occupation of the person so affected. Too great thickness, as well as an over-convexity of the cornea, are allowed to be causes of short-sightedness, and these may, and, I believe, often do, the former particularly, present at birth; but until it is decided how far myopia depends on unnatural conditions of the cornea alone, and what part the peculiarities of curvature of the crystalline lens, &c. play in the affection, it would be foreign to the subject to enter upon these vices of refraction.

For other peculiarities of vision and irregularities of refraction, apparently the result of congenital deformation of the cornea, I refer the reader to the interesting case of Professor Airy, of Cambridge, published some years ago in the Transactions of the Cambridge Philosophical Society, and since quoted into the various Cyclopædias and works on both optics and ophthalmic medicine. It is known that the cornea is not a correct surface of revolution, but that the curvature of its horizontal plane is less than that of its vertical. When this exceeds the usual extent, it gives rise to irregular refraction, causing a circle to appear an oval, a point a line, &c.; in fact, lengthening out an object in one direction, and compressing it in another. To this malformation Mr. W. Jones has applied the term "cylindrical eye;"* perhaps it would be better to call it CYLINDRICAL CORNEA.

Instances are on record of PLURALITY OF CORNEÆ, and

* Wharton Jones,—*Cyclopædia of Practical Surgery*, article "Cornea," p. 832.

also a total DEFICIENCY OF CORNEA; thus it is sometimes double, as occurs in *monoculi*, under which head that deformity will be considered; and two instances have been recorded of the complete absence of all vestiges of this structure. One of these fell under the observation of the elder Himly, in a case of microphthalmus with a very small palpebral aperture. The bluish sclerotic passed over the place of the cornea, in the same form and curvature as the rest of the globe, and did not there partake of the shape which that membrane presents, a proof, according to Rudolphi and himself, that it was true sclerotic, and not opaque cornea.* A somewhat similar instance is related by Klinkosch.†

The malformations of the sclerotic itself are, I believe, exceedingly rare; and those congenital peculiarities and diseases which have not been already disposed of under the head of Megalophthalmus and Microphthalmus, will be considered under that of Monoculi.

In addition to those cases of microphthalmia which I detailed in the former portion of this Essay, I may mention some others which have since been recorded in the foreign periodicals.‡ M. Stœber, of Strasbourg, has lately laid before the Medical Society of Lyons the particulars of some most interesting facts relative to this congenital deformity, which, as well as the cases which I have already alluded to, lead us to incline to the idea of its being at times an hereditary transmission of defect. A man living in the neighbourhood of Saverne lost his right eye by accident. His daughter was born with microphthalmus of the left eye. She had two sons; the eldest was born with this vice of con-

* Rudolphi,—*Grundness d Physiologie*, Bd. ii. s. 174.

† Klinkosch,—*Progr. quo anatomen partus capite monstroso proponit.* Prag. 1766.

‡ Petrequin,—*Annales d'Oculistique, publiées par le Dr. F. Cunier*, tome xiii., Janvier, 1845. Bruxelles.

formation in both eyes, and the younger in but one only,—the right. In the mother, at the period of her examination by M. Stœber, in her thirty-eighth year, the palpebral aperture was very much less than natural; the cornea was flat; the anterior chamber almost entirely wanting; the iris was of a grey colour, non-contractile, and incomplete at its inferior part, so as to produce coloboma iridis. She stated that the vision had decreased of late years in that eye, yet she was still able to distinguish objects of a large size pretty clearly.

In the case of the elder boy, the globes were both very much less than natural, and affected with the oscillatory motion of those born blind, yet the sight was tolerably good; the lids were greatly depressed, the cornea flattened, and, according to the account of the mother, were so small at birth as to resemble two minute black spots in the centre of the eyes, but that subsequently they increased in magnitude, apparently by the clearing of the sclerotic coat; and the reporter of the case says, that even then, when the boy was seven years old, the cornea passed off irregularly and imperceptibly into the sclerotic; this transparent tunic first becoming opaline, then opalescent, and finally opaque. The irides were of a grey colour, like the mother's, and deficient in their lower and outer parts, causing coloboma in both organs. The pupils were non-contractile. The particulars of the younger boy are not given in the report.* In two of the cases related by Gescheit, it would appear that a similar coincidence with that of the grandfather of these children existed. This state of parts, to which I have already alluded, together with the increase of transparency of the cornea after birth, is confirmatory of the doctrine of development insisted on by the anatomists.

M. Cunier, of Brussels, in the January Number of the *Annales d'Oculistique* for this year, has afforded us some

* Stœber,—*Gazette Médicale de Strasbourg*, 20 Decembre, 1844.

most interesting information on the subject of the hereditary nature of microphthalmia and deaf dumbness. In the instances recorded by this oculist, we find that a woman whose eyes were quite perfect, but whose mother had microphthalmus, married a man whose grandmother was deaf and dumb. The product of this union was five children, three boys and two girls. The girls were both affected with microphthalmia, one of them was deaf and dumb, and had moreover complete absence of the iris in one eye; the other, who is now married, has had a child who is deaf and dumb, has microphthalmus, and coloboma iridis.*

While these pages were passing through the Press, I met with one of the most remarkable cases of microphthalmia, attended with coloboma iridis, convergent strabismus, and nystagmus, that has yet been recorded, and of which the accompanying woodcut, from a drawing by our distinguished artist, Mr. Connolly, affords a faithful representation.

This little girl, Ellen Sullivan, æt. 10, at present an in-

* Cunier,—*Microphthalmie et Surdi-mutité héréditaires.*—*Annales d'Oculistique*, Janvier, 1845.

My friend, Mr. Dalrymple, writes to me:

"In addition to the cases mentioned in the *Gazette Medicale* I have seen two cases, one of Microphthalmia in both eyes, with vertical coloboma of the iris, and one in one eye, also with coloboma. In the double case it was complicated with cataract. One was a man of forty-five or fifty years of age, intelligent, and capable of making observations. He was obliged to use the highest powers of double convex lenses I ever saw, which was not a microscope;—it was a sort of doublet made up like an opera glass. No ordinary lens would do. In the single case both corneæ were small and vertically oval; the coloboma was only complete in one eye, but the fissure was marked in the other."

mate of the South Union Workhouse of this city, is well formed in every other respect, and states that none of her family were affected with any peculiarity of vision or visual apparatus; but having been placed in this establishment some years ago, and knowing little about her family, this latter statement must be received with caution.

The first view of this child impresses one with the idea that the globes have collapsed from injury, so small are they, and so much drawn within the palpebræ. The left eye, which is the most affected, is little more than half the natural size, but the right is somewhat larger, though very much smaller than a well-formed globe. There is convergent strabismus in both eyes, slightly developed in the right, but well marked in the left, so that when she steadies the right eye on any object, the cornea of the left is partly hidden by the caruncle. The oscillatory motion consists in a general sweep of the globes from canthus to canthus, and in addition a quick rotatory and tremulous action of the eyes on their antero-posterior axes. The corneæ themselves are somewhat flattened, though circular in their margins, and notwithstanding that they are diminutive in size, they are not disproportioned to the other parts of the globe. The irides are brown, and remarkable for the want of those prominent lines, and diversity in shades of colour, as well as the complete absence of the pupillary rings, which characterize these membranes. Both irides are deficient at their lower borders, leaving a much larger pupil than in any other instance of coloboma that I have met. Her vision is weak, and she is, as might be expected, very short-sighted, but still she can read good-sized print with either eye. It is more than probable that the strabismus was congenital.

The endeavour to keep the eyes open while the drawing was taking, has given an appearance of greater magnitude of the globes than in reality they possess, and has also caused the peculiar elevated position of the brows.

(*To be continued.*)

BIBLIOGRAPHIC NOTICES.

On the Changes induced in the Situation and Structure of the internal Organs, under varying Circumstances of Health and Disease; and on the Nature and external Indications of these Changes. By Francis Sibson, Resident Surgeon to the General Hospital, near Nottingham. Worcester, 1844.

In the present day, when so much importance is attached to minute accuracy in diagnosis, and when it is admitted, on all hands, that the correct prognosis and proper treatment of disease depend on the tact of the physician, in acquiring a knowledge of the precise lesions present, the treatise of Mr. Sibson cannot fail to prove an acceptable contribution to our stock of medical literature. It originally appeared in the 12th volume of the Transactions of which the Provincial Medical and Surgical Association, from it is now reprinted; but, we regret to say, without the addition either of a table of contents or an index, one or both of which the extent of the work (nearly 280 octavo pages) and the number of the diagrams, demand.

Too little attention is, we think, in general, bestowed in the examination, by auscultation and percussion, of the diseases of the heart and lungs—on the exact position of those organs, as determined either by original malformation of the thorax, or by the effects of recent or previous disease on its contents. In a valuable thesis, published some years since by M. E. J. Woillez, it is stated, that an accurate examination of the chest in sixty-seven healthy individuals shewed that it was well formed and symmetrical only in twenty-four. The following are some of the conclusions drawn from a careful admeasurement of 116 chests:—Physiological prominences of similar form to that of morbid ones are of very frequent occurrence. These are in general on the left side anteriorly, and on the right posteriorly. The right side is in

most cases larger than the left, except in left-handed individuals; and, in seven cases out of eight, the right nipple was higher than the left.

Mr. Sibson having found that, from his notions of the usual and healthy sites of the various viscera being ill-defined, he was frequently at fault in examining patients suffering from chest diseases, has made a practice, for some years, of taking diagrams of the position of the viscera, when making *post mortem* examinations of the patients that died in the Nottingham Hospital, on the following plan:

"I procured a frame, and stretched strings across and along it, at distances from each other of three inches; the whole frame was thus subdivided into 45 squares. I ruled a piece of paper with squares of a like fashion, but of one-third the size. The frame I laid over the subject to be copied, and, with care and accuracy, traced the objects that were behind each three-inch square, upon the corresponding one-inch square on the paper. The diagrams 4, 5, 12, 17, and 24, were thus framed.

"Afterwards Dr. Hodgkin suggested to me the following plan, which I immediately adopted—a plan that placed my inquiry on an entirely new and more solid footing. This method consists in drawing the outlines of the organs on a piece of lace, stretched on a frame, and placed over the body. The sketch is transferred by placing the lace over a sheet of paper, a piece of the 'manifold letter-writer paper' being interposed. By pressing firmly with a point on the chalked outlines, they are traced in black on the paper beneath. By this plan, employed with care, perfect accuracy is insured. It has the advantage, also, of being applicable to the living as well as to the dead. To reduce these full-sized diagrams to their present dimensions, I employed a pentagraph that was recommended to me by Dr. Hodgkin."—pp. 4, 5.

The treatise, then, of Mr. Sibson, consists of a description of the actual and relative position of the lungs and heart in a state of health; and of the changes produced in their situation by the various diseases to which they are subject, which is based upon observations made as above stated, and illustrated by partly coloured copies of the diagrams which were made at the time. We are thus enabled readily to test the accuracy of the statements made by our author; and, after a careful perusal of his observations, and a comparison of them with the illustrations, we feel bound to accord our meed of praise to Mr. Sibson, for the manner in which he has executed a task by no means void of difficulty.

The treatise commences with a description, most minute

and accurate, of the position of the contents of the thorax, with relation to its external configuration; particular stress being laid on the relative bearings of the different lobes of each lung, and of the cavities and valves of the heart, with the vertebræ, the ribs, and the sternum; attention being also drawn to the changes produced in their position by the healthy movements of inspiration and expiration. The peculiarities in the respiratory movements of the child, and of the male and female adult, are also noticed. In the following extract we have the result of the author's experience of the measurement of the chest at the different periods of life:

"*Measurement of the Chest.*—The positive diameter of the chest is usually greatest over the lower margins of the lungs; which margins are usually pushed out by the liver on the right side, by the stomach and spleen on the left. The liver is generally more bulky than the combined stomach and spleen. The base of the right lung is more extended than that of the left. The measurement from the sternum to the vertebræ, over the lower margin of the right lung, is, in the very great majority of persons, greater than that over the lower margin of the left.

"*In Children abdominal Measurement greater than thoracic; right and left side equal.*—In children the abdominal organs yield to the pressure of each other in every direction, and are, in comparison with the thoracic viscera, much developed. The measurement over the lower margin of the lung (the two sides of the chest seldom differ) is, in comparison with that round the chest, under the axilla, greater than in the adult; the former measurement being positively larger than the latter, notwithstanding that the scapulæ and pectoral muscles are included.

"The measurement round the abdomen, near the lower edge of the costal cartilages, is even greater than that over the lower margin of the lungs.

"The relative proportion of the measurements alters as the child grows, and as the disproportion between the size of the abdominal and thoracic organs diminishes. About the age of six, the measurement over the axilla, that over the lower margin of the lungs, and that over the lowest rib, are nearly equal; there is very little difference between the two sides. About the age of 11 or 12, the difference of sex and the habits of life begin to tell.

"*In the Boy and Girl the Chest Measurement is greater than the abdominal.*—In both boy and girl the measurement over the lower margin of the right lung is greater than it is over that of the left; in both, too, is the measurement over the lower ribs less than that over the lower margin of the lung; and this measurement is again less than that below the axilla. In the boy, especially the country labourer, the abdominal measurement is much smaller than the middle thoracic.

"The upper and lower measurements are usually equal on each side. In one boy, immediately after a hearty distending meal, the middle measurement of the chest was greater on the left than on the right side.

"*Adult Male.*—In the full-grown young man, the measurement over the lower margin of the right lung is usually half an inch greater than it is over that of the left. The measurement over the scapulæ is about an inch longer than that over the base of the lungs.

"Below the middle measurement the costal walls slope in over the lowest costal cartilage; the whole girt is about one-fifth less in the athletic labourer, and one-tenth less in the mechanic, than it is over the lower margin of the lung.

"*Old Age.*—In the old man the whole framework of the chest is larger, and the abdomen is more distended, than in the middle-aged.

"*In Women.*—In women the right side is usually the largest; the abdominal measurement is but little smaller than the middle thoracic."—pp. 400, 401.

Our author next proceeds to consider the effects of disease in altering the position of the lungs, and these he treats of under three heads:—1st, Diseases of the lungs, where the bulk of both lungs is enlarged—in which division he includes *Emphysema* and *Bronchitis;* 2nd, Diseases of the lungs, where one organ and one side of the chest are amplified—including *Pneumonia, Pleuritis,* and *Diffused Tuberculous Consolidation;* 3rd, Diseases in which the bulk of the affected lung is lessened, as in *Phthisis,* or *Cirrhosis.* The latter disease is not mentioned under this denomination, but a diagram is given illustrating the change of situation produced by it.

We cannot avoid remarking here that we think Mr. Sibson would have performed his task much more satisfactorily, and also have rendered his own observations of much more benefit to his professional brethren, had he, before publishing his treatise, made himself better acquainted with what has been already written on diseases of the chest. This struck us very forcibly with respect to the description he gives of the external signs of *emphysema,* in which no notice whatever is taken of the importance of distinguishing between this disease when it affects the upper and lower lobes of the lungs; a diagnostic point of much importance in practice, and one upon which much stress was laid in a paper of Professor Stokes, which appeared in our Number for March, 1836. The same neglect of the writ-

ings of his contemporaries is apparent throughout the work, whenever our author ventures (which he very frequently does) to introduce pathological observations.

The concluding, and what we look upon as by far the most valuable part of this essay, contains an account of the change produced in the situation of the heart and its valves by disease. The following is Mr. Sibson's description of the change of position which occurs in enlargement of the heart without pericardial adhesion:

"When the heart is enlarged, its surface being free from attachments, the lungs on each side, the diaphragm below, and the costal cartilages and ribs in front, are displaced.

"The whole volume of the heart descends, pushing before it, or being drawn down by, the central tendon of the diaphragm. They are not only the ventricles and auricles that are displaced, but all the great vessels springing from, or merging in those cavities, are drawn down by them in their descent. Every valvular orifice, whether guarding the cavities or the great vessels, takes up a lower than normal position. —*Diagrams* 20 and 21.

"If both ventricles be alike enlarged, they retain their usual relative position to each other; if the left ventricle only be enlarged, then the body of that ventricle, to the left of the septum, is very much increased.—*Diagram* 20. If the right ventricle be disproportionably enlarged, then the ventricular septum is seated close to the left side of the heart.—*Diagrams* 14 and 15.

"*Valves.*—The precise bearings of the valves cannot be stated. They usually retain their positions relatively to each other; but they vary in situation according to the extent of the displacement. The important feature, in cases of enlarged heart free from adhesions, is, that the situation of the valves is lowered. In diagram 20, the mitral, tricuspid, and semilunar valves, which are exposed, are all lowered. In diagrams 14, 15, and 21, the lowering of the great vessels is very notable; and the position of the valves, their mutual bearing being known, may be readily inferred.

"If the left ventricle be greatly enlarged, the mitral valve is situated unusually to the left—the attachments of its base are scarcely altered; but the fleshy columns, and the tendinous webs and chords, are stretched by the apex unusually to the left."—pp. 547, 549.

The Cold Water Cure, its Use and Misuse, examined. By Herbert Mayo, M.D., F.R.S., formerly Surgeon of Middlesex Hospital, London. London, 1845.

To reason with the enthusiastic and credulous believers in some supposed novel system for the cure of "all the ills that flesh is heir to," is a matter as difficult as it is useless. Ignorant of the ordinary laws which regulate the course of diseases, these people are unable to discover that to nature, in conjunction with other circumstances, is often due the credit they are falsely led to attribute to the new panacea; and if, haply, this latter fall short of their expectations, or be positively injurious, their faith is still unshaken: "its failures are unheeded, while its successes continue to be reverberated on the public ear." From the ignorant promulgator of such a system we cannot expect to learn its real value; but when an enlightened and duly qualified person comes to devote himself to its examination, we then get possession of facts, well observed, shewing what is true and what false about it, and we at length find, without surprise, that the new system cannot realize the visions it held out; that it is not unattended with danger; that instead of being new, it is only the more extended use of a remedial agency already well known in practice; and that much of its supposed efficacy arises from influences quite extraneous to it.

Such an expositor of the cold water cure of Priesnitz, of its use and misuse, has been at last given us in the person of the candid author of the present tract, who, after three years' personal experience, has found in the system little more than any one of common sense might have anticipated.

"I do not," says Dr. Mayo, "profess to do the same things. I do not adopt and use it without modifications, which he would repudiate as hostile to the spirit of his method. But I take its elements and employ them my own way. Perhaps, if the prescribed routine had suited my own case, I might have been misled by it. But my own case was too serious, and could not be cured by the system with its errors; it happened to require and admit of a part only of the routine treatment; and in following this view, and looking to see how much each individual case of serious disease requires, the system has disappeared, and in the place of the cold water cure, I discern only a more extended and scientific use of cold bathing."—p. 73.

The reader must bear in mind, that it is the director of a hydropathic establishment who thus speaks. How the author happens to appear in such a character he tells us.

"My knowledge of the cold water cure originated in my having recourse to it myself, as a desperate remedy, in a malady which seemed hopeless. Through repeated attacks of a sort of rheumatism my constitution appeared completely broken down. Already crippled in my limbs, preserving what power of exertion I still retained, only through the use of opium, and my indisposition still increasing, I looked forward to being before long worn out with suffering, and to death as a release. I could not bear the fatigue of a land journey, or I should have gone at once to Graefenberg; but Coblentz and Boppard might be reached from London by water—so I went to Marienberg in June, 1842. On arriving there I was placed on the routine treatment of sweating and bathing. The immediate effect upon my health was strikingly beneficial; and in a week I was able to relinquish the use of opium. The rheumatism did not, however, give way proportionably to my general improvement: the pains of the joints were indeed heightened: but this I had been taught to expect. I was then advised, and at length persuaded, to adopt a more active course of treatment, and accordingly, in addition, douched twice a day. This remedy, extremely agreeable and invigorating at the time, sensibly increased my strength, and I sanguinely anticipated, towards autumn, that I was advancing to a prompt recovery. But before long it became evident that the strength my body gained was shared by the disease: my knees and feet became large and heavy with fresh effusion; and, however better in myself, I fell back in the use of my limbs, and seemed further than ever from the power of standing and walking. I now believe that the use of the douche was unsuitable to that stage of my disorders. I was, besides, unlucky enough to fall upon two other errors of treatment during the latter part of the autumn and winter, through which I lost further ground; and finally, in February, 1843, was obliged temporarily to discontinue the cold water cure.

"By this time I had seen a good deal of hydropathy. I had seen one or two lives lost, as it appeared to me, through over-treatment; several patients, after temporary improvement, becoming worse; others, who, already gainers, would, I thought, have made greater progress, if they had been contented with doing less. In my own case I had been, though reluctantly, led to the adoption of more treatment than seemed to me rational; and I had suffered through it. But several English patients from Laubbach had in the meantime sought my advice, and the moderate courses of treatment which alone I had felt justified in recommending to others, had been uniformly followed by benefit. So, gradually, I came to form opinions of my own as to the proper management of the cold water cure, the general efficacy of which had been sufficiently proved to me in my own case by the advantage my health had derived, even while I was otherwise suffering from its misuse."—pp. i–v.

He then became assistant to a water-doctor at Marienberg, whence he removed to Boppard. Dr. Mayo by no means rejects, as Priesnitz does (or rather as he was obliged to do by the stringent ordinances of Austria), the use of ordinary remedial agents, and seems very fairly to distinguish the classes of cases in which they are necessary from those to which the water-cure is applicable.

"Acute inflammations of important organs constitute the strongest ground a physician can take, by which to exemplify the utility of his art. In this class of diseases the timely use of blood-letting, calomel, tartar emetic, saves many lives, by arresting disorganizing processes, which, left to their natural course, would prove fatal.

"Another remarkable field in medical practice is that of spasm, pain, irritation, and nervous excitement; that is to say, the large variety of cases, over which opium, as the most efficient representative of its class, dominates.

"A third field comprises different forms of morbid diathesis, whether congenital, or from subsequent vitiation of the body, in correcting which certain drugs possess a specific influence, as mercury and iodine in syphilis, colchicum in gout.

"The three classes of remedial agents, which have been thus specified, like every other good thing, are liable to be misused; and much harm may thence arise, and has often thence arisen. But a practitioner, nevertheless, who should try to combat disease without them, would resemble a boxer, who should enter the prize ring with his right arm tied behind him.

"When tonic remedies are required, drugs are less efficient; but, on the other hand, they are for the most part innocuous.

"Where alterative means are necessary, the course resorted to in English practice, however serviceable in the main, is not equally unexceptionable. To get rid of general and local plethora, to rouse torpid actions, to move secretion, to evacuate, purgative drugs are the means generally employed. But they are liable to fail, and their continued use is not without bad consequences.

"The instances last adverted to belong to the domain of hydropathy. If a tonic, reductive, or alterative course is needed, the means which hydropathy brings to hand are far more efficient and safe than the corresponding courses of medicine.

"Then the place to be assigned to hydropathy in the treatment of disease, nearly coincides with the use of mineral springs to drink of or bathe in. The cold water cure comprises the same valuable accessaries which the practice of visiting mineral springs holds out, but it embodies them in a much more perfect and efficient form. It is not, however, pretended, at least by me, that the cold-water cure can be brought to supersede the use of mineral waters. On the contrary, I know that the latter are occasionally of service, where hydropathy has failed."—pp. 2, 3.

The means of the water-cure he divides into two heads, the accessory and the special.

" First, of the accessory means.

" 'Cœlum et animum mutare," to remove to a salubrious spot in a fine country, leaving behind one the worry and toil of occupation, to rise early and breathe a pure air, to pass many hours out of doors, to take such exercise as one's ailments permit, to live on plain and simple food, to drink the purest spring water, to retire to rest early,—these are conditions, which it is only necessary to enumerate to create a presumption in favour of a system of which they form the basis. For their usefulness in promoting and restoring health is without question. Only invalids in general were practically unable to avail themselves of them, for they knew not where to find them united, before hydropathic establishments were invented. To combine removal from home, from the engagements of an active, or the temptations of an idle life, with the presence of cheerful society, under circumstances where everything favourable to health is put in one's way, every temptation to imprudence in living removed, and attention to the rules conducive to recovery are rendered easier by the force of example, to provide satisfactory occupation and amusement in the place of a course of sanatory discipline, form the important desideratum to invalids, first supplied in hydropathic practice.

" But to look a little closer into these preparatory conditions for the restoration of health, and how they are realized.

" The situation of an hydropathic establishment should combine the following, to give it every advantage: distance from the patient's home, retirement, a fine climate, a dry atmosphere, fine scenery, the proximity of mountains.

" The arrangements should be such, that the hour for the principal meal should fall early in the day, when digestion is most vigorous. By this means the general adoption of early hours is secured; as the breakfast and supper hours, to match with a one o'clock dinner, must be early. At the same time, the day, thus divided, is shortened, and opportunity made for afternoon bathing. The dinner should consist of meat and vegetables, plainly dressed, the breakfast and supper of bread and butter (with eggs or boiled fruits to the latter), and milk for those whom it agrees with; otherwise, in place of milk, cocoa or black tea, for it is preposterous in the idea of curing a patient to make him eat or drink what he cannot digest.

" The patients should have the means of meeting at breakfast in a common room, and of spending the evening together; and these simple provisions should be made to aid in preventing time hanging heavy. To which object the recurrence of baths at stated hours of the day, with the period of necessary exercise afterwards, further contributes." —pp. 3, 4.

" It is then evident," he pursues, " that there are many invalids who would be restored to health by the accessories of hydropathy alone, or by following the cold water cure with the omission of the cold water:" he confesses, in other

words, that *the cold water cure is oftentimes thought to have done what it did not do*, and we entirely agree with him. Hydropathy, it is plain, is not for the poor man, who cannot afford to travel and enjoy the sweets of a romantic valley and of a pure, refreshing climate; it is for the rich, the luxurious, the pampered invalid, who has injured himself by dissipation of all kinds, or who has suffered from the excess or want of employment of mind and body; for people of this sort, and they form, we suspect, the great majority of those who go in search of the water cure, what better restorative can be found than the simple accessories alone of hydropathy, so attractively set forth?

After describing the various kinds of baths, douches, &c. in use, he arrives at the special means of treatment, which, he says, may be undertaken with four different intentions: it may be either tonic, reductive, alterative, or sedative.

" 1. The tonic course.

" Of this sweating forms no part. Cold bathing, with friction and exercise, and cold water drank in moderation as a stomach bath, are its elements."—p. 32.

He enumerates different classes of cases to which this treatment is applicable.

" 1. This tonic course may be employed with advantage in cases of general debility left by protracted illnesses, courses of medicine, hæmorrhages,—in short, in general debility not the result of coexisting disease.

" 2. In debility depending upon constitutional weakness in the circulation.

" 3. In case of deficient innervation, comprehending for instance hysteria, in which the use of cold affusion is well known. Mental depression, with powerlessness to exert the mind or body, except at capricious intervals. Delirium tremens, in which the failure of nervous energy has arisen from over excitement by drink, opium, tobacco. Certain forms of palsy. Palsy of one side in persons not advanced in years, in whom the head derangement which caused the paralytic stroke is at an end, and the causes which produced *that* are no longer in operation. Muscular weakness of the legs, threatening paraplegia.

" 4. In children disposed to scrofula, and even in those already labouring under scrofulous disease, in the joints, bones, or subcutaneous glands. In such cases this treatment is singularly beneficial. It must not be resorted to, when either the lungs or the mesmeric glands are the seat of tubercle.

" 5. In muscular rheumatism, and in regular gout, in certain habits."—pp. 33, 34.

We will not deny, that in many cases of general debility much good may arise from this treatment; but surely the Author will not say that the judicious change in his habits was not the real cause of the improvement in the subject of the following illustrative case.

"A gentleman, thirty-two years of age, was placed under my care by Sir Alexander Downie, M. D., of Frankfort, to try the cold-water cure for delirium tremens. The habit of drinking to excess had been indulged in for several years; during the two preceding, besides wine, he had commonly drank a bottle of brandy daily. His manner was nervous; his pulse was frequent; his hands shook; so that painting, which had before been his principal occupation for the last two years, he had not touched, nor for the same time had he ventured to shave himself. Then this was the history of each day: he would wake about five, and lie for two or three hours in the lowest horrors of dejection, about eight he rose, and took a glass of brandy, and sponged himself with cold water; as the morning wore on, taking more stimulus, he rallied a little, and at twelve could eat some broiled meat for breakfast. In the afternoon he walked or rode, and after dinner, when he had drank freely, he was cheerful for a time, and his nerves were strung again; then he went on drinking, and became stupid or violent, occasioning his mother and sister, with whom he lived, the greatest distress and alarm. Then he went to bed and slept heavily.

"The treatment pursued was the following: He was allowed one tumbler of brandy and water after dinner, two at night, which was to be decreased daily, so as to be totally discontinued in ten days, which was done. Then I had him awakened at half-past four in the morning out of his heavy sleep, well rubbed in the wet sheet, dried, and put to bed again, after swallowing a tumbler or two of cold water. He quickly went to sleep, and had to be wakened between seven and eight to undergo affusion with cold water. Then he dressed, drank four tumblers of water, which he naturally found very grateful to his parched throat, while dressing before starting on his walk; on his return from which, to his surprise, he ate breakfast with an appetite. He had no further bath that day, but was out in the air most part of it; feeling no depression through the reduction of his dose of wine and brandy, but, on the contrary, being in high spirits, and delighted with the success of his first experiment in hydropathy. The following morning the same experiment was repeated with the same result; and for a month he did this and no more daily, except drinking six tumblers of cold water in the afternoon and evening. At the expiration of a month, the early waking and friction with the wet sheet were discontinued, and he slept well till awakened at six for the affusion with cold water. In six weeks from the commencement of this treatment, after the first ten days of which he had not tasted wine or spirits, and during which he had experienced no depression or craving for his former stimulus, he was cured. His eyes were no longer red, his complexion had become fresh, he had gained flesh, his pulse was under eighty, his hand had become steady enough to enable him to resume his painting, and to shave after his morning bath."

"II. The Reductive Course.

"The basis of this course of treatment is profuse sweating, with just enough cold bathing afterwards to prevent the debilitating effects of the former. The sweating process is repeated twice in the day, or, under special circumstances, is continued for many hours. In the former case, sweating by adventitious heat is often to be resorted to." —pp. 38, 39.

He says: "The cases in which this course" (the grand one of the water-doctors) "is required are comparatively few, and in most of those in which I have known it used, it appeared to me to have been misapplied." He cites no instance of its beneficial employment, but gives several illustrating its injurious effects.

"III. The alterative course.

"The basis of this mode of treatment is the employment of the two antagonist means of sweating and cold bathing in counterbalancing proportions; to produce free perspiration, but not to reduce by it; to give tone by cold bathing, but not to stimulate; to bring the other secretions to a wholesome state by exciting moderate action of the skin; to give tone to the stomach and alimentary canal by draughts of cold water; to promote all the vital actions by moderate exercise; these are the intentions of the alterative course.

"Thus the patient is to be packed every morning in the blanket, or in the blanket and wet sheet alternately, till perspiration commences, and then to have water poured on him or to take the plunge-bath. This, with attention to the accessaries of hydropathy, and drinking a few tumblers of spring water at appropriate hours, constitutes the essential of the alterative course. And it certainly seems difficult to imagine a course of treatment on the one hand less exceptionable on any ground, on the other better calculated to work a salutary change in the blood and the system. Certainly the ordinary resources of medicine, the small dose of blue pill at night, the tonic aperient draught in the morning, or a course of alkalies and sarsaparilla, or what not, however useful these means, when others are not to be had, are not only experimentally, but to one's common sense, resources that promise less than the simple hydropathic course above specified. For it is to be borne in mind that the function of the stomach, and the action of the bowels, on which so much turns in the restoration of health, are invariably improved by hydropathy, and that these effects are obtained without nauseating the one organ, or heating the other.

"Then what I have specified as constituting the proper alterative course in hydropathy, simple as it is, contains all that is necessary for

the restoration of a vast variety of cases. And there are many and many patients, the progress of whom towards recovery is materially retarded by complicating the treatment, and subjecting them to increased discipline."—pp. 47, 48.

He tells us the proper subjects for this treatment.

"There are many, who have started in life with every promise of enduring health and strength, yet who, '*nel mezzo del cammin*,' either from over-exertion of thought or anxiety, neglect of proper relaxation, neglect of exercise, living in confined air, errors of diet,—from some or all of these causes combined, have found that promise defeated. Their spirits have lost their elasticity, their temper has become irritable, mental exertion is often an effort, and leaves them unstrung and exhausted; they experience headach and loss of sleep, the appetite and digestion are capricious, the bowels torpid, they look out of health, and, with no positive illness, are yet standing on the threshold of disease. Head disorder, confirmed dyspepsia, irregular gout, this or that local ailment, may come out of such a beginning, and convert them into permanent invalids, or at the lightest event throw them temporarily out of their career of active life and useful exertion."—p. 49.

IV. The sedative course.

"The general effect of cold on the frame is certainly depressive; but hitherto this first effect has been contemplated only as far as it leads to another and secondary result, namely, the return of warmth, and general excitement and invigoration. But there are cases in disease, where the production of the first effect is directly salutary, and where the secondary result would be mischievous. The cases referred to present these features: the circulatory and nervous systems, one or both, are in a state of unusual excitement. Then the object of the hydropathic treatment suited to them, is to apply cold with sufficient intensity or duration to subdue that excitement and to preclude reaction, using the sedative without the stimulating agencies of the cold water cure.

"Therefore the douche, exercise, and, for the most part, friction, are excluded from the idea of this treatment; but packing in the wet sheet or blanket may form a part of it.

"Then the sedative treatment presents the following varieties: it may consist in

"1. Cold affusion.

"2. General or partial immersion in cold water for a period of from half a minute to three hours or more.

"3. Packing in the wet sheet, to be renewed as soon as the bodily heat has reached its full pitch again; for instance, every twenty minutes for several hours consecutively.

"4. Long continued immersion in cold water, succeeded by packing in the blanket.

"Cases admitting the application of the sedative course are, fevers, inflammation, spasmodic affections of the voluntary muscles, mental excitement, delirium, insanity."—pp. 69, 70.

Of this course he confesses to have had no experience.

From what precedes, it is evident that Dr. Mayo has stripped the water-cure of its preposterous extravagancies, both of pretension and practice, and that it becomes in his hands nothing more than "a more extended and scientific use of cold bathing." As to drinking cold water, he recommends that patients should study their own fancies with regard to it. Of immoderate sweating he is no advocate, indeed the bad effects of its indiscriminate application have been discovered by Priesnitz himself, who has, in consequence nearly abandoned the use of it. We have also seen how limited in its applicability to positive or tangible diseases hydropathy is: of these, it seems to have most efficacy in constitutional rheumatism and irregular gout. We much doubt, however, that it can eradicate the latter, as the Author says, or that it can prevent its recurrence in one hereditarily disposed to it, if the patient return to a course of life calculated to renew its attacks. Of its use in chronic rheumatism he gives an example.

"A lady towards sixty years of age, extremely delicate in appearance, came from Marienberg, where she had recently commenced the hydropathic treatment, to Mühlbad, in the early part of July, 1843. She had suffered during nine years, having experienced, however, no one severe attack, but having constantly rheumatic pains in the hands and feet, not often amounting to much, but becoming aggravated in damp and cold weather. Gradually her hands had become distorted, the fingers being drawn towards the ulnar edge of the hand, the knuckles swelled and not admitting of extension; she could not hold her knife and fork. Her feet were contracted, painful, and tender, and she could with difficulty walk a few yards. She had tried various remedies, all of which had failed to produce any effect, except hot baths, which made her worse. Her hydropathic treatment was the same as in the preceding case [viz., sweating in the blankets every morning, with a plunge bath afterwards, and drinking two tumblers of water before breakfast, and no more, except at dinner.] She remained under it two months. In that time she had made very remarkable progress, the rheumatic pains having much abated, and her strength materially improved, so that before she went away she was able to walk three miles at a time."—p. 58.

Syphilis is not to be cured by hydropathy. Neither is cancer.

"No one much acquainted with disease could expect hydropathy

to cure cancer. Yet it has been said to do so. And I saw the experiment made in one case under very favourable circumstances at Marienberg and Laubbach, at both of which establishments the patient resided in succession. When I made the acquaintance of this gentleman, in June, 1842, he was a hale-looking, strong man, something turned of fifty, of a florid and healthy complexion. The disease was situated at the edge of the tongue; where there was an induration of the size of a bean, with an ulcer in it. This patient, whose constitution could afford it better than that of most, strenuously pursued the most active hydropathic treatment, sweating generally twice a day during four to five months. At the expiration of this time I saw him in passing at Laubbach, himself altered in appearance for the worse, his strong frame thinner and shrunk, but the ulcer certainly had a more favourable look; its surface was granulated, clear, and florid, and seemed disposed to cicatrize, though the hardness remained as great as ever. But this amendment was delusive; and barely more than a fortnight afterwards, when this patient came over to Marienberg to ask my advice, the ulcer was again foul and spreading. Then I told him he had no time to lose, and that he had better go to London and have the part removed by ligature, an operation which, in my crippled state, I could not undertake. But he had not resolution to take this step; instead of which he placed himself in the hands of some practitioner at Wiesbaden, who promised to cure him without an operation. The ulcer then continued to enlarge; the glands of the throat, too, I heard, became affected; then hæmorrhages took place from the ulcer, and the patient sank rapidly, and died in the spring of 1843."—p. 45.

It is equally inapplicable in epilepsy:

"One, that I did not see, died; a second, that I saw at Marienberg, likewise died; a third, that I likewise saw at Marienberg, was sensibly the worse for the treatment."—p. 56.

In insanity it has been attended with miserable failure. One patient,

"From being foolish and cheerful, became gloomy, morose, his countenance injected with blood, and the end was that he was picked up in the road insensible and paralytic. In ten other cases the injudicious treatment was confined to the use of stimulating hydropathic means."—p. 71.

Disorders of the skin are not the best cases for it:

"Disorders of the skin are not the best cases for hydropathy, inasmuch as the hydropathic means all tend to irritate the skin. Nevertheless, as disorders of the skin are often the result of general derangement of health, many are thus cured. Their treatment requires a very light hand, and the frequent substitution of warm or tepid baths for the cold bath."—p. 54.

And of its effects in bronchitis we are given an example:

"Now undismayed by what he had undergone, he came to Marienberg in June, 1843, while I was yet there, and because I was there. He brought with him a severe cold and bronchitis, which he had contracted on his journey, and which, being a surgeon, he knew well enough how to treat. But feeling a delicacy in Dr. Schmitz's house, as to the use of any remedy but hydropathy, and being, notwithstanding his past experience, still a staunch believer in the whole system, he put himself into Dr. Schmitz's hands to be cured. Accordingly he was packed in the blankets, with a wet bandage applied round the chest twice a day for three or four hours, and profusely sweated; and the operation terminated by his being washed with cold water, which brought on, as regularly as it was used, suffocative fits of coughing. However, he went on with this for three days, till his condition really became alarming, which I led Dr. Schmitz to see, who then proposed that I should take him under my own care. All that the poor fellow wanted was warmth and quiet—just to be liberated from hydropathy. So ordering him some warm diluent, I left him to the repose he needed; and I found the next morning that, exhausted as he was, he had slept well without using the opiate I had placed at his bed-side. He woke refreshed, his cough looser, his chest less sore; and living on tea and broth for a few days, he was convalescent."—pp. 46, 47.

We should not have noticed Dr. Mayo's little book at such length, but that an intelligible and trustworthy report of what the cold water can, and cannot do, has been long a desideratum which we could not expect to be supplied with by the vile followers of the Gräfenberg peasant. We will give one passage from a publication of one of these gentry who some time since *set up* in the neighbourhood of Dublin, which may well exhibit how calculated he is to benefit mankind in general, and pathologists in particular.

"3. *Hæmorrhoides.* Among the large number of causes contributing to nervous diseases are, the hæmorrhoides so often met with. This malady, having the property of fixing on different parts of the body, forms the terror of the patients; then it often occasions diatetical irregularities, and so becomes an erroneous diagnostic to the medical man. But to the question, what in especial forms and is the cause of this terrific disease? Nothing else than superabundant adfluxion of the blood in the lower parts of the stomachical cavity, and in particular to the intestinal veins, and those of the portal system. The thick accumulations of choked blood, from the nodose tubercles on the arms, as also all kinds of variations on the legs and spermatical cordon, through which arise disagreeable obstacles in the circulation. These tubercles, after an accidental cause, often produce *metastases* on more noble parts, and become thus deleterious. Without entering into minute pathological details concerning all compli-

cations of hæmorrhoides, it must be observed for certain, that the allopathical means are as efficacious here as in other diseases. Some medical men say they have specific drugs against it, whilst they take quite a different disease for hæmorrhoides; another confines his observations to a single symptom, without taking into consideration the others, and the complication which even exists already. The physician finds a tumour on the arms with a *vehement knocking* of blood, recommends leeches there, and *sulphur* in powder internally, but does nothing against the first cause of the malady; his allopathical friend, again says, that sulphur has produced congestions to the chest and head, and applies leeches also on the arms, (not less than twelve or fifteen), at the same time prescribing *antiphlogistical remedies;* and through this inconsequent theory, the patient daily loses more and more of his strength."—pp. 55, 56.

We present this passage without having made the slightest alteration in it; his whole book is, in fact, in the same perspicuous and learned style; yet this poor man styles himself, on his title page, *M.D., and also of surgery. Formerly Physician at the Court of Vienna, Member of the old Universities of Vienna and Naples, &c. &c.*

Of the curative efficacy of cold water in many cases of atony and debility, general or local, and in some chronic local affections, we entertain no doubt, and we think its use is too much neglected in medical practice. In derangement of the abdominal viscera, for instance, it is well known that poultices are often of eminent service, and what else are the wet bandages applied to this part? The friction of the skin by sheets wrung out of tepid or cold water is also calculated to be of use; and who that has seen, in a hydropathic establishment, the powerful douches, and the various contrivances for directing a flow of water in all possible ways upon every part of the body, but must have acknowledged the effect likely to be produced by them!

Dr. Mayo describes the cold sitz, or hip-bath, as being not only very agreeable but useful in some cases.

"As a general tonic, a form of cold bath to be taken once, twice, or even oftener in the day, for a few minutes preparatory to exercise; it is a most convenient and indispensable element in a course of cold water training. Then in hæmorrhoidal complaints, and in various kinds of uterine disorder, it is of not less utility. Then derivatively, to relieve the head, its operation is surprising: many a headach, which nothing else had moved, has given way at the first trial of the sitz bath. Nervous headachs, the headach of indigestion, headach from cerebral congestion, such admit of relief by this means, though not in every case. Nor less are the stomach and digestion benefited by its use, and the action of the bowels assisted. Nor are its general revulsive effect, and power of equalising the circulation, less remarkable; so that a sitz bath is the best remedy for cold feet.

"But for the trouble of dressing and undressing, writes a patient, I should think it an irresistible luxury—a cold sitz bath."—p. 15.

We cannot conclude without remarking on the candour with which Dr. Mayo gives the results of his experience in the water cure; and if, in some particulars, he seems too sanguine as to what may be expected to be done by it, we are inclined to look for the explanation to a certain degree of impairment of his judgment, produced by his bodily infirmities; of this, we think, we can find internal evidence, in an occasional incoherence of style, and in his delighting in the frequent reiteration of "then," used without reference to anything preceding—faults which do not appear in our author's earlier productions, which are all well written.

"_____ We are not ourselves,
When Nature, being oppressed,
Commands the mind to suffer with the body."

While the foregoing was passing through the Press we happened to meet with two works, nearly a century and a half old, which clearly demonstrate how very little there is of originality in the Hydropathy of Priesnitz. One of them, "the Curiosities of Common Water," sets forth "the Stupendious Effects thereof in the preventing and curing of Diseases, So that in some Sense Water may be stiled an Universal Remedy, as it may be applied to all persons, and as it can be had in all Places where Men inhabit."

The other, an extremely curious and very learned work, is entitled ΨΥΧΡΟΛΟΥΣΙΑ, or, "the History of cold Bathing, both ancient and modern, with the genuine Use of hot and cold Baths," by Sir John Floyer, Kt., and Dr. E. Baynard, Fellow of the College of Physicians. 3rd Edit. 1709.

It is here shewn that cold bathing formed part of the religious ceremonies of all primitive nations, because it served the double purpose of benefiting both soul and body together. Its efficacy, joined with stimulation of the skin, as a remedial agent in disease, was well known to Galen, for we find that "previous to immersion in the cold bath, he orders the body to be prepared by plentiful and vehement friction with a coarse cloth," a practice common amongst the Romans, who also frequently used to pass from the warm bath into the cold. That it is nothing new to hear of gout being cured by cold water, is illustrated by the fact that "Augustus was cured thereof by the bold undertaking of Antonius Musa, to

immerge the Emperor in cold water, which was attended with such happy success that he was rewarded with a profuse sum of money, and a statue in the temple of Esculapius." Dion Cassius informs us that Augustus not only bathed in, but drank cold water. The great benefit of treating wounds, contusions, sprains, &c., by the application of towels and cloths wet in cold water, is distinctly described. And the following practice at St. Mungo's Well, in 1701, is precisely the packing in the wet sheet of 1845. This well was in much repute for curing the rickets in children:

"Some Dip them twice or thrice over Head and Ears, with their Shifts and Night Caps on; Others, out of tenderness to the Child, or in Regard to the Child's Weakness, content themselves with Dipping only the Shirt and Night Cap in Water, and put them Wet upon him. As soon as the children are dipped, they, with their wet Cloaths on, are wrapped up in warm Blankets over their Head and whole Body, and put immediately to Bed, which instantly puts them into a violent sweat. In this Condition they lie all Night, till towards Morning the Cloaths are taken off by degrees, that so they may cool gradually, and in the Morning they have dry Shirts and Head Cloaths put on." —p. 124.

The use of water alone as drink, the necessity of a due degree of exercise, and of moderation in living, is rigidly insisted on by all these water doctors, who adduce an abundant store of cases illustrating the wonderful effects of bathing in, and drinking cold water, in gout and rheumatism of the most aggravated kind, in paraplegia, paralysis, cancer, dropsy, fever, small-pox, agues, chorea, and several other diseases, the knowledge of which, Dr. Baynard, in his quaint style, says,

"May be of great use to Mankind, as well to posterity as to the present age; and here," he adds, "I do boldly assert to the blushless faces of all its opposers, that such prodigious and unheard Cures has been done *sub diû*, and in the face of the Sun (by Cold Immersion), without Trick, Fraud, or Cozenage, insomuch that could any physician perform but the tythe of such cures as we daily see done by cold water, he would be followed and esteemed more like a God than a man; but, alas! Envy, Pride, and Malice, those characteristics of the Devil, ever was and ever will be in the Sons of Discord and Contradiction. But for men of Repute and Learning to oppress so known, evident, plain, and beneficial a good, that performs the three parts of Physick, the Physician, Surgeon, and Apothecary, all in one, must certainly be a Divine Gift and a Blessing from Heavan, where little or no human skill is required for the cure, &c."—p. 400.

Fruits and Farinacea the proper Food of Man; being an Attempt to prove from History, Anatomy, Physiology, and Chemistry, that the original, natural, and best Diet of Man is derived from the Vegetable Kingdom. By JOHN SMITH. London: John Churchill, Prince's-street, Soho, 1845, 8vo. pp. 422.

"THE task of an author is, either to teach what is not known, or to recommend known truths by his manner of adorning them; either to let new light in upon the mind, and open new scenes to the prospect, or to vary the dress and situation of common objects, so as to give them fresh grace and more powerful attractions; to spread such flowers over the regions through which the intellect has already made its progress, as may tempt it to return and take a second view of things hastily passed over, or negligently regarded."* The work which we are about to introduce to the acquaintance of our readers, will be found to comply with all these requisitions. With a fair share of originality, it collects and arranges into a consistent whole a vast number of most interesting facts, scattered through a variety of works; and combines into one train of reasoning much of what has been advanced by the numerous distinguished authors who have hitherto advocated an exclusive vegetable diet.

Whether or not Mr. Smith may be able to persuade his countrymen that they are, in the strictest reality, "fruges consumere nati," we fear his facts, were they ever so strong, and his arguments, were they ever so well urged, would fail to induce John Bull, accustomed as he is, from infancy to age, to have ever ringing in his ears all that has been said and sung, by saint and sinner, in praise of the "Roast Beef of old England," to abandon that national dish, with its accompanying Brown Stout, and, "ut prisca gens mortalium," to limit his alimentary wants and wishes to the hermit's simple fare of

"A scrip with herbs and fruits supplied,
And water from the spring."

Had the author employed us to select a motto for his work, we should have fixed on the following from Persius, as in every way appropriate:

"Dixeris hæc inter varicosos centuriones,
Continuò crassum ridet Vulfenius ingens
Et centum Græcos curto centusse licetur."

* Johnson's Rambler, No. 3.

The first book discusses the question of the "original food of man," and the argument may be exhibited as follows:

1. Man being created in a state of innocence and happiness, and of course free from the influence of custom and prejudice, partook at first of that nutriment which was best suited to his organization; his habits being afterwards gradually and slowly modified by the change of circumstance effected by migration, &c.

2. But the sacred Scriptures, the unanimous voice of antiquity, and an analysis of human motives and feelings, prove that, in the early ages of the world, man availed himself for his support exclusively of the fruits and farinaceous vegetables, which a tropical clime spontaneously produced in variety and abundance.

3. Therefore we are justified in concluding, that such substances form the most suitable nourishment for the human race.

The historical testimony adduced from the Old Testament Scriptures, and from a profusion of ancient authorities, Greek, Roman, Scythian, Egyptian, Phœnician, &c., is extremely apposite and interesting; but from this part of the work our extracts must be few and short indeed. Admitting, within certain limits, the adaptibility to external circumstances of the human organization, the Author seems to adopt the opinion of Plutarch, that "truly as for those people who first ventured upon the eating of flesh, it is very probable that the sole reason of their doing so was scarcity and want of other food." In supplying the wants of his system man is, in many respects, as much under the impulse of instinct as are the inferior animals. His own feelings are the main guides in eating, drinking, and sleeping, as well as in propagating the species, &c.

"Upon these instinctive feelings, then, mankind must have originally depended for direction in the selection of appropriate diet; and can we suppose, judging even from our own perverted sensations, that man would be tempted by the sight of other animals to kill them for food? There is 'beauty in them' it is true; their shape, their symmetry, and motions, delight and please us; but there is no such beauty as is calculated to excite the appetite while they are *living*, much less when *dead*. But suppose an animal to have been killed, either by design or by accident, and that its skin had been removed, would this be a sight calculated to excite desire, or would the smell and taste be gratified by such an object? Rather would not the sensations arising from these organs excite horror and aversion; and in a warm climate, where putrefaction immediately succeeds dissolution, must not the dead flesh have speedily diffused an offensive odour, and occasioned insupportable loathing and disgust?"—pp. 40, 41.

"Another physical reason presents itself for considering man not to have been originally carnivorous [the author has previously been engaged in shewing that *fire*, by which animal food is rendered agreeable and digestible, was unknown to the early inhabitants of the world], namely, the want of implements for slaying, cutting, and preparing other animals before he could make use of their flesh for food. All animals destined for feeding upon flesh, are provided by nature with instruments for catching, tearing, and devouring their prey; but for man there is no such provision; a plain indication that previously to the discovery of the arts, he must have been indebted to some other production for his subsistence."—p. 44.

The second book is of a more strictly medical character, being an attempt to adduce, from comparative anatomy, proofs of the correctness of the Author's views. The different organs of the human body are successively examined, and carefully compared with their analogies in the other orders of mammalia, in order to ascertain on what type they are formed. Man has neither keen scent nor swiftness of foot to pursue his prey, nor claws or tusks to destroy it when overtaken; but his erect position, and the form of his hands, completely fit him for gathering the fruits of trees and plants. His teeth "form an uninterrupted series; they are all nearly equal in length, and closely approximated in each jaw, a character by which man is distinguished from all other animals, excepting the fossil genus Anoplotherium, which is allied to the Tapir tribe." His canine teeth, which have been said to indicate his carnivorous tendency, are less prominent than in animals admitted to be exclusively graminivorous, as the horse, camel, and stag. His bicuspids have two prominences instead of (as in the carnivora) one sharp and prominent. His molar teeth are precisely similar to those of the quadrumana, but differ from the rest of the herbivora in the arrangement of the enamel. In the carnivora the inferior molars fall inside the upper, so as to *tear* what is seized; in man and the graminivora they exactly meet the upper teeth, so as to *grind* what is placed between them. In the carnivorous animals the articulation of the lower jaw does not admit of lateral motion; the zygoma is large, and so arranged as to secure the greatest amount of strength in the jaws; the temporal and masseter muscles are very largely developed, filling the whole side of the skull; whilst the pterygoid muscles, as well as the salivary glands, are extremely small, the very converse of which obtains in the human subject, the quadrumana, &c. Again—

"The length of the intestinal canal, as compared with the length of the body, is, in carnivorous animals, as three, five, or (in some few

cases) eight to one. Herbivorous animals vary considerably in this respect: in the Pachydermata (as the horse, ass, &c.), the proportion is six, eight, or eleven to one; in Ruminants (as the ox, deer, sheep, &c.), it is eleven, and even twenty-eight to one; and in the Simiæ, six, or eight to one. In man, the proportion has usually been considered about six or seven to one; but as the legs and thighs were improperly included in estimating the proportion in his case, and excluded in that of other animals, the result is incorrect, and we may regard ten or twelve to one as a nearer approximation to the truth." —p. 65.

The stomach of man bears the closest resemblance to that of the horse, and many other animals, living on grain and fruits, whilst the comparative size of his colon and cœcum as distinctly allies him to the herbivora, as it separates him from animals subsisting on flesh alone. The vermiform appendix "is found only in the human species, in the chimpanzee, the ourang, the gibon (the last very short) and in the wombat."

In short, his nearest resemblance, in regard to his digestive organs, is to be found amongst the quadrumana, which, in a state of nature, live entirely on the vegetable productions of the earth.*

The foregoing is but an outline of the anatomical details which Mr. Smith examines at considerable length, and having done so he proceeds to shew, that the opinion he is advocating was entertained long ago by the most eminent cultivators of natural science. We have only room for one or two quotations, and first,

"Linnæus, one of the most celebrated naturalists that ever existed, speaking of fruit, says: 'This species of food is that which is most suitable to man; which is evinced by the series of quadrupeds, analogy, wild men, apes, the structure of the mouth, of the stomach, and the hands.'"—p. 81. "Baron Cuvier, whose knowledge of comparative anatomy was most profound, and whose authority, therefore, is entitled to the greatest respect, thus writes: 'Fruits, roots and the succulent parts of vegetables, appear to be the natural food of man: his hands afford him a facility in gathering them; and his short and comparatively weak jaws, his short canine teeth, not passing beyond the common line of the others, and the tuberculous teeth, would

* In the public dissections at the Royal Zoological Gardens, the Profession in Dublin have had numerous opportunities of observing the perfect analogy subsisting between the digestive organs of man, and those of the quadrumana; and it must have been noticed, that even in the chimpanzee (examined about three years ago), which approaches nearest to the human species, and is undoubtedly a vegetable-feeder, the teeth had a far *more carnivorous* character than in man; the lower canines being very prominent, and a groove being formed in the upper jaw for their reception.

not permit him either to feed on herbage, or devour flesh, unless these aliments were previously prepared by the culinary processes.'"—p. 83. "Professor Lawrence observes: 'Physiologists have usually represented, that our species holds a middle rank, in the masticatory and digestive apparatus, between carnivorous and herbivorous animals—a statement which seems rather to have been deduced from what we have learned by experience on this subject, than to have resulted fairly from an actual comparison of man and other animals.'" &c.—p. 84.

The objection that animal food is very extensively used and found to be nutritious, is really of no force, when examined into, since the question is not what is possible, but what is natural and best. Although organized beings, both animal and vegetable, have each of their parts undoubtedly *suited to a particular purpose*, they are all possessed of a certain degree of *adaptability*. Thus nearly all of the fruits and flowers that we are most familiar with, have been brought from a climate and soil widely different from our own, and the metamorphoses which such changes produce, form some of the most interesting departments of botanical research. The capability of adaptation to external circumstances is even more remarkable in the case of animals.

"A lamb, for instance, during a long sea voyage, was induced to live upon the flesh of animals; and so powerful was the force of habit, that it finally refused to crop the grass destined by nature for its support. Horses, on the coast of Arabia, are constantly fed on fish—herbage being deficient; and they seem very much to relish this, to them, unnatural diet. The Gauls fed their oxen and horses with fish; so did the Paeonians, mentioned by Herodotus. 'In Norway, as well in some parts of Hadramant, and the Coromandel coasts, the cattle are fed upon the refuse of fish.'* Even a young wood pigeon, which is principally granivorous, has been brought to relish flesh, so as to refuse every other kind of food, even grain, of which it is naturally so fond.

"Thus are various herbivorous and granivorous animals reduced by circumstances to live upon animal food; and it is equally true, that carnivorous animals (as the lion, tiger, cat, &c.) have been taught to live and to thrive tolerably, upon vegetable diet. 'If the young of these animals, before they have tasted flesh, be carefully trained to a vegetable diet, till they are grown up, they will manifest no desire for flesh meat.' Young kittens have been fed upon vegetable diet, without appearing to have suffered from it in health and strength; and when fully grown would refuse to eat flesh, which, if forced upon them, would first render them sick. They would kill rats and mice, but would not devour them."—pp. 87, 88.

We recollect the astonishment expressed by a very scien-

* Life of Reginald Heber. Harper's Fam. Library, No. 40.

tific gentleman, on seeing in a Greek boat in the Levant, a goat picking mutton bones with the greatest relish, and grasping them between his forelegs with skill, the result of long practice, for the animal was fed exclusively on flesh. On the other hand, few dogs in Ireland get much flesh meat, and most persons have met with instances of their *preferring* farinaceous food. We know of more than one case where a dog had to be killed on account of *stealing fruit*, even when well fed. The transmission of habits alluded to by the Author, in a note respecting M. Roulin's interesting memoir, is also to be taken into consideration. M. Roulin draws attention to the fact that the cows of Colombia, owing to the practice of milking having been laid aside for some years, have their teats and udder differently formed from those of Europe, and only give milk *so long as the calf is with them*. The same thing occurs on the west coast of Africa. A friend of the reviewer residing at Gambia, purchased a number of goats in order to secure a supply of milk, but having disposed of the kids, to his equal astonishment and annoyance, not one drop of milk could be procured. M. Roulin made two other very interesting observations in South America, viz., that the horses bred in the grazing farms of the Cordillera, and which are taught to amble in a peculiar manner, moving simultaneously the two legs of one side, like the giraffe, when let loose in the woods, on account of lameness or other defects, give origin to a race called "aguilillas," to which this pace is natural; and that the dogs of the borderers on the River Madeleine, *the first time* they are taken out to hunt the pecari, are instinctively led to keep the whole troop at bay without attacking any individual animal, whilst dogs of any other kind are sure to attack one or more pecari, when, however powerful they may be, they are at once surrounded and devoured. Our domesticated dogs will bark, although they may have been separated from their parents and all other dogs from birth: on the other hand, the wild dogs of South America never bark, but howl like wolves, though a pup born in England from two brought over by Mackenzie, learned to bark; and Cuvier has drawn attention to the fact, that the peculiar disposition of terriers, setters, &c., is more or less hereditary. We know a gentleman who has a large number of hens which lay every day all the year round, but never can be got to incubate, and the breed is maintained only by putting the eggs under hens of a different kind. To add another instance in illustration of this curious fact of the transmission of *habits* as well as *instincts*: both Ellis and Williams mention, that in the South Sea

Islands, where no quadrupeds formerly existed, rats having become very numerous, the most effectual check to their increase was found to be the newly-developed instinct of the pig, leading two or more of these animals to combine to hunt rats, some watching the hole, and others burrowing. From all this it is evident, that the carnivorous habits of a large part of the human family may, without any improbability, be accounted for chiefly by example, and partly also perhaps by hereditary tendency.

The use of tobacco is fully as wide spread, and certainly more inveterate; while as to taste, we are told by Sir J. Ross, that the Esquimaux, while they *abhorred* plum-pudding, gulphed down lumps of putrid fish, blubber, and whole quarts of train oil; and the Batinia, and other *delicacies* of the Russian peasants, horrified and disgusted De Custine and Bremner. On the other hand, *some* weight ought to be allowed to the desire evinced by all children for fruit and sweets, *in opposition* to both admonition and custom.

Reason was bestowed on man to enable him to mould external nature into conformity with his organization, not to change that organization, as caprice or necessity may lead him to change his habitation or his food:

"To discover the intimate relations that exist between animate and inanimate nature; not to change or confound them; to investigate and obey the physiological laws and functions of animal life; not to subvert them, or to render man independent of their influence." —p. 92.

We fully agree with the Author as to the arrogance and folly of supposing that the whole creation was called into existence for the sake of man alone. The following is not very flattering to human pride:

"Certain acari, pediculi, and entozoa, prey upon man, whose body (externally or internally) is their natural and only habitat; it seems necessary to their very existence. With much more apparent reason, therefore, might it be said that man was created for these loathsome creatures, than that sheep, oxen, or other animals, were formed for his use; since they are not indispensable to his health and happiness." —p. 126.

"Know, Nature's children all divide her care,
The fur that warmed a monarch, warmed a bear.
While man exclaims—'See all things for my use!'
'See man for mine!'—replies a pampered goose.
And just as short of reason he must fall,
Who thinks all made for one, not one for all."*

* Pope's Essay on Man.

In the commencement of the Third Part, Mr. S. endeavours to shew that he is supported by the experiments of modern chemists, but by attempting to reconcile and combine their conflicting theories, he inadvertently falls into several errors. The experiments and observations of recent chemists and physiologists seem to prove, that the gastric juice being poured out by the villi, uncovered by epithelium, first described by Gruby,* dissolves and combines with the nutrient particles of the food, in a manner not yet fully understood; that absorption, as first shewn by MM. Bouchardat and Saudras, takes place exclusively in the stomach, by the veins, and all these results, added to the observations of Berzelius on the action of bile on fat and sugar, seem to establish, almost beyond a doubt, that the lacteals and lymphatics are really nothing more nor less than the veins of the white tissues.† One of the inconsistencies we have alluded to is the assumption of *lacteal absorption*, at p. 138, and of exclusive absorption by the veins of the stomach, at p. 149. Our Author, also, we are surprised to find, adopts and defends Dr. Prout's very strange hypothesis that the human body has the power not only of assimilating, but actually of *creating* inorganic bodies! At p. 145 we read as follows:

"Dr. Prout has distinctly stated that he has found albumen (an azotized principle) in the duodenum, when none was found in the stomach: from which circumstance he concludes, that highly azotized substance may be secreted from the blood, either in the stomach or duodenum, or both, for the purpose of being united with the non-azotized constituents of the food, to form a compound adapted to the nutrition of the tissues."

Yet, after this proof of secretion of nitrogen from the blood taking place in the duodenum, we are informed in the very next paragraph, p. 146, that

"Tiedemann and Gmelin, as well as other physiologists, believe that the secretion of the pancreas *adds to the chyme richly azotized animal substances, albumen, casein, and osmazome.*"

Surely this is sufficient explanation of albumen appearing in the duodenum, and not in the stomach, without the necessity of supposing the secretion of nitrogenized substances from the blood? The hypothesis of Dr. Prout, above alluded to, would, undoubtedly, never have been entertained for a moment by any one were it not for the deserved celebrity of the gentleman by whom it was first enunciated. Every experiment and observation tends to prove, that in the mysterious laboratory of vegetable organization, inorganic matter undergoes a transformation essential to its assimilation, by the higher class of animals. To this rule there is no *proved* exception. In the case of oxygen, adduced by Mr. Smith, there is really *no analogy*, for oxygen is not *assimilated*, but merely employed for the *waste* of the tissues. In nutrition, there is nothing more than absorption of elements already forming appropriate combinations, and we know of no instance of these combinations taking place in animal bodies. Such is the result of the researches of Dumas, Liebig, Boussingault, &c. Is it reasonable, then, to adopt an hypothesis supported by no proofs, and totally opposed to what we know to take place in all analagous cases? The fact that Indians and Arabs are supported during long journeys by gum alone, is accounted for by Liebig, by supposing that the gum combines with oxygen, thus protecting the organs from waste; but as muscular effort is taking place, there must also be waste; and if respiration be sometimes employed only to burn away our food, we ought sometimes, when digestion is not going on, be able to do without oxygen altogether! The inadequacy of one theory, however, to account for the facts, should not induce us to adopt another with less arguments to support it. Again, if the human body can, as supposed by Dr. Prout, either create new elements, or analyze others, which we look on as simple, we should be continually discovering such new substances in animal bodies, and the excrements of animals should exceed the ingesta; or rather, if living beings can *create any* substances, there is no good reason why the *whole* of their nutriment should not likewise be created by themselves without any aid from without. We noticed some other chemical errors, but they do not interfere with the Author's arguments, and are, probably, but oversights; besides, as M. Dumas, in his recent controversy with M. Liebig respecting the formation of fat, most sagely and modestly remarked, "on such subjects the evidence afforded by experience ought to have infinitely more weight than all the results arrived at in our laboratories."

The objection to vegetable food, from the supposed necessity for *variety*, is very ably handled, and the invalidity of the conclusions drawn from Magendie's and other experiments most conclusively displayed. We have always won-

* *Thèse pour le Doctorat, &c., Du Suc Gastrique et de son Role dans la Nutrition.* Par CLAUDE BERNARD. 1844. The experiments and observations in this essay are in the highest degree novel and important, and we know that the talented author, who is M. Magendie's assistant at the College de France, is most trustworthy.

Gruby,—*Morphologia Fluidorum pathologicorum.*

† See Dr. Aldridge's examination of the question, "Is the chyle incipient blood?" in the 25th volume of this Journal.

dered at the importance attached to those experiments, and at the inferences drawn from them, since they necessarily lead to the conclusion, that the lion and the cow should occasionally change places for the good of their health, and for the sake of variety. The gastric juice of each animal is suited to the solution of particular substances only, and since Nature neither supplies us with *pure* water to drink, nor *pure* oxygen to breathe, it should have been expected, *a priori*, that the concentrated vegetable food of Majendie, and the concentrated animal food of Tiedmann and Gmelin, would prove equally unsuited to animal organization.* The extensive and varied experiments on men (pages 173, &c.) proving that whilst pure white wheaten bread, when used exclusively and for a long time, invariably produced indisposition and great prostration of strength, whilst bread made from the same grain, *without the separation of bran*, was found highly nutritious and strengthening, are most interesting and important both to the physician and the physiologist; and the inferences which the Author draws as to diet are just and useful: our limited space, however, compels us to pass on without giving extracts, which must necessarily be long.

The Author adduces numerous proofs of the superior strength conferred by vegetable food; but as few of our readers are unacquainted with the fact, that the hardy troops of Greece and Rome, with the gladiators and the combatants in the Grecian games† were all (before manners were corrupted by the overthrow of democracy) exclusively fed with corn roughly ground by themselves, whilst their only drink, when in action, was a little vinegar and water, it is quite unnecessary, in exhibiting the argument for vegetable fare, to enter into the proofs adduced in the work we are examining of the comparatively *very recent* origin of carnivorous habits among the *lower classes* (maids of honour and such like were gluttonous very early) of the population of these isles, or to quote the accounts of the Pattamars of India, who travel for weeks together sixty or seventy miles a day, subsisting on a little boiled rice; of the Kroomen so well known to merchantmen, and remarkable for strength and endurance

* In the admirable Report of the "Gelatine Committee," which continued its researches during ten years, the reporter, M. Magendie, states, that even any *artificial combination* of gelatine, albumen, and fibrine, *will not suffice for nourishment*, whilst a very small quantity of their *natural* combination—*flesh*—will answer that purpose. A very conclusive refutation of a host of unnatural and cruel experiments.—*Comptes Rendus des Séances de l'Académie des Sciences*, Août, 1841.

† See Rollin, Athletæ, Introduction.

under a burning sun, whilst their religion forbids them to make use of flesh; of the water carriers of Constantinople (alluded to in the Sanatory Report); the runners of South America, and the hardy peasants of Iceland, Norway, Sweden, Russia, &c., all exclusively or chiefly supported by vegetable food, and remarkable for courage, perseverance, and strength.*

That vegetable fare is conducive to clearness of intellect and activity of mind, is a fact on which few persons entertain any doubts, and the stupidity and torpor that follows a full meal of flesh, not capable of dissipation even by the stimulus imparted by wine and spirits, is not peculiar to civic entertainments, but is proved by the arrangement of all commercial bodies, and the practices which have grown up in commercial communities. Most of those great men whose virtues and wisdom have caused all succeeding generations to look back on Greece, and particularly on Athens, with a feeling of affectionate veneration akin to worship, abstained entirely from flesh, from apprehension of impairing their mental powers, and for a like reason in modern times—

"Our immortal Newton, while writing his great work on optics, lived entirely without animal food. Lord Byron excluded flesh from all his meals, though the vegetable regimen he adopted was by no means a judicious one, and was far from according with anatomical structure, and physiological laws. Shelly—whose poetic power, compass of imagination, and elegant diction, have seldom, if ever, been surpassed—was both a rigid abstainer from flesh, and an able advocate of vegetable diet."

Porphyry, Des Cartes, Haller, Lord Heathfield (the gallant defender of Gibraltar), Howard the philanthropist, Sir R. Phillips, Ritson, Hufeland, Lambe, Cheyne, &c., are all referred to as having experienced in their own persons the advantage of this restricted fare, and many interesting particulars are detailed respecting them; whilst the vivacity and ready wit, patience under privation and suffering, and great intellectual power (displayed even in the most unfavourable circumstances) of our own vegetable-feeding countrymen (they were called ποηφάγοι in the time of Solinus), and the somewhat similar character of the Scotch, Swedes, Norwegians, French, Italians, and Spaniards, shew at least that an animal diet is not *necessary* either for development of body or mind. The Persians, who live on pilau, or boiled rice

* There is, perhaps, no animal which possesses so much strength in proportion to its size, united to such indomitable courage, as the common game cock, which, if we are rightly informed, is prepared for the arena by being fed for some weeks exclusively on corn and sugar.

and fruit, and the Greeks whose food consists of rye-bread and grapes, are remarkable for their symmetry and elegance of form. And

"Adam Smith, in his 'Wealth of Nations,' informs us, that the most beautiful women in the British dominions, are said to be, the greater part of them, from the lower rank of people in Ireland, who are generally fed with potatoes. The peasantry of Lancashire and Chesshire, also, who live principally on potatoes and butter-milk, are celebrated as the handsomest race in England."—p. 317.

The influence of food in relieving or giving rise to certain diseases, as gout, scurvy, scrofula, hepatic affections, the development of tænia, &c., is considered in several chapters; and testimony is adduced to shew that deformities are much less frequent in countries where the food of the inhabitants is principally vegetable. We are astonished that Mr. Smith has not alluded to softening of the bones produced by rickets, which, in England at least, is one of the most fertile sources of deformity. In a course of lectures given by M. Trousseau, at Necker Hospital, a few years ago, that distinguished physician adduced a great number of experiments and observations on animals of all kinds, to shew that the young, even of the most carnivorous species, if fed exclusively on flesh from their very birth, become almost invariably deformed and rickety. M. Trousseau illustrated his remarks by actual specimens; and, if we mistake not, there is a series of preparations of the kind in the Museum of the Ecole Pratique. Since our attention was drawn to this subject, we have met with many corroborating facts, such as the following. A lady residing in Dublin had several very healthy children, which were reared in the usual manner, when a relative, who had high ideas of the importance of animal food, coming some years after to reside with her, the next child, as soon as it could walk, was given as much flesh meat as it would take. It proved very delicate, and its younger sister still more so, which was all attributed to the want of sufficient nourishment. The next and last child was accordingly literally forced to drink porter and eat beef and mutton from a very early age, and its organs being unable to assimilate such unnatural fare (like the animals in Tieddemann's and Majendie's experiments), it was very often indisposed. This poor girl, now in her twelfth year, is toothless, not more than three feet high, and shockingly deformed, although she was well formed, and of the full size, at birth. Both parents have been always healthy and robust, and their residence salubrious.*

* Here we cannot omit mentioning a remedy which we have never seen used in such cases in Ireland, although throughout France and the northern countries it is looked on as a specific for softening of the bones from almost any cause. MM. Trousseau and Brettoneau first drew attention to the power of combating rickets possessed by all the fish oils, but in the highest degree by cod-liver oil (Oleum Jecinoris Asselli). M. Trousseau was led to try the effects of this remedy by the following circumstances. He was the attendant of a family, all the children of which were highly rickety from their earliest years. Change of air and various other means were tried without effect, when the father was induced by some fishermen in the north of Holland, where he was in the habit of spending the summer, to make his children take regularly a large spoonful of cod-liver oil three times a day. The happiest effects were soon experienced: and on mentioning the case to M. Trousseau, that scientific physician at once sent for a large quantity of the oil, and tried it very extensively in the hospital to which he is attached. The success of his experiments have placed this remedy among those the efficacy of which is best established in the opinion of continental physicians. M. Trousseau for some years past has always combined the use of cod-liver oil with exclusive vegetable diet, and exposure as much as possible to the sun. Of the success of his treatment of rickets we have had ample evidence.

We shall allude to but one other proof of the sanatory influence of vegetable food, viz., its influence on longevity:

"It is said, that in no other part of the world (in proportion to the population), are there more instances of extreme longevity than among the Norwegian peasantry, who scarcely ever taste animal food. In the severe climate of Russia, also, where the inhabitants live on a coarse vegetable diet, there are a great many instances of advanced age. The late returns of the Greek Church population of the Russian empire give (in the table of the deaths of the male sex), more than one thousand above a hundred years of age; many between one hundred and a hundred and forty; and four between one hundred and forty and one hundred and fifty. It is stated, that to whatever age the Mexican Indians live, they never become grey-haired. They are represented as peaceable cultivators of the soil; subsisting constantly on vegetable food; often attaining a hundred years of age, yet still green and vigorous. Of the South American Indians, Ulloa says: 'I myself have known several, who, at the age of a hundred, were still very robust and active, which unquestionably must, in some measure, be attributed to the perfect sameness and simplicity of their food.' Both the Peruvian Indians, and the Creoles, are remarkably long lived; and retain their faculties to a very advanced age. Slaves, in the West Indies, are recorded from a hundred and thirty to a hundred and fifty years of age."—p. 368.

Professor Quetelet, of Brussels, has established that the Icelanders, whose ordinary fare is coagulated milk, rice, cheese, and a porridge made with Cetraria Islandica, with fish only at rare intervals,* rank highest as to longevity, being followed in the descending scale by the Swedes, Norwegians, Russians, Irish, Scotch, &c. One more quotation on this subject, and we have done:

* Henderson's Iceland, vol i. p. 113.

"Henry Jenkins lived one hundred and sixty-nine years; and although it is not stated that he never ate any animal food, yet if we may judge from the language of his historian, it can have formed but a very small portion of his diet. He informs us, that it was coarse and sour; that is plain and cooling. Old Parr, who died at the age of one hundred and fifty-two years and nine months, lived on old cheese, milk, coarse bread, small beer, and whey: these, with pure air and exercise, were the true 'pills' that imparted to him health and stamina for so long a period of time. Ephraim Pratt, of Shutesbury, who died in 1804, at the age of one hundred and sixteen years, took no animal food for forty years: he lived very much on milk, and that in small quantity, yet he could mow 'a good swarth' almost to the hour of his death. His son attained to the age of one hundred and three years, by similar means."

Old Parr, at the age of one hundred and two, was guilty of seduction,* for which he did penance in his parish church. He married a widow in his hundred and twentieth year, and had a child by her. After living in the country on his frugal fare to the age of a hundred and fifty-two years, and three months, the Earl of Arundel induced him to go up to London, where, being fed high, and drinking plentifully of wine, he survived the change but six months. A committee of the Royal Society was appointed to examine his body, and the Report, drawn up by the illustrious Harvey, contains the following words: "Ut paucis dicam, omnes ejus partes internæ adeo sanæ videbantur, ut si victum et ærem non commutasset, satis diu forte vitam produxisset."† Old Parr left three sons, who all lived to considerably above a hundred years. The observation quoted at p. 112, from that acute writer, Sylvester Graham, is very just. It is truly wonderful to see how little difference in longevity there is all over the world. As in the planetary system, one thing balances another, and mere length of life proves almost nothing. In one place good habits preponderate, and in another good climate, &c., &c., but in no place do we find all the elements of longevity combined: our own land might have been adduced as an instance in point. Lord Devon's, and other Parliamentary Reports, prove, that in Ireland there is more physical misery than in any other country in the world; yet by the Census Report of 1841, we have *in a million of inhabitants*, in Ireland 526 persons, aged *ninety-one* and upwards, and in England but 485 aged *ninety* and upwards: again, in Ireland, there are 207 at *ninety-seven* and upwards; in England but 97 aged *ninety-five* and upwards.*

* It is an opinion very commonly entertained, that vegetable food tends to increase the procreative powers of man, and the notion seems to have arisen from considering the number of children seen every where in Ireland. The number of children met with in the streets and roads ought, however, to be ascribed to the *misery and want of house accommodation* in Ireland, which, by collecting the children in the public thoroughfares, leads to a misapprehension of their actual numbers. By the Registrar General's fifth Report, the births in England are 1 in 31, whilst in Ireland they are 1 in 30·7, a difference which may safely be overlooked. Again, from the "Ordnance Memoir of Londonderry," we find, as the result of extensive statistical induction, that in Ireland the average number of children to a family was of *Irish* 2·34, of English 2·93, and of Scotch 3·04.

† Boneti Sepulchretum Anatomicum, vol. i. p. 491; and Phil. Trans. for 1668–9, p. 69.

Mr. Smith devotes a chapter to the exposition of the reasons which induce him to believe, that at a period not very remote, all mankind will depend for subsistence on the vegetable kingdom alone. His chief ground for this opinion is the great space required to subsist an exclusively carnivorous animal, viewed in connexion with the improvements in agriculture, and such inventions as M. Maitré's process of converting straw into flour fit for making bread, M. Gouldson's "mode of separating and preparing the farinaceous parts of such bulbous roots as turnips, carrots, parsnips, beet, &c., and of converting it into a fine flour," &c.

"The estimated produce of an acre of land is of—

†Mutton,	. .	228 lbs. per year, or	10 ounces per day.	
Beef,	. . .	182½	,,	8 ,,
Wheat,	. .	1526	,,	4⅓lbs. ,,
Indian Corn,		1100	,,	3 ,,
Potatoes,	.	22,400	,,	61 ,, p. 390."

We may add from Humboldt, that *one acre of banana plant will produce* 174,400*lbs. of nutritive fruit!!* Now,

* In the Irish Census the returns of age are given in quinquennial periods thus: 6 to 10; 11 to 15, &c.; but in the English the similar periods begin and end differently: 5 and under 10; 10 and under 15, &c. A very curious circumstance is observable in the numbers given in the age tables for both countries, namely, the occurrence of *nodes*, if I may use the expression. Thus in the Irish age table, p. 388, the series of *differences* on the quinquennial periods, beginning at the third, are alternately positive and negative; they are as follows: + 251729, —45881, + 331583, — 122701, + 238784, — 107395 + &c. In the English table the same thing is observable, but is not so very marked, viz., 144815, 36177, 266631, 11576, 281479;—3571, &c. This seemed to indicate periods of greater and less mortality or *crises* in human life; but since the alternate increase and decrease only commences a few years after birth, and the maxima in the death tables (which are there less remarkable), are isochronous with the maxima in the age tables of the living, and begin at the same period, this variation in the numbers must be owing to want of exact information, and only proves that, in Ireland, *round numbers* were much more used in giving the ages then in England, and in England than in Scotland. In the latter country there were (in a million of the population of 1841), 737 persons aged ninety years and upwards, and 183 aged ninety-five years and upwards.

† Middleton.

"Suppose, that in Great Britain and Ireland there are (in round numbers) eighty millions of acres, of which sixty millions are arable, or capable of being cultivated. Let half of these be appropriated to the production of the finest fruits, flowers, and timber; and to the support of cattle, sheep, and other animals, for the production of milk, wool, &c.; we shall then have thirty millions of acres for potatoes, wheat, and other grain. Let one-half of this remnant be sown with wheat, and the remaining ten millions planted with potatoes: then—

	Inhabitants.
15,000,000 of acres of wheat, at three qrs. per acre, will feed, ...	45,000,000
15,000,000 of acres of potatoes, at ten persons per acre, ...	150,000,000
Total, .	195,000,000

which is equal to seven times the present population, and more than thirty times the number that the land would support on flesh alone; without taking into consideration the produce of the thirty millions of acres appropriated to fruit and other delicacies."—p. 392.

"Our population returns supply us with many valuable facts; and from these we learn, that the population of this country has for the last forty years been increasing, after the rate of fifteen per cent. in ten years, or doubling its numbers in fifty years; and if neither wars, disease, nor other checks, interfere with this well-ascertained law for the next two hundred and fifty years, eight hundred and ninety-six millions will undoubtedly be the population of Great Britain and Ireland. Two centuries and a-half, therefore, are a period not so far distant as to be unworthy of the attention of every British subject. It is evident, also, that within a very brief space of time, no considerable portion of the inhabitants of Great Britain can indulge in a diet of animal food, without immense foreign supplies; and the law that operates here will, in the course of a few more centuries, densely populate other countries, and finally render a fruit and farinaceous diet equally necessary throughout the earth."—p. 397.

Mr. Smith should have carried his calculations a *little farther*, and estimated the probable period when the earth will be unable to supply either animal or vegetable food for its superabundant and still increasing population! Over-increase is at least a more imminent danger than the union of the planets in the centre of the system, which gave rise to such vulgar terrors when the acceleration of the planetary motions was first observed; and it is consolatory for the present generation to know, that taking a mean betwixt the estimates of Hassel and Balbi, at least five hundred years must have passed away before all America will be even as densely peopled as England, supposing neither pestilence nor war to occur, and population to increase as in the last century.

Having now given as full an outline of Mr. Smith's views as was consistent with the narrow limits of a review in a Journal such as this, we cannot conclude without very strongly recommending our readers to possess themselves of a copy of his work, which, whatever views may be entertained on the subject of which it treats, we are confident no one will regret purchasing. There are but few books that in the same space comprise as much information, in a pleasing and entertaining form, as the treatise on *Fruits and Farinacea.**

* The writer of the above bibliographic notice has brought to bear on the subject of exclusive fruit and farinaceous diet both reflection and experience. When about four years of age, having been much bantered by some friends on petting lambs and rabbits, and afterwards eating the flesh of such animals, in a fit of childish indignation he declared he would never again eat flesh. This resolution was adhered to, and his parents (who were not very much impressed with the necessity of animal food, and who believed that the whim would soon wear off) not interfering, abstinence from animal food soon acquired the force of a habit, which has grown with his growth, and strengthened with his strength, having now been persevered in for more than twenty-one years. Since the period mentioned he has entirely abstained from eating anything that ever had life, as well as from eggs and cheese; whilst he never partook of even one glass of wine, spirits, or any intoxicating liquor, nor does he make use of tea or coffee. His health has been invariably good, and at school and college he was possessed of more activity and strength than any of his associates of the same age, whilst he exceeded all in endurance. Though sedentary habits must have prevented the full development of his muscular powers, he has on more than one occasion walked sixty English miles in one day, without any other inconvenience than blistered feet. His weight is at this day within a pound of what it was at the same season seven years ago, but increases half a stone every summer, losing as much during the winter. His urine never contains hippuric acid, but has less than the average of uric acid and urea. Six hours' sleep is all that he ever requires. To Mr. Smith's facts, proving that exclusively vegetable fare entails no privation, and, when persevered in for a time requires no effort, he can add his own experience. To abridge the number of our wants is to increase our happiness and independence; and the writer is confident that he derives as high sensual gratification (or at least as high as he would wish to derive) from satisfying his appetite with fruits and farinacea, as can be afforded by the "dapes crucntæ" of others, whilst he is at least free from those after consequences which he hears so often complained of by his friends. A few years ago he learned that one of his uncles (by marriage), also a physician, and who lived and died in the state of Pennsylvania, had observed exactly the same regimen from his earliest years. The gentleman alluded to was always remarkable for his European complexion, in a country where sallowness is almost invariable. He was possessed of great activity and vivacity, and was gathered to his fathers in a good old age, having never been a day unwell until the illness of which he died. A cousin also, of the reviewer's, of the same age and profession as himself, having come to reside with him when about seven years old, was soon led, from motives of attachment, to adopt his Pythagorean habits, in which he persevered for above fifteen years, and was eventually induced to become carnivorous, only by the painful sense of peculiarity which he experienced in mingling with society. Since he commenced the use of animal food he has been subject to repeated attacks of perityphlitis, or ileo-cæcal tumour, recurring every few months, and often endangering his life. A distinguished

Outlines of Chemistry, for the Use of Students, by William Gregory, M. D., Professor of Chemistry in the University of Edinburgh. 12mo. London: 1845.

Dr. Gregory has supplied, in his present volumes, a want long felt by the medical student, and the chemical teacher; both of whom have much required a work similar to that before us, which would serve as a manual of reference for the former, and as a concise text book for the latter. We have an abundant stock of extended treatises on this subject, many so large and diffuse, that their form alone is sufficient to deter the student from ever hoping to attain even a moderate knowledge of a most important branch of education; but Dr. Gregory has, in these volumes, given a *resumé* of all the most important facts at present known, in the most concise form, and most scientifically arranged; while, at the same time, he has avoided that obscurity of style which so often mars the attempt at brevity, and has made it his principal aim to present to the reader an accurate arrangement of facts, unincumbered by doubtful theories. To medical students this is a most valuable quality in any chemical work; their time is too valuable, and their practical avocations too numerous to allow of their devoting much of it to scientific chemistry; and, with the great mass, it is almost impossible to get them to display even a moderate zeal in the acquirement of those branches bearing practically on their profession. If this be true of the chemistry of inorganic substances, how much more so is it of organic chemistry, a branch of the science at present so little methodized, and so filled with varying theories, that we cannot wonder at the indisposition to study a branch of science which every year may alter, and many years must elapse, ere it assumes the character of a purely demonstrative science. Of course we cannot be expected to enter into a detailed review of a work like the present. In the first volume Dr. Gregory has given all the most important facts in the chemistry of inorganic bodies, scientifically arranged, and clearly expressed, and has avoided all details of processes which are not absolutely required for the elucidation of his subject. He has not encumbered his work with detailed accounts of many metals and their compounds, which are of rare occurrence, and only of interest to the scientific chemist; and he has aimed at making it strictly a hand-book for the elementary student, in which he has admirably succeeded, as the clearness of his explanations of processes, and the perspicuity of style in developing theories, combined with its exclusion of all that is valueless for uncertainty or rarity, must render it a great boon to the student. As a specimen of the style of explaining the internal theories of isomorphism and isomerism, we subjoin Dr. Gregory's account of these interesting and important subjects.

"Isomorphism.

"Most substances, when they assume the solid form slowly, so as to allow the particles to follow their natural attractions, exhibit, more or less perfectly, a regular form: in other words, they crystallize. Thus carbon, when slowly deposited in the form of diamond, assumes the form of a regular octohedron, or of some form geometrically allied to it; and common salt, a compound body, takes the form of the cube and its modifications, including the octohedron.

"Now it has been observed that the same substance invariably crystallizes in forms belonging to the same system, but that different substances very frequently present different crystalline forms. Thus, while diamond crystallizes in regular octohedrons, iodine forms acute rhombic octohedrons: and while common salt crystallizes in cubes, chloride of barium yields right rhombic prisms.

"It happens, occasionally, but rarely, that the same element is capable of assuming two crystalline forms, belonging to different systems, and not geometrically connected with each other. Thus sulphur, crystallizing from its solution in bisulphuret of carbon, forms very acute rhombic octohedrons, but when melted by heat, and allowed to consolidate by cooling, it yields oblique rhombic prisms.

"The same is occasionally observed in compound bodies. Thus carbonate of lime, in its common form of Iceland spar, crystallises in obtuse rhombohedrons and in innumerable varieties of that form: but in the rarer form of arragonite, it assumes the form of a rhombic prism.

"These cases, and others which are analogous, are to be explained by a different arrangement of particles, dependent most probably on a difference of temperature at the period of the formation of the crystals. They are not, however, numerous enough to affect the general

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medical friend met with the following analogous case. An Irish gentleman who happened to be in Spain at the period of the invasion of that country by the French, was induced by prudential motives to enter a convent of La Trappe. On the vegetable fare adopted by these monks he soon got so fat as to become the opprobrium of the fraternity. He continued to observe the rules of the order until his arrival in Ireland with a colony of Trappists a few years ago, when he left them and came up to Dublin. Having in early life been very fond of flesh meat, of which he ate a great deal, he was surprised to find that now the smallest portion of animal food produced diarrhœa, and two years of experimenting had passed away before he was able to eat a beef steak. On the other hand, we have never heard of inconvenience arising from a properly regulated *farinaceous* diet, though we have known it adopted in one instance by a distinguished physician at seventy years of age.

This note is added at the request of friends to whose judgment the reviewer always feels pleasure in deferring.

law, that the same substance always assumes the same crystalline form.

"But the admirable researches of Gay-Lussac and Mitscherlich have established the fact, that in many instances, different compounds assume the same form. Thus, the following substances, and many others, take the form of the cube, tetrahedron, or regular octohedron, which are geometrically connected. Chloride of sodium (sea salt), chloride of potassium, sal ammoniac: bromide of potassium: iodide of potassium: sulphuret of lead: fluoride of calcium: bisulphuret of iron: arseniuret of cobalt: sulphate of alumina and potash (alum): ammonia alum: chrome alum, iron alum: sesquioxide of iron, sesquioxide of aluminum, sesquioxide of chromium. In like manner other crystalline forms are found to be common to many different compounds, although none occurs so frequently as the cube and its congeners.

"Now at first sight it would appear that no relation whatever could exist between the form of these numerous and very different compounds, and their composition. But on closer inspection, they are found to arrange themselves into groups. Of these groups, two may be specified among the compounds above enumerated. One is that of the chlorides, bromides, iodides, and fluorides of metals, having the formula MR, that is, 1 at: metal to 1 at: radical. This includes chloride of potassium KCl, of sodium Na Cl, of ammonium (sal ammoniac) Am Cl: to which may be added bromide of potassium KBr, iodide of potassium KI, and fluoride of calcium Ca F: and this group is a very large one. It will be observed that the members of it contain an equivalent of metal united to 1 equivalent of a metalloid, and are, therefore, so far analogous in composition. The next group is that of the alums. Common alum has this formula.

$$KO, SO_3 + Al_2O_3, 3SO_3 + 24\,HO.$$

Now if we substitute ammonium for potassium, we have

$$Am\,O, SO_3 + Al_2O_3, 3SO_3 + 24\,HO:$$

and this is the formula of ammonia alum. Chrome alum is

$$KO, SO_3 + Cr_2O_3, 3SO_3 + 24\,HO:$$

and another may be formed by substituting Am for K. Iron alum is

$$KO, SO_3 + Fe_2O_3, 3SO_3 + 24\,HO.$$

And here also another alum is obtained by substituting Am for K. A good many more alums may be procured by substituting Na (sodium) for K, and Mn for Al, that is, manganese for aluminum; and all these salts have the same crystalline form and the same general properties. Here, as in the former more simple group, the analogy in constitution is at once obvious. Every alum is

$$m\,O, SO_3 + M_2O_3, 3SO_3 + 24\,HO.$$

m stands for a metal of one class, such as potassium, sodium or ammonium: and M for a metal of another class, such as aluminum, iron, chromium, or manganese. It appears, therefore, that a salt, containing

1 eq. of a neutral sulphate of a protoxide of one of the former metals (mO, SO_3), along with 1 eq. of a neutral tersulphate of a sesquioxide of one of the latter metals ($M_2O_3, 3SO_3$), and 24 eq. water (24 HO) takes the crystalline form of common alum, the type of this group. From this we must conclude that the similar *arrangement* of particles prevailing in all these alums is one chief cause of the similarity in form. We see that the particles need not be all identical in two similar crystals; for example, of common alum and of iron alum. But there must be an analogy between those elements, the equivalents of which may be mutually substituted for each other. We find, accordingly, in all other relations, an analogy between potassium, sodium, and ammonium, on the one hand, and between aluminum, iron, chromium, and manganese on the other. In the group first mentioned, that of the chlorides, bromides, and iodides of certain metals, we find the same analogy between potassium, sodium, and ammonium on the one side, and between chlorine, bromine, and iodine on the other.

"Now to these groups of analogous elements, the name of isomorphous groups has been given, as there is every reason to believe that, as elements, they possess the same form (ἴσος, equal, and μορφή, form); and the phenomena of identical form in compounds of different but analogous composition, have received the name of isomorphism. Two elements are isomorphous, which either crystallize in the same form, or may be substituted for each other in their compounds, equivalent for equivalent (the other elements remaining unchanged), without affecting the form of the compound.

"The doctrine of isomorphism enables us, in many cases, to decide on the formula of a compound, and, consequently, on its equivalent. Thus, we have seen that aluminum or iron may be replaced by chromium, without change of form, in alum; and we find that sesquioxide of aluminum, sesquioxide of iron, and oxide of chromium, also crystallize in the same form. Now, the composition of oxide of chromium was formerly uncertain; but finding, as we do, that it is isomorphous with the other two sesquioxides, we conclude that it is also a sesquioxide, and that its formula is Cr_2O_3.

"Again, chromic acid is found to contain twice as much oxygen for the same amount of chromium, or it may be represented as Cr_2O_6. This being a most improbable formula, we observe next, that chromic acid may be substituted for sulphuric acid, without change of form; in other words, these acids are isomorphous. But the formula of sulphuric acid is SO_3, and we, therefore, conclude, that the formula of chromic acid is CrO_3; which agrees perfectly with the first observation, that it contains twice as much oxygen for the same weight of chromium as the oxide does; for CrO_3 is the very same proportion as Cr_2O_6."—pp. 34–37.

"We can hardly doubt that not only the salts, but the acids, are really isomorphous, and would be found so, if we could obtain them all in crystals; and we have the same reason to conclude that the elements of these acids are also isomorphous; that arsenic and phosphorus, sulphur and selenium, for example, crystallize in the same form.

"Indeed, the only plausible explanation of the existence of isomorphous groups of compounds is, that the elements characterizing those those groups are isomorphous, and hence their analogous compounds are so. If we assume that arsenic and phosphorus are isomorphous, then we see that $As_2 O_5$ must be isomorphous with $P_2 O_5$, since the oxygen in both is, of course, the same. In like manner, arseniate of soda, $As_2 O_5$, 2 Na O, HO, 24 aq., must be isomorphous with phosphate of soda, $P_2 O_5$, 2 Na O, HO, 24 aq., since all the elements in these two salts are the same in nature, number, and arrangement, except that As_2 in the first is replaced by P_2 in the second, and the elements As and P have been assumed to possess the same form.

"There is one case which requires explanation. It is the isomorphism of potash, KO, and oxide of ammonium NH_4O; or, in other words, ammonia with 1 at: water, NH_3HO. Here we have a body composed of six equivalents isomorphous with one containing only two. But, on the one hand, there is good reason to believe that the compound metal, ammonium, NH_4, exists; and if we represent this by a single symbol Am, its oxide will be Am O, corresponding in constitution to KO, each being formed of 1 eq. metal, and 1 eq. oxygen. It is true Am is a compound; but, on the other hand, this compound acts as an element, and Am=NH_4 is only 1 eq. *of metal.* Besides, we cannot be certain that even potassium, K, is not also a compound, although we have not as yet succeeded in decomposing it, if it be one. At all events, it is a fact, that NH_4 may be substituted for K without affecting the form of the compound in which the substitution is made, as in the alums; and we have only to assume that the compound NH_4 happens to be isomorphous with the simple substance K, and all the facts would follow.

"We shall have occasion to return to the subject of isomorphism, when treating of salts generally, and of their crystallization.

"Isomerism.

"We have seen that, as a general rule, analogy of composition implies analogy or similarity in form and external properties. But it has been observed in a number of cases, that two or more compounds, formed of the same elements, in the same relative proportions, and having, therefore, the same composition in 100 parts, are yet entirely distinct from each other in all their properties. Such bodies are called isomeric bodies (from ἴσος, equal, and μέρος, part).

"It is obvious that, as the proportions of the elements are the same, the source of the difference in properties must be sought for in the *absolute number*, or in the *arrangement* of the atoms. Thus, acetic ether and aldehyde are two entirely different liquids, containing exactly the same relative proportions of carbon, hydrogen, and oxygen. These proportions, reduced to the smallest number of atoms, are $C_2 H_3 O$. Now, there is no doubt that the absolute numbers in aldehyde are $C_2 H_3 O_2$; and there is also no doubt that the absolute number of equivalents in acetic ether is $C_4 H_6 O_4$. Here it is evident that, although the proportions are the same, the equivalent of acetic ether is twice as large as the equivalent of aldehyde. Again, the composition in 100 parts, and consequently the relative proportions of the elements of urea, is exactly the same as in hydrated cyanate of ammonia; while the equivalent of both compounds appears to be the same, or, in other words, they contain the same absolute number of atoms of the element. But we know that the hydrated cyanate of ammonia is represented by $NH_3 + C_2 NO, HO$; and that urea contains neither ammonia, NH_3, nor cyanic acid, $C_2 NO$. Let us suppose the atoms in urea to be simply untied thus, $C_2 N_2 H_4 O_2$, and we see at once that the same relative and absolute number of atoms may readily give rise to perfectly distinct compounds. In some cases, we know what the arrangement is in both compounds. Thus, hydrated acetic acid, $C_4 H_3 O_3$, HO, and formiate of oxide of methule, $C_2 H_3 O + C_2 HO_3$, both contain $C_4 H_4 O_4$. Such isomeric compounds are called *metameric;* and where the absolute number of atoms differs, *polymeric;* where the absolute number in one or both is unknown, they are called simply *isomeric.*

"It is easy to see that wherever the atoms of the elements of a compound admit of more than one arrangement, metameric compounds may occur. In binary compounds, such as water, HO, there is but one arrangement possible, as long as the absolute number of atoms is not doubled, trebled, or still further multiplied. But in such a compound as peroxide of iron, $Fe_2 O_3$, for example, the elements might yield several metameric compounds, such as $2FeO + O$, $FeO + O_2$, $Fe + FeO_2$, not to mention the multitudes of compounds which might be formed with precisely the same composition in 100 parts, by increasing the absolute number of atoms.

"The discovery of isomerism, however unexpected, is thus entirely consistent with the atomic theory, of which it is merely a special case. Isomerism is of very frequent occurrence among organic compounds, owing, no doubt, to their usually large atomic weights, since the numerous atoms of the elements afford much scope for isomeric modifications; and doubtless this principle plays an important part in the processes of organic life and growth, as well as in decay." —pp. 38–40.

Dr. Gregory's second volume is devoted to organic chemistry, and as far as can at present be done, gives an outline of this branch of the science. "A complete and scientific arrangement is quite unattainable," he truly says in his preface; but Dr. Gregory has succeeded in giving a very interesting and useful outline of what is at present known: and the difficulty of doing even so much is very great. In a science the facts of which are daily accumulating, and frequently overturning all preconceived notions on the subject, it is, to use Dr. Gregory's words, impossible to form any fixed system; "every one feels the impossibility of remaining satisfied with the views held at present." In this we fully concur; and we fear that there is, even in this work, too hasty generalization, and too great a tendency to adapt facts to theories. This attempt must be made, however, in any

work professing to treat of organic chemistry, and Dr. Gregory has, as far as possible, contented himself with stating the facts, which the modern experimenters in this branch have established. He has presented as good a system as our present knowledge affords, but many years must elapse before a sufficient number of data can be obtained on which to found a theory likely to hold a permanent place among the physical sciences. We cannot enter into any analysis of the contents of this volume, but will conclude our short notice of this excellent work, which we most cordially recommend to the notice of all who wish a well digested and concise view of the present state of chemical science, by the introduction to the second volume.

"Organic Chemistry is so called because it treats of the substances which forms the structure of organized beings, and of their products, whether animal or vegetable. It has long been known, that all organized structures, as well as all the substances formed in or by these, are, in great part, composed of a very limited number of elements; insomuch that a large proportion of them may be described as consisting, almost exclusively, of only four simple substances, namely, carbon, hydrogen, oxygen, and nitrogen.

"But while these four elements undoubtedly constitute the chief part of all organized tissues, and while such products as woody fibre, sugar, starch, gum, fat, oils, and many organic acids, contain only the first three, that is, carbon, hydrogen, and oxygen, we must not forget that other elements occur in the organized kingdoms of nature: some of them, such as those of phosphate of lime, in large quantity; and all, whether they occur in smaller or greater proportion, as truly essential to animal and vegetable life as the four elements abovementioned, the predominance of which characterizes the organic world.

"Thus, no plant can grow, or form cells, or even fibre, without the presence of certain mineral or saline compounds, which are derived from the soil, and which, when the plant is burned, constitute its ashes. These are, potash, soda, lime, magnesia, with, occasionally, oxides of iron and manganese, as bases; and silicic acid, phosphoric acid, sulphuric acid, chlorine and fluorine, as acids and acid-radicals.

"Again, the juices of all plants, and more especially their roots and seeds, contain some one or more of the compounds known by the names of albumen, fibrine, and caseine. Now these compounds contain small, but absolutely essential proportions of sulphur and phosphorus, besides earthy and alkaline phosphates.

"Lastly, the bones of animals contain not only phosphate of lime, but also phosphate of magnesia and fluoride of calcium, both in very considerable quantity; and iron is an unfailing constituent of blood.

"To the four elements first mentioned, as constituting the chief mass of organic substances, we must therefore add, as no less essential, although, for the most part, in smaller proportion, the following

metalloids, chlorine, fluorine, sulphur, phosphorus, and silicon; and the following metals, potassium, sodium, calcium, magnesium, iron, and occasionally manganese.

"It thus appears, that the fourteen or fifteen elements which constitute the chief mass of the mineral or inorganic world are almost the same which occur in organized matter: the difference being chiefly this, that in inorganic nature the *predominant* elements, nearly in the order of their abundance are, oxygen, hydrogen, nitrogen, silicon, chlorine, sodium, aluminum, carbon, and iron, after which follow potassium, calcium, magnesium, sulphur, phosphorus, and fluorine; while in the organic department the order is nearly as follows: carbon, oxygen, hydrogen, nitrogen, potassium, calcium, phosphorus, silicon, sulphur, sodium, magnesium, chlorine, iron, and fluorine. Aluminum, so very abundant in the mineral kingdom, hardly ever occurs in organic compounds, and when it does occur is, perhaps, accidental.

"The above considerations are sufficient to shew, that there is no essential distinction to be made between organic and inorganic chemistry, founded on the nature of the elements concerned.

"Neither is there any such distinction to be pointed out in regard to the laws of combination and decomposition which prevail in these different departments of chemistry; for we find the same affinities operating; and although organized tissues and their products have, in general, a more complicated constitution than inorganic compounds, containing a larger number of equivalents of their elements, and consequently having much higher atomic weights, we cannot consider such characters as forming a valid ground of distinction.

"But while we should find it very difficult, if not impossible, to draw the line between inorganic and organic chemistry on scientific principles, we may still recognize, for convenience sake, a certain distinction, founded, first, on the origin of substances, whether animal, vegetable, or mineral; and secondly, on the uniform predominance of carbon in animal and vegetable matter.

"In reference to the first point, it is to be observed, that although the elements concerned are those common to the inorganic and organic kingdoms, the compounds which constitute the latter are formed under peculiar circumstances, such as, for the most part, cannot be imitated in our experiments.

"It is true that chemistry has succeeded, in some cases, in forming artificially certain compounds which occur as products of organic life, such as urea, formic acid, and oil of spiræa. But, in the first place, most, if not all of these, require for their production the aid of an organic product: thus, formic acid is produced from starch, oil of spiræa from salicine; and although urea may be obtained from cyanic acid and ammonia, it is doubtful if either cyanogen or ammonia can be obtained except from organic compounds, directly or indirectly. Secondly, it is particularly to be noticed, that we have not yet succeeded in forming, artificially, either an organized tissue, or even any one of the compounds (albumen, &c.) of which such tissues are made. These organic compounds which have been artificially formed, are

invariably *products of decomposition*, or, in other words, the excretions or secretions of organized bodies; and are far less complex in their constitution than organized structures.

"From these facts we draw the conclusion, that certain circumstances, of which the most important is the *vital force*, so modify the play of affinities in organized beings, as to produce the compounds usually termed organic, which, so far as they are capable of entering into the composition of tissues, cannot be imitated by art.

"In regard to the second peculiarity of organic compounds, namely, the predominance of carbon in their composition, we observe that, as this carbon is united to the three gases, oxygen, hydrogen, and nitrogen, with each of which it forms gaseous compounds, and as, further, the latter elements, among themselves, form compounds, such as water and ammonia, which are also volatile, so the action of heat on organic compounds is characteristic; producing *combustion* of all, save the ashes, when there is free access of air; and *charring* them, or, in other words, causing the separation of part of their carbon, in close vessels, while the greater part is dissipated in the form of volatile products.

"Here, then, we have a ready test of organic matter, which is so characteristic, that we might almost define organic chemistry as the chemistry of such compounds as are charred when heated to redness in close vessels. There are very few substances, indeed, of organic origin, which do not exhibit this character.

"Organic chemistry has been defined as the chemistry of compound radicals; but, although we must admit the existence of many such radicals in organic chemistry, we cannot adopt this definition in contradistinction to that of inorganic chemistry, as the chemistry of simple radicals, because the recent progress of science has led, or almost compelled us to admit the existence of compound radicals in inorganic chemistry, as has been explained in the first part of this work.

"It is, perhaps, worth while to point out, that all the organic compound radicals hitherto established, or supposed to exist, are compounds of carbon, if we except amidogen (see p. 64), which contains only hydrogen and nitrogen.

"It is also proper here to state that, under the name of organic compounds, many substances are treated of which do not occur in nature, but which have been obtained by subjecting true organic products to various influences: to that, for example, of heat, as in what is called the destructive distillation, which yields such substances as naphtha, naphthaline, &c.; or to the action of chlorine or bromine, of sulphuric or nitric acids, of alkalies, &c., by all which means whole series of new compounds are obtained. Lastly, some very interesting and important compounds are included under the term organic, which arise from the addition of elements not naturally occurring in the organic kingdom; as, for example, kakodyle and its compounds, which contain arsenic as an essential constituent; and the very singular bases in which platinum is added to the usual elements of organic alkalies.

"But while, as has just been stated, compound radicals are not exclusively characteristic of organic chemistry, we may still derive great assistance from attending to the compound radicals of organic

chemistry. For while we admit the existence of such radicals in inorganic chemistry, along with simple radicals, we must bear in mind that all the organic radicals as yet discovered are compound, and many of them exceedingly complex, containing three or four elements.

"It is true that we are not yet acquainted with the radicals of a very large proportion of organic compounds; such as the principal organic acids, the organic alkalies, &c. But the known organic radicals furnish us with the means of classifying many most important substances, just as we classify the compounds of any metalloid or of any metal together. As to those groups or series of organic compounds, the radicals of which are not yet known, we can only class them according to analogies of properties, of composition, or of both." Vol. ii. pp. 239–242.

An Inquiry into the physiological and medicinal Properties of the Aconitum Napellus; to which are added Observations on several other Species of Aconitum. By Alexander Fleming, M. D., President of the Royal Medical Society of Edinburgh. Edinburgh, 1845. 1 vol. 8vo. pp. 160.

We have often thought it very remarkable, that in so uncertain a science as medicine admittedly is, such little trouble should be taken in ascertaining, by direct experiment, the relative value of the remedies that are in daily use amongst us. The majority of physicians, content with observations made by the older writers on Materia Medica, and which many of the modern authors, on the same subject, have servilely copied, continue blindly to prescribe medicines which have been over and over again shewn to be completely inert. Of this fact, the *extract of hemlock* of the London and Dublin Pharmacopœias is an excellent example. The active property of this valuable remedy is completely dissipated by the heat employed in evaporating the extract, so much so, as to render it completely inert;* nevertheless it is the preparation most commonly prescribed, and we have

* The following anecdote is related by Orfila, in the second volume of his *Toxicologie Generale*, "We were one day," says he, "in the shop of an apothecary who had several times furnished us with the extract of hemlock, which we had administered to dogs, to the dose of ten drachms, without causing any serious effect. We endeavoured to prove to him that the extract was badly prepared; and in order to convince him effectually, we swallowed, in the presence of several individuals, who were in the shop, a drachm of the same extract suspended in two drachms of water. It did not produce the least effect, while twenty or thirty grains, if properly prepared, would have most probably proved a fatal dose."

heard those who prescribe it frequently speak of the good effects which they imagine they have seen it produce.

We were led to make the foregoing remarks by a perusal of Dr. Fleming's valuable essay, which affords us another example of the neglect into which an energetic medical plant has fallen, owing, as the Author states in his preface,

"To the variable strength, and frequent entire inertness of the preparations commonly in use, and partly also to the fact of inert species having been substituted for it, as for instance, the Aconitum Paniculatum, which has been directed by the London and Dublin Colleges as the officinal species, and which is shewn in this inquiry to be destitute of medicinal properties."—p. viii.

The work of Dr. Fleming obtained the gold medal annually bestowed by the University of Edinburgh for the best inaugural dissertation of the candidates for the degree of Doctor of Medicine, in 1844; and is now published with the recommendation of the medical faculty of that University. As it contains numerous new and interesting facts with reference to the medicinal and physiological action of aconite, the truth of which is made manifest by direct experiment, we think we shall be rendering a service to our readers by giving them a concise analysis of its contents.

The first section is taken up with a short outline of the history, botany, and physical characters of the plant. The root, leaves, and seeds, all possess medicinal properties; but of these the root is by much the most active. It consists of a tapering root stock, and one or more pyriform tubers. The latter alone should be employed. As the tubers possess most activity immediately after the plant flowers, they should be then dug up, cut into thin slices, and dried slowly at a low temperature. The leaves are most active before, or during the flowering season.

The second section contains an account of the physiological action of aconite on animals and plants. In the lower animals it first produces weakness of the limbs and staggering, followed by accelerated, or slow and laborious breathing. Paralysis next ensues; the general sensibility of the surface being, at the same time, impaired; finally, death by *asphyxia* takes place, being preceded by blindness to a greater or less extent. After death, motion of the involuntary muscles, as of the heart and intestines, does not cease for some time, but the irritability of the voluntary muscles is impaired; venous congestion exists, venous blood being usually present in the left side of the heart, and in the aorta. In some instances, general convulsions, and even opisthotonos precede death, which, however, evidently depends on congestion of the brain. To the same cause the author ascribes the *contraction* of the pupil of the eye, which so generally occurs in poisoning with this plant, for in some cases, in which this was guarded against, *dilatation* was present, shewing that the latter is the direct or specific effect of aconite. The most characteristic symptom is *muscular paralysis*, the common sensibility being, at the same time, more or less impaired; a sedative action is also exerted on the heart. When introduced into the stomach of animals, the poisonous effects of aconite are often partially neutralized, rendering it probable that its action is interfered with by the gastric juice. Dr. Fleming's experiments differ from those of Orfila, inasmuch as he never found aconite produce an irritant action in any part to which it was applied.

The effects of monkshood and of its alkaloid, aconitina, are precisely similar.

Aconite is a direct sedative poison to vegetables.

The third section treats of the physiological action of aconite on man. Its topical action is that of a direct sedative to the nerves of sensation. When chewed, it produces an increased flow of saliva, and causes heat and tingling in the lips and tongue. If the tincture of the root, or the alkaloid, be rubbed briskly to the skin, intense heat and tingling in the part are felt, which is succeeded by numbness, and a sense of tightness or dragging. When applied to one of the temples, or one side of the forehead, more or less blindness of the same side is frequently produced. Its local action on the muscular system is also directly sedative. In no instance has Dr. Fleming seen its topical application give rise either to pain, redness, or swelling.

The action of aconite, or its alkaloid, on the eye, is somewhat peculiar. If the conjunctiva be slightly painted with the ointment of aconitina, *contraction* of the pupil speedily takes place, and continues for several hours; but if it, or the tincture of the root, be applied to the temple or forehead, the pupil occasionally becomes *dilated;* at the same time, however, partial blindness of the same eye takes place. The alcoholic extract, applied in the same way as belladonna, does not affect the pupil.

The author next describes the physiological effects of the drug when administered in small or medicinal doses, and as the facts narrated by him appear to have been most carefully observed, and offer much that is both novel and prac-

tically useful, we present them to our readers without condensation:

"*First Degree of Operation.*—In the course of twenty minutes or half an hour, after the exhibition of five minims of the tincture, a feeling of warmth in the stomach is usually experienced, which is occasionally accompanied by slight nausea, and oppression of the breathing. After the lapse of thirty or forty minutes this sense of warmth is diffused throughout the body, and, in a few minutes more, is attended by numbness,' tingling, and a sense of distention of the lips and tongue. There is also tingling at the tips of the fingers, and a peculiar sensation is felt at the roots of the teeth; the feeling of warmth soon disappears, but the numbness and tingling of the lips and fingers continue for a period varying from one to three hours. Slight muscular weakness is generally experienced, with indisposition for exertion, either mental or corporeal. In about half an hour more, the pulse is found to be diminished in strength; and in another hour both the pulse and the respiration have become less frequent. Thus, a pulse which, in the normal state, beats seventy-two in the minute, will by that time have fallen to about sixty-four, and the respirations, supposing them to have been eighteen, to fifteen or sixteen."

"*Second Degree of Operation.*—Should a dose of ten minims be given at first, or the first dose of five minims be succeeded in two hours by another of equal amount, these symptoms supervene more rapidly and with greater severity; the tingling extends along the arms, and the sensibility of the surface is more or less impaired. In an hour and a half the pulse will probably have fallen to about fifty-six beats in the minute, and become smaller and weaker than before, still maintaining, however, perfect regularity. The respirations will have diminished to about thirteen, presenting, at the same time, a slow, labouring character. Great muscular debility is now experienced; and giddiness, with confusion of sight, comes on when the erect posture is assumed. The individual sinks into a lethargic condition, evinces great disinclination to be disturbed, although he rarely falls asleep, and complains much of chilliness, particularly in the extremities, which are cold to the touch. These phenomena continue in their full intensity from three to five hours, when they gradually disappear, a sensation of languor, which lasts for several hours more, alone remaining."—pp. 22, 23.

Dr. Fleming recommends the physiological effects of aconite not to be carried to a greater extent than this, when it is employed medicinally, as the next degree of its operation is not unattended with danger.

"*Third Degree of Operation.*—On the administration of five minims more, two hours subsequent to the last dose, the sense of warmth and the numbness and tingling again spread rapidly over the body; the sensibility of the surface is still farther diminished; lancinating pains in the joints are occasionally complained of; the headach, vertigo, and dimness of vision are aggravated; the countenance grows pale and anxious; the muscular feebleness increases; the voice becomes weak, and the individual is frequently impressed with the dread of approaching dissolution. Occasionally the pulse is reduced still further in strength and frequency, perhaps falling to forty or even thirty-six beats per minute, but still maintaining its regularity; more frequently, however, it rises to seventy or eighty, and becomes small, weak, and probably more or less irregular; the respiratory movements are also irregular, being either short and hurried, or deep and sighing; the surface is moist, and still farther reduced in temperature. Sickness may now come on, and, if formerly present, is much aggravated, and probably attended by vomiting; these symptoms do not entirely subside for one or two days.

"*Fourth Degree of Operation.*—If the administration be carried further, the symptoms assume a more alarming character; the countenance becomes pale and sunken; froth issues from the mouth, and the prostration increases. Two patients thus affected stated that they felt as if dying from excessive loss of blood. Consciousness usually remains, or there may be slight wandering delirium, as occurs also after profuse hemorrhage. The voice is whispering, or is altogether lost. The pulse becomes still smaller, weaker, and more irregular, and the breathing more imperfect. The surface is colder than before, and is covered with a clammy sweat.

"When the action of the drug is carried to a fatal extent, the individual becomes entirely blind, deaf, and speechless. He either retains his consciousness to the last, or is affected with slight wandering delirium; the pupils are dilated; general muscular tremors, or even slight convulsions, supervene; the pulse becomes imperceptible both at the wrist and heart; the temperature of the surface sinks still lower than before; and at length, after a few hurried gasps, death by *syncope* takes place."—pp. 23, 24.

It is but justice to Dr. Fleming to state, that his means of observing the fourth stage of the operation of aconite on man were due to accident, and are derived from four instances in which an overdose was taken, through error on the part of the individuals or their attendants.

When aconite is administered as a remedial agent, our author recommends that a small dose should be at first given, which must be increased or repeated until the effects described in the second stage of its operation be produced.

We have next a detail of the effects of aconite on each system of organs individually. On the cerebro-spinal system, it acts as a *sedative* primarily, by a direct or specific action, when conveyed to it by the blood; and secondarily, by its sedative action on the circulation, as also by producing engorgement of the venous system of the brain and spinal cord, this engorgement, however, being never

produced unless when the drug is given in poisonous doses. Any slight hypnotic action which aconite may appear to possess, Dr. Fleming thinks is altogether due to its property of alleviating pain, an opinion with which we are disposed to coincide, inasmuch as we look upon this *indirect* hypnotic property possessed by aconite, conium, digitalis, tobacco, and the numerous vegetables whose active principle is hydrocyanic acid, as a distinguishing feature between *sedatives* and *narcotics*.

On the muscular system aconite acts as a direct and powerful sedative, the action, according to the dose, continuing for a period varying from a few hours to several days. From its effects, then, on the muscular and cerebro-spinal systems, Dr. Fleming deduces the following inferences:

"1. That it is calmative, anodyne, and antispasmodic.

"2. That it is an advisable antiphlogistic in apoplexy, phrenitis, or any disease in which the circulation of the brain is excited.

"3. That it is contra-indicated in headach arising from anæmia, or chlorosis, and wherever there is a torpid or paralytic condition of the muscular system.

"4. Its properties suggest its employment in convulsive or spasmodic diseases."—pp. 30, 31.

The first, third, and fourth of these inferences are, we think, correctly deducible from the premises; but we cannot possibly understand on what grounds Dr. Fleming can recommend as a remedy in apoplexy or phrenitis one which he has already shewn possesses the property of producing *engorgement of the venous system of the brain and spinal cord;* nor does he, in the chapter on the therapeutical employment of the drug, or in the appendix of cases in which it has been used, narrate a single instance in which it has been administered in a disease bearing any resemblance to those mentioned in his second inference.

On the vascular system aconite acts as a *direct sedative*, the strength and volume of the pulse being more or less reduced, as also, in the first instance, the frequency of the beats; but when the action is carried farther, the pulsations become more rapid, being at the same time irregular and intermittent. If only two or three doses have been given, their effect lasts for a period varying from twelve to twenty-four hours; but when it has been employed as a remedy for a week or more, several days elapse before the heart recovers itself. The effect which change of posture produces on individuals under the influence of aconite resembles that which occurs where digitalis has been administered; consequently, patients when taking it should be cautioned against any sudden change of position.

From the effects of this drug on the circulation, Dr. Fleming deduces the following practical inferences:

"1. That it is a powerful antiphlogistic.

"2. That it is calculated to be of great value in all cases where there is inordinate activity of the circulation.

"3. That it is contra-indicated when there is obvious mechanical impediment to the passage of the blood, particularly through the heart or lungs.

"5. That it is contra-indicated whenever there is irritability of the circulation, with great diminution of power, such as occurs after severe hæmorrhage."—pp. 36, 37.

On the respiratory system aconite also acts as a *sedative*, the number of respirations being diminished. This effect, we think, is altogether due to its action on the nervous and circulatory systems; we cannot, therefore, agree with Dr. Fleming in drawing distinct practical inferences with reference to the treatment of diseases of the lungs from the action of the drug.

On the alimentary canal the only effect it produces is that, occasionally, of slight nausea.

Any action it exerts on the secerning system, our author is of opinion must be attributed to its sedative effects on the vascular and nervous systems.

In only two instances has Dr. Fleming seen the least evidence to lead him to imagine that aconite is a cumulative remedy.

We have next an account of the effects of aconite in large and poisonous doses, from which it would appear that it is a *directly sedative* poison, producing death in three forms: first, by a powerfully sedative impression on the nervous system; second, by suspension of the respiratory function; and third, by syncope. The latter was the mode of death in all the well-authenticated cases of poisoning in man, in which the fatal result was generally protracted for some hours.

With reference to the *modus operandi* of aconite, Dr. Fleming is of opinion that it acts solely by direct transmission with the blood to the part affected.

In cases of poisoning with aconite, the author, in addition to the usual means employed, suggests the employment of an infusion of the stomach of the rabbit, as in some of his experiments the gastric juice of this animal appeared to have some influence in neutralizing the poison. Tannic acid, also,

from its power of forming insoluble compounds with the vegetable alkaloids, may be expected to be useful.

The fourth section contains an account of the therapeutic action of aconite. Its effects are, as a sedative of the nervous system, *anodyne*, *anti-neuralgic*, *calmative*, and *anti-spasmodic*; as a sedative of the circulation, *antiphlogistic*.

In *neuralgia* it has been employed with much success. In a table drawn up by Dr. Fleming, of the various published cases in which it has been used, as well as of those occurring in his own practice, the average duration of treatment was *six days*. But, like all other remedies in this disease, it sometimes fails even to afford relief. The cases in which our author thinks it will afford most benefit are those which are purely dynamic, or of inflammatory origin.

The good effects of the topical application of aconitina in *tic douloureux*, observed by Dr. Turnbull, are confirmed by our author's experience in three cases; in a fourth it only afforded slight temporary relief. In *toothach* the tincture rubbed to the gums, or dropped into the carious tooth, seldom failed to afford relief. A drop or two of the tincture, diluted with an equal quantity of water, introduced into the external meatus, was also found useful in *earach*. In the *neuralgic* affections of the thoracic and intercostal nerves, and in those of the extremities, the external application of the tincture proved very successful; and in twelve cases of *sciatica*, in which it was used by Dr. Fleming, seven complete, and two temporary cures were effected. In *cephalalgia* the author administered aconite internally in fifteen cases, and in ten of these with complete success. Of these three were cases of nervous, four of plethoric, and three of rheumatic headach. Of the five in which it did no good, three were nervous and two dyspeptic. In the severe muscular and arthritic pains of the epidemic fever of Edinburgh, in 1843–44, Dr. Fleming applied the tincture externally, in several cases, with decided benefit.

According to the author's experience *in diseases of the heart, and aneurism of the large vessels*, where the indication is to diminish the action of the heart, aconite is a most valuable remedy.

Dr. Fleming next gives an analysis of the published cases of *acute rheumatism* treated by aconite; as also those which came under his own notice. From this it would appear that the average period required to effect a cure with aconite, is five to six days, and that some alleviation of the pain is occasionally experienced in the course of an hour

after the first dose has been taken. The result of those cases also shews that affection of the heart does not occur in this disease when treated by aconite. Our author is of opinion that the beneficial effects of this remedy, in the cure of acute rheumatism, are due to its *anodyne* and *antiphlogistic* powers, and does not agree with Dr. Lombard in thinking that its action is specific. From Dr. Fleming's account, aconite does not appear to be near as successful in the treatment of *chronic* as of *acute rheumatism*, particularly when the disease affects the smaller joints. Our own experience would lead us to place much more reliance on the employment of conium in this malady, which we have seldom seen fail in effecting a cure of this usually intractable disease, even in its most chronic and aggravated character, when partial disorganization of the structure of the joints has taken place.

In *lumbago* aconite seems to be a most useful remedy, decided relief of the pain in the back being often obtained in the course of an hour after it was administered. It was usually employed both externally and internally.

The author also employed it in several other diseases with much advantage, the names of some of which only will our want of space permit us to enumerate; viz., *erysipelas*, *pruritus*, *chilblains*, *hysteria*, *spasmodic asthma*, &c.

The fifth section contains an account of the mode of administering aconite. As a high temperature completely destroys the active properties of the drug, and as the expressed juice contains only a portion of them, the two following preparations are recommended for use by Dr. Fleming:

"*Tinctura Aconiti.*—Take of the root (*conium?*) of A. Napellus, carefully dried and finely powdered, sixteen ounces, Troy; rectified spirit, sixteen fluid ounces; macerate for four days, then pack into a percolator; add rectified spirit until twenty-four ounces of tincture are obtained.

"It is beautifully transparent, of the colour of sherry wine, and the taste is slightly bitter.

"*Extractum Alcoholicum Aconiti.*—This is prepared by distilling, at a low temperature, the spirit from the tincture, until the consistence of an extract has been obtained. The process should be completed in a vapour bath.

"Its colour is dark brown, or almost black. It has an agreeable smell and bitter taste. The dose is one-third of a grain thrice daily, commencing with one-sixth of a grain."—p. 80.

Dr. Fleming prefers the tincture for internal use; its dose, as an *anodyne, antineuralgic, and calmative*, is five

minims three times daily, increased by one minim daily, until the effects described under the second degree of operation are produced. As an *antiphlogistic* the first dose of five minims ought to be repeated in four hours, and the sedative action sustained by a dose of two and a half minims every third or fourth hour, according to circumstances; the patient being seen, and the pulse examined, before the exhibition of each dose. In diseases of the heart three or four minims five times daily may be given. For external use, *aconitina*, if it can be had pure, is to be preferred. The following is Dr. Fleming's formula for the ointment:

"℞ Aconitinæ gr. xvi.; Spiritus Rectificati m. xvi., tere optime; deinde adde Axungiæ ʒi.; ut fiat unguentum."

Aconitina, however, owing to its high price, is seldom to be had pure; a circumstance which our author justly thinks accounts for the low estimation in which it is held by many who have tried it; and which, we are of opinion, will also account for the fallacy of some recently published experiments, with reference to the physiological properties of the drug. The tincture fortunately proves an excellent substitute for the alkaloid.

The sixth and last section is taken up with Dr. Fleming's experiments on the activity of different species of the genus Aconitina, the result of which proves that the various species contained in the section Napellus are the most active; while those contained in the section Leammarum, which includes the *Paniculatum* (the officinal species of the London and Dublin Pharmacopœias), are perfectly inert.

The author has added three appendices to his essay; the first of which contains the experiments performed by him, illustrative of the physiological action of the Aconitina Napellus on animals; the second its physiological and therapeutic action on man; and the third, the recorded cases of poisoning with monkshood.

We cannot conclude this analysis of Dr. Fleming's essay without expressing the very high opinion we entertain of the talent and judgment of the author, in executing the difficult task of ascertaining, by direct experiment, the proper value of a medicine long in use. We look upon his inquiry as a most valuable contribution to that important, though strangely neglected, branch of practical medicine—therapeutics; and we think it adds much to the deservedly high reputation of the University which bestowed on him its gold medal.

SCIENTIFIC INTELLIGENCE.

The late Dr. Whitley Stokes.—Dr. Whitley Stokes was born in the year 1763. His father, who had been a Fellow of Trinity College, had retired on a College living, and was Chancellor of the Cathedral and Master of the Endowed School of Waterford, to which his character as an accomplished scholar gave a high reputation, and was fully justified by the number of eminent men educated there, amongst whom was his son. At an early age Dr. Stokes entered the University, where his undergraduate career was highly distinguished, as much by his industry and talents as by enthusiasm in the investigation of physical science; and at an early age he obtained a fellowship, under circumstances highly characteristic of his energetic mind. He had, for some months previous to the examination, been labouring under illness, brought on, in a great measure, by the severity of his study, and when the day of trial came he was so ill and weak that his friends considered it impossible that he could undergo the necessary exertion. However, his fixity of purpose could not be shaken, nor would he allow what he deemed the certain reward of his exertions to be snatched from him by any light cause, and on the morning of the examination he was carried into the hall, and to the astonishment of all, proved by his answering that, though the body was exhausted, the mind was unimpaired; and, to the joy of his friends, he was declared the successful candidate. Having attained this grand object of his ambition, he did not lapse into a merely indolent performance of his college duties—he seemed to regard what many deem the goal, as only the starting point of life, whence he was to proceed in a career of active prosecution of those pursuits which were to confer, not benefit on himself or his family, but on literature, science, and the best interests of mankind. Indeed, from this period till a few years before his death, his life was one continued exertion; and under constant opposition, which seemed but to stimulate and exalt his energies, his mind was unweariedly devoted to whatever pursuit he thought best fitted to ameliorate the condition of his fellow-men, and especially his countrymen. "Whatsoever was lovely, whatsoever of good report, if there was any virtue or any praise," to these things only were his thoughts directed. It might be he was mistaken—it might be his mind was too far in advance of the intelligence of the age, or that his generous and exalted soul trusted too much to the honesty of mankind—but still we have abundant cause to admire the purity of his intentions, the nobleness of his ends, and the unselfish steadiness with which he pursued his career.

Having accepted a lay fellowship which was fortunately then vacant, he shortly after took his degree in medicine; to which profession all his tastes and feelings directed him; its elementary studies were eminently suited to one of his inquiring mind, embracing as they did the most interesting branches of natural philosophy and natural history; and to the latter especially were his energies, during his whole life, directed. It also gave a free scope to his philanthropy, as in it he could actively engage in a continual succession of benevolent actions, and directly aid his fellow-men.

In the year 1793, he visited Edinburgh, then the first school of physic in Europe, where he took his degree of Doctor of Medicine. During his stay there he was, as might have been expected, a most enthusiastic student, and laid down the plan of a Botanic Garden for his native city, on the model of that in the Scottish capital. We have seen a letter addressed by him to the late Bishop of Ferns, who was then actively engaged in the attempt to get the Garden established, and learn from it that Dr. Stokes's plans were pretty closely followed in the beautiful garden which is now one of the greatest ornaments of this city, and not surpassed in Europe for the variety and arrangement of its specimens. This was, we believe, the first benefit he conferred upon Dublin, and we conceive that the originator of the Botanic Garden of the University, if he had done nothing more, deserves our gratitude for the pleasure and advantage thereby afforded us.

"To visit the fatherless and widows in their affliction" is one great object of Christian practice, and we feel convinced that in the choice of his profession Dr. Stokes was strongly actuated by this precept; and never was a profession adopted with nobler aims or from purer motives, which were enduringly acted on throughout a long life. Even when engaged in the most active and soul-absorbing pursuits, he still had his advice and assistance ready at the call of poverty and sickness; he was enthusiastic in his zeal to alleviate distress or abate the pangs of want and wretchedness, and many could now testify to his tenderness in watching beside a sick bed "where lonely want retired to die," and where his footsteps would bring comfort and ease; and oftentimes when the sufferers were restored to health by his means, he placed them in a position to earn a subsistence. Many remember occasions when he volunteered his aid in staying those periodical ravages of pestilence which have so often visited our city, and though he was a firm believer in the contagious nature of fever, his fears of infection never interfered with his duties as a physician.

This recalls to our recollection two periods in which the character of this brave and wise man was truly shewn. We allude to the two great epidemics of fever which visited Ireland—during both of which he was foremost in the advocacy of every measure which could stay the pestilence, or alleviate suffering. Active, untiring, bold, he threw himself into the front of the battle, devoting his time, his knowledge, and his purse, to meet the exigencies of the period. He urged on Government the establishment of district hospitals. He pointed out how the sick might be separated; how their dwellings and clothing might

be purified; and laboured night and day in the great work of charity, enlightened and inspired by science.

When the great fever of 1827 and 1828 broke out, such was the pressure of the epidemic that whole families were often carried to the hospitals, and carts laden with the sick and dying arrived hourly from different parts of the country, their drivers so terrified by the ravages of the fever, that hastily throwing down their burdens on the lawn of the hospital, they fled from the scene of pestilence and death; and single patients were frequently brought in wheel-barrows, and overturned at the entrance; the whole resembling what has been recorded of the plagues of the middle ages—but with this difference, that here the sufferers knew that science and philanthropy awaited them.

The hospitals of Dublin being quite inadequate to the accommodation of the sick, temporary houses, covered with canvass, and tents, were erected in various situations; and in the Meath Hospital alone the number of beds was upwards of three hundred, the care of which was divided among four physicians, of which the subject of this memoir, and Dr. Graves, now President of the College of Physicians, were the principal.

Here might Dr. Stokes be seen, then in his sixty-fourth year, at all hours, early and late, labouring in the incessant care of the sick—prescribing, administering, directing, advising; giving hope to the desponding, and, where hope had fled, smoothing the bed of death itself.

Dr. Stokes filled, successively, the chairs of the Practice of Medicine in the School of Physic, and in that of the Royal College of Surgeons in Ireland. As a lecturer, he was distinguished for the originality of his views, the depth of his researches, and the energy and eloquence of his address.

On his resignation of his fellowship he was appointed Lecturer on Natural History, and during the period he held this professorship, he gave many courses of lectures on the different branches of this interesting study, in which he not only introduced subjects treated of in the University by him for the first time, but put forward many and original views on various topics connected with the natural sciences. He was the first teacher in Dublin of the modern theories of geology and mineralogy, and it was under his direction that the present Museum of Mineralogy in Trinity College was arranged, and many of the most interesting specimens were contributed by him, especially those which served to elucidate the mineral resources of Ireland. He was also the first to put forward the modern theory of meteors being either fragments of a former planet, or small planetary bodies revolving round the sun, with orbits crossing that of the earth, and which being consequently occasionally brought within the sphere of the earth's attraction, give rise to those showers of meteoric stones, which are now admitted to have fallen from the air on various occasions. This subject he treated fully in a lecture delivered many years since, and he contrasted the different popular opinions relative to shooting stars being produced in the atmosphere, or sent out of the volcanoes in the moon, refuting those opinions by arguments, the truth of which recent

discoveries have fully proved, and which are now generally adopted by the philosophic world. He also delivered many courses of lectures on the volcanic theory of the earth, and put forward what is now considered the established theory, though then received, as all new views are, with ridicule or contempt; and he was the first to introduce, in common with the distinguished Dr. Macartney, those views of comparative anatomy brought to perfection by Cuvier. It was to forward the study of natural history in this country that he determined on the formation of the Zoological Society of Dublin; and to assist in this object, he visited Paris and London, to make himself practically acquainted with the system pursued in the Jardin du Roi and the Zoological Society of London. During his visit to the former city he made the acquaintance and friendship of Cuvier and Brongniart.—*Portrait Gallery of the University Magazine for August*, 1845.

PROCEEDINGS OF THE ROYAL ACADEMY OF MEDICINE, PARIS.*

[Communicated by Dr. J. O. Curran.]

Contagion of Typhoid Fever, &c.—At the sitting of the 20th, the report of a commission appointed to examine the Memoir of M. Patry, on the Contagion of Typhoid Fever, was read to the Academy, and gave rise to some discussion. As the non-contagious nature of typhoid fever is one of the facts dwelt on by those who endeavour to establish typhus and typhoid fevers as distinct diseases, rather than varieties of the same disease, modified by temperament, habit, &c., we shall furnish our readers with an abstract of what was advanced on this interesting and important subject.

M. Patry looks on typhoid fever as *contagious*, and supports this opinion by a great number of cases observed in the district where he practises. Besides this view is, as stated by M. Bricheteau (who read the Report), almost unanimously entertained by the practitioners in rural districts. Some persons have looked on the difference between the disease in the city and country as only apparent, and arising from the circumstance that it is almost impossible to trace the source of contagion in Paris, whilst in small towns, and in the country, it can be done with facility. M. Bricheteau thought that there was another reason why contagion, or rather infection, took place more evidently in the country than in large cities, viz., that in the country diseases of all kinds generally acquire greater intensity from the want of proper care, neglect of cleanliness, and inattention to other hygienic means; that whilst, undoubtedly, in great cities misery and over-crowding are abundantly to be met with, the sick there receive attention at an earlier period, and assistance is afforded with more skill and judiciousness.

* The reports of the proceedings of the Academy of Medicine are taken from the Paris *Presse* and *Gazette Medicale*, principally from the latter.

In fine, the reporter looked on the facts adduced by M. Patry as proving most conclusively that typhoid fever is contagious and infectious in villages and in the country. If in large towns it is not so, or is so only to a limited extent, this ought to be attributed solely to the fact, that aid is there more promptly afforded and better applied; whilst the means adapted to the preservation of health are much more strictly attended to.

M. Moreau.—"I perfectly agree with the author of the memoir which has just been read, but I differ from the reporter as to contagion and infection, which he makes indifferently to play the same part. I believe, that in small places it is not merely by infection, as M. Bricheteau seems to suppose, but by true contagion, that the disease is propagated; typhoid fever is there contagious *per se*. The following instance puts this beyond doubt. A farmer, in the environs of Paris, residing in a healthy locality, occupying a spacious and well aired house, and living in easy circumstances, had a daughter, twenty-one years of age, who was suddenly seized with typhoid fever, which carried her off on the twenty-first day of her illness, although she was surrounded with every comfort, and had the advantage of the best advice. She was waited on by her mother, who never left her bedside for a single instant. One of her brothers, twenty-four years of age, robust, and extremely healthy, who occupied a farm at a considerable distance from his father's, visited his sister several times; the evening of her death he spent the entire day by her side, and did not leave her until he had paid her the last sad duties of affection. Returning to his own house he was immediately seized with typhoid fever, and expired on the eighth day. His mother, who had hastened to bestow on him the attention which she had rendered to his sister, was attacked in turn, and died in four days. These three patients were attended by a highly educated physician, and were seen by M. Chomel and myself. Here, evidently, there was contagion and not infection; for the house occupied by this family was very large, well aired, and healthy; and, I must repeat, every possible attention was given to cleanliness, and every thing had the air of ease and plenty."

M. Bricheteau.—"M. Moreau and I are of exactly the same opinion. I have not said that the transmission of typhoid fever is exclusively due to infection: I know that there are cases where it is evidently propagated by contagion."

M. Rochoux.—"The diseases of large and small towns have been spoken of as if the character of the disease varied with the population of the place at which it occurred. It should first be shewn, that the disease of Paris is not the same thing in the country; this would be equal to saying, that the sun which illumines Paris is not the same as shines on the departments. If it be really proved that the typhoid fever which is the subject of this memoir is contagious, then it is evidently not the same disease as the typhoid fever of Paris; for there is no physician present, not even M. Bricheteau himself, who can quote a single case of contagion of the latter disease

which has been met with during the last twenty-five or thirty years. [Denials from several members.] The typhus of 1814 was contagious: did attention to cleanliness and ventilation then confer immunity? By no means. That disease has not since made its appearance, whilst typhoid fever has never ceased to prevail; and I repeat the assertion, that I defy any individual to adduce a single well authenticated case of typhoid fever propagated by contagion since the epoch I have mentioned. Diseases totally distinct have, evidently, been confounded together; the fever which has been spoken of as prevailing in the departments is typhus, and not dotynenterite; I seek no other proof of this than the statement of M. Bricheteau himself, when he attributes the development of the disease to uncleanliness and inattention to hygienic means in small places, whilst every body knows that these causes are insufficient to give rise to dotynenterite."

M. Bricheteau.—"The disease which is the subject of the memoir is most accurately described, and the symptoms are exactly those of our typhoid fever. M. Rochoux asserts, that there exists no case of contagion at Paris; he is mistaken, there are such cases, and I have met with them myself. M. Delaroque's memoir contains many incontestible examples. Besides, it is well known that a disease may become contagious or non-contagious, according to circumstances, without thereby changing its nature."

M. Collineau.—"I have seen typhoid fever both in Paris and in the country; it is the same disease in both places. Notwithstanding, I must say, that contagion appeared to me to be evident in the country, whilst in Paris I never met with an instance of it. The opinion of practitioners out of Paris is almost unanimous on this subject."

M. Castel.—"We shall never understand one another on this subject, so long as we take contagion in an absolute sense. Contagion is only a relative existence. There is no disease of which we can assert, that it is always, or that it is never contagious. Contagion is, in fact, an accessory phenomenon. As to the distinction which it has been attempted to establish, between diseases which spread by infection and those which are propagated by contagion, I should wish to see the phrase banished from medical nomenclature. Does not infection take place whenever there is contagion? The only difference that I can see is, that in what is called contagion transmission takes place from one individual to another, whilst in infection it takes place from some focus to the individual. It is folly to make of this two modes of transmission. It is to varying shades and degrees of the disease, that we must attribute the facility or difficulty of its transmission.

"Uncleanliness and neglect of hygienic precautions, doubtless, exercise a powerful influence on contagion; but a still more powerful influence is exerted by climate and by the seasons. A disease which one season is not at all contagious may be so the next; and a disease which is not contagious in France may be so in Spain."

M. Rochoux.—"It is too evident that we hold different opinions. For my part, I look on contagion as an essential character of a disease. Variola, syphilis, and glanders cease to be such when stripped of their character of contagion."

The report was then adopted, when M. Gaultier de Claubry gave notice of his intention to bring the question again before the Academy, as the subject of a special memoir, which he would lay before them at a future sitting.

In connexion with the opinions of the Parisian academicians, on the interesting and important subject of the contagion of typhoid fever, we shall now lay before our readers an abstract and analysis of a description of a recent epidemic of that disease affecting the troops in garrison at Stockholm, from the pen of the learned Professor of Clinical Medicine in that city.

Observations sur la Fièvre Typhoïde qui a régné pendant les Mois de Décembre, 1841, *et de Janvier*, 1842, *dans la Caserne du Corps de Gendarmerie de la Ville de Stockholm; par* Magnus Huss, Professeur de Clinique Médicale à l'Ecole de Médicine de Stockholm.*—The corps in which the epidemic made its appearance had been remarkably healthy for the five previous years, and occupied its usual quarters, which are very damp, especially in winter. The men are lodged in large and spacious wards, fourteen feet high, in each of which forty-four persons sleep, two in a bed. The food and clothing are of the best description. The duty, to which all are liable, consists in mounting guard every alternate night, from ten P. M. until four A. M. For two months previous to the breaking out of the epidemic, the men were in the habit of returning to their quarters almost every morning drenched to the skin, and their wet clothes were then hung up to dry in the room in which they slept. The atmosphere was thus loaded with moisture, and fresh air was admitted as sparingly as possible, in order that the temperature might be maintained sufficiently high to dry the wet clothes. The combined influence of the humidity of the atmosphere and the exhalations of the men, applied to the external surface of the body, and carried into the lungs in respiration, is looked on by the Professor as the exciting cause of the disease, which made its appearance on the 17th December, reached its acmè of intensity on the 24th of the same month, and ceased on the 29th of January, after having lasted five weeks.

As usual in epidemics, the symptoms were more or less severe as the disease was increasing or diminishing.

The *age* of the patients ranged from 19 to 52:—23 were under 25 years;—20 from 25 to 30;—12 from 30 to 35;—6 from 25 to 40;—and 3 from 40 to 53.

Of 64 persons attacked by the disease 62 recovered.

Professor Huss divides his cases into categories, as follows:

A. Cases with predominance of cerebral symptoms. (*Twenty-two cases*).

* Gazette Médicale de Paris, Nos. 15 to 26, inclusive.

B. Cases with abdominal symptoms. (*Twelve cases*).

C. Cases presenting both abdominal and cerebral symptoms. (*Thirty cases*).

The premonitory symptoms, which were seldom entirely absent, were prostration, anorexia, dizziness, pains in the head or small of the back, with occasional chills and troubled sleep, during an average period of three days. In classes A. and C. epistaxis now and then occurred; and in B. and C. diarrhœa, nausea, or colic, was sometimes met with during the period of incubation.

The invasion of the disease was marked by rigors, occurring one or more times every twenty-four hours, and lasting from a few moments to several days. Increased prostration, diarrhœa, or nausea, were, however, sometimes the only indications. In this stage the symptoms were less severe in the second category than in the first; and in class C the disease was occasionally ushered in by violent vomiting, fainting fits, or splitting pains in the head, without any premonitory symptoms.

After the invasion of the disease, the symptoms were in all divisible into two stages.

A. Cases with cerebral Symptoms.—a. Chill, followed by heat of skin, supra-orbital headach and throbbing, generally persistent. Face swollen: cheeks more or less lurid red; eyes brilliant, injected, pupils rarely dilated; nocturnal delirium, often violent, generally preceded by insomnia and vertigo, appearing at no fixed epoch; epistaxis in some cases, generally slight, not critical, but sometimes relieving delirium, rarely endangering life by its profuseness; blood dark, and imperfectly coagulating.

Ringing in ears, hearing rarely exalted. Pulse ranging from 88 to 112, usually 100: as this period approaches its close, sounds of heart enfeebled, *particularly the first*. Blood not buffed, and clot of diminished consistence.

Tongue at first moist, and gradually becoming dry and hard; papillæ enlarged; centre covered with brown, dark coloured fur; breath heavy and offensive; thirst variable; abdomen soft and flat, without pain on pressure; bowels generally constipated.

Respiration 30 or 40. Congestion of bronchi or lungs, in one-fifth. Skin hot, usually dry, and always presenting an eruption (*érythème typhoïde*), consisting of reddish spots, of irregular form, and varying in magnitude from a minute dot to the size of a bean, disappearing momentarily on pressure, more or less abundant on chest and shoulders, very rarely seen on face or abdomen, bright red at their first appearance, which is usually on the third or fourth day, and gradually becoming darker, ordinarily unimportant, but, in severe cases, frequently blueish, or violet blue. Urine acid, sometimes quite clear, but generally brown or reddish brown; occasionally, incontinence or retention.

b. After these symptoms had lasted for a period varying from five to nine days, the second stage came on insensibly, and in two or three days was fully established. The patient became more tranquil, and

was unwilling to be disturbed, lying constantly on the back, and frequently talking to himself. In three or four days more muttering delirum, or more or less of stupor, set in, the expression of the features became changed, the face was shrunk, there was redness of one or both cheeks, a deep sulcus formed from the angle of the mouth leading towards the chin, and the eyes became heavy and dull.

Epistaxis rare; more or less of deafness in one-third of the cases; pupil contracted in but one instance. Tongue cleaner, but hard, dry, fissured, and rough as a rasp; sordes on teeth and gums not infrequent; thirst inextinguishable, with desire for cold water.

Belly soft, and free from pain; constipation.

The pulse, on the fifth day, usually began to become smaller, feebler, and more rapid. After the seventh it generally averaged 110 or 112, in a few cases being small, thready, and unequal, and 128, or 130, or even inappreciable from subsultus tendinum; at the same time the *first sound of the heart became fainter or altogether inaudible*.

Chest not much affected, but cough, without expectoration, and signs of congestion frequent.

The maculæ rarely disappeared at this stage, but were undergoing the change before alluded to, and the skin was generally hot, dry, and pungent, never above 104° F. Eschars occurred in $\frac{3}{11}$, but were without influence on the disease.

Urine voided acid, but rapidly becoming ammoniacal; clear, clouded, or letting fall a deposit; involuntary micturition in $\frac{4}{11}$, retention in $\frac{1}{9}$.

Convalescence commenced, in ten cases, by well-marked *crisis*; in two by indistinct crisis; in eight by lysis; and two terminated fatally.

Crisis took place between the ninth and fourteenth day of the disease—*by sleep* (lasting from thirty-six to forty-eight hours) in two; by *transpiration*, two; *sleep and transpiration*, two; *urination*, one; *perspiration and urination*, one; and, in one case, by all these combined.

Health and strength were completely re-established in from fourteen to fifteen days, after convalescence was fairly commenced.

Of the two deaths, one took place on the fifth day, when the heart was found softened, the blood decomposed, the spleen broken down (*en bouillie*), and Peyer's glands enlarged but not ulcerated.

In the other fatal case convalescence had manifestly commenced on the thirteenth day, and was going on rapidly. On the fifteenth day of his illness the patient went alone to the water-closet, where he fainted, and lay for near an hour in a state of nudity, before his absence was remarked. Pneumonia was the consequence, and he died on the seventeenth day. In addition to the appearances in the lungs, a very firm coagulum was found occupying the right cavities of the heart; the spleen was softened, and the only traces of disease in the intestines was a blueish grey colour of Peyer's glands, "and some of the orifices of their ducts evidently enlarged."

B. Cases with Predominance of abdominal Symptoms. —(*Twelve Cases.*)—*a.* After the rigors indicating *invasion*—sensation of intolerable weight in the forehead, with dizziness on motion; countenance at first only expressive of feebleness, with dulness of eye and slight injection of the sclerotic; soon expression is entirely lost, and the features assume an aspect of indifference quite peculiar; pupils occasionally dilated, never contracted; hearing more or less impaired (in seven); intelligence intact, but replies given with slowness and hesitation; conversation apparently disagreeable; somnolency, or sleeplessness, vertigo on attempting to sleep; memory very imperfect or wanting.

Towards the end of this first period nocturnal delirium began to shew itself in the evening, then at night; patient talks to himself, grasps at imaginary objects, his strength gradually fails, and at length he is motionless in his bed. In three cases severe epistaxis; pulse from 80 to 108, usually 100; full, equal, and soft at first, afterwards feeble; sounds of heart normal, becoming feeble; blood (from two patients) dark coloured, coagulum imperfect.

Tongue at first flesh-red, fissured, and with enlarged papillæ in eight; thickly coated in centre in four; dry, glistening, and trembling, in four; breath fœtid; taste depraved; thirst intense; abdomen soft, flaccid, or swollen; ilio-cœcal tenderness on pressure in seven; ilio-cœcal gargouillement in all; in all, from three to ten alvine evacuations daily, semi-fluid, brownish yellow, or yellowish green, of different shades, and cadaveric odour; often, in the advanced stages, passed involuntarily.

Eruption less general than in class A, never blueish, in two cases complicated with purpura, the spots of which were not altered by pressure; urine, &c., natural.

b. The second stage took place a little later than in the first category, and was ushered in in the same manner; but the prostration was more profound, and when fully established the patient lay on his back, with his knees drawn up, and his mouth open, generally low down in the bed.

Where hearing in the previous stage had been impaired, it continued so, and in two cases there was absolute deafness. In one instance the pupils were largely dilated, natural in the rest; in two the corneæ ulcerated from being constantly exposed. The pulse varied from 60 to 130, generally equal; in two cases intermittent, feeble, and sometimes inappreciable from subsultus tendinum. *Sounds of the heart at first feeble; then first sound the same as the second; and gradually becoming feebler until the second alone was audible.*

The tongue was in general more fissured, drier, and harder than in *a*; and the tongue, teeth, and lips were often covered with dark, tenacious sordes; the tongue could not be protruded, only quivering a little when the patient attempted to thrust it out; lower jaw also occasionally affected with trembling. Meteorism of abdomen in two cases on 14th day; abdomen flaccid, with gargouillement, on pressure in right iliac fossa; in all the rest diarrhœa continued with more or less intensity; stools generally involuntary. Skin dry, harsh, and ardent. Where maculæ had existed gradually fading away, without change of tint. Bed-sores occurred in three cases where there had been no attempt at crisis, and in one they were very severe.

In all the cases of muttering delirium there was involuntary micturition; in two, where stupor was intense, retention.

Convalescence by distinct crisis, five; imperfect crisis, two lysis, five. Of the crisis one was by sleep (of thirty-six hours' duration), on the ninth day; two by transpiration on the eleventh and fourteenth days respectively; one by sleep and transpiration on the eleventh day; and one by urination on the fourteenth day. Of the two doubtful cases, one had suppuration of the inguinal lymphatic glands, and the other enlargement of the parotid, when gradual amendment began to take place. Where the first sound of the heart had become inaudible, as convalescence went on, the first sound was again heard, at first faintly, then similar to the second; and it gradually recovered its normal rythm with the inverse series of phenomena which preceded its disappearance.

It was chiefly in cases of convalescence without crisis, that the diarrhœa persisted after the other symptoms began to disappear. Convalescence generally lasted from three to four weeks.

C. Combination of cerebral and abdominal Symptoms.—(*Thirty Cases*).—With the exception of one case, which presented the same characters up to the period of crisis, two stages in the development of the symptoms were here also observable.

a. The symptoms of invasion were invariably followed by supra-orbital headach, throbbing in the temples, and weight in the eyes; face flushed and swollen; eyes glistening; sclerotic slightly injected; photophobia in but one case. In three or four days nocturnal delirium gradually came on, and in a few there was the continuance of a slighter delirium during the day. Somnolence rare, insomnia common; hearing perfect; tinnitus aurium frequent. Pulse full, and invariably soft, ranging from 80 to 100, becoming feebler, and more frequent. Heart, tongue, &c., as in B. Diarrhœa in the majority, constipation in some; in which case the cerebral symptoms were more intense. Bronchial and pulmonary congestion in four. Skin generally dry and hot, but sometimes moist and soft. Maculæ reddish-brown, or brown, never blueish, not very abundant, but always present; purpura rather rare. Temperature of the epigastrium from 93 to 100, F.

β. Between the fifth and sixth day the delirium became mild, continuous, and mere grumbling (*marotement*); the face got thinner, paler, and had an expression of extreme indifference, the patient always answering that he was "very well." In some there was sopor: pupils often a little dilated. In nine cases hearing more or less impaired; dorsal decubitus almost invariable; and a strong tendency manifested to glide down in the bed. Pulse 100 to 112, soon becoming thready. Some alteration of the sounds of heart, as before noted: first sound totally absent in but two cases. Tongue dry and

hard, more frequently not incrusted, and in some cases soft and flesh-red all through; occasionally tremulous, more or less swollen, rarely pointed. Breath heavy, and often very offensive. Abdomen soft, never retracted; ilio-cœcal gargouillement frequent; diarrhœa variable. In some cases of muttering delirium, involuntary stools. Eruption gradually disappears; but sometimes marks remain during convalescence. In one case cough continued until after convalescence was fully established. Convalescence occurred at the same period as mentioned under A. and B. In fourteen there was distinct crisis; in three, where there was either suppuration or serious congestion of the lungs, crisis was doubtful. In the remaining thirteen, the symptoms, after fluctuating for two or three days, gradually and steadily subsided, and convalescence was complete. One of the most decided indications of amendment was the patient's turning on one side, or remaining in that position when so placed.

Crisis occurred in three cases by sleep; in two by sleep and transpiration; in three by transpiration alone; in three by transpiration and in one by sleep and urination. The critical period was from the eleventh to the fourteenth day, or even a little later. The same remarks apply to the heart, &c. as under B.

D. Exceptional Cases.—There were a few cases which are not included in the foregoing descriptions, being, in fact, instances of the disease cut short by prompt and appropriate treatment. Three such cases commenced exactly as the preceding; all were maculated, and one presented spots of purpura, yet after a bleeding, or the exhibition of an emetic, the patient got quite well on the third or fourth day.

Sequelæ.—*Deafness* continued after convalescence in two cases of the first division, but was eventually removed by electricity in one, and in the other by camphor introduced into the auditory canal, Arnica Montana being at the same time administered internally.

Morbid sensibility in the feet and legs was experienced during convalescence by some patients, who had complained much of their head, and a few were troubled by it long after recovery.

Atony of the intestinal canal, manifested by continued anorexia, or deficient digestion, in three cases, protracted recovery, but was at length removed by tonics.

Œdema of the legs, during convalescence, very frequently followed absence of the first sound of the heart, and also occurred after severe forms of the diarrhœa.

Paralysis of the bladder during convalescence occurred in two cases which had suffered from retention, but was successfully combated by catheterism and tonics.

Etiology.—Professor Huss's views on this subject are thus expressed: *The essence of this epidemic consisted in an alteration of the blood, both in its physical constitution and in its vital properties, the immediate result of miasmata received by the blood.* His opinion is founded on experiments proving the action of poisons introduced into the blood; the abnormal colour and consistency of the clot, and the cerebral

symptoms, which he regards as the result of this unknown change. The author looks on his cases as true typhoid fever, which, however, we are inclined to think he considers identical with typhus. He evidently is fully persuaded of the *essentiality* of fever.

Contagion could not be distinctly traced, the men mingling together indiscriminately, without the direct propagation of the disease being observable.

We come now to the treatment which seems to have been so successfully applied in the foregoing cases, and first of

External Remedies.—Bleeding.—1st. *General:* when the face was flushed, and the sclerotic injected, with a full pulse presenting a trace of hardness. Never used after the third or fourth day of the disease.

2nd. *Local:* cupping nape of neck in apprehended cerebral congestion; also when there was abdominal tenderness and pain, six or eight cupping-glasses were applied at once, and repeated two or three times, very rarely after the seventh day.

Turpentine fomentations (by dipping cloths in hot turpentine), found extremely useful; applied to abdomen, when gurgling and sensible, and also when the diarrhœa was profuse; and to the chest in bronchial and pulmonary congestion.

Ice to head, only when and so long as agreeable to the patient.

Poultices applied to the abdomen *only* when it continued tense and painful, with diarrhœa, after the application of cupping-glasses; in such cases always beneficial. Often a poultice was applied during the night, and the turpentine fomentation during the day.

Bathing the whole body with chlorine water, was in all cases practised regularly three times a day.

Enemeta were used only in Class A; when wished to act as a purgative, tincture of colocynth was added.

Catheterism was used three or four times daily in case of retention.

Treatment of Bed-sores.—As soon as redness was noticed, the part was bathed with brandy and white of egg, or compresses moistened with saturnine lotion were kept applied to it; where sores formed poultices were used; and where the sore was inflamed, it was filled with *querci tannas plumbicus*, washed regularly with infusion of chamomile, and afterwards treated as a simple wound.

Glandular swellings were left to the reparative efforts of nature.

Internal Remedies, *arranged in the order in which they were prescribed during the course of the Disease.—Emetics*, on the appearance of the first symptoms.

Purgatives.—Glauber's salts, repeated every two hours until an evacuation, in cases free from abdominal symptoms. Castor oil, ʒi. every two hours, in head cases with profuse diarrhœa, was attended with the best results.

Hydrochloric Acid was the remedy most used in the first stage of Class A. A drachm of the acid of the Swedish Pharmacopœia was added to twelve ounces of decoction of mallows, and a table-spoonful

of this mixture administered every two hours. The remedy was continued *as long as the pulse continued full, firm, or compressible, and as long as the sounds of the heart remained normal, or the first sound shorter than in the natural state.* The employment of this remedy was not contra-indicated by the state of the tongue or of the gastric organs; it was given when the tongue was loaded or not, red and fissured, soft or hard, moist or parched: it was given, too, when the abdomen was painful or not, tense or flaccid, in constipation and diarrhœa. The *sole* contra-indication of its use was bronchial or pulmonary congestion, which was aggravated by it. The only medicines it was ever combined with were, infusion of Ipecacuan. and Mucil. G. Arab.

Hydrochlorate of Ammonia, in doses of ten or fifteen grains every two hours, was given where the muriatic acid could not be prescribed.

Phosphoric acid (Pharm. Swed.*) was used in *all* the cases. Three drachms were dissolved in twelve ounces of decoction of mallows, and one or two dessert-spoonfuls of the mixture given every two hours. Phosphoric acid was indicated when *the pulse began to lose its fullness, and the first sound of the heart became short, like the second*, at the same time that prostration was increased, and the tongue usually became dry, and often incrusted; it was also given when the symptoms indicating the end of the first stage, and the beginning of the second, were observed to be present. During the second stage no symptom counter-indicated its employment.

Ipecacuanha, in the form of infusion, twenty or thirty grains to ℥viii. of water, was, in all cases, given *on the appearance of diarrhœa*, whatever the state of the abdomen. If vomiting followed, the infusion was made weaker, or it was mixed with Mucil. G. Arab., and abandoned in case of severe nausea not thus obviated.

Camphor.—Professor Huss looks on the state of the tongue, pulse, strength, &c. as extremely uncertain guides in indicating this remedy, which, however, he gives with confidence as to the result, *when the first sound of the heart becomes so feeble as to be with difficulty audible.* The camphor was generally found to be injurious if the tongue were flesh-red and the belly tender, with diarrhœa, and when these symptoms existed, and the remedy was otherwise indicated, a large extent of the body was bathed with camphorated spirits. It was often combined with the use of phosphoric acid, or Ipecacuan. One or two drachms of camphorated mucilage (Ph. Sued.†) was usually given every two hours or oftener.

Musk was given only in two cases during this epidemic. The indication for its use, derived from prior experience, is given as follows: "When the patient lies constantly on his back, when he keeps muttering or talking to himself, when there is carphology, when he has muscular twitchings, subsultus tendinum, or more violent muscular action; when, at the same time, the first sound of the heart is inaudible and the pulse thready," with this group of symptoms five grains of musk combined with a grain of camphor, given every two hours, *night and day*, is relied on with the greatest confidence. Professor Huss does not diminish the dose as recovery takes place, but only increases the length of the intervals.

Opium was given (to produce sleep) in but one case. Its general indication is: "The presence of mild or muttering delirium, with continual agitation without indication of cerebral congestion; the pulse should be feeble but not small; the first sound of the heart should be distinct; but, above all, the skin should not be hot and dry; on the contrary, it should be soft, pliant, and even a little moist, and the pupils either natural or dilated." It is given in the following form:

℞ Camphoræ, gr. i.
Opii, gr. i.
Salis Cornu Cervi, gr. iv. M.

This is given at bed-time, occasionally repeated at two hours' interval, and never administered two nights in succession. It was mostly required about the eleventh day.

Belladonna.—The extract was employed in the same doses and combinations, and on the same indications as opium, the state of the pupils only excepted. "*For belladonna to act favourably, the pupils should be in the state of contraction.*"

Sulphuric Acid, either alone or with Arnica Montana, or Infus. Ros., was prescribed with benefit towards the end of the disease, and was indicated by "*profound prostration, with commencing bed-sores, or persistent diarrhœa.*

Spirit of Turpentine was employed in but one case of the epidemic in question, but the author's experience of this remedy as a means of combating typhoid pneumonia, is highly favourable. He gives it internally at the same time that he uses it as an embrocation to the chest. Of typhoid pneumonia he speaks as follows: "I consider typhoid pneumonia as a passive phenomenon, caused by stasis of the blood, in consequence of deficient energy in the right ventricle of the heart, which has not sufficient force to drive the blood through the capillary net-work of the lungs; the blood is arrested, accumulates, and renders denser the pulmonary tissue almost as occurs in pneumonia. The first indications of this state call for the employment of turpentine."

Arnica.—An infusion of the root (℥ii. to ℥viii. of water) was preferred, and was given chiefly when convalescence had commenced.

Are Typhous and Typhoid Fevers distinct Diseases?—From the facts elicited during the discussion in the French Academy of Medicine, reported above, some conclusions seem deducible with something approaching to certainty.

* Phosphoric acid, by the Swedish code, is directed to be prepared as follows:—Take bones in fine powder, lb. iv.; concentrated sulphuric acid ℥ xxxiv.; water lbs. xxiv. Boil, &c., &c. The lime is precipitated by Carb. Amm., and the glacial acid obtained by evaporation is dissolved in three parts of water.

† Camphorated Mucilage of the Swedish Pharmacopœia is made as follows:—℞ Camphoræ, ℈i.; Mucil. Gum Arab., ℥ii.; tere simul adde gradat. Aquæ Fontis, ℥ xxiv. M.

1st. That the ordinary spotted fever of the *rural districts* of France is highly contagious.

2nd. The ordinary spotted fever met with in the *great cities* of France is not appreciably contagious.

3rd. That this fever met with in the country is not distinguishable from that met with in town.

These propositions are in fact only a fresh enunciation of what was proved long ago by Bretonneau, Leuret, Gendron, and others, and fully admitted by Louis (*sur Fièvre Thphoide*, 2me. edit.), and many other pathologists of eminence. Should we then adopt the opinion of M. Rochoux, that contagion is *essential* to a disease; or, to express the same idea in other words, that we are in the habit of giving different *names* to diseases differing on the sole point of contagion; and, accordingly, divide typhoid fever into the civic and rural varieties, giving to each an appropriate name indicative of its individuality? Surely not. Erysipelas is not ordinarily contagious, but occasionally it is so, and whole hospitals are sometimes shut up until the disease is got rid of, yet different names have not been given to the communicable and incommunicable malady. The same remark applies to purulent ophthalmia, peritonitis, diphtherite, &c.; and, as a general rule, we find that diseases which, when they occur sporadically, are mild and incommunicable, become severe and often contagious, when they appear as epidemics. A principle, by-the-by, which seems to offer some explanation of the very contradictory statements advanced some years ago, in reference to the contagion of plague.

Now it is well known to all who are in the least acquainted with the views of continental pathologists, that this point of contagion is one of those principally dwelt on, as marking the distinctness of our Irish maculated fever from the *fièvre typhoide* of Louis and others. The only apparent differences between the two diseases, that we have ever heard noticed, are the following:

Fièvre Typhoid.	*Typhous Fever.*
1. Not contagious.	1. Contagious.
2. Occurring chiefly at puberty, seldom or never in infancy or old age.	2. Met with at all ages.
3. Eruption of rose-coloured spots (*taches rosées*).	3. Eruption, resembling measles, or confluent small-pox in its first stage.
4. Diarrhœa the rule.	4. Diarrhœa rare.
5. Spleen often enlarged.	5. Spleen rarely enlarged.
6. Gargouillement in right iliac fossa.	6. No gargouillement.
7. Recurrence not very rare.	7. Seldom or never occurring twice in the same individual (?)
8. Mortality great.	8. Recoveries very frequent.
9. Intestines more or less affected in all cases (?)	9. Intestines but rarely ulcerated.

Such, then, are the assumed differences, and on each we shall bestow a few moments' consideration; and first of *contagion*.—This we have already disposed of; we have found that Irish typhus is not one whit more contagious than French typhoid fever, except in great cities. In fact the fever of this country is not now looked on with such ignorant terror as it was general some years ago. Of 9,588 cases of fever admittted into the Belfast Hospital, and in which the question of contagion was investigated: in 2,342 no trace of it could be discovered; and the same group of cases, viewed in another light, gives 1,856 *families* affected with fever, which could be traced to contagion, and 2,343 in which the origin of the disease could not be discovered.—(*Mateers' Statistics of Fever, Dublin Journal*, vol. x.)

Age.—The great rarity of typhoid fever attacking infants or old persons, has been dwelt on as one of the most important characters of the disease, marking its distinctness from typhus, by all who look on those diseases as different. Dr. Lombard seems even to hold (Dub. Jour., vol. x. p. 21) that typhoid fever never attacks infants, but we shall see that this is quite incorrect. The observations in regard to age appear to be subject to two sources of fallacy.

1st. Typhoid fever has been almost exclusively studied in Paris, where it is met with on a great scale, in the extensive and well-appointed hospitals of that learned capital. Now Paris, from the system of centralization so terribly carried out in France, being the great focus towards which tend all the aspiring classes, has actually a smaller proportion of families and a larger proportion of persons from 15 to 35 or 40 years of age, than any city in Europe. It was then to be expected, that a very large proportion of the subjects of fever, examined by Andral, Louis, &c., should be neither very young nor very old. This neglect of analyzing populations is a very common oversight in statistics. Assuming the mean age of the inhabitants of a place, or even their average mortality, to be an indication of sanatory condition, is an error such as we are alluding to; and, being one of several oversights which runs through the otherwise valuable Parliamentary "Report on the sanatory Condition of the labouring Classes," has given rise to much false reasoning, as to the supposed *essentially* injurious influence, on the health, of manufacturing industry. Thus, when we read that the mortality of the rural districts of Surrey is but one in fifty-two, of Brighton one in forty-two, and of Liverpool no less than one in twenty-nine, we feel shocked at civilization. If, however, we take, in these same places, the population *above five years of age* (and this class is really the only one that can properly form an element in calculations of salubrity—infant life being more dependent on care bestowed on its preservation, than on mere hygienic conditions), we find the mortality in Surrey one in sixty-four, in Brighton one in sixty-two, and in Liverpool one in fifty-three. The great manufacturing mart, with its 70,000 cellar-inhabitants, having really a mortality very little higher than the fashionable watering-place, or the rural retreats of the rich. The discrepancy between the first and

last numbers being owing to the fact that Liverpool, from causes we cannot here specify, has a very large *infant* population; and everywhere the mortality of infants is very great, being, under twelve months old, no less than twenty per cent. per annum. We believe the error as to fever is quite analagous; but,

2nd. We conceive that the rarity of typhoid fever in infants on the continent, is owing to the fact that foreign physicians regard as *indubitably* typhoid fever, no case *of which they have not actually fingered the ulcerated intestines;* whilst, both on the continent and in Ireland, fever in children is *seldom fatal*. That we do not exaggerate the difficulties of diagnosis will be evident, on reading over the article on that subject in the 2nd vol. of Barthez and Rilliet (*Maladies des Enfants*), Barrier (*Maladies de l'Enfance*), Forget (*Traite de l'Entérite folliculeuse*), or of any foreign work on the diseases of children. Still, even with all these limitations, numerous cases are on record. M. Manzini, in Nov., 1841, brought before the Academy some instances of children brought into the world with the characteristic rose-coloured spots, and all the other evidences of typhoid fever. M. Charcellay has published several examples of the disease in infants of a few days old (*Journal de Tours et Archives Gen. de Med.*, 1840); Billard met with it at twenty-four days, and in another instance at thirteen months; MM. Barthez and Rilliet have published cases at seven (vol. ii. 403), twenty-two, and twenty-four months old (*Arch. Gen. de Med.*, 8re., 1841); and Bricheteau, Taupin, Audiganne, Littré, &c. mention numerous other instances.

All, or nearly all pathologists admit, that cold, hunger, and suffering of all kinds, if not actually productive of typhoid fever, at least render the constitution highly susceptible of that disease, and we feel confident, that after glancing over Lord Devon's Report on the Condition of the Irish Peasantry, no person will feel in the least surprised that amongst them fever should be more rife,* and spread more rapidly (and consequently, from the greater numbers, that instances occurring in infants and aged persons should not be very rare) than amongst the inhabitants of more highly favoured France. We have reason to believe that, *compared to the numbers affected*, fever is as rare in the very young or very old here as abroad. Of 11,209 fever cases admitted into the Belfast Hospital, but 301 were five years old and under, and only 171 aged sixty and upwards. In the more extensive, but necessarily, on such a subject, vastly more inaccurate Irish Census Report, the proportion of infantile cases is less, but the relative number of aged patients is much greater.

Diarrhœa is the symptom which at first sight would seem to mark a distinction between the fever of Paris and of Dublin. We know not whether it occurs as frequently in the departments as in the

* By Mr. Wilde's very elaborate Irish Census Report of 1841, we find, that of a total number of 1,187,474 deaths from all kinds of causes, no less than 112,072 were returned as "*fever*."

capital, but at Stockholm Professor Huss did not meet with it more frequently than is ordinary here. In fact, in Paris almost every disease either begins, or at some stage of its progress is complicated with diarrhœa, the cause of which may probably be found in the water, so strongly impregnated with sulphate of lime, the diet of the inhabitants, or in the other hygienic conditions to which they are exposed. On the other hand, many epidemics of fever (and every epidemic here* is more or less different from what have gone before) observed by Drs. Barker, Cheyne, Graves, Stokes, &c., have differed from those preceding and following them, only in the greater frequency, or even invariableness of the abdominal symptoms.

Gargouillement and enlargement of the spleen are, of course, not peculiar to the Parisian disease, but depend on the intensity of the abdominal symptoms, whether fever be present at all or not.

The eruption, and first of the *taches rosées*:—they are, at least, not characteristic of typhoid fever. M. Louis met with them in *one-fourth* of a large number of cases *not typhoid*, examined by him for the purpose of determining the diagnostic value of this peculiar eruption; and although in the second edition of his book "*Sur la Fièvre Typhoide*," he suspects the accuracy of his observations made *ten years* before, we must remember, that the distinguished pathologist has now assumed the parentage of notions hostile to his first experience, and a favourite theory is quite enough to blunt the discrimination of the most thoroughly honest observer. A host of pathologists (Chomel, Taupin, Barthez, and Rilliet, &c.) have proved that the *taches rouges* bear no fixed relation, in number or colour, to the intensity of the disease, that they are not invariably present in typhoid fever, and that they are present in cases certainly not typhoid.

Again, the maculæ so common here, "resembling the first appearance of confluent small-pox" (Lombard), are, we have seen, well known in Sweden, and are frequently met with France; in one case by Taupin, quoted by Louis, being so profuse as actually to cause the case to be at first mistaken for small-pox. Andral's observations on this head are in perfect accordance with the experience of practitioners in this country, the slightly prominent rose-coloured spots being met with chiefly when diarrhœa prevails. In Dublin, the eruption may be present, or not, without any change in the character of the disease, and not long ago, two continental physicians remained in town six weeks, anxious to see the kind of eruption spoken of, as prevailing here, but during all that time, they did not meet with a single instance, although they examined a great number of cases presenting all the symptoms with which it is usually associated.

* My friend Mr. Wilde, in his learned and admirable "Report upon the Tables and Deaths," before referred to (Irish Census Report, for 1841), has shewn, by very exensive induction, that fever, although probably always endemic in Ireland, has, at least for the last one hundred and fifty years, raged as a severe epidemic every tenth (*quam prox.*) year, and that with the most singular regularity.

THE FREQUENCY OF RECURRENCE is a point on which it is very hard to arrive at certainty. It is not long since variola was supposed not to occur twice, although few will now be found to maintain that opinion. In fact, attention has been too recently directed to the phenomena of recurrence of disease, to lay much stress on the presence or absence of a fact so difficult to be determined. That typhous fever does attack the same individual more than once can be doubted by no one who has ever attended a fever hospital. Most Irish students have seen many such cases, and we know surgeons in the country who have themselves had the disease several times.

THE VERY DIFFERENT SCALE OF MORTALITY here and on the Continent has also been laid much stress on, but will not surprise any Irish physician who has read Andral's *Clinique Medicale*, or who has paid a visit to the wards of, at least, many of the Parisian hospitals. We shall never forget following to the dead-room, in order to inspect a subject who had been bled most *awfully*, a very eminent professor at La Charitie, celebrated for the freedom with which he plies his lancet, and on discovering in the intestines the ulceration so usual in Paris fever, hearing him express his regret *that he had not ordered blood to be taken more freely!* One of the most distinguished physicians in Ireland, a few months after his appointment to the hospital with which he is at present connected, was found fault with by the government of the institution for his extravagance in the use of wine in the wards under his charge. His colleague, also a man of distinction, *often bled* in the course of fever, and never gave wine. The wards of both were supplied with patients by alternate admissions, as the applicants, most of whom come from a considerable distance in the country, presented themselves at the hospital. The physicians never saw the patients until they met with them in the wards, the whole business being managed by the government of the institution. In the course of the dispute, as to the necessity of the impugned expenditure, it was suggested, to compare the mortality under the two kinds of treatment, and the following was the result:

Wine Treatment.		*Depletion Treatment.*	
Total Admisssions, . .	160	Total Admissions, . . .	146
Deaths, ...	4	Deaths, ...	12
Mortality, 1 in 40.		Mortality, 1 in 12$\frac{1}{6}$.	

This statistical summary settled the question, and the quantity of wine ordered was not afterwards found fault with. The numbers given above (which, we have taken from authentic documents) are for three months, terminating at the period when the complaint was made; and we may add, that preparation of the cases was in this instance absolutely out of the question. We should not forget, however that from the frequency of abdominal affection in Paris, the mortality there *ought* to be much greater than in Dublin, where that complication is the exception rather than the rule.

THE PATHOLOGICAL APPEARANCES MET WITH IN THE INTESTINES is in reality the main, or the exclusively distinguishing feature in typhoid fever as compared with maculated typhus. Louis has proved, by extensive and accurate research, that typhoid fever is not, as stated by Broussais, a *gastro*-enterite, and he remarks (with Lallemand, Andral, Trousseau, Abercrombie, &c.), that *idiopathic* inflammation of the stomach is, in fact, the rarest of all possible inflammations; he has never once met with it in all his numerous dissections. According to M. Louis, typhoid fever is but dothenenterite.* French physicians of even greater eminence than M. Louis, however, hold very different views on this subject. M. Chomel impresses on his class at the Hotel Dieu the *essentiality* of fever. "Typhoid fever," said that great physician a few years ago, when giving a clinical lecture on a case in the hospital, "typhoid fever is not a mere enterite, the symptoms do not bear any fixed and invariable relation to the lesions found after death in the intestinal tube, and we require something more than is demonstrable by the knife to explain the disease. Dothinenterite is no more the cause of typhoid fever than the scarlet eruption is the cause of scarlatina." At the same time M. Chomel stated, that he had met with cases of well-marked typhoid fever, with diarrhœa, &c. where no lesion could be found after death in the intestinal canal. The same views, or something very similar, are held by MM. Trousseau, Andral, &c.; and we have seen that the Professor of Clinical Medicine at Stockholm does not, by any means, regard the intestinal lesion as constant. But farther, *even Broussais himself* did not deny that typhoid fever occurs without any *demonstrable* lesion; and, if we mistake not, he gives some cases of this kind. He was, however, ingenious enough to invent a method of explaining away such difficulties by *supposing*, that as external erythema disappears after death internal erythema would do so too, and that, consequently, the exceptions in question were but cases in which disease had not gone far enough to leave permanent traces of its existence. Without inquiring whether the natural state of the intestinal mucous membrane be not one of vascular congestion, it is enough to say, that supposition is no proof, and one single observed exception is quite enough to overthrow the most laboriously built-up inductive argument. The truly essential and non-inflammatory nature of typhous and typhoid fevers, has been, within these few years, established on the firmest basis, by the extremely interesting and important results of investigations into the constitution of the blood in health and in disease, both in man and in the inferior animals, carried on by two eminent Parisian physiologists. MM. Andral and Gavarret† have proved, that whilst in the phlegmasiæ the fibrine of

* M. Louis' very exclusive views of the nature of fever are probably the cause of his describing as *acute Phthisis* what, in Ireland at least, would be regarded as very *ordinary fever*. See his work, *Recherches Anat., &c. sur la Phthisie*, and Dr. Evans' Lectures on Pulmonary Phthisis, where some of the cases we allude to are quoted and examined.

† Recherches sur les Modifications de Proportion, de quelques Principes du Sang dans les Maladies. Paris, 1842.

the blood is notably *increased*, in fevers, both typhous and typhoid, that element is remarkably *diminished* in quantity. These results are constant, and the accuracy of the processes employed, and the correctness of the inductive reasoning, have been fully established by the youthful Professor of Medical Physics in his reply to several objectors.*

"In the first place," says a distinguished supporter of the opinion we are combating, "it is important to bear in mind, for it is the key-stone of my whole reasoning, that I affirm, without fear of contradiction, that the symptoms which in Paris and Geneva I have almost always seen in fever, *are exactly those which I have seen in the different fever hospitals that I have visited in Dublin and Glasgow.*" And again, "I mentioned this subject to my friends at Glasgow, and they allowed me to dissect the body of a person in whom, I said, no doubt could exist as to the presence of the follicular disease. Judge, then, how great was my astonishment at not being able to detect a single trace of this morbid change in any part of the intestinal canal."† We see, then, that typhous and typhoid fevers are often so perfectly *identical* in their symptoms, that even so acute and experienced an observer as Dr. Lombard was utterly unable to make the distinction (and we have ourselves seen M. Rostau, at the Hotel Dieu, similarly puzzled), whilst an eminent Swedish professor describes as typhoid fever a disease which, were it to occur in Ireland, would be looked on as what all were familiar with, or might even be stigmatized by some scientific traveller as the nidus of infection for the whole of Europe.

The essence, or, in other words, the organic change, which is the invariable accompaniment of both diseases, is, in the opinion of the best physicians in Ireland and elsewhere, completely unknown. Is it then in the least degree philosophical to mark by distinct names affections undistinguishable during life, and differing *invariably* on no one point of pathology that has as yet been indicated? We are, indeed, authorized by the extensive experience of many talented men, to arrive at the conclusion, that the fever of different *localities and epochs* has very different *complications*, the cause of which, future observations may perhaps enable us to understand and explain.

Reponse aux principales Objections dirigées contre les Procédés, suivis dans les Analyses du Sang et et l'Exactitude de leur Resultats. Paris, 1842.

Recherches sur la Composition du Sang de quelques Animaux domestiques, dans l'Etat de Santé et de Maladie. Paris, 1842.

* The Germans, whose love of speculation and of metaphysical abstractions is displayed even in their medical literature, regard typhus as caused by a peculiar "typhous matter," which, according as it is deposited in the intestines, the lungs, &c., gives rise to *ileo-typhus*, *pneumo-typhus*, &c. Since the appearance of Dr. Staberoh's papers in this Journal many years ago, we have examined, both here and on the continent, very many cases of typhous and typhoid fever, which had terminated fatally, but we have never been able to discover any evidence of the deposition of matter different from what might be expected to result from inflammation or congestion occurring in an enfeebled state of the system. Rokitansky, whose notions of fever are not very dissimilar from those of Liebig, admits the occasional total absence of any demonstrable lesion, and explains such cases by saying, that the "*typhous process*" may have run its course in the blood without localizing itself. See *Rokitansky's Handbuch der Pathologischen Anatomie*, and the observations of Drs. Drysdale and Russell, quoted in *Wilde's Austria and its Institutions.*

† Dr. Lombard, in Dub. Journal, vol. x., pp. 20, 22.

It is very interesting to find the results arrived at many years ago by Dr. Stokes, fully borne out by a series of independent observations in the capital of Sweden. In March, 1839, Dr. Stokes published in this Journal his "*Researches on the state of the Heart, and the Use of Wine in typhous Fever*," and the following are some of the propositions in which he enunciates his views:

No. 2. "That a diminished impulse, or a complete absence of impulse, occurs in certain cases of typhous fever.

No. 3. "That in such cases we may observe a diminished first sound, or even an absence of the first sound."

No. 4. "That both these characters may exist with a distinct pulse."

No. 8. "That in some cases both sounds are equally diminished."

No. 10. "That these phenomena indicate a debilitated state of the heart."

No. 14. "That the diminution or cessation of impulse; the proportionate diminution of both sounds, or the preponderance of the second sound, are direct and nearly certain indications for the use of wine in fever."

If we but substitute "camphor, phosphoric acid, and musk" for wine, in the above extracts from Dr. Stokes's paper, we have the exact conclusions arrived at by Professor Huss. The phenomena of the impulse in the cardiac region, and the direct connexion between absence of the first sound and softening of the heart, do not seem to have been studied by the Swedish observer; but there is nothing in his recorded experience contrary to the views of our distinguished countryman.

The proposition laid down by Professor Huss, that Belladonna is beneficial only when the pupil is in the state of contraction, is a corroboration of Dr. Graves's statements in this Journal many years since.

P. S.—Since the above was in print, we have received the twenty-ninth Number of the Gazette Medicale de Paris, containing an account of another discussion on fever which took place in the Academy on the reading of a report by M. Louis, in the name of MM. Honoré Maccartan and himself, respecting a memoir on the epidemic typhoid fever of the arrondissement of Lure, addressed to the Academy by M. Jacquez. We have room but for one or two short extracts.

"As to age," says M. Louis, "it results, from the statistical table drawn up by the Author, that before the age of ten years the predisposition to typhoid fever is less than during the period from fifty to sixty. He, besides, notes several individuals aged from sixty to seventy, and one between seventy and eighty, whom the disease had not spared." Again: "As to habitation, he is led to believe, from

the facts he has collected, that insalubrious and badly ventilated rooms, and, above all, air vitiated by the assemblage of a great number of persons, suffice, without any contagion, to originate typhoid fever." And, after many distinguished physicians had stated their belief in the propagation of typhoid fever by contagion in Paris as well as in the departments, M. Louis remarked: "For my own part, I have observed four cases, respecting which it was impossible for me to entertain a doubt. Contagion appears to me to be especially manifested when the hospitals are over-crowded: besides, we ought not, on this point, to compare together the sporadic and endemic diseases."

Having, both at home and abroad, always heard the greater frequency of recurrence of typhoid fever laid down as a most important diagnostic element, we were not prepared for the following: "The frequency of recurrence," says M. Louis, "also occupied the attention of the author of the memoir. In his opinion, recurrence is not very rare, but the facts on which he founds his opinion do not appear (to the reporter) very conclusive. I cannot forget that I and my two colleagues *met with the only well authenticated instance of a second attack of typhoid fever*," &c.

Thus we see that in proportion as the subject is fairly and thoroughly discussed, all the fancied grounds of distinction between typhus and typhoid fevers crumble away by degrees, and eventually we are forced to admit, that whatever can be predicated of the one disease can be predicated equally of the other. M. Rochoux endeavoured to escape from M. Jacquez's facts, by denying the accuracy of his diagnoses,* but M. Louis indignantly rebutted the imputation, and his sentiments were shared in by the other members of the commission. The greater frequency of abdominal *complications* appears to be the only distinction between the fevers of France and Ireland, as we have seen that, in the opinion of the best observers, both are often caused by unfavourable hygienic conditions, are propagated by contagion, occur most frequently at the middle period of life, present the same group of symptoms, equally rarely affect the same individual a second time, &c. &c.; and since the organic cause of both is equally unknown, it is no wonder that the attempts to mark the distinctive characters of typhoid fever have hitherto proved so totally futile. "For my own part," said M. Piorry, in the discussion to which we have been referring, "I am convinced that if a number of physicians were to be asked what they meant by typhoid fever, *as many different answers would be returned as there were individuals.*"

"Truth is one, but error is infinite."

* The very trifling mortality, viz. one in forty-five, was also adduced in proof of the inaccuracy of diagnosis of the author of the memoir, but probably the fact of M. Jacquez not being a partisan of bleeding in fever may account for his success, as in the instance before alluded to.

THE

DUBLIN JOURNAL

OF

MEDICAL SCIENCE,

NOVEMBER 1, 1845.

PART I.

ORIGINAL COMMUNICATIONS.

ART. VI.—*Contributions to Therapeutics.* By J. MOORE NELIGAN, M. D., M. R. I. A., Physician to Jervis-street Hospital, Lecturer on Materia Medica and Therapeutics in the Dublin School of Medicine, &c.

[Continued from Vol. XXVI., page 243.]

No. II.

ON THE EMPLOYMENT OF OIL OF TURPENTINE IN LARGE DOSES IN THE TREATMENT OF PURPURA HÆMORRHAGICA.

It is now very generally admitted that there is not the least similarity, either in their nature or origin, between purpura hæmorrhagica and the scurvy of seamen. Nevertheless, this idea, the correctness of which was so strongly insisted on by Willan, still influences much the opinions of many practitioners, with reference to the treatment of this disease; and the statement put forward by our great English authority on skin diseases, "that the treatment of this disease is simple, and may be comprised in a very few words:

a generous diet, the use of wine, Peruvian bark, and acids," is, even in the present day, too indiscriminately adopted. On the other hand, we find it laid down by numerous writers on the disease, who adopt the opinion of Dr. Parry, *that it is always of inflammatory origin*, that early and free venesection alone holds out any hope of successful treatment. My intention in the present communication is, without attempting to reconcile or account for those conflicting opinions, to narrate some cases of purpura which were speedily and effectually cured by the administration of turpentine in *large doses*, and at the same time to state the reasons which first led me to employ it.

In the ninth volume of the Edinburgh Medical and Surgical Journal, Dr. Harty of this city, in a communication to Dr. Bateman of London, details some cases of purpura simplex, and of purpura hæmorrhagica, in which the free employment of purgatives was attended with marked and rapid success. The purgatives employed by him were calomel and jalap, and he states that he was induced to adopt this mode of treatment of purpura from incidental remarks of the good effects of purgatives in this disease to be met with in the writings of Heberden, Hoffman, and others. In the spring of 1840, while acting for a few months as one of the physicians of the City of Cork Dispensary, I met with eight cases of purpura hæmorrhagica of the worst form. The district which I had the charge of (Blarney-lane and its neighbourhood) being one of the poorest in the city, the individuals who were attacked with the disease were nearly all of broken down constitutions, owing to overwork and insufficient nutriment. Having, in consequence of the asthenic character of the disease, treated the first two cases which came under my care, on the tonic plan, without success, in the next case I met with I had recourse to the employment of free purgation, but this case, which, however, was not seen until the disease was very far advanced, also terminated fatally. The

fourth case, in which the individual was younger and of a more robust habit of body, terminated favourably under the free use of purgatives, employed as directed by Dr. Harty.

From the result of those four cases I was, of course, led to place but little reliance on the use of bark and acids in the treatment of this disease, and to look more favourably upon the employment of purgatives. I thought, however, that still more favourable results might be expected from the administration of oil of turpentine, which, while it acts as a powerful cathartic, also possesses the property of checking hæmorrhage, depending on an atonic state of the smaller blood-vessels, owing, probably, to its powers as a diffusible stimulant. In consequence of those views I employed this remedy in the four cases that afterwards came under my care, while in charge of the district, and they all recovered. I prescribed the oil both in the form of draught and of enema; the usual dose for adults being from one ounce to an ounce and a half, and for children from two drachms to half an ounce, generally in combination with castor oil, to render its cathartic action more certain.

Since that time I have employed oil of turpentine in every case of purpura which has been under my care, and its use has been invariably attended with beneficial results. The mode of its administration, and the effects which it produces, will be better understood from a perusal of the following cases, the two first of which I have selected as being evidences of the effects of the remedy, both in the child and in the adult, and also as having been witnessed by the clinical class in the hospital; and the third, in consequence of its having been attended, in consultation, with an intelligent practitioner of this city, who was at first adverse to the use of the oil of turpentine in such large doses.

Case I.—Reported by Dr. J. O. Curran.

Sore Throat, Anorexia, and general Depression in a Patient exposed to Contagion of Scarlatina; Occurrence of Purpura Hæmorrhagica four Days after; Turpentine per Os et Anum in large Doses; rapid and uniform Recovery.

Anne Welby, a remarkably fine-looking child, six years of age, was admitted into Jervis-street Hospital on the 11th of April, 1843. She is robust, but very pale, and her countenance has a most languid and anxious expression; the lips and nostrils are covered with blood of a dark colour, which has coagulated over them, and blood is oozing slowly from the margins of the gums; an eruption of small, circular spots, about two lines in diameter, and varying in colour from a blackish purple to the hue of arterial blood, is thinly and pretty uniformly diffused over the whole body; the spots are nearly all of the same size, and perfectly circular, but a few closely resemble vibices both in colour and outline; the colour of the eruption is not in the least affected by pressure, nor by the part of the body on which it occurs; a few spots are sensibly prominent, and there are also some which are mere bloody vesicles, and which rupture under slight pressure with the nail; one or two spots are situated on the red margin of the lips, as well as on the mucous membrane of the mouth; the tongue is moist and slightly furred, and the papillæ, which are red and prominent, give it a mottled appearance; the fauces are very red, and the right tonsil considerably enlarged, puckered, and of a deep brownish red colour; the pulse 120, small and hard; the respiration quiet, and there is no cough or expectoration.

The history of the case is shortly as follows:—patient slept in the bed with her brother and sister, who had just been attacked with scarlatina. On Thursday (the 6th) she was observed to change colour several times, she abandoned play, and could not be induced to eat anything. The following day she complained of her throat being very sore, and her mother observed that it was swollen; sickness was also complained of. The next day there was no alteration. On Sunday morning the eruption was first perceived; her gums were then bleeding, and in the course of the day she passed blood by urine, by stool, and also by vomiting; she had also several attacks of epistaxis, which, however, were very slight, and subsided spontaneously; on the next evening she was admitted into hospital.

April 12th. Was very restless during the night, and could not be induced either to eat or drink anything; slept little; this morning her countenance has the same appearance of languor, there is more depression, but the pulse, &c., continue as before; the patient will not answer questions, nor even open her mouth, or put out her tongue, when desired to do so.

Many new spots have made their appearance; they are of a florid red colour, whilst the hue of those previously noticed has become darker; no new vibices have been observed, and there has been no epistaxis since her admission; blood still oozes from the gums, and occasionally from the nares, which the patient is continually irritating with her fingers; the urine is said to have been of a porter colour, but it was not preserved; the bowels have not acted since her admission.

℞ Olei Terebinthinæ,
Olei Ricini, utriusque, ℥iii.
Aquæ Menthæ piperitæ, ℥ss.

Misce. Fiat haustus statim sumendus, et vespere, ni alvus prius responderit, repetatur.

April 13th. The above draught was given twice, but it speedily excited vomiting; the whole of the medicine, however, did not appear to have been ejected from the stomach; it had no action whatever on the bowels, and consequently five grains of calomel, with an equal quantity of scammony,

were administered at bed time, by the directions of the house surgeon.

The eruption is unchanged; the skin is hot; the pulse hard, and ranging about 130; the tongue has lost the mottled appearance which it presented on the day of admission, but it is still slightly furred; the fauces are red, but the swelling of the right tonsil is diminished.

The bowels have not been moved; there is no pain complained of, the respiration is but very slightly accelerated, and there is no cough whatever.

℞ Olei Terebinthinæ,
Olei Ricini, āā ʒss.
Decocti Hordei, ʒx.
Fiat enema statim adhibeatur.

April 14th. The injection operated freely, bringing away a considerable quantity of feculent matter, intimately mixed up with grumous blood.

The improvement in the appearance of the patient is of the most marked and decided character. The countenance has partially regained its colour and animation, and the patient is sitting up in bed, amusing herself, and readily answering questions. The pulse is less frequent and not so hard; the tongue quite clean and moist; the skin cool. No new spots have made their appearance, and those which were previously present have become much darker coloured.

℞ Olei Terebinthinæ,
Olei Ricini, āā ʒii.
Decocti Hordei, ʒx.
Fiat enema, hodie injiciendum.

April 15th. Continues to improve; the enema to be repeated.

April 16th. Dejections still consist almost wholly of grumous blood, but mixed with a much larger and very evident proportion of feculent matter. Pulse 120; respirations

24; skin of natural temperature: eruption much faded; expression of countenance cheerful and healthy. The enema to be repeated.

April 17th. Had two perfectly natural dejections after the enema; feels and looks quite well; spots very much faded.

April 20th. Countenance quite healthy and lively; eruption scarcely perceptible; the bowels being confined she was ordered a mild purgative of calomel and scammony.

April 24th. Discharged cured.

This child was admitted into hospital again on the 2nd of January, 1845, nearly two years afterwards, labouring under a second attack of purpura, not nearly so severe, however, as in the first instance. The oil of turpentine was administered to her in the form of draught, uncombined with castor oil, the quantity prescribed being two drachms night and morning, for five successive days; it was given floating on the surface of peppermint water, in which form it was retained by the stomach, and produced from three to four stools daily. She was quite well on the 7th instant, the sixth day after the appearance of the spots, but she was kept in hospital until the 12th of January, for fear of a relapse.

Case II.—*Purpura Hæmorrhagica, occurring in an Adult, cured by large Doses of Oil of Turpentine.* Reported by Mr. Farmer.

William Flanagan, aged 50, a labourer, admitted into Jervis-street Hospital July 1st, 1845. The entire of the body and limbs is covered with small circular spots of various size and colour; from half a line to a line in diameter, and varying in colour from the florid red of arterial blood to a purplish-black hue. There are also several large, ecchymosed patches of a deep greenish-purple colour; those are situated chiefly on the right mamma, the elbows, the loins, and the backs of both legs. Firm pressure produces no effect on

either the small or large spots. He complains very much of weakness, with pain in his back, which, together with a feeling of great lassitude, has, from the commencement of his illness, altogether prevented him from working. He is constantly coughing up a frothy serum, deeply tinged with blood; the gums also bleed slightly, and he states that, previous to his admission into hospital, he passed bloody stools. The pulse beats about 60 in the minute, but is feeble and very compressible. The body is emaciated, and the countenance very expressive of anxiety.

In early life the patient was addicted to intemperance, nevertheless he enjoyed perfect health until the first attack of the present disease, which was about six months ago. Since that time he has been repeatedly attacked with the disease, but at no time so severely as at the present. He was in an hospital during the first seizure, where he was cured of it, but it reappeared in three months afterwards; he was again admitted into the same hospital, but having been discharged before the spots completely disappeared, they in a few days began to increase in size and in number, and he has never been free from them since. The great size of the vibices, together with the bloody dejections and sputa, and the complete prostration both of mind and body, compelled him at length to seek admission into this hospital.

July 2nd. Many new spots have made their appearance since yesterday, and the bowels have not been moved since his admission.

℞ Olei Terebinthinæ ℥iss.
Syrupi ℥ii.
Aquæ Menthæ piperitæ, ℥ii.
Misce. Fiat haustus statim sumendus.

July 3rd. Was somewhat intoxicated yesterday after taking the draught, which vomited and purged him freely, the stools being slightly mixed with grumous blood. He feels much better to-day, and eats with an appetite, which he has

not done for some time. The spots are darker coloured than on admission, and some new ones have made their appearance, but the sputa are not so bloody.

July 4th. The large blotches are fading, and turning of a yellowish green colour, while the small spots are disappearing; sputa still tinged with blood; bowels not moved yesterday.

℞ Olei Terebinthinæ ℥iss.
Olei Lini ℥i.
Decocti Hordei ℥xvi.
Fiat enema, statim adhibeatur.

July 5th. The patient is improved in every respect, with the exception of the sputa, which are more bloody; the bowels were affected only once by the enema; there is no appearance of blood in what he passed.

℞ Olei Terebinthinæ i.
Syrupi ℥ss.
Aquæ Menthæ piperitæ ℥ii.
Misce. Fiat haustus statim sumendus.

July 7th. Still improving; both large and small spots are gradually disappearing; bowels rather confined; the draught to be repeated, and to have full diet.

July 9th. Feels quite well to-day; none of the small spots to be seen, and the larger blotches much diminished in size; has had no expectoration for the last two days; as the bowels were confined, he was ordered the common castor oil draught.

July 12th. Flanagan was discharged to-day quite cured, having been kept in hospital until all the stains disappeared from the skin.

The third case was that of a delicate child, five years of age, whom I attended in consultation with my friend Mr. Dobbyn, of D'Olier-street, in May, 1843. After two days' slight fever, the entire body became, in one night, thickly

covered with spots of purpura, while two large vibices were apparent on the nares, evidently produced by the pressure of the body on that part; the bowels were free, but the stools consisted of feculent matter, intimately mixed with blood. The oil of turpentine was administered to her in the form of draught, in doses of two drachms and a half twice daily. She was only five days confined to bed, and on the sixth day scarcely a trace of the disease could be perceived on any part of the body.

This case I look on as being particularly interesting, when considered in connexion with that of Welby, the first case I have related in this communication, inasmuch as this was an exceeding delicate child, of a rather strumous habit of body, while the girl Welby was a fine, healthy-looking child, with, after her recovery, a very florid complexion. It thus appears that this mode of treating the disease is equally applicable when it occurs in the robust as in the debilitated, a fact which is fully borne out by the experience I have had of it for the last five years.

Appendix to Contribution, No. I.

Since the publication of my communication on the Therapeutical Properties of Hemlock, in this Journal, twelve months since, I have used it most extensively in the treatment of chronic rheumatism, and my subsequent experience of its effects would lead me to speak, if anything, in more favourable terms of the beneficial results which it produces. Many practitioners, who have employed it in consequence of my recommendation, have complained to me that although it has generally alleviated pain, it has not produced the same benefit which it has in my hands; but on inquiring from them I have been enabled readily to account for this difference in its effects, inasmuch as they have not given it in sufficiently large doses, having, in every instance, substituted the same number of drops for the minims in which I prescribed it, and

having been afraid to push its employment until the constitutional effects, namely, "a disagreeable sensation of dryness of the throat, with a feeling of constriction and a difficulty of swallowing, amounting to actual pain," which I have described, have been produced by it. I have, consequently, of late been in the habit of prescribing the *Succus Conii* in the form of mixture, ordering half an ounce of it to be mixed with seven ounces and a half of camphor mixture. Of this mixture the patient takes at first half an ounce, that is fifteen minims of the hemlock juice, every fourth hour. We are thus enabled to increase the dose very gradually, until the constitutional effects are produced; and moreover, we avoid the uncertainty which always arises from allowing patients or nurses to measure medicine by drops.

I am induced to add the following report of a case which has recently occured in my hospital practice, with the intention of shewing how much relief may be produced by the use of this preparation of hemlock, even in the most inveterate forms of rheumatic arthritis.

Arthritic Rheumatism, of twelve Years' standing. Reported by Mr. Farmer.

Rose Montague, aged 28 years, unmarried, by occupation a servant, was admitted into Jervis-street Hospital, June 19th, 1845. She states that she enjoyed excellent health until her sixteenth year, when, having been much exposed to cold and wet while in the discharge of her duty as a servant, she was attacked with severe pains in her joints while in bed at night, and a sensation of numbness, at first affecting only her left arm. The pains gradually affected joint after joint, and produced such excruciating agony that her screams could be heard at a great distance. The joints which were the seats of pain then began to swell and feel gritty when moved; she also partly lost the power of moving them. The swelling has continued in them ever since, and

they have also gradually become more contracted. She did not undergo any treatment for the disease until about four years since, when she was admitted into the Monaghan Infirmary. She was kept there for about three months, during which time she states that the treatment principally consisted of the repeated use of warm baths, from which she did not derive the least benefit.

On admission the affected joints presented the following appearance. The hip joints, which were the first affected, were almost immoveable; the process of abduction being nearly impossible, owing to the bony deposits on the outside of the joints. The knee, shoulder, and elbow joints, were very much swollen, and their power of motion considerably diminished; so much so that she was unable to extend her legs, which were semiflexed, nor could she raise either of her hands to her head. The least motion of the affected joints caused a gritty sensation to the hand placed over them, and in the knee-joints could be distinctly heard. The wrists and the articulations of the fingers presented the greatest alteration of structure, being nearly all of them displaced from their natural positions, in consequence of which they have a very distorted appearance. At the junction of the ungual with the first phalanx of the thumb of the right hand, the ends of the bones are partly absorbed, and she is obliged to tie a bandage round the joints to keep the thumb in its place. Besides the enlargement of the epiphyses of the bones, there is a gelatinous effusion surrounding most of the joints.

The patient's general health at present is very good, but she suffers much occasionally from pain, and from occasional attacks of inflammation of the joints. She is totally unable to walk, and is obliged to be lifted in and out of bed.

To omit the daily reports of this case suffice it to say, that she was kept in hospital until the 1st of September, a little more than two months, during the whole of which time

she was kept under the influence of hemlock, its constitutional effects having been at four different periods produced; and the following is the report of her state on the day of her discharge.

The swelling has completely disappeared from her knees, so that she is able to straighten her legs, and to get in and out of bed without assistance, although she is unable to walk alone more than a few steps. She is able to raise her hands to her head, and, to use her own words, "to turn up her back hair," which she was unable to do for the last ten years. She is also able to use her needle, and to work for a long time without being fatigued, having completely dispensed with the bandage on her right thumb for the last three weeks, it has become so strong. She is also quite free from pain, and is discharged at her own request, Dr. Neligan's term of attendance at the hospital having expired.

ART. VII.—*Description of a Case of severe Trichiasis and convergent Strabismus of both Eyes, successfully treated by Operation; with an Account of the Mode of applying Ligatures on the Recti Muscles of the Eye.* By W. R. WILDE, M. R. I. A., Fellow of the Royal College of Surgeons in Ireland, and Surgeon to St. Mark's Ophthalmic Hospital, &c. &c.

MARY BEAUFORT, aged 30, of Loughlinstown, County Dublin, was admitted into St. Mark's Ophthalmic Hospital on the 22nd of October, 1844, with entropium and trichiasis of the upper and under lids of both eyes, and also double convergent strabismus.

The appearance of this poor woman was very remarkable, and truly characteristic of her lamentable condition: from the long continued intolerance of light, the head was bent forward, and inclined to one side, as in children labouring under strumous ophthalmia, the forehead and brows being

much corrugated. On examining the eyes the palpebral apertures consisted of mere irregular slits, scarcely a quarter of an inch wide in their extreme breadth; two gaps existed in the upper lid on each side, and the whole margins had an irregular, puckered appearance; the ciliæ were thin, of a whitish colour, irregularly placed, and chiefly either lying flat on the globe of the eye, or turned completely in under the superior palpebra. On slightly elevating the lid, and drawing it from the globe, the trichiasis, or irregular growth of hairs, became very apparent, more particularly in the neighbourhood of the clefts formed in the tarsal margins of the lids, to which I have already alluded. On the lower lids the ciliæ were likewise thin, short, and partially inverted; and towards the outer angle, in each eye, four or five of these hairs, apparently morbid growths, grew directly in upon the globe. A whitish line, extending parallel with the margin of the tarsi, ran along the middle of the upper eyelid on each side,—the cicatrices of previous operations. The accompanying is from a very graphic sketch by Mr. Neilan, taken the day after her admission. On divaricating the

lids, so complete and inveterate was the inversion of the globe that but little of either cornea could be discerned; on the right side the pupil could not be observed at all; and this eye, she says, is now of "little use" to her. By covering the left eye the globe of the right is slightly everted, but still not sufficiently so to expose the entire of the

cornea; in the left eye somewhat more than the third of the cornea is obscured behind the carunele, and on covering completely the right eye, she is able very nearly, but not entirely, to expose the inner margin of the cornea: both corneæ are slightly nebulous; both conjunctivæ and scleroticæ are much more vascular than natural, there is considerable epiphora, and some mucous discharge. With much difficulty she is able to find her way, and that only in a modified light. In this deplorable condition, suffering considerable pain, and occasionally labouring under severe attacks of ophthalmia, she has begged and groped her way during the last ten years.

The history which she gives of herself is, that when 7 years of age she was affected with slight strabismus during an attack of hooping-cough (not an unusual cause), and that when about 15 years of age her eyelashes first began to turn in, when she suffered considerable pain and uneasiness, but still, with the exception of the application of the usual eye-washes, did not apply for proper medical relief till four years afterwards. She was then admitted into one of the large surgical hospitals of Dublin, where Mr. Guthrie's modification of Sir P. Crampton's operation for entropium was performed; viz. the perpendicular division of the tarsus in two places, a longitudinal incision on the internal side of the cartilage, an elliptical portion removed from the external integument of the lid, and the eversion of the cartilage, and retention of it in that position, with ligatures and straps of adhesive plaster, for several days. By this means she got "slight relief" for some time, but within six months she was as bad, if not worse than before. From that period to the present she has continued in the same deplorable condition.

Her disease having been considered incurable, she did not apply for further relief, and contented herself with occasionally removing the hairs when they became more than usually troublesome. Since the entropium and trichiasis became confirmed, the strabismus has greatly increased in intensity,

the corneæ evidently turning inwards to avoid the irritation of the irregular growth of hair, as, to use her own expression, she had but a "slight cast" in one eye, previous to the supervention of the trichiasis. On everting the lids the palpebral conjunctiva was smooth, and free from granulations, but there were evident marks of contraction in this membrane in its infero-superior diameter, as, I have already mentioned in my former paper on this subject, is generally the case.*

In appearance this woman indicated much suffering, and her general cachectic aspect was such as one would not willingly undertake an operation with its possessor; the face was white and bloated; the breath fœtid; and the tongue of that peculiar whitish appearance, not inaptly resembling a piece of macerated spleen, which I have constantly remarked in those who have been the subjects of subacute inflammatory action of the eyes for any great length of time; the bowels were constipated, and the rest disturbed.

Having been submitted to a course of aperient medicine, a modified light, and complete rest, for some days after her admission into hospital, on the morning of the 27th December I detached the tarsal edges of the rima palpebrarum, so as completely to remove the ciliæ, with the slip of cartilage and integument on which they were set. Finding the margins of the superior palpebræ so very irregular, from the effects of the former operation, I dispensed with the primary subcutaneous incision above the ciliæ, but laying hold of the external angle of the tarsus with a toothed forceps, and standing, with regard to the patient, in profile, I shaved off all the ciliæ, following with the knife the various sinuosities which the tarsal edge presented, as I have already described in my former paper on this subject. In like manner the margins of the inferior tarsi were disposed of. In this case

* See an article on Entropium and Trichiasis, in the Dublin Medical Journal for March, 1844, vol. xxv. p. 105.

I dispensed with the use of ligatures, owing to the irregularity of the edges, and also from the desire to encourage the hæmorrhage, which was considerable, as much as possible; after the bleeding had ceased, a pledget of lint, wet with cold water from time to time, was retained, by means of a light bandage, over both eyes.

28th. This morning she expressed herself very much relieved, since the irritation produced by the offending hairs had been removed; and the photophobia was much less.

30th. On examining the eyes I found that the raw or exposed edges of the tarsi had commenced adhering at their external angles, so as to require the application of the Sulphas Cupri for the next few days.

Under this treatment, and a slight astringent wash, the edges of the tarsi were completely healed by the 4th of January, 1845, when I operated on the right eye for the cure of the strabismus, by the division of the internal rectus muscle.

4th. The first difficulty which I had to encounter was that of bringing any portion of the sclerotic, internal to the cornea, into view; this, after a considerable delay, was at last effected by my assistant, Mr. Thornton, who laying hold of the conjunctiva at the external edge of the cornea with a toothed forceps, and, forcibly drawing the eye outwards, thus enabled me to cut down on the internal rectus at the inner side. The usual steps of the operation were then proceeded with, and the muscle fairly divided. The muscle was not so large or fleshy as I have frequently remarked it on former occasions, but it was rather tendinous, and seemed to possess more power than I have ever before remarked in this operation; so powerful, indeed, were its efforts, as forcibly to draw the hook by which it was held several times within the margin of the caruncle. Its insertion was also much posterior to that in the normal condition, or rather it appeared to have become adherent to the globe, on its inner surface, for

more than the eighth of an inch posterior to its original anterior attachment.

Having satisfied myself that every fibre of the muscle was fairly divided, I then examined both eyes together, and found, that while the position of the left eye continued unmoved, considerable convergence still remained in that on which I had operated. Again examining carefully, and satisfying myself that the muscle was completely divided, by laying the blunt hook on the side of the sclerotic, and searching round with it, so that no fibre could remain uncut, I laid hold of the sclerotic extremity of the divided muscle with a forceps, and passed a fine curved sewing needle, armed with a single silk ligature, through it in two places. Having by this means obtained a direct purchase on the globe, and a power which, by continually sustaining, must, in the end, overcome all muscular exertion, I drew the eye towards the external angle, till the cornea was rather inclined outwards than directly forwards; and, taking care not to cross the latter membrane, I fixed the ends of the ligatures over the malar bone, by means of adhesive plaster. A bandage was then placed over the other eye, and she was removed to bed; and in order that the ligature might remain fixed by the adhesive plaster, all moisture was carefully removed, and all wet applications avoided.

5th. She has not complained of any uneasiness in the eye, and the inflammation and ecchymosis are not more than what is usual. On examining the ligature the strain upon it is found still to exist, and the eye remains in the position in which it has been artificially placed.

6th. The circumstances of the case are still much the same, but the tension of the ligature still remaining, and not the slightest inconvenience being experienced from it, I determined on allowing it to remain until the next morning, partly to test the result of such an application if left to itself for any length of time.

7th. On this morning it was found that the ligature had cut its way through the end of the tendon, but the eye retained its new straight position; and the irritation, lachrymation, and intolerance of light, as well as the vision, were very much improved.

16th. Nine days afterwards I proceeded to divide the rectus internus of the left eye, but experienced even more difficulty than on the former occasion in obtaining a view of the sclerotic internal to the cornea, and it was only after considerable delay, and finding various manœuvres ineffectual, that one of the assistants laid hold of the conjunctiva, at the external side, and drew outwards the globe, till I could cut down upon and insert a hook under the muscle, in doing which considerable force had to be exerted.

Precisely the same phenomenon took place on this as on the former occasion, the convergence of the eye was considerably lessened, but not entirely lost. Here I passed the ligatures, as in the right eye, and by their means retained the globe in a position possessing somewhat more divergence than would exist in a perfectly healthy eye. No uneasiness, nor inflammation followed this proceeding; but the strain having been removed from the threads, I divided, and withdrew them on the evening of the second day, both eyes remaining in a natural position.

During the next week, or until about the tenth day, she complained of double vision, and some mucous discharge.

She was discharged from the hospital on the 27th of January, but presented herself at the dispensary on the 31st of February, and her appearance was so much altered and improved, that one could scarcely recognize her as the same individual. The palpebral apertures were then fully opened and the frowning, wrinkled appearance of the brows had completely disappeared; the corneæ were in their natural position; and all intolerance of light having been removed, she was enabled to gaze at objects even the most brilliant: the

chronic ophthalmia, under which she laboured for so many years, had likewise been removed, and vision had improved in accordance with these different propitious events. The sclerotic extremity of the divided muscle, on the right side, exhibiting the usual granular pedunculated knob, which is common from the tenth to the thirtieth day after the operation, it was removed, and an astringent wash applied to both eyes.

On the 27th June, 1845, this woman returned to let me see her improved condition, when the drawing was taken from which the accompanying illustration was executed.

In no instance have I seen a more perfect cure, or greater change, by either operation. The whole mien, attitude, and appearance of this poor creature has become altered: she stands with her head erect, the brows smooth and open, the eyelids wide apart, the corneæ and sclerotics free of all inflammatory action; all trace of strabismus has vanished; and there is not a single cilia remaining. In the left eye the tarsal edge of both lids is smooth, rounded, and natural in colour; in that of the right, the upper portion is still reddish, and slightly lumpy, but free of any irregularity. The punctæ, both upper and lower, are quite pervious, and in their natural situation in both eyes; a slight watery state still remains, but the irritable condition of the cheek, which formerly existed, has been entirely removed; owing to which, and the improved condition of her general health, her face has become plump and natural coloured. During sleep the

globe is covered by the lids as perfectly as in the normal healthy eye.

October 8th. I had again an opportunity of seeing the subject of the foregoing case, and I am happy to be able to report as favourably as in June last.

Next to the division of the muscles of the globe at their corneal extremity for the cure of strabismus, either convergent or divergent, the most certain means of procuring a favourable result consists in the ability of fixing the eye in some determined position for some hours or days after the operation. And the history of the foregoing case affords a good example of such means, as well as their mode of application.

When Dieffenbach's practical application of the theory of Von Walther and Stromeyer, for the cure of strabismus convergens, by division of the internal rectus muscle, in 1840, was promulgated to the world, medical men of every description, several of whom possessed but little power, either of diagnosis or manual dexterity, rushed into the field as operators for the cure of squinting; and patients desirous of having this striking deformity removed, flocked in crowds round every professor. In this way numbers were operated on whose cases were quite unsuited to the operation, even such as, where accident or disease had induced the obliquity of the organ as the best compensation which nature could, under the circumstances, provide. It is needless to add, that many were operated on whose eyes should never have been meddled with. In some it failed for want of knowledge or dexterity in the operator; a few were reduced to a condition exactly the reverse to what they were before the operation, and fully as bad, namely, that of extreme divergence: in some the eye became remarkably staring and prominent, resembling lagophthalmus; others squinted worse than before; several had the caruncle and semilunar fold of the conjunctiva completely cut away, so as to leave a deep, un-

seemly gap between the globe and the inner canthus of the eye, as where much violence was used in operating, particularly by those who poked into the orbit with a large dissecting forceps, to look for the muscle, without the aid of a blunt hook. In some, the deformity, though relieved at the moment of the operation, returned shortly after; and in several cases the squinting, though cured in the eye originally affected, seized upon the other afterwards. In fact an experiment upon a great scale was, and, to a certain extent, still is, going on with regard to the cure of strabismus, and extending to almost every country where white man has placed his foot; the result of which we have not yet become fully acquainted with. It is not my intention, in the present brief notice, to enter into details upon the subject. Having preserved accurate notes and statistical tables of some hundred cases operated on during the last five years, I may, at a future period, give the result of my observations; suffice it for the present to say, that I still hold to the opinion expressed in this Journal in August, 1842, that when the operation is properly performed, and the cases judiciously chosen, above eighty per cent. will be successful.*

Among the cases that do not turn out successfully are those in which the antagonist muscle has become paralysed, and these can be generally known beforehand, by the inability of the patient to direct the cornea from its unnatural position. Others there are, in which, from some cause which has not yet been fully ascertained, the complete division of the muscle does not restore the eye to its normal position; and this is often the case in divergent strabismus, even though both eyes may have been operated on. I may remark here, that if the eye does not become straight on the moment of the operation, there is little chance of its doing so afterwards.

To remedy this defect the idea of subsequently fixing the

* Vol. xxii., page 163.

eye by some mechanical means had often occurred to me. In the operation for club-foot, or the division of tendons in other portions of the body, the mere solution of continuity is insufficient to effect the cure without the application of a splint, or some apparatus, whereby the divided ends of the tendons or muscles are kept asunder; but the difficulty of applying such means to the eye, or apparatus so delicate as not to produce inflammation or other injurious consequences, presents itself to the most casual observer.

On the 1st of August, 1842, I operated on the right eye of Mr. J. M., aged 40, for severe divergent strabismus. In this case the eye was completely amaurotic, and turned very much upwards and outwards; but the person being very anxious to have the deformity removed, I divided the external rectus in the usual manner. Having waited for some time, and assured myself that no fibre of the muscle remained undivided, and this being, moreover, a case in which vision was in no wise risked, I determined to try the effect of mechanical means, and, with the assistance of Mr. Grimshaw, put it in force in the following manner:

Having curved a small sewing-needle, about No. 7, and armed it with a fine ligature, I seized hold of the divided end of the muscle—that attached to the sclerotic—with a fine toothed forceps, and passed the thread twice through it, drawing it tight the second time, so as to secure firmly a piece of the divided tendon, and thus attained a power over the globe, which would carry it in any direction. The loose end of the ligature I attached, by means of straps of adhesive plaster, to the middle of the nose, so as to draw the eye a little inwards and downwards.

So little inconvenience did the patient experience from this, that, although directed to go to bed, I found him a few hours afterwards engaged in business in a large open shop; the consequence of which was that considerable pain and inflammation set in during the night; and the next morning,

fearful of any ill consequence ensuing from an operation which, at that time, I deemed exceedingly hazardous to the safety of the organ, I removed the ligature, which was still considerably on the stretch. On this the eye turned again slightly outwards, but nothing near so much so as it originally presented. By this case, however, I became emboldened to investigate the matter more fully, and to experiment with the ligature at greater length. A few days after, Anne Kennedy, æt. 60, presented herself with severe convergent strabismus of the right eye. In my note-book of that period I find the following record:

'This heroic old dame, whose occupation was that of attending a lunatic pensioner in the Royal Hospital, notwithstanding her age and the severity of the strabismus, determined to run the risk of an operation. In this case the strabismus was so extreme, that a large portion of the inner margin of the right cornea was concealed by the caruncula lachrymalis. On the 13th of August, 1842, with the assistance of Dr. Hill, I divided the internal rectus on the right side in the usual manner, making myself certain that every fibre was completely severed. As this only partially relieved the squint in that eye, and as the left then turned in considerably, I divided *its* internal rectus also. Still, although I made a very clean dissection of the sclerotic on both sides, considerable convergence remained, so I then passed two ligatures, of a single thread each, through that portion of the tendon which remained attached to the sclerotic on both sides, and drawing the ends of these ligatures downwards and outwards so as not to cross the cornea, I attached them to the cheek-bone on each side by means of straps of adhesive plaster, taking care to draw the ligatures so tight that a slight divergent strabismus was produced in both eyes.

I did not see her till the third day, when she walked down from James's-street barefooted, with the ligatures quite loose but the eyes perfectly straight, and but very slight inflammation of the conjunctiva existing. The ligatures were then

removed, an astringent lotion was applied to the eyes and some aperient medicine administered.

Subsequently this case progressed in the usual manner, and the button-shaped ends of the muscles were removed on the twelfth day. This case was the most advanced age at which I have performed the operation.

I saw this woman in the early part of the spring of 1844, and the eyes had remained perfectly straight. She says that double vision continued for a considerable time after the operation, but finally was completely removed.

I have since employed this mechanical means with complete success in seventeen other cases, four divergent, and thirteen convergent, besides that mentioned in the beginning of this article, and in some of the latter the ligatures had to be applied on both eyes. The length of time for which the ligature is to be allowed to remain on, varies according to circumstances; but, as a rule, I may state, that it should never be removed while it continues on the stretch, or, in other words, till the eye has completely righted itself, either by the action of the other muscles, or by the fixed position, or "setting," if I may so say, of the globe in its new aspect.

Miss M., æt. 27, was brought to me for operation by Dr. Graves, in August, 1843. She had been affected with internal strabismus in both eyes, the result of long-continued strumous ophthalmia, in her childhood. With the left she squinted slightly, but the cornea of the right, which was slightly nebulous, was almost entirely concealed within the inner or nasal angle, so that the palpebral aperture was filled up with the white, shining mass of the sclerotic, which gave her a most extraordinary and painful appearance. When she closed the left eye and endeavoured to evert the right, the most she could, by any voluntary effort, achieve was, to bring the inner margin of the cornea into view. Having divided both internal recti, the left eye became perfectly

straight, but the right only as much so as, before the operation, she was able by the will to attain when the left was closed. Having waited in vain for about an hour, to see whether the organ might right itself, as in some cases I have known it to do, I applied two ligatures on the right eye, in the manner already described, and fastened them over the malar bone, which proceeding placed the eye in rather a divergent position. As this lady returned to Kingstown immediately after the operation, I was unable to see her until the morning of the third day, when, to my chagrin, I discovered that the ligature having by accident, about two hours before my arrival, broke through its fastenings on the cheek, the eye had partially returned to the position in which it was left by the simple division of the muscle, although, she informed me, that up to the moment of the thread giving way it had remained perfectly straight.

As the ligature still retained its connexion with the globe, I readjusted it, and, on the fourth evening, had the satisfaction to find the eye perfectly straight, and the thread, which I then removed, quite flaccid. This case turned out very favourably, and has remained so up to this date, not only having the deformity removed; but the eye, being restored to its natural position, has become a useful organ.

In fixing the ligatures care should be taken to fasten them by a second coil into the muscle, otherwise, if allowed to play in a loop, they will cut through sooner than their object is effected. When we have reason to believe they will be required, the portion of muscle attached to the sclerotic should be left longer than usual, by dividing it between the hook and its origin, as far back as we can with safety manage. In attaching them to the cheek or nose, care should be taken that they do not cross the cornea, which, in case of internal strabismus, will be avoided best by drawing them, immediately after their insertion, without the lower lid. This turns the eye, it is true, slightly downwards,

but that is, at the moment, of little consequence. The inability of closing the lids in sleep is an objection to the ligature being made to cross the upper eyelid. In fastening them externally, the best plan is, first, to apply a slip of plaster on the cheek, then lay down the ligature and cover it with another strip, and having drawn the threads to their proper degree of tensity, reverse their ends and apply a third piece of the adhesive plaster, about twice the size of the other two, over all.

I have performed this operation frequently in the presence of several surgeons of this city, who have subsequently witnessed its successful result, and in no instance have I known inflammation or other bad consequences to follow.

In favourable cases of ordinary strabismus, I unite the wound in the conjunctiva by means of three points of interrupted suture, composed of exceedingly fine silk, or hardess, a practice recommended by Cunier, but which, I believe, originated with Dr. Gulz, of Vienna. This not only facilitates the healing process, and lessens the ecchymosis and inflammation which generally follows the operation, but prevents the bulging of the sclerotic which sometimes occurs at this point. In some cases I have included the divided edges of the conjunctiva in the same ligatures with which the globe is fixed, in the manner already described.

In 1842, Dieffenbach published his large work on strabismus, "*Ueber das Schielen und die Heilung desselben durch die Operation*," in which I cannot find any mention of the application of ligatures for the cure of strabismus convergens; but in the chapter *Vom Schielen nach aussen* he gives an account of a Russian gentleman who squinted outwards with the right eye, and in whom it did not become straight on division of the muscle, in which case he applied the ligature by knotting it round the divided end of the muscle, and attaching its free extremity to the bridge of the nose. In this case he also excised a large elliptical portion of the conjunctiva on the inner side of the globe, the object

of which was, to produce contraction and cicatrix of this membrane, by which he expected that the subsequent lesion would be counteracted. Considerable inflammation followed, which was reduced by the application of ice water, and the ligature was allowed to remain in until the eighth day.

This operation was successful; but the eye, he says, remained somewhat more convergent than natural; this may, however, have arisen from the length of time the ligature was allowed to continue in the muscle. Two other cases, both of external strabismus, are recorded by Dieffenbach, in which having divided without success the external rectus, he applied a ligature, and perfect cures were effected.

I have never found it necessary to remove any portion of the conjunctiva, nor have I ever had occasion, except in the case alluded to in page 214, to leave the ligature in longer than the fourth day, twenty-four hours being often sufficient to effect the desired object.

When I first employed the ligature in August, 1842, I was not aware of Dieffenbach's application of it, although I believe he had used it the preceding year. I believe, however, I was the first to employ it in convergent strabismus, or to have applied it in either case extensively in this country. In some of the cases in which I have employed the ligature, Luscitas, or fixity of the eye in the straight position, has followed, and usually in cases of divergent squint, where I had reason to believe paralysis and atrophy of the internal rectus had previously existed.

When the strabismus is caused either by permanent spasm, or even shortening of the internal rectus, as well as when there is paralysis of the abductor, it would be worth while trying the effect of putting on a ligature without division of the muscle, and attaching it for a few days in the manner described above.

Again, might it not be advantageously tried in restoring to a straight position those eyes that have become over-divergent after the usual operation?

ART. VIII.—*Practical Observations on a peculiar Ulcer of the Anus.* By J. J. SCALLAN, L. R. C. S. I., Lecturer on Relative Anatomy, and Demonstrator in the School of Medicine of Apothecaries' Hall, Dublin.

EXTENSIVE as is our knowledge of the diseases of the rectum, there is yet an ulcer of the anus, which, on account of the severity of the symptoms which it produces, and the close similarity which they bear to those caused by fissure in the same locality, it is of importance should be accurately discriminated; that, the affection being truly and early diagnosed, prompt relief may be afforded to the sufferer. This ulcer, it would appear, has not entirely escaped the observation of previous writers, but it is alluded to in such very general terms as make no approach to a precise description; and having had some experience of the protracted suffering which results from the affection not being properly understood, I am induced now to direct attention to it.

In order to the cure of any disease, the knowledge necessary for us to be possessed of is reducible to two great heads—diagnosis and treatment—both equally important, but the former by much the more difficult of acquirement. To the elucidation of these two essentials, I shall accordingly direct my endeavours; first, briefly summing up what has been already written on the ulcerations at the anus, that we may thus, with the greater distinctness, understand the diagnostic marks by which this affection may be recognized.

The ulceration described by Boyer, under the name of fissure of the anus, and subsequently noticed by Dupuytren, as occurring at three distinct parts of this region, each situation causing, according to this author, a difference in symptoms, and demanding a distinct mode of treatment, is a form of ulceration, which here calls for particular notice. Dupuytren, in describing this disease, says, "*Elle est accompagnée en general de douleurs si violentes qu'il importe*

beaucoup de pouvoir y remedier au plus tot; les douleurs presentent un caractere en quelque sorte special, c'est d'augmenter graduellement et de se prolonger longtemps apres la défécation;" but, at a subsequent part of his paper, he excepts from this description two of the three forms of fissure which occur here; for, in speaking of that which is found below the level of the sphincter, he says, "*Elles genant peu la défécation, n'occasionnent point de constriction du sphincter et par conséquent sont fort peu douloureuses;*" and again, of these above the level of the sphincter, "*Elles causent lorsque le malade va à la selle tenesme difficile à decrire qui cesse aussitot apres l'excretion.*"

Sir B. Brodie, in describing the preternatural contraction of the sphincter muscle, mentions, that we will sometimes meet with a small superficial ulcer immediately in front of the coccyx, the presence of which he refers to the irritation of the fæces, delayed in their passage by the contraction of the muscle. This form is but an accidental complication of the disease described by him as a "preternatural contraction of the sphincter muscle."

The same author proceeds to describe an ulcer at the anus, unaccompanied by preternatural contraction of the sphincter, which, so far as the latter circumstance is concerned, is identical with the ulcer about to be described, and a similar form of ulceration is noticed by Mayo and Copeland.

In the fifth volume of the Dublin Hospital Reports, an ulcer is described by the late Dr. Abraham Colles, which bears, in many particulars, a perfect similarity to the disease under description, though, in my mind, it is not quite identical with it.

In the twelfth chapter of the late Mr. Bushe's work on diseases of the rectum, we find him express himself in such a manner as leaves no doubt of his having seen the form of ulceration which it is my wish to describe; but he does not enter into any description of it. "In a sound constitution,"

he says, "though sometimes pretty extensive, it (the ulceration) is generally superficial, and without induration." This would imply that the excavated ulcer is connected with an unsound state of the constitution; which I have not observed, neither did Dr. Colles, otherwise he would not have failed to notice it.

Having thus briefly noticed the forms of ulceration already recorded, I shall now proceed to describe that to which it is my object to direct attention.

The symptoms which characterize the disease may be summed up in a very few words. It is ushered in by an uneasy sensation at the anus, increased on going to stool; as the disease progresses, the sufferings, during the act of defecation, become daily more aggravated, conveying to the patient a sensation of scalding, or of a red hot iron being introduced into the gut; on the completion of the act of defecation some relief is felt by the patient, but, after the lapse of a few minutes, the sufferings are renewed, and continue unmitigated for a length of time, varying, in different cases, from four to nine or ten hours, when they gradually abate, and, at length, leave the patient at perfect ease, until a renewal of the necessity for the passage of the fæces causes a return of the sufferings.

The symptoms here detailed are very nearly identical with those caused by one form of fissure of the anus, namely, that described by Dupuytren as occurring at the level of the sphincter, but, as I am not prepared to admit the perfect accuracy of his division, I shall in this essay speak of fissure in general terms. One difference, nevertheless, exists, and serves in most cases as a point of diagnosis, namely, that in the disease under description, the patient, during the interval, in most cases, suffers so slightly as scarcely to be cognizant of any annoyance, but, in fissure of the anus he is at no period at ease, suffering, during the intervals, a sensation of much heat and tension, which gives place, when the cause

for exacerbation arises, to the intolerable anguish hitherto considered the characteristic of the affection, and which is symptomatic also of the disease under consideration.

By attention to the point of difference just mentioned, we shall be enabled, in some instances, to diagnose the disease by the symptoms alone, but we cannot do so in all cases, and, when we take into consideration the unsatisfactory statements often made by patients, we may come to the conclusion, that in no case can we thus arrive at a complete diagnosis; in fact, whereas we can simply, by the symptoms, diagnose those two affections from all others, we cannot separate one from the other until we shall have resorted to a manual examination.

On proceeding to the examination of the anus, we are first struck by the absence of that permanently contracted state of the orifice, which is an almost invariable accompaniment of fissure. Generally speaking, in the disease under description, the orifice is as lax as in the healthy state, or if it be in any case contracted, it is but slightly so: this lax state of the orifice allows the examination to be made with much less pain to the patient, and equally less difficulty to the surgeon, than in the case of fissure, circumstances which cannot fail to attract the attention of any one who has had experience in those diseases. On proceeding with the examination, the next point which attracts attention is the absence of the fissure. We seek at its usual seat (the lateral and posterior parts), but find that no fissure exists. If the finger be now introduced sufficiently far to be on the level of the upper part of the sphincter, laid flat on the mucous membrane, and carried over its lateral and posterior parts, its extremity will sink into an ulcer, rather deep, and of a size varying from half an inch to an inch in diameter; the dipping of the extremity of the finger, and the sensation which the rough surface of the ulcer conveys to it, indicate satisfactorily the existence and situation of the ulcer, which

is confirmed by the sensations of the patient, for the words of Dupuytren, in describing the symptoms of fissure, are also precisely applicable to this disease: "*la pression fait ressentir beaucoup de douleurs.*" We also find in this disease, that, immediately on the pressure being made on the surface of the ulcer, the finger is grasped by the contraction of the sphincter muscle.

It will be perceived, that the ulcer which I have endeavoured to describe differs in many points from those noticed by the authors above mentioned; for instance, its size is generally smaller, and *it is excavated*, &c. &c.

The reader will observe the great similarity between this ulcer and that described by Mr. Colles; but he will also observe points of difference sufficient to prove that they are not identical. If I were to reason from the symptoms, I would say, that they are the same disease, occupying different situations. The ulcer of Mr. Colles, being situated above the sphincter, and that under description on its level, we would thus have two forms of ulcer (excavated), as we have two forms of fissure, one above, and one on the level of the sphincter; but I have not sufficient experience of Mr. Colles's ulcer, to say, whether this explanation be borne out by observation.

The treatment which this ulcer demands is identical also with that so successfully practised in cases of fissure, the symptoms of which it so closely resembles, namely, division of the sphincter muscle, an operation, the performance of which is devoid of danger, and, in the present disease, owing to the laxity of the anal orifice, of difficulty also, the only instrument required being a long, probe-pointed bistory, either slightly curved or straight, which, having been placed flat on the index finger of the left hand, is, by the introduction of the finger, carried into the rectum; the extremity of the finger having sunk into the ulcer, is carried to its upper edge, where it is allowed to rest; with the right hand the bistory is now pushed upwards, until it also

touches the upper edge of the ulcer, the bistory is then carried boldly downwards and outwards, cutting completely through the substance of the muscle, and making the wound and the ulcer one continuous surface, as recommended by Mr. Colles. The after treatment is sufficiently simple; a dossil of lint dipped in oil, or smeared with simple cerate, is to be introduced into the gut, which, in a few days, should an ichorous discharge, which in some cases occurs, demand it, is to be replaced by a lotion of Ol. Olivar. et Liq. Plumbi Subacet. This will, generally speaking, be sufficient to complete the cure; in some cases, other mild applications may become necessary, but never any of a severe character.

The following case will serve as an example of the disease, and will illustrate the observations which have been made.

—— Keenan, a labourer, æt. 30, of abstemious habits, felt uneasiness on going to stool, which gradually increased so much, in the course of a few days, as to cause him to apply for relief; accordingly he consulted a medical man, who prescribed an electuary for him, which he continued to take for about a week; his sufferings having nevertheless gradually increased. I was then requested to see him. I found him in bed, to which, he said, he was confined by the debility caused by the excessive pain which he endured. He stated that previously to going to stool he was at perfect ease, but, when the necessity for an evacuation arose, he suffered the most excruciating torture, sufficiently so to cause the sweat to roll from his forehead, and to produce a sensation of faintness; he was slightly relieved on the completion of the evacuation, but, after a few minutes, his sufferings were renewed, and continued to harass him for several hours, when they gradually abated, and at length left him at ease, until a renewal of the evacuation caused a similar paroxysm.

Having by an examination assured myself of the nature of his disease, I proposed an operation, to which he refused

to submit; I then resolved to treat him by anodyne enemata, not in the expectation of thereby curing the affection, but, under the circumstances, I determined to make the experiment of this mode of treatment. I accordingly ordered him to use an enema containing 45 drops of Tinct. Opii, whenever he would suffer pain, and of those he used one or two each day, and thus obtained so much relief that he believed himself to be undergoing a rapid cure: after a few days, however, his sufferings resumed their former severity, and yielded but in a very slight degree to the use of the anodyne: at length, after a lapse of eight or ten days, worn out by the permanence and intensity of pain, he consented to the operation, which was performed in the manner described above, cutting completely through the sphincter muscle. The hæmorrhage was slight; and a dossil of lint dipped in oil was placed in the wound.

This patient never afterwards suffered from the peculiar pain of the affection. On visiting him the day after the operation he expressed, with the greatest delight, the comfort of his state. After a few days, an ichorous discharge having appeared, the wound was dressed with a lotion composed of Liq. Plumbi Subacet. et Ol. Olivar., which caused it to heal rapidly, and the patient has since remained perfectly free from annoyance.

Whilst engaged in committing those observations to paper, a case appeared in the *Lancet* (May 17th, 1845), which, though not belonging exactly to the description of ulcer under consideration (being an example of the superficial form, that which has been already described by most of the authors above-mentioned), nevertheless proves two points of very great importance; first, the mildness of the symptoms caused by the superficial ulcer as compared with those resulting from the excavated (the form under description), and from fissure of the anus; and secondly, the prompt and effectual relief given by the operation.

I would recommend its perusal at length to my readers.

In this case a labourer, æt. 40, of an unhealthy aspect, was formerly a sailor, and resided in the West Indies for eight years. He was admitted into hospital under the care of the physician, but during his residence he began to be troubled with pain upon passing his stools; this increased, so much that he stated it almost prevented him from passing them at all. When he did so it was accompanied with considerable pain, of a sharp character, which continued half an hour after; he frequently observed a few drops of blood upon his linen after the evacuation. He subsequently came under Mr. Luke, and the rectum being inspected by means of a speculum, a superficial ulcer, about the size of a threepenny piece, was discovered at its posterior part, just within the sphincter. The sphincter was divided by cutting directly through the ulcer. The next time he evacuated the bowels he had lost the pain previously felt, and experienced a mere soreness from the incision.

The first step in our investigation must be an inquiry into the cause of the symptoms which characterize this disease, and which appear to me very simple of explanation. The fæces, in their passage, not only press upon the surface of the ulcer, but, by distending the anus, necessarily stretch it also, and break the granulations; a portion of the fæces adheres to the surface of the ulcer, and, thus forming a source of irritation, causes that continued spasmodic contraction of the sphincter muscle, which, bruising the ulcer, serves to keep up the uneasiness. Now, the relief of the patient is to be accomplished by the healing of the ulcer, which can only be effected by adopting such measures as shall place it at rest, an indication at once fulfilled by the section of the sphincter muscle, by, in fact, destroying the power by which those contractions take place.

The treatment by caustic is disposed of by stating, that, even admitting it sufficient to cure the disease, it would, nevertheless, be a much more objectionable remedy than the operation, on account of the severity of the application, as the pain produced by it is of the most severe description, and lasts for several hours. On the other hand the operation is performed in a few seconds, and, when skilfully executed, the patient becomes instantly relieved from the peculiar pain of the disease, and never again suffers from it.

In conclusion I beg to make a few practical observations on the treatment of fissure of the anus, and which are equally applicable to the ulcer which I have described, and which may be called "the excavated ulcer of the anus."

In some instances the operation apparently fails to relieve the patient. A case such as the following will occur. An individual suffering from fissure will be operated upon; he will experience some relief, but not to any extent, and, after a day or two, the operator finding that he has failed to cure the disease, has recourse to the use of powerful escharotics, thus inflicting upon the patient an increased amount of suffering; relief from the pain of the disease is thus obtained for a few days, but again the patient suffers, and is only relieved by means of anodyne fumigations and fomentations, &c. After the lapse of a considerable time, and the endurance of protracted and severe suffering, he is finally cured. Having had an opportunity of examining a case such as that just mentioned, I can state that the failure is not in the operation, but in the operator. In those cases the operation has not been fully performed, and the sphincter has been only partially divided, cut *into* but not cut *through*. Simple as this operation is, there is none in the range of surgery in which the maxim "suaviter in modo, fortiter in re," requires to be more strictly kept in mind. The excessively tender state of the parts demands imperatively the "suaviter in modo;" hence all introductions of specula, &c., should be avoided, being exceedingly painful, and quite

unnecessary, and the absolute necessity for the total division of the sphincter equally demands the "fortiter in re."

Having, when making allusion to fissure of the anus, spoken of fissure in general terms, it is necessary, for the sake of distinctness, to state, that did I perfectly agree in the division of Dupuytren, I should have spoken of one form of fissure only, namely, that situated at the level of the sphincter muscle, because he restricts to this form all the cases of fissure which exhibit the symptoms to which those of the ulcer of the anus bear so perfect a similarity. I have no reason to doubt the accuracy of the division into those on a level with, and those above the level of the sphincter, but I believe that some cases of fissure below the level of the sphincter exhibit symptoms which are restricted by Dupuytren to those on a level with the sphincter.*

* We are inclined to believe, that the ulcer thus accurately and minutely detailed in the foregoing graphic description, is identical with that mentioned by the late Mr. Colles, in the fifth volume of the Dublin Hospital Reports, page 155, in 1830, and subsequently lectured on, at the College of Surgeons, in 1835 and 1836, when he entered more fully into its peculiar characters and mode of treatment, than we find in the terse but faithful description of it in the work just alluded to. In that mentioned by Mr. Colles, the ulcer was situated at a short distance from the anus, was attended with purulent discharge, and sharp pain on going to stool, which continued for an hour or two afterwards. On examination, the finger sunk into the small hollow cup of an ulcer with hardened edges, but soft in the centre.

In his lectures, we remember this eminent Professor mentioning the peculiar laxity and "*ever-shaped*" condition of the external margin of the anus. His mode of examining these ulcers was, we believe, peculiar to himself, and consisted in the introduction into the rectum of a conical piece of polished box-wood, representing, in its transverse section, a full ellipse, on one side of which a large blunt gorget was accurately fitted, so that, when placed together, they presented a perfectly smooth outline. Having introduced this for nearly three inches into the gut, the wooden plug was pushed slightly outwards with the thumb, while the handle of the gorget was retained steady in the palm of the hand. By this manœuvre the gorget was disengaged from its groove, and the plug withdrawn, and then the surface of the gut could be seen reflected on the polished concave surface of the metallic instrument, and its lower portion accurately examined with the eye, by directing the patient to evert the anus as much as possible. Several forms of specula have been since invented, but few better than this simple apparatus, which gave very little pain on its introduction; and the pupils of Mr. Colles will long remember the tact and dexterity with which he conducted these anal examinations. Might not the simple cylindrical speculum used for investigating the condition of the membrana tympani or os uteri be advantageously employed in these cases, to which, if necessary, a prism could be attached. Mr. Colles concludes his article in the Dublin Hospital Reports, by detailing his means of cure, which was "to introduce into the rectum a convex-edged scalpel, and make an incision through the entire length of the ulcer, continuing it through the sphincter, and dividing the edge of the anus."

It is to be regretted, that in the volumes of lectures lately published with the consent of Mr. William Colles, those lectures upon diseases of the rectum and anus, subjects with which the late Professor was particularly conversant, to which, in latter years, he paid a great deal of attention, and which he fully entered into in the concluding portion of his course, during the last few years in which he filled the chair of surgery, should have been so meagrely reported. The lecture on ulcer of the rectum is nearly a literal transcript of the article in the Dublin Hospital Reports.—Ed.

Art. IX.—Plastic Surgery.—*Practical Observations on the Operations for cleft Palate.*

Die Gaumennaht.—Staphylorrhaphe, Uranorrhaphe, Uraniskorrhaphe, Kionarrhaphe, Velosynthesis.

[From the German of Professor Dieffenbach.*]

This beautiful, ingenious, and skilful operation, which consists in bringing together the wounds formed artificially in the borders of the cleft palate, and uniting them by means of sutures, can only be undertaken with success on grown persons. It owes its invention to Von Grafe, who practised it successfully for the first time in 1816. After him Roux was the first who repeated the operation, and many surgeons have since that exercised themselves in the same field—Chelius, V. Ammon, Baum, Philipps, Ebel, &c.; and I have

* *Die Operative Chirurgie Von Johann Friedrich Dieffenbach.* Erster Band. Leipzig. Brockhaus, 1845, p. 856.

been also successful in many cases in removing, by my own methods, the most complicated cases of this nature, as well as bringing the operation into more general use, and rendering its results more fortunate and sure.

The principal object of the operation is to improve the speech; any defect or split in the palate, whether in the margin or on the middle of it, as well as when there is an aperture in the hard palate, causes an impediment in the speech, and a particular snuffling, inharmonious sound. When the defects or splits are greater, and stretch over the whole palate, the speech becomes entirely unintelligible, and the sound of the voice a continual unmodulated noise, a guttural hissing through the throat and nasal fossa; and when the cavities of the mouth and nose are not separated, there is, in speaking, a continued and free emission of the breath. The second inconvenience connected with the division of the palate is the difficulty of swallowing food, especially liquids, which frequently escape upwards through the nose. In the case of double hare-lip (*Hasenscharte* and *Wolfsrachen*), with projection of the inter-maxillary bone in the shape of a truncated knob, there is, on account of the separation of the superior maxillary bones and the palate bone, a deep slit dividing the palate and uvula, which forms both its ends, as the extreme points of the cleft. This is the highest degree of this congenital defect which is connected with hare-lip; but sometimes it occurs without any division of the lip.

Observation shews us the following degrees; the least is where the uvula (*Zäpfchen*) is altogether or partially divided, or where the slit extends more or less into the soft palate, so that it is cleft one-half or more, or altogether, as far as the palate bone. If it extends further, the palate bones are separated posteriorly either partially or altogether, or even to the edge of the alveoli; and the lip is either entire or is singly or doubly divided, on one side, together with the bones of

that side, while on the other a slit exists in the lip, unattended by separation of the alveoli.*

Another direction of this deformity is where it is turned outwards; the lip is divided either like a single or double hare-lip, or the slit extends to the alveolar process on one or both sides, and then approaches the place where the inter-maxillary bone joins the upper middle jaw bone (*Oberkiefer der Mitte*); and the palate bones are separated anteriorly to the extent of one-half or even altogether.

The velum is here sometimes perfect, and sometimes more or less divided, until we again arrive at the highest degree in that direction.

A third form of separation is where it begins both in front and behind, behind with a division of the uvula, and in front with either single or double hare-lip. In the higher degree the slit penetrates backwards into the palate, and in front into the upper jaw and palate bones; and lastly, the slit is still greater, and there remains in the middle of the palate only a small bridge of bone. Sometimes the posterior slit is disproportionably long, or the slit in the palate particularly large, and then that of the lip is small; or the reverse takes place.

All clefts in the lips or palate that have come under my observation belong to one or other of these forms. I have only observed a single case of congenital oval opening in the soft palate, without division of the uvula or palate bones, which occurred in a young medical student.

The breadth of the slit in the palate varies as much as the length; as a general rule, the small slit is narrow, the

* We have lately had an opportunity of examining a very remarkable case of a child about a year old, in whom, from the appearance which it then presented, it was evident that hare-lip existed in utero, but was closed by some process of union which took place prior to the birth, for there was a well-marked cicatrix in the usual situation, extending from the left side of the root of the septum to the red border of the lip, where a slight cleft, as after the surgical operation, still remains.

large wide, and the larger proportionally wider. This depends upon the greater or less contraction of the muscles, which are in some instances weak and thin; in a case of long slit the edges are not widely separated. The cleft in the palate has mostly an elliptic form, widest in the middle, and posteriorly, where the parts of the uvula approach each other; it has seldom the triangular shape: and still more seldom are the sides in straight and parallel lines with a top round.* If the cleft extends through the entire bony palate, and through the alveolar apophysis (*Zahnhöhlenfortsatz*), then there is, as we have already observed, on each side only a narrow rudimentary soft palate which ends in two thin points. The divided palate is sometimes thick and sometimes thin, but the edges especially are often very thin.

If the soft palate only is divided the edges are thick, and the slit not very wide, and here a favourable result may, in general, be expected from an operation; but when the cleft is very wide, the edges are thin, and particularly when the bony palate is divided, and there is only a rudiment of the soft palate on the sides, success is doubtful. A large congenital cleft gives more hope of cure than a small one caused by abscess. The palate closure is less successful in cases of slits and holes caused by syphilitic, scrofulous, and mercurial sores, than by congenital defects; in the first because the palate is made hard and unpliant by previous inflammation: but in the last it is both pliant and extensible. Wounds in the palate which are caused by accidental injuries, or other accidental causes, are the easiest cured by sutures.

The operation on the cleft palate, and that for vesical fistula (*Blasenscheidenfistel*), are the two most difficult operations in surgery. The situation being unfavourable, the stiffness and sensibility of the parts, and the difficulty of respiration,

* In the original, the figures of these various shapes are introduced into the letter-press.

make this task (in the former) more difficult. The thinness of the edges, the slight breadth of the surface of the wound, the covering of the mucous membrane, so unfavourable to any plastic process, the continued moisture caused by the increased secretion of saliva, the great tension, the want of support of the partition, and the continual motion caused by breathing and swallowing, are altogether such difficulties to the healing, that a successful operation is really wonderful.

Preparatory to the operation Ebel has already recommended to deaden the sensibility of the parts, either with the finger or a lint pencil, and that the patient should be directed to observe his defects with his mouth open before a looking glass. This is very useful advice, for, men who suffer from chronic ulcers in the throat, by frequent gargling and pencilling, lose altogether the sensibility of these parts. Nevertheless I never could succeed in these preparations; the patients did indeed, in my presence, put their fingers deep into their mouths, until they retched, but told me, with wry faces, that if they could not dispense with this preparation, they would rather forego the operation altogether. I have, therefore, latterly, not tried these preparations.

The following are the instruments used in stitching the palate:—1, a small fine hook, such as is used in the operation for squint; 2, a small, narrow pointed knife, with an octagonal handle; 3, a long narrow forceps, with toothed extremities; 4, a straight, feather-spring palate pliers, provided at its distant extremity with a thick, furrowed, button end; 5, palate needles and lead wire; the first are half an inch long, flattened, and three-cornered at one end; and at the other round, hollow, and internally provided with a screw, into which the wire can be fixed: the wire must be of pure lead, and new drawn, for old wire is very brittle. 6, a corn forceps (*Kornzange*); 7, a pair of plain curved scissors; and 8, for the closing of small holes in the palate, a small eared hook and thread-like lead wire.

I. OPERATION FOR CLEFT OF THE SOFT PALATE.

At this operation the patient sits opposite the window, the head being supported by an assistant; he then opens his mouth, draws in his breath, and puts down his tongue.

1. *Incision of the Edges.**—The edge of the cleft palate is seized in the middle by putting the hook through it from within outwards; the knife is then pushed through near the hook, and drawing it with a sawing motion upwards and forwards, a strip about the breadth of a straw is removed; the knife is then turned downwards, and the lower part cut off, pulling it away with the hook. The same is done at the other side. The patient is then allowed a little rest, and to wash his mouth with cold water; but he must not gargle, as the palate is too much irritated by it.

2. *The Insertion and Closure of the Fastenings.*—If the cleft extends over the whole palate, four or five fastenings are required. The needle is first put in the holder, so that the rounded end fits closely in the furrow, while the point projects in a proper manner.† The instrument (needle), thus armed, is passed through the cleft, first in the upper part,

* In the original, *Bludtigmachen der Rander*, literally "bringing out of blood on the edges."

† We have had an opportunity of seeing Dieffenbach perform Staphyloraphy on three occasions, in each of which he used the lead ligature; but we only saw one of these cases subsequently, and it was successful. Those who have attended the clinique at the Charité at Berlin, are well aware how difficult it is to observe the result of his operations, for the moment the patient is operated on, he is removed from the theatre to the wards of the hospital, where none of the pupils, and very rarely foreigners, are allowed to enter. Splendid exhibitions of manual dexterity, particularly in minor and plastic surgery, and various and improved modes of operating, may be witnessed, but certainly not the result of operations discovered or statistically recorded, under the teaching of this distinguished surgeon. In using the lead ligatures, it is not mentioned in the text that they are first pointed accurately in a conical manner, and then screwed tightly into the female screw of the steel pointed needle, than which they are a little less. Two great objects are achieved by these ligatures: their flexible nature allows them to be gradually

and the palate pierced through about three lines from its edge, from within outwards, on one side. When the needle appears sufficiently advanced through the palate it is laid hold of by the *Kornzange* in the left hand, and loosened by pressing the spring of the needle-holder; the needle and the wire are then drawn out of the mouth with the forceps; the second needle is then put in the needle-holder, and, drawing the wire further out, it is also pushed through the cleft and the palate pierced through on the opposite side, as in the former case, and the needle and wire drawn forward till the centre of the latter comes into the cleft. The ends of the wire, with the needles attached, are then cut off, and the wires twisted together until the edges approach each other a little. This (the twisted ligature) is then turned aside into the corner of the mouth, or the assistant can hold it on the upper part the cheek. The other three or four sutures are then put in at measured distances, and moderately twisted, by which means the edges are made to approach but not touch each other. The wires are then by degrees twisted more and more, and the coagulated blood of the wound is removed with a small sponge, applied on a forceps;* at the tighter twisting together, one side of the wire is supported close to the palate by the forceps, that the soft part be not torn.

tightened from time to time till the operation is completed by the approximation of the edges, and they are also much less liable to cut through in case of strain than the usual thread ligature. Our Dublin surgeons are well acquainted with an ingenious instrument made by Mr. Maclean for the purpose of passing thread ligatures through the soft palate, in cases of operation; and to this gentleman we are also indebted for a very ingenious mode of fastening the sutures by passing a small perforated shot through both ends of the thread, and, running it down on the palate, closing it there by pressing it with a pair of pliers.—See "Account of Cases operated on by Sir P. Crampton and Mr. Cusack," in vol. xxii. of this Journal, page 321. See also vol. xxiv. p. 167.

* We have long been in the habit of using this latter apparatus, which is a very convenient and useful instrument in small plastic operations. It consists in a bit of fine sponge, of the size of a marble, fixed in a spring forceps, the legs of which cross each other.

If the cleft is near closing, the upper ligature is then cut off with a flat bent scissors, about four lines from its insertion, and the double end is twisted closer together with a pliers. The same manœuvre is then performed with the other sutures. Before the wires are finally twisted together, a small piece of sponge is pressed into the space between the sutures, in order to clear off the blood. The wires are then twisted more closely together, till the mucous membrane covers the rings, so that they are scarcely seen; the ends of the wire are then again shortened with the scissors, blunted with the pliers, and turned away from the tongue, and the mouth is washed with cold water. This is my mode of treatment of clefts that are not very wide, and whose edges can be joined without much straining; but if the cleft is wide, so that the palate would be over-strained in twisting the wires, the union does not succeed; the stitches would either tear through at once, or ulcerate out in a few days, therefore,—

3. *Side Incisions are necessary.*—One side of the palate is pierced through with a scalpel, half an inch from the edge, and half an inch from the end of the wound; the velum is then cut through upwards, in a sawing manner, to the bony palate; another incision is made on the opposite side; the blood generally flows copiously, and the mouth must be washed frequently with cold water. The beneficial effect of these incisions shews itself immediately; the still strained palate hangs down lax, like a damp curtain, and the wounds on the sides appear like two oval clefts, which would admit two fingers. The painful and straining sensation which penetrates into the ears also ceases immediately, and the air passes freely in and out through them.

Side incisions are necessary before the entire closing of the cleft, in the higher and extreme degrees of this defect; and they especially give a possibility of closing after all the wires are put in, a little twisted together, and the original

cleft lessened; but if on a second twisting of the wires there still remains a cleft of a finger's breadth, one side is to be pierced, and the palate cut through as near the cheek as possible. A similar incision is made on the other side, the twisting of wires is then to be continued until the cleft is closed, and the ends of the wires are then to be cut off.

The patient must remain in bed, more in a sitting than a recumbent posture, and the watching of a careful assistant is very necessary; and the mouth must be rinsed from time to time to clear away the mucus, which collects in large quantities, and adheres to the ligatures, to assist which a piece of sponge fixed on a small stick is of use. Only water and mucilaginous drinks should be given to the patient, but not lemonade, because it induces coughing and oxidises the wire. On the third day the mouth may be washed with lukewarm water, or elder tea, and on the fourth, being assured of its complete adhesion, by probing it with a camel's hair pencil, one suture may be removed. The end of the wire is first turned to one side with a forceps, and a piece of the ring which now appears cut out, it is then turned to the other side, and the double twisted end cut off, the remaining portion of the ring may be then removed. On the fifth and sixth days the other sutures may be taken out. Frequently the operation succeeds in uniting the entire cleft.

In smaller fissures of the soft palate, which only extend over half or a third of the lower part, two or three stitches are usually sufficient: the shorter the cleft the narrower it is also, and the more probable the success, than in large clefts. If the sutures cut through the edges, and the cleft opens, the wires must be removed, and no attempt made to unite them for some time. Sometimes the stitches suppurate, so that only one remains. Here they must be speedily removed, except that one, for the support of a bridge; the breadth of a straw affords a greater probability of success at a subsequent operation, because this bridge gains four-fold in

breadth, through the complete healing of the remaining edges of the cleft: the preservation of union in the lower half is always fortunate, because there then remains only a short cleft with the borders approximated, which can afterwards be completely joined. If all the sutures have cut through, the operation is then indeed frustrated, but it does not lessen the probability of success at a subsequent period; still it is advisable to defer any other operation for at least a year, because, till then, the scars have not become soft, nor the palate resumed its extensibility. I have often succeeded in an operation, which I had before tried unsuccessfully. In one instance (a young lady), on whom three operations had been performed by an experienced hand, I succeeded completely in closing the cleft, with a leaden ligature, after other methods had failed.

As regards the artificial side incisions, they usually close without any assistance from art. There generally arises, in a few days, a granular condition of the edges, that fills them up; and if this protrudes too much, it can be reduced by touching it with Nitratas Argenti.

II. OPERATION FOR PARTIAL OR TOTAL DIVISION OF THE HARD PALATE, WITH EVEN EDGES.

The cleft in the palate is in these cases usually large, and a side incision after the insertion and partial twisting of the sutures, is always necessary. The intention of this operation is to unite the palate, to lessen the cleft in the palate bone by degrees, and at last to close it, and, in the mean time, to put on an obturator, or plate with which the opening is covered.

In cases of very wide cleft in the hard palate, where there is only a rudiment of the soft palate, the closing can be effected by previously lessening the cleft of the palate bone. The edge of each palate bone is pierced through with a strong, straight, three-cornered punch (*Pfriemen*), and a thick, soft

silver wire put through the opening, the ends of which are twisted together. The mucous membrane is divided near the place where the palate bones join the alveolar processes; a thin, smooth, concave chisel is then put to the bone, and it is cut through on both sides. The wires are then twisted again, till the edges of the bony cleft approach each other a little, or altogether; the first alone can be generally done. The ends of the wire are then cut off. The effect of the closer approximation of the edges of the cleft in the bone is immediately perceptible in the soft palate. The side slits in the bone, which are at first filled up with lint, close themselves by means of copious granulations, according to the usual process. The edges can sometimes be brought still closer by twisting the wire: by the application of the hot iron, or Tincture of Cantharides, which renders them purulent, and the bony spaces are lessened. When the space in the bone is either closed or diminished so much, that the cleft in the soft palate is considerably lessened; the sewing of the palate may then be undertaken, according to the directions already given, and side incisions made in the soft palate before the sutures are put in.

The rest of the operation, besides the exciting of the granulations on the borders of the bony cleft, consists in the removal of the mucous membrane, and pressing it into the slit; the loosened edge is then pierced with fine leaden sutures, and the place where the skin has been removed is filled up with dry lint.

The sutures, after a few days, generally break through, and the granulations that arise in the place where the skin has been taken off, prevent it from retracting altogether, and a part always remains in the cleft. This operation is to be continued from time to time, until the cleft is removed.

III. THE DIVISION AND REUNITING OF THE SOFT PALATE.

The incision of the soft palate is a necessary commencement to any operation for the extirpation of the steatomatous

swelling which adheres on each side of the palate. The palate is cleft exactly in the middle upwards from the uvula; the sides of the palate immediately retract, and the rest of the operation is performed according to the rules already given.* If the patient is not exhausted, and that everything is in readiness, the opening in the palate may be immediately reclosed, and the operation on it be continued in the manner already described. But if the passage is not free, on account of the thickness and swelling, as one of the chief objects of the operation must be to afford free respiration, the opening in the palate must not be closed, because the extirpating and astringent means can be introduced through it, and the result watched; and the aperture is not to be closed till it has succeeded in relieving the patient from his sufferings. When only a partial opening is necessary, about a finger's breadth is left undivided in the palate. I was successful in many operations of this sort.

Accidental wounds in the soft palate I have only met in boys, and always from falling on a stick or a tin trumpet, which gets between their teeth, and in one case from falling on a drum stick. These wounds are always ragged, the rag hanging downwards, and they are always in the soft palate, because it (the instrument) is stopped by the edge of the bone. In closing these I have mostly used a strong crooked needle, applied by means of a needle-holder, and it generally requires two or three thread sutures. Ferrier tells us of an instance where a man pierced through his palate with a stick, which he held between his teeth, having fallen in jumping over a ditch. He brought a thread through by means of a metal tube which was held by the teeth, and another through the nose. Not to be imitated.

* The rules adverted to are those recommended for the removal of polypi by means of hooks and curved scissors, to which we shall refer in a future volume. The operation described above is for the removal of tumours behind the soft palate.

IV.—TREATMENT OF THE OVER-LARGE OPENINGS OF THE SOFT PALATE.

Very small openings in the soft palate, that either remain after a partially successful stitching, or are caused by penetrating sores, may be closed by exciting inflammation in the borders. For this purpose concentrated Tinct. of Cantharides is the most effectual; Lapis Infernalis causes the loss of a layer of the organized mass, and the process of inflammation that follows produces an insufficient granulation, so that the hole generally increases in size. The concentrated acids recommended by many surgeons for exciting inflammations, only produce a superficial corrosion of the borders; nor does such a quick granulation follow their use as that of the cantharides.

If the opening is large and oval, and the palate soft, the edges are cut evenly to fit to each other, leaden sutures are then put through the edges with a small eared hook, and twisted as already mentioned. If the cleft remains after the palate stitching, the approach of the edges is easier, and the closing more probable than where the edges have become callous through ulceration. If the oval opening extends over more than half the palate, and remains after the operation for cleft palate, the cure is performed with the same instruments, and in the same manner as at first, there being plenty of room. But where only a bridge-like union has taken place, the narrow slips are best left alone at the incision of the edges (a second time), because if the union does not succeed they will readily suppurate, and a point remaining open at this place can afterwards be easily closed by constant touching of the edges with the Tincture of Cantharides.

In cases of round holes in the soft palate, caused by abscesses, we should not attempt to cut them into an oval form, the more easily to unite their edges, because if that operation does not succeed, the hole remains a great deal larger. The

skin round the edges only is to be removed, and one or two leaden wires passed through with the small hook; a crescentic incision is then made in the palate round one-half of the hole, and the wires are twisted together. This side opening, is next filled with charpie. This secondary incision closes itself by granulations: and the original, either through the first intention, or by means of the granulating process. Sometimes it is advisable, especially if the opening is large and oval, to make elliptical incisions on both sides, at short distances from the edges, and then close the sutures. I have oftentimes succeeded in this manner in closing holes in the palate. But none of these operations are so sure of succeeding the first time as in the case of an operation on hare-lip; only an improvement can be expected, and that often after great trouble and perseverance.

V. MANAGEMENT OF OPENINGS IN THE HARD PALATE.

Small holes in the hard palate are healed by granulation which is produced by concentrated Tinct. of Cantharides; a bundle of light charpie, tied together with a thick, strong thread, and moistened with the tincture, is inserted with a forceps into the opening which it is made to fill; and, that the patient may not swallow the charpie, it is fastened outside the mouth to the cheek, by the long thread and adhesive plaster. The lint is to be removed after it has remained in an hour.

If the opening is larger, and the edges covered with a thin skin, the borders are cut round within about a quarter, or half an inch of the edge; the skin is pushed away from the bone with a scraper, and the opening fastened by a suture. The side wounds are filled up with charpie, and treated according to the directions given in cases of cleft of the hard palate.

In cases of large round holes, immediate success need not be expected; here the patient ought to have made, by a clever dentist, a palate plate (*Gaumenplatte*) to cover the

opening, but it should not project into it; it should be covered on the outside with a thin layer of gum elastic, and fastened by means of flat wire beams to the cheek teeth (*Backenzahnen*). The speech is by these means completely restored, but the closing of the opening need not be given up; the plate may be taken out every day, and the borders moistened with Tincture of Cantharides, and the plate replaced. In this manner I have frequently seen holes in the palate that a finger could be put through, closed up.

VI. COMPARISON OF THE DIFFERENT METHODS FOR STITCHING SOFT PALATES.

The decided advantage of the method for stitching the palate, given in the foregoing, as well as the great number of successful cures produced by it, have procured it great extension; the incision of the border of the opening is best performed by fixing it with a small hook, and cutting it off from near the hook with a knife, in a sawing manner, upwards. To believe that it can be better fixed by a hooked forceps, or a *Kornzange*, is as great a mistake as to think, that at an operation for strabismus, the globe can be easier fixed with a forceps than a hook.*

The palate can bear squeezing together less with pincer-like instruments, which irritate, than with the small hook,

* From this doctrine of Dieffenbach's, we are compelled, by long experience, to dissent. When, several years ago, the operation was first commenced, we used, in common with our neighbours, all manner of hooks and apparatuses to fix the eye, except those large double flesh hooks with which some London operators transfix the sclerotic. One by one we have gradually thrown aside these instruments, even with young children, and, desiring the patient to evert the eye, we instantly seize upon the conjunctiva between the cornea and the inner canthus, with a long, fine toothed forceps, which fixes the globe, and gives the operator a perfect command over its motions with the left hand, at the same time that it elevates the conjunctiva into a fold from off the surface of the sclerotic, and thereby renders its incision with a scissors held in the right hand, both secure, easy, and rapid. The *Kornzange* is a kind of forceps, or long pliers, with hooked extremities.

which is scarcely felt, in bringing the mucous membrane together. This part in particular shews its insensibility on the removal of the edge with a knife. This latter instrument is not only preferable to the scissors, but it alone can be used, because the edges of the cleft cannot be reached with the scissors, on account of the soft palate descending obliquely downwards behind the root of the tongue. If the soft palate had an opposite direction, scissors would be the most appropriate instrument, because, after fixing the point of the uvula, the edge of the cleft could be easily cut off with them, particularly as a moist glutinous border can be better cut off with a scissors than with a knife, but the uniting of the borders with leaden wire is of more importance than the mode of removing them. That a metal wire is not so suitable for the soft palate as a thread would appear evident, but the disadvantage is nothing in comparison with the advantage to be derived from it. If the insertion of the ligature through the border of the palate-cleft succeeds, the closing of the fissure by twisting the wire together is perfectly easy, because it can be done by degrees, without the least inconvenience to the patient, or irritating the palate or tongue. The most difficult part of the operation in using the silk ligature is thereby avoided or converted into a very easy one, for if waxed threads are used, it is very difficult to tie the sutures equally tight; if you succeed in inserting one well, one of the others may be too tight, or too slack, one may cut through, and the others may not keep well together; and this cannot be remedied, but leaden wire can by degrees be twisted together, so that all the sutures are equally tight.

The side incisions are furthermore of particular importance. Only when the sides of the soft palate are pierced through is the operation worth anything, or any way secure, and while without them we can only hope to close small openings in the palate:—with them we are able to cure the largest; because, by means of the wide openings of the side

incisions, nature is forced to a regeneration by filling them up with granulations, so that the palate gains, what it was deficient in breadth. Roux had an early idea in case of clefts that extend also through the hard palate, and are, therefore, very wide, to loosen the soft palate from the bone by transverse cuts, in order to bring the edges closer to each other. The palate does, by these means, indeed, yield a little, but if one operation does not succeed the whole of the soft palate is disqualified for another, because the patches draw back and become shrivelled up. But if the operation, notwithstanding the side incisions, does not succeed, the cleft, by means of the filling up of the openings, becomes less, and gives greater probability of success afterwards. The first sets everything on one cast, the second is, at the least, half successful. Nor is the operation, as Roux recommended, made easier by the suture being put in before the side incisions are made; the incision is, through them, made very difficult. Roux thought thereby to avoid the profuse hæmorrhage, and the motion of the anterior and posterior parts of the palate, but I have never observed either. What other surgeons did to attain that object varies greatly, and there is much that is ingenious, both as regards the *manuelle* and the instruments. Inflammatory means were also recommended for wounding the edges, instead of cutting instruments; Von Gräfe recommended *kali causticum*; concentrated acid of brimstone, and spirits of salts (*concentrite Schwefel-und Salzsaure*). Abel advises Tincture of Cantharides; Doniges a hot iron (*Glüheisen*). The best known cutting instruments are Gräfe's first chisel-like instrument for paring the edges; afterwards he used the knife. Roux advises taking hold of the edge with a forceps or *Kornzange*, and cutting it off with a scissors; but I have always seen him do it with a straight button-pointed fistula knife. Hruby uses the *Bakenzange** and

* A form of forceps, with one side flat, and placed at right angles with the other, already known in this country.

a knife, and operates with them in the same manner as with the bone lip-holder in the operation for hare-lip. The palate needles are of different shapes; Gräfe first used those strongly bent, and three-cornered, afterwards the lancet-pointed. Roux employed them larger, and more bent; Alcock half oval, with the point bent inwards; Ebel short, straight, and flat; Warnecke flat, with an ear below the point, and a whale-bone handle; Doniges used a hook needle with the handle bent backwards; Krimer's needle with a handle has a useless joint near the point; Lesenberg's pincer-shaped needle opens in the length, and closes by means of a sliding ring; Schwerelt's needle, in imitation of the former, closes by means of a spring between the branches, the ear is not oval, but three-cornered, and its neck thinner than at the point. The needles without handles are used by means of a holder.* The most useless of all methods and instruments is the insertion of sutures through tubes which protrude from the mouth, as in the case of under-bound polypus in the throat. That it may not be imitated I here notice Villemur's method. He uses a metal cylinder, and a wooden handle; an elastic needle is put into the channel, pushed through the cylinder with the handle, and bent into a half circle, when the edge of the palate is pierced through from within outwards, it is taken hold of with a forceps and is then drawn forward with a thread. I think Philips and Le Roi's ingenious apparatus too complicated; the newest instrument is the one invented by the dentist Hertig, which has a clincher provided on the top.

FORMATION OF A DESTROYED PALATE.

Staphyloplastice.—A complete *Staphyloplastik* would be a fruitless undertaking; only a partial restitution of a palate,

* We have slightly condensed this portion from the redundancy of language used in the original, as well as the difficulty of rendering by description the form of these different instruments intelligible to the English reader.

which has been destroyed by ulceration, and when the defect is on one side, can be undertaken. This operation is one of the most difficult, because the parts of the palate that remain after ulceration are rough and uneven. The operation is performed in the same manner as in cleft palate; after fixing the edges of the defective palate with a small hook, they are cut off, and made even. Sometimes there are edges on both sides, sometimes only on one, and on the other a very narrow border. After the wires have been put through the borders, they are twisted together until a tension is produced, when the inner surface of the cheek on each side is cut into, a few lines deep in a downward direction, about an inch from the border of the palate; the wires are then twisted a little tighter, so that these side incisions are made to gape, and the membrane of the cheek is drawn into the place of the deficient part of the palate. The membrane of the cheek is then again loosened with a pair of flat bent scissors, and the loose part once more drawn inward to fill up the vacancy by twisting the wires still tighter. It is of course understood that this operation is practicable in certain cases only.

The growing together and blending of the palate with the back of the pharynx, requires an operation which is also a form of *Staphyloplastie.* This circumstance is most deplorable, and persons afflicted with it are far worse off than those who have lost the velum altogether; it is generally the consequence of scrofulous ulcers, on the inner surface of the palate and side of the pharynx, whose granulations have thus grown together. Sometimes it causes a perfect separation of the throat and cavity of the nose, and sometimes there remains in the middle a rounded opening, overgrown with mucous membrane. The persons thus affected are usually deaf, on account of the closure of the Eustachian tubes. The operation consists in loosening the palate from the wall of the pharynx, which is more troublesome and difficult than the ordinary operation for cleft palate. The patient

is placed on a chair with his mouth wide open, then, a cross incision is made with a small scalpel with a long octagonal handle, about half an inch below the place where the parts have grown together: the margin is then fixed with a small hook, and separated a little from the posterior wall of the pharynx; the further separation upwards is effected with a bent lancet-shaped knife, and at last it is cut away with a flat bent scissors. A narrow spatula-shaped iron is then pressed backward through the nose, to loosen the adhesions at the upper part;—the incisions being completed, the only means of preventing the parts again adhering, is effected by passing a thread on a small bent needle through the edge of the palate, on both sides, a short distance from each other, the ligatures are then tied, whereby the border is drawn back about half an inch, and the threads cut off near the knots; other sutures are to be applied until the edges are sufficiently drawn up. The operation of loosening of the palate is, without this retraction, generally unsuccessful; I have, however, sometimes succeeded in keeping the parts separated by passing down through the nose a small strip of linen,—that is, where only the lower part of the palate was attached; but if the whole of the posterior wall of the pharynx has grown to the palate, there is but little to be expected from it. In the subsequent treatment of it, the stitches are to be allowed to remain in until they cut through.

APPLICATION OF THE PALATE-PLATE.

There are intruments of this description both for the hard and soft palate.

Obturator for the hard Palate.—That for the hard palate should be so formed, that while it closes the aperture, no air can penetrate by it, that it does not constrain the tongue, and that it restores the speech so well that the most accurate ear is unable to detect any defect. Formerly, and even until very

lately, a piece of sponge was frequently used, to press into the opening; the closing is by this means indeed effected, but after some time the aperture is so much enlarged by it, that it is deprived of all chance of ever growing together again. I have thus seen persons with an opening in the palate, where only a quill could be passed through, after a few years wearing of the sponge so increase it, that a finger might be inserted. The fixing of the sponge in a gold, silver, or platina plate, which covers the edges of the opening while the sponge goes into it, is more ingenious: the closure of the opening is thereby indeed better effected, but the extension of the edges is still not prevented by it.

The only good plate for the palate is one that, protruding outwards, covers the opening, and fits accurately on the unevenness of the palate arch; it is fastened to the back teeth by means of thick, round, gold wire studs, which extend beyond the hard palate, and are applied with a thin clasp. On the side next the palate the plate is covered with a thin layer of caoutchouc, in order to close it the better, and to prevent too great pressure.

[Here follows a description of the usual mode in which dentists take casts of the mouth with a piece of softened wax, and also the mechanical manner of striking up the plate].

Obturators for the soft Palate.—These are dangerous apparatuses; every artificial means for the closure of holes or clefts in the soft palate, or for the restitution of the velum destroyed by burns, syphilis, or scrofula, are ineffectual, and therefore useless, nay, even hurtful. A tin plate can close a hole in the hard palate without inconvenience, because it excludes the passage of the air and food; farther down, the parts are more moveable and sensitive, and it is impossible to put on any apparatus well, yet the most of those on whose palates I have operated, were more or less provided with ingenious preparations

for filling up these clefts or deficiencies, without being able to use them, though they generally preserved them with a great degree of affection. At my particular request a gentleman once put in his artificial golden palate: he forced out a few inarticulate sounds, opened his eyes widely from pain, and quickly tore the foreign body out of his throat. If there happens to be an insensible individual that can wear a metal substance in the soft palate, his speech will be more unintelligible than without it, because the air, and even food and liquids, pass by the edges into the cavity of the nose. All artificial palates are formed simply on the concavity of the velum, and composed of gold, silver, or platina plates, with or without a uvula. They are sometimes made of one, sometimes of more pieces, joined by hinges, and, therefore, moveable. There are also very thinly beaten gold plates, or a plate of caoutchouc, and stretched on a frame, so that the middle of the instrument does not produce inconvenience; and this is particularly the case with a frame, in the edge of which there is a groove to receive, and press together the edges of the palate. We have as yet no perfect apparatus for cleft of the soft palate, only in the case of holes, the edges of which are callous, and where no operation would, for the present, be practicable, the patient may be allowed to wear a double gum elastic plate, without danger of increasing the opening, as a sponge does.

[This simple apparatus exactly resembles a shirt-stud, and is composed of three thin plates of caoutchouc, the small one being placed in the centre; it is the invention of Dieffenbach, and is also recommended by Pauli. The central plate should be made so small, that it will not touch the edges of the aperture while the two side plates retain the instrument *in situ*; by which means the opening is not increased.]

When the patient wishes to put on the obturator, he dips it into lukewarm water, and then presses together one of the plates with a plier*, and, standing before a looking-glass, inserts it into the opening. It ought to be taken out three or four times a week to clean it or put in a new one, as well as to touch the edge of the opening with Tincture of Cantharides when a closing may be expected.

PRESSURE MACHINES TO LESSEN THE CLEFTS EXTENDING OVER THE WHOLE PALATE.

In case of large clefts in the hard or soft palates of children, many preparations, the effects of which are the more powerful if it is connected with a hare lip on which an operation was early performed, are recommended for the gradual closing of the cleft in the upper maxillary bones. That a slit in the palate could be closed by an operation on hare lip, is an illusion that was formerly very prevalent. The most effectual machine for the gradual closing of the upper maxillary bones are those which Jourdain, Levret, and Lewis recommended. Autenrieth, Weinhold, and Maunoir also advised pressure to be applied on both sides of the upper maxillary bone. A thin steel keel that goes over the head, whose ends are provided with circular plates that lie on the cheek bones, is most appropriate. In little children the effect of this apparatus is very considerable, and the gradual lessening of the cleft in the palate bone is, after some time, quite perceptible. Grown-up people seldom possess the necessary perseverance; but with them this apparatus is quite useless.

[The admirable work from which we have taken the foregoing extracts, will, we feel assured, be one of the most popular that has appeared in Europe for some time, particularly that portion of it which treats of Plastic Surgery. In our next Number we will follow up this subject. In the meantime we must inform our critical German readers we have here endeavoured to translate ideas, not words.]

BIBLIOGRAPHIC NOTICES.

On the Nature and Treatment of Gout. By WILLIAM HENRY ROBERTSON, M. D. London, Churchill. 8vo. pp. 372.

WHATEVER question may arise with respect to the term gout, as regards its pertinent and proper application, it would seem to be generally admitted, not less professionally than popularly, that the disease going under that title is specially the inheritance of the rich and the indolent—of those who repose upon the lap of luxury, and indulge in the excesses of the table, those on whom the sun of fortune has favourably smiled, and who are in the habit of living more for themselves and less for the world at large. Gout has been designated an aristocratic disease, in the strict sense of the word, combining, as it would appear, the aristocracy of intellect with the aristocracy of wealth, and usually laying siege to those who use the empire of the mind more than the slavery of the body. It is also said to hold a prominent position among the fashionable diseases of the day, and, therefore, is to be met with in those resorts which are frequented by invalids in the higher walks of life.

How far climate and country favour its propagation is a matter of much speculation, but it is not improbable that commercial prosperity, with an advancing state of the arts and sciences, exercises some share of influence in its development. As the circumstances immediately connected with its manifestation are clearly of such a nature as can apply but to a certain grade of society, and that comprising a very small section, when compared to the general mass, it might *a priori*, be expected that a modifying influence, such as would tend towards uniformity, steadiness, and simplicity, would stamp either its course or its character. Still, strange though it may appear, the contrary is exactly the case. For were we to wade through, and sift every disease in the most comprehensive nosology, we could scarcely hit on one so capricious in its approach, and so changeable in its complexion. For weeks and months its well-known forebodings have been significantly heralded forth, while on other occasions not the

slightest premonitory symptom is to be recognized. And when it has set in in a regular form, there is no calculating on its duration; the mildness or severity of the symptoms affording no certain criterion for judging, and its retreat being oftentimes no less sudden than its advance.

The vast variety of features which it assumes, and the wide range which it includes within its sphere of action, have conjointly contributed towards endowing it with the faculty of simulating other diseases, so faithfully, and so much to nature and life, as to render the diagnosis not less a matter of difficulty and deep perplexity, than one of very grave and vital embarrassment.

There is scarcely a symptom, or an assemblage of symptoms, ordinary or extraordinary, which it has not occasionally exhibited, whether to indicate a slight deviation from perfect health, or to more distinctly indicate the presence of a fierce and formidable incursion. A simple palpitation of the heart, a sense of lightness in the head, a slight irregularity in the pulse, an acidity of the stomach, a flatulent eructation, a transient cough, a wheezing in the larynx, an ague-like chill, a puffiness about the ancle, an indescribable sense of irritability, oftentimes alternating with despondency, may individually and collectively be as much the legitimate offspring of what is called the gouty diathesis, as the torturing pain and spasm, with those more serious affections of joints and internal organs, as represented by symptoms of anchylosis, paralysis, vertigo, stupor, delirium, asthma, angina, and syncope, which mark and distinguish the several species of the disease in their acute and more aggravated stages;—inflicting on the wretched sufferer either a sudden and a deadly blow, or entailing such an amount of general distress and mental agony as to render the constitution a perfect wreck, and life itself a scene of endless and universal misery. There is no organ or structure of the body that does not, in some shape or the other, fall under its influence. The trunk, extremities, smaller and larger joints, superficial and deeper parts, and all the organs of sense, are open to its attacks. The bony framework of the system gives woful evidence of its ravages. The different functions also, both animal and organic, are directly or indirectly affected, either in the arrest of their ordinary and natural duty, or the supervention of a totally deranged and unhealthy condition.

The foregoing general observations, which we felt it necessary to premise, may afford some reasonable explanation why it is that gout, more, perhaps, than any other affection,

opens so wide a field for medical disputation, and why it also constitutes a rich and luxuriant harvest to the empiric and to the ignorant pretender.

The author, therefore, who would take in review the general complexion and individual features of the disease, separating the real from the spurious, the essential from the incidental, who would trace it to the fountain head, ascertain its nature, study its character, and watch its course, noting down each deviation; who would carefully observe the various effects of remedial agents, who would narrate facts faithfully and intelligibly, neither distorting by preconceived notions, nor obscuring by vague phraseology—such an author would at least make a move in the right direction, and add much towards dissipating the shadows which cloud the subject, as well as take from the disease some share of its Protean pretensions, and make no small advance towards establishing a system of treatment on a basis at once solid and substantial.

The present author presents himself to our notice with what may be called reasonable claims, and with pretensions of no mean order. He is a practitioner of some standing at Buxton, a locality so long and so highly celebrated for the beneficial effects of its waters in gouty affections. The circumstances in which he has been placed have undoubtedly afforded rich materials for proper investigations, and when he tells us that the disease has engaged much of his time and thoughts, we are naturally disposed to look with a favourable eye on a production from his pen. But it is not on those advantages, of so obvious and valuable a nature though they be, that he would found his reputation. The great advances in chemistry and its collateral sciences, are alone sufficient to have justified him in laying before the Profession "a new work on a disease so intimately connected with a humoral and" (as he observes) "it may, perhaps, hereafter be written, a chemical pathology." This is a clear intimation that he keeps pace with the improvements of the day, fanning the lambent flame of philosophic research, and reaching the temple of fame through those brilliant pathways in medical truths which the genius and acknowledged labours of a Liebeg have discovered. From this it would clearly appear that our author is a humorist, and the revival of the humoral pathology may be styled as nothing less than a rekindling the light of other days, long since faded. He, however, is not exactly a humorist of the old school, he has not at hand the four humours to

explain the different types of diseased condition, and he constantly employs those terms in reference to the solids, the nerves, and blood-vessels, which the overthrow of the humoral pathology called into use.

The author deems it necessary to open with some preliminary observations, from which we extract the following:

"Gout is produced by such a degree of interference with what have been well called the organic laws, as diverts the amount of nervous influence, which is necessary to the due performance of the functions of the capillaries, to other—it may or may not be nobler and higher—uses; thus interfering with the free conversion of arterial into venous blood, impeding the rapid deposition of new materials and the equally rapid removal of the old, giving time for chemical changes in the contents of the capillaries, and for the formation of crystallised materials, the irritation of which is probably the immediate cause of gout and its consequences. Whatever has the effect of interfering with the communication of the salutary and needful influence of the nervous system to certain capillary vessels may be a remote cause of gout.

"Gout cannot, under any circumstances, be looked upon as an unimportant malady, nor as affording to the system a desirable and useful exit for crude and noxious matters, and thereby saving it from more serious and life-endangering diseases. It is a disease *sui generis*, and for which the seeds must be sown a long time before it can shew itself; which other diseases cannot produce, although they may excite or aggravate one of its paroxysms.

"Gout is a disease which occurs in paroxysms, which, when not modified, are sometimes distinctly marked; the duration and course of which are definite, several of them constituting an attack or fit of the disease, having an interval of longer or shorter time between the fits, but leaving a greater liability to its recurrence, and at shorter intervals, after every succeeding fit.

"Other diseases may excite, but they cannot produce gout; which is not a secondary affection arising from some other morbid condition, but a primary disease, having its peculiar predisposing and proximate causes, which other diseases can only excite or aggravate, and with which they may have no connexion whatever. Therefore, when gout supervenes upon other ailments, they are not to be regarded as having produced it, although they may have acted as its exciting cause; nor when those ailments have been greatly relieved, or perhaps entirely removed, on the supervention of gout, is the gouty paroxysm to be looked upon as their result, but as having influenced them by diverting the determination of blood from the organs previously affected, and in the same proportion relieved their morbid state.

"It is generally unwise, and sometimes unsafe, to check the development of a gouty paroxysm. In this respect, gout resembles the exanthematous, and some other diseases. This is no proof that gout

is a desirable result of morbid action, but that the system, having become gradually and increasingly deranged, can only be relieved by a paroxysm of the disease, or by disease of some central and vital organ; this being the usual consequence, and always the risk to be incurred, when a paroxysm of gout is checked, or its development interfered with; a risk which ought only to be incurred under peculiar circumstances, and then to be prepared for and lessened, as far as may be, by all the means that medicine affords.

"Although the occurrence of the gouty paroxysm often relieves, or removes, previously existing derangements, it does not lessen their liability to return. Gout is not, as was once supposed, a direct means of diminishing the tendency to other diseases. On the contrary, by disturbing the equilibrium of the circulation, diminishing the tone of the capillaries, deranging the nervous system, and interfering with or impairing its influence on the secreting and excreting organs, gout becomes an important agent in increasing the morbid tendencies of the system, aiding other causes of disease, and lessening the probabilities of life. The immediate relief afforded to deranged states of organs by a paroxysm of gout, must not be confounded with its ultimate consequences. Gout can only remove or diminish pre-existing derangements, by its derivating or evacuating action; and there could hardly be a more uncertain and severe counter-irritant, or a more hazardous evacuant, than a fit of gout."—pp. 2–5.

The more detailed considerations he divides into six general heads. 1st. The remote cause and the predisposing cause. 2nd. The exciting cause. 3rd. The nature of gout. 4th. The treatment of the paroxysm of the disease. 5th. The treatment after the paroxysm, and during the intervals between the paroxysms. 6th. The means we possess of preventing altogether the access of the disease. He considers hereditary influence the principal remote cause, observing generally that the children who most resemble the gouty parent are the most liable, have the disease earlier in life, and also to a greater degree. The other causes are substantially as follows;—sedentary habits, undue exercise of the mind, particularly in intellectual pursuits, mental emotions, depressing passions, irregularities of diet, gluttony, intemperance, habitual over-indulgence in sleep, insufficient muscular exercise, variability of the atmosphere, moisture of climate, a residence near the sea coast, &c. &c.

He enters on each cause respectively, giving a physiological detail of the *modus operandi*, specifying the influence on the functions of the body, locally and generally; and after travelling far and wide, repeating the same journey over and over, we fall in with him on his favourite hobby-horse, *plethora*, an old name, but a new being altogether, of *humerous* disposition no doubt, still withal of vast power, and almost universal means of adaptation; carrying his rider ahead with increased speed, and mounting over difficult and dangerous passways hitherto inapproachable.

We beg our readers' attention to a portion of his credentials.

"From the account of the remote causes of the gouty diathesis it will have been gathered, that it is by inducing or adding to a plethoric habit, that they produce this diathesis, and that plethora is probably the predisposing cause of gout. It should be remembered, that plethora is not confined to those cases in which much is added to the fluids and solids of the system, but includes those cases in which less of the solids and fluids is expended than is received; and that consequently a man of spare habit, who is abstemious and temperate, may, by taking too little or too much sleep, or by sleeping at irregular periods and at variable times, or by long-continued sedentary habits, or by taking exercise at irregular periods and in varying amount, or by using his mind unduly, produce in his system the same result as the *bon vivant* and intemperate arrive at by an opposite route. This explains the apparent anomaly of people so different as the sedentary, spare, pale-faced student, and the bloated and unctuous high and full feeder, and the gross, rubicund, and pimple-faced sot, should so often be victimised by the different diseases to which plethora lays the train; and it serves to give intelligibility, correctness, and simplicity to the various means advised for the prevention of gout."—p. 38.

And lest the individual character of plethora may be mistaken as a plethora *ad molem*, or a plethora *ad spatium*, at page 51 he says:

"It means that condition in which the blood is probably excessive in point of quantity, and deficient in its proportion of serum, the red particles being in excess, and redundantly charged with fibrine;" and adds, "that every person so affected is more or less liable to gout."

And again at page 55:

"When gout first attacks the system it is backed by plethora, either actively or passively; the system is surcharged with nutrimentary matters, has abundant materials for sustaining the attack, and carrying on the struggle to a successful end. But after repeated attacks, when the plethoric condition has become less and less, from the advance of life or some other cause, when the vital energies are sensibly reduced, the attacks are less and less efficiently resisted, the disease triumphs more and more over the enfeebled and atonic system, the struggle becomes longer, the attacks run so insensibly into one another that the sufferer seems to be exposed almost constantly to gouty visitations, and, at length the powers sink, the energies are expended in the conflict, and the sufferer dies."

Here, to our surprise and disappointment, we find plethora stumbling. It would appear that all is not right as regards the *blood* of the animal. The plethoric condition, the "fons et origo" of the evil, becomes less and less, and, notwithstanding, a more serious and a more alarming state of things ensue.

Exciting Causes.—Under this head very little is said, and the specification of causes is almost identical with the predisposing, already mentioned, with the exception of local injuries, and perhaps imagination, which, as in the case of the celebrated Sydenham, when he was engaged in his work, was capable of inducing the worse fit of gout he ever had.

Nature of Gout.—In this stage we have plethora again before our view, but rather in the back-ground, still, however, playing an important part:

"Although it must be admitted that we do not know what is the proximate cause of gout, the condition with which the disease is intimately connected, and upon which its phenomena seem to be chiefly dependant, is well known. It consists in the deposition of lithic (uric) acid, and its compounds with alkalies, and principally with soda, in the fibrous tissues. It is this which serves to distinguish gout from other diseases, which is the principal feature of its morbid anatomy, and which guides its treatment, and influences its results."—p. 69.

He subsequently observes, p. 72, "whatever the condition of the fibrous tissue may be, it is probably the proximate cause of gout;" and then he contrasts the lithic acid diathesis of gout with that which contributes to the formation of a calculus in the kidneys and bladder, and maintains that the latter is chiefly dependant on climate and diet, and does not appear to be essentially connected with plethora, has no dependance on hereditary influence, and, in fact, that it is only a morbid excess of a natural product which is always found in healthy urine.

As regards the inflammatory symptoms of gout, he thus accounts for them:

"It is not improbable, that the irritation of the capillaries of the part, resulting from the throwing down of crystalline particles of lithic acid, or of its compounds with alkali, may be the true cause of gouty inflammation, and may help to explain many of the phenomena and peculiarities of the disease. The long period generally, and perhaps always, necessary for the formation of the gouty habit, the instant aggravation of the local derangement, and immediate development of inflammatory action, which follows the action of such exciting causes as would add suddenly to the amount of deposition, and so increase the degree of irritation to a point inconsistent with the normal discharge of the functions of the part, such as the formation, or the increased production of lactic acid, consequent upon a debauch, or an injury from a blow or a sprain, the various degrees of gouty inflammation, the rapidity with which the inflammatory action passes from one part to another, the degree to which the disease may be modified, its manifestation retarded, its violence moderated, and its duration shortened by alkaline medicines, by diaphoretics, purgatives, and other evacuants, and by carefully regulated diet, and, in short, all the phenomena of the disease, do probably countenance the hypothesis, that the deposition of lithic acid always attends an attack of the gout, and, perhaps, always precedes it."—pp. 78, 79.

He considers gout to be always of an inflammatory character, the degree of inflammation being very different in different cases and varieties of the disease, and though the deposition of lithic acid is induced and favoured by plethora, he presupposes an intermediate state of the system (the blood?) which is usually understood to be the very opposite to plethora, even taking the term in the sense in which he applies it:

"It is unquestionable that a cachectic condition of the system becomes engrafted on the plethoric, and contributes to the formation of of the gouty habit of body."—p. 98.

"Cachexia is probably inseparable from the gouty habit of body, and is perhaps a connecting link between plethora and the localization the disease."—p. 99.

History.—This branch of the subject which is almost inseparable from a description of the nature of the disease, is given at much length, and comprises a full account of the paroxysm, its varieties, stages, and symptoms, with the several morbid conditions coexistent with, and consequent on its incursion. Reckoning the most ordinary symptoms in the aggregate, we have

"Disturbed sleep, interrupted at times by violent starting of the limbs, and particularly of the legs,—cramp, sometimes affecting the arms, or the loins, but in a much greater number of cases the backs of the legs,—a degree of numbness of the lower extremities, said to be chiefly complained of in the thighs,—a tremulous convulsive movement extending down the limbs,—a sense of creeping under the skin,—slight and evanescent sensations of chilliness, affecting particularly the back and lower extremities,—slight stiffness, and even soreness of one or more joints, in some cases of many different joints in succession, sometimes amounting in degree togreat pain of one or more joints on attempting to use them, causing lameness when affecting the tarsal or metatarsal joints, and being often mistaken for a sprain,—a sense of general lassitude,—and more or less of stomach disturbance,

commonly attended with acidity. The degree of gastric derangement differs very much in different cases, being sometimes attended by unmistakeable gastritic symptoms. The bowels are usually costive, but in some cases, on the contrary, are irritable and relaxed. The state of the urine differs much in different cases, but is generally high-coloured, somewhat scanty, and slightly clouded, occasioning so much irritation of bladder as to render the necessity of micturition somewhat more frequent than usual. Mental irritability, the well-known stigma attached to sufferers from gout, and which commonly attends the paroxysm, frequently precedes its accession, manifesting itself in occasional and unreasonable outbreaks of passion, or of captiousness. This, alternated perhaps by extreme depression of spirits, is singularly remarkable in some people, previously to every paroxysm of gout, as well as during the fit."—pp. 102, 103.

He investigates the symptomatology of the attack in reference to the organs of circulation, perspiration, digestion, excretion, the liver, mucous membranes, kidneys, skin, and the nervous system, giving a somewhat minute and faithful analysis of the particular derangements and disturbances usually attendant thereon. He also gives a very ample description of the depositions in the joints, and those more serious alterations of structure which, fortunately but on few occasions, so strikingly mark the character of the disease:

"The deposition is not enclosed in an envelope of false membrane. Deposited outside the synovial membrane, it may fill the contiguous cellular membrane, or it may form a coating to the cartilages of the affected joints, or cover and burrow among the tendons which invest them, or even may extend to the tendons that are in their immediate neighbourhood. Those tendons which invest affected joints, as those which surround the metatarsal and metacarpal joints, the wrist and ankle joints, are of course the most liable to be mixed up with the deposition, and to have their functions impaired or destroyed by it.

"In extreme cases, the disorganization of an affected joint may proceed much farther than this. The synovial membrane may be gradually and extensively detached from its adhesions, it may be partially destroyed, and the deposit may make its way into the cavity of the joint. The substances of the cartilages may become involved in the disorganization; and they may be partially, and it is said they may be wholly, absorbed. Even the denser part of the bone, which is contiguous to these lesions, may be destroyed, the spongy tissue be exposed and reddened, the denuded extremity of the bone become covered with granulations, and these becoming eventually absorbed, the end of the bone, uncovered by membrane or cartilage, or its own denser external part, may be left naked.

"The forms in which the concreted matter presents itself may be traced to the attending circumstances: thus, its surface may be grooved, as in the joints, where it has been exposed to the effects of friction; or it may be in the form of detached grains, as when it becomes concrete in the cellular tissue, the walls of the cells being subsequently absorbed.

"It is extremely rare, however, that the disorganisation consequent upon gouty deposition proceeds to the extent that has now been set forth. The deposition very seldom penetrates into the cavity of a joint, and very rarely affects the articulating surfaces of the bones. In a very large proportion of the cases, its ravages are confined to the cartilages, the cellular tissue, and the ligaments. In some of these cases, the mechanical irritation of the concrete deposit produces chronic inflammation of the affected structures; suppuration and ulceration ensue; the concreted matter is broken down by the destruction of the tissue in which it had been deposited, and is mixed with the pus; the irritative inflammation steadily extends; the cutis becomes involved in the inflammatory action, and ulcerates; and the abscess thus formed, which has been gradually producing a more and more pointed external swelling, has at length an apex, that assumes through the cutis, as it becomes thinner and thinner, and finally through the cuticle, more and more of the singularly and characteristically white appearance; and at length the cuticle gives way in its turn, and the specific deposit makes its escape, largely mixed with pus, &c."—pp. 161, 163.

He adopts, in full, the terms of other writers, in reference to the different species of the disease, making one or two additions which are hardly justifiable, and concludes the history by pointing to the distinguishing marks between gout and rheumatism, as a means of correct diagnosis.

Treatment.—The consideration of the treatment, as the author justly observes, is to be determined by what is known concerning the nature, history, and symptoms, in connexion with the circumstances of each individual case. In the instance before us, it would seem to betoken somewhat of a rambling propensity, spun out and encumbered with theoretic speculations, not strictly appertaining to the purpose. Holding in our recollection the very decided position the author had taken in the preceding pages, we were preparing ourselves to be treated to some new nostrum of high value, which would chime in and harmonize with his favourite doctrines. We had induced ourselves to calculate that the sound of some never-failing panacea was to tingle in our ears, that some powerful medicine was at hand which would resolve the plethoric condition of the blood, or that some chemical agent was within reach, which was capable of decomposing the lithic acid salts that impregnated the capillary vessels. In the former case the gouty diathesis would have been alto-

together annihilated, the seeds of the disease blighted in the bud, and there could be no foundation whence the cachexy could derive its origin. In the latter, the grand focus of pain and mutability would be smothered, and the exciting cause of gouty inflammation would cease to exist.

But we fear much, that remedial means of such distinguished attributes must be admitted to hold a very remote place in the womb of time, and are quite beyond the point of all expectation. The author, however, is sanguine on the subject. The rapid strides of modern inventors tend to inspire him with hope, that the day for such a discovery is not so far distant. In the meantime, however, until the happy anticipation be realized, we are to find him in the uniform and calling of a routine practitioner, sober and steady, with no extravagant pretensions, no extraordinary cures to chaunt forth, steering that course which the intelligent and sensible practitioners of the day are in the habit of taking as their guide. In his system of therapeutics he follows nature as experience dictates, and modifies his remedies as symptoms may require, without adding anything in the shape of novelty or peculiar interest to claim attention.

Though he insists on the inflammatory character of gout he does not rush blindly into antiphlogistics. He is fully aware of the evil effects consequent on a hasty and inconsiderate depletion. He distinguishes correctly its use from its abuse, and advances some very judicious observations on those acute forms of the disease, particularly in the cases of special localizations which peremptorily call for so active, and, in the present instance, we may add, so critical a remedy. He also seems to entertain very correct ideas as relate to the proper administration of colchicum, and we agree with him fully in the view that its beneficial effects manifest themselves more directly and signally on the local inflammation than on the constitutional diathesis, whatever that may be. His remarks on the different combinations of the medicine, and on the various circumstances contra-indicating its use, are generally much to the purpose.

What he says of the numerous medicines, classified under the heads of diaphoretics, purgatives, sedatives, narcotics, tonics, and alkalies, &c., would be highly valuable, if he did not ramble so widely into digressions so foreign to the matter in question, and give himself so much the habit of constantly recurring to physiological inquiries of an obscure and mystical tendency. This is a fault of too glaring a description to be passed over. It is unbecoming to a degree,

and constitutes a lasting disfigurement of a practical treatise. Immediately succeeding the treatment of the disease, we have a section on "The Treatment and Management of the Gouty Habit of Body," which, as may easily be imagined, bears relation to all those means which have for their object the improvement of the general health, and of course include air, exercise, nourishment, temperance, agreeable occupation of the mind, &c. &c. On reaching the conclusion of the work, we are presented with a few chapters on "The Means of preventing Gout," and here we cannot avoid saying, that chapter the end is a true and faithful echo of chapter the beginning—both harping in the same *plethoric vein.*

Die specielle Pathologie und Therapie, vom klinischen Standpuncte aus bearbited. Von Dr. C. Canstatt. III. Band 7 Lieferung. Erlangen, 1844.

Special Pathology and Therapeutics, arranged from Clinical Observations. By Dr. C. Canstatt.

We have already noticed the foregoing portions of this valuable work, and now proceed to lay before our readers a few selections from the Number which has just reached us. Like the preceding ones it contains, not only a considerable amount of research, but also some original matter; and the author has bestowed great pains on its arrangement, which very much facilitates reference. It contains, in a very small compass, all the most useful information which the present state of medicine affords; and some of the author's observations open up new views to the reader.

In his paper on Enteric Pathology he remarks:

"Observation has shewn that alteration of structure is more frequently, and more strongly, exhibited in those parts of the intestinal tube, where its fæcal contents (even in the healthy state) experience a retardation in their progress, for instance, about the termination of the ilium, the cæcum, and rectum."

From hence he infers—

"That the quality of the fæcal matter exercises no inconsiderable influence in exciting, or at least forming, such pathological change."

The diagnosis of certain abdominal affections is confes-

sedly difficult. To assist our detection of the seat of an obstruction, or the alteration of position of some of the viscera, Dr. C. advises—

"That the colon be distended with a large enema, which renders the sound over this viscus dull on percussion, whilst the extension of the dulness (proportionate to the amount of fluid in the bowels) enables us to detect either the altered position of the gut, or the seat of the mechanical obstruction. To effect this the enema must be large, which, should it experience no obstruction, will inform us of the situation of the colon; for should the sound on percussion over the epigastric or hypochondriac regions, prove clear, it is evident that either the stomach or small intestines occupy those regions; whilst, by changing the patient's posture, we may alter the situation of the fluid in the colon, and, consequently, of the dulness occasioned by it."

Diseases of the rectum are not very likely to be confounded with each other; but Dr. C. conceives it possible:

"The spasm of the sphincter ani (nervous tenesmus) might be mistaken for inflammation of the rectum; but the severity of the pain in the former, as also its paroxysmal character, affording complete intervals of ease, the spasms not accompanying each fæcal evacuation, with the absence of tenesmus, sufficiently distinguish it from Proctitis; examination with the finger, however, confirms the diagnosis, as the mucous membrane remains healthy in the spasmodic affection. There is also a possibility of confounding Proctitis with dysentery, because of the scanty sanguineous evacuations, and the tenesmus, &c., which are common to both—for inflammation of the rectum, though occurring in dysentery, is by no means identical with it—severe abdominal pain, commencing in any of the regions occupied by the colon, and moving downwards to the rectum, inducing tenesmus, with the general constitutional disorder, sufficiently distinguish dysentery from the mere local affection."

Diarrhœa is one of those affections but too often submitted to a mere routine treatment, the impropriety of which is pointed out by Dr. Canstatt, who insists on the necessity of attention to the causal indication before having recourse to astringents and tonics, too often employed indiscriminately, and of which Dr. C. says:

"This indication requires to be fulfilled with caution. Diarrhœa is often attributed to want of tone of the intestines; astringents are improperly administered, which increase the existing irritation of the mucous membrane; these medicines, however, can only be used with propriety in those cases where positive debility, or passive irritability of the mucous membrane is known to exist."

Dr. Canstatt bestows high encomiums on the nitrate of silver as a valuable medicine in obstinate forms of diarrhœa; having succeeded with it after the failure of other remedies. He prefers the following formulary of Hirsh, who extols the Argenti Nitras as a special remedy for the diarrhœa ablactatorum.

"℞ Argent. Nit. Crystall. gr. ½, solve in Aq. distill. ℥ii.; Gumm. Mimos, ℈ii.; Sacch. Alb. ℥ii. M. D. in vitro. charta. nigra. obducto. The dose is from a tea-spoonful to a dessert-spoonful of this mixture every alternate hour."

The term "Ileus" is occasionally employed in a vague sense, being sometimes applied to any abdominal affection characterized by pain, constipation, and vomiting. Dr. C. limits its application to those cases—

"In which an obstruction occurs to such an extent as to completely arrest the progress of the fæcal contents in the intestinal tube, whereby the peristaltic motion becomes inverted, and fæcal vomiting ensues." "This definition of ileus implies that it is merely a symptomatic affection, inasmuch as the obstruction may be owing to a variety of causes."

To the interesting question, is there a purely spasmodic form of ileus? Dr. Canstatt furnishes the following answer:

"When the abdominal cavity of an animal is laid open and exposed to the contact of the atmosphere, we observe antiperistaltic movements of the bowels, which are increased by further irritation until they ultimately predominate over the natural peristaltic motion; now if we admit that increased reflex action from the nervous centre on the nerves supplying the intestines, is necessary to every form of ileus, it is evident that it is so far a spasmodic affection; but whether this spasm is idiopathic, i. e., is unpreceded by obstruction of a mechanical nature, is not yet agreed on. Its existence is denied by Abercrombie, Monneret, and others, because no well authenticated cases have been recorded; and those instances in which enemata and suppositories are said to have been rejected by the mouth in consequence of anti-peristaltic motion, seem to want the necessary authenticity. Professor Rokitansky's description of the origin and progress of ileus is as follows:

"'The idiopathic form of this complaint is rarely met with, and is always owing to atony of a portion of the intestine, which is the primary lesion, and the immediate consequence of which is an accumulation of fæcal matter. The exciting causes are sedentary habits, mental depression, the habit of overloading the stomach, the use of irritating cathartics, rheumatism of the intestines, or spinal and cerebral diseases.

The large intestine is the usual seat of this lesion, which disposes to accumulation and stagnation of its fæcal contents, and which, by distending the gut, increase its calibre, and ultimately paralyze it, when it becomes incapable of reacting on its contents, and ileus is the consequence. But in order to effect this, a certain amount of energy is required in the healthy portion of intestine situated above the obstruction; and this, which is essential to the establishment of ileus, is also the only means by which nature can remove its cause, for the action of this sound portion of intestine effects the removal of the fæcal contents of the paralyzed portion, whilst the latter may then regain its activity, and ultimately its normal condition. But the absence of sufficient power to effect this desirable result, allows accumulation and consequent dilatation of the bowel to progress to such an extent that a change of the relative position of the intestine takes place, by its sinking lower in the abdomen; there is, therefore, a more complete barrier opposed to the passage of the fæces into the portion of bowel below the obstruction; accumulation proceeds, and encroaches on the healthy portion of the tube which is situated above it, which is thereby excited to action which becomes inverted, and its contents are carried to the stomach, and thence discharged by vomiting."—*Rokitansky's Hebb. d. Path. Anat.* iii. s. 304.

"Amongst the many causes of obstruction, two in particular demand our especial attention—intussusceptio and volvulus.

"When a portion of intestine passes into another, in the same manner as the finger of a glove when drawn into itself, it is said to be intussuscepted, or invaginated; thus a portion of intestine, when contracted during increased peristaltic action, can be driven into a dilated portion contiguous to it, hence invagination, which may arise from a portion of intestine passing downwards into the part immediately below it (*invaginatio descendens*); or from its passing upwards into a dilated portion of the tube situated above it (*invaginatio ascendens regressiva*): the former is that usually met with, but both forms may occur in different parts of the same intestine. The small intestine is more frequently invaginated than the large, in which, however, it is occasionally met with, and to a very great extent, varying from a few lines to several feet, the greater portion of the gut becoming invaginated, and even projecting from the anus. Invagination is frequently observed in the dead subject, which probably occurred in the moments preceding death, and is to be distinguished from the true permanent invagination, which gives rise to symptoms of obstruction. The former is of small extent, there may be several present in the same subject, but they are unaccompanied by any trace of inflammation, or other structural change: they are common to children and adults.

"Simple invagination is found to consist of three layers of intestine, an outer, middle, and internal, or, as they are termed by Rokitansky, the sheath, and the tubes of ingress and egress. Similar surfaces in the invaginated portion are always opposed to each other, the serous to serous, and the mucous to mucous, whilst between the middle and inner layer a portion of mesentery is always impacted, which, together with the middle layer, is the first part to suffer from obstructed circulation and inflammation, giving rise to adhesion between the opposed surfaces, and terminating in gangrene, perforation, &c. The intussusception is occasionally doubled, and is then found to contain five layers of intestine.

"When the internal and middle layers of the intussuscepted portion of intestine inflame and sphacelate, they may be thrown off and voided by stool, and if during this process adhesion has been effected between the serous surfaces of the invaginated portion and its sheath, the continuity of the tube will be preserved, and recovery may be the result.

"Instances of such favourable terminations have been recorded, *vide* Frank, Richelet, and others; the portion of bowel thus cast off is of considerable magnitude, but the patient's recovery can only be attributed to the perfection of the adhesive process prior to the separation of the gangrenous portion.

"Volvulus, though differing anatomically from intussusceptio, is equally dangerous, and, presenting the symptoms of obstruction and ileus, is not to be distinguished from intussusception by any characteristic symptom during life. Under this head are arranged all those cases of mechanical obstruction arising from a twisting of the gut on its axis, or from its becoming entangled in the omentum or mesentery, and by penetrating the foramen of Winslow, or becoming ligatured by the vermiform process, or bands of false membrane, the consequence of lymphy exudation, or from dislocation of a part of intestine, whereby it is rendered unable to perform its peristaltic action, or from hernia, &c.

"Amongst the remedies recommended for the removal of intussusceptio, the mechanical dilatation of the intestines by the introduction of air, by means of a forcing syringe, has been chiefly insisted on by Rokitansky, Maxwell, Bremner and others."

The following diagnosis of tympanitis abdominalis, in which the air is situated in the cavity of the peritoneum, is interesting:

"Hitherto the differential characters of tympanitis, or meteorismus, and those furnished by a collection of gas in the peritoneal cavity, have not been well defined, and the diagnosis was occasionally rendered more difficult by the combination of both. Schuh has lately furnished us with the means of diagnosing these affections with greater certainty.

"In tympanitis abdominalis the gas is equally diffused throughout the entire cavity, rendering prominent the parietes, and elevating the diaphragm; and when the patient assumes the recumbent position, pressing the liver backwards towards the spine, thus substituting

a clear sound, on percussion over the right hypochondrium, for the natural dulness of this region, occasioned by the liver; further, the escape of gas per rectum brings no relief, nor is the swelling thereby diminished.

"Contrary to Abercrombie's assertion, a collection of gas may occupy the cavity of the peritoneum, unpreceded by perforation of the stomach or intestines; it may be exhaled or developed during the decomposition of unhealthy peritoneal exudation; or, it may possibly pass through the coats of the intestine (exosmosis) when suffering from great distention."

"The only remedial measure, in the case of tympanitis abdominalis, is puncturing the abdomen with a fine fork. Schuh selects, for this purpose, the most elevated part of the abdomen."

Mr. Roberton *on the Period of Puberty in Hindu Women.*

The July Number of the Edinburgh Medical and Surgical Journal contains a highly interesting and important paper by Mr. Roberton of Manchester, "On the Period of Puberty in Hindu Women." Mr. Roberton has already been the means of dispelling many false notions long entertained upon this subject, and we make no apology for laying before our readers some of the facts arrived at by his more recent labours.

After remarking on the absurdity of speaking of the Hindus as if the term applied to a single distinct race or people, instead of being, as it really is, the common appellative of the inhabitants of a vast tract of country, differing amongst themselves in religion, language, colour, and physical conformation, as well as in diet, and in most of their manners and customs, even more widely than the most diverse races on the continent of Europe, he writes as follows:

"Women anciently appear to have been more reserved and retired than they are in this part of the world; but the complete seclusion of them would seem to have come in with the Mahommedans, and it is even now confined to the military classes. The Brahmins do not observe it at all. Women, however, do not join in the society of men, are not admitted to an equality with them, do not eat with them, nor walk with them; the woman always follows the man, even when there is no obstacle to their walking abreast.

"As a general rule, the Hindu women do not learn to read. Against educating them there appears to exist a strong and deep prejudice, owing to a belief that, however proper an accomplishment reading and writing may be for dancing girls (who commonly possess some education), it is neither desirable nor decorous in women of respectable character.

"By the code of Menu, a girl might be married at eight, and if her father failed to give her a husband for three years after she was marriageable, she was at liberty to choose one for herself. The same infantile age for marriage still obtains. The bride must always be under the age of puberty, and both bridegroom and bride are usually under ten. This may be called the first marriage. There is a second ceremony, when consummation takes place, which happens as soon as ever the female reaches the age of puberty. This custom of early marriage amongst the Hindus is remarked in the earliest historical notices we possess of them by European writers. Indeed, amidst the great diversity of traits which may be observed in the manners of different Hindu tribes and nations, I am not aware that there is any exception to the universal prevalence of infantile marriage, and of consummation of the marriage, at the latest, on the arrival of the age of puberty."

Various attempts to glean some information as to the phenomena connected with utero-gestation in India, by inquiry amongst medical officers of the army, and Europeans resident in our Oriental empire, having utterly failed, Mr. Roberton bethought himself of applying to the Baptist missionaries in India, who promptly and readily exerted themselves to afford satisfactory answers to his queries. The Hindus, it appears, are in the habit of marking the occurrence of the first menstruation in the most open and public manner; the poorer classes wear flowers in the hair at the back of the head; the richer give a feast on the occasion; and the girl, who has generally been betrothed in her sixth or eighth year, then goes to live at the bridegroom's house, and the marriage is consummated. By the knowledge of this disgusting custom, and by making inquiries of the mistresses of female mission schools, the missionaries were enabled to afford Mr. Roberton most material aid in his interesting researches. Dr. Goodeve, Professor of Midwifery in the Medical College, Calcutta, also supplied him with a table containing the particulars of ninety cases of primary menstruation. We have not room for the insertion of these documents, however interesting, but must content ourselves with Mr. R.'s remarks on their contents.

"The ninety instances in the table are here drawn up to compare with a table for England, consisting of 2169 instances, collected by Dr. Robert Lee, Professor Murphy, and myself."*

"* See Dublin Journal, No. lxxvii. pp. 178, 1845."

Years of Age.	English. When menstruation took place.	Hindu. When menstruation took place.
8	—	1
9	14	5
10	55	9
11	77	16
12	142	27
13	263	9
14	396	8
15	417	7
16	340	5
17	215	1
18	138	1
19	65	—
20	33	1
21	9	—
22	4	—
23	1	—
	2169	90

"From these tables I find that the average age in England for the commencement of menstruation, deduced, it will be seen, from ample data, is fourteen years, and the average age for Calcutta, deduced from ninety instances, is twelve years and four months; shewing a difference of twenty months. In other words, assuming that the data in Dr. Goodeve's table are enough to warrant a conclusion, —Hindu women reach puberty, *on the average*, twenty months earlier than the women of England.

"Of course the number of instances from Hindustan will have to be increased manifold before a final satisfactory conclusion can be arrived at as to what is really the average age of female puberty. The data for England are now, perhaps, sufficient; those for Hindustan have had a fortunate beginning, and in a short time, we may hope, will be augmented by the zeal of other contributors. Probably the eminent professor to whom I am indebted for so valuable a communication, will yet add to the body of facts he has supplied. I am not without hope that such may be the case.

"Some of the inferences to be drawn from Dr. Goodeve's table and answers, and the letters of the missionaries, may be stated thus:

"1st. That the view of Haller, namely, that female puberty in the warm regions of Asia occurs from the eighth to the tenth year, is not only erroneous but wide of the truth.

"2nd. That the age for the earliest commencement of menstruation, either in Bengal or England, is *nine* years. The single case at *eight* in Dr. Goodeve's table might easily be paralleled in this country. An instance of the kind came under my own notice in the course of last year.

"3rd. That hence, although the *average* age of puberty, according to Dr. Goodeve and Mr. Wenger, is earlier in Calcutta than it is in this country, puberty does not actually appear at an earlier period of life in the one country than the other.

"4th. That the remarkable difference between the tables consists in the far greater proportion of Hindus who arrive at puberty at the age of twelve.

"To put this fact in as clear a light as may be, I have to observe, that in England, and the other European countries where tables of the ages of puberty have been collected, it has not been found that a large proportion of instances cluster at any particular year of age. On the contrary, the occurrence of the sign of puberty is distributed (as may be seen in those tables) over a number of years, but pretty equally in the 12th, 13th, 14th, 15th, and 16th years. Out of 2169 English cases, only one in about fourteen begins to menstruate at the age of twelve; whereas in Dr. Goodeve's table, nearly one in *three* begins at that age. May not the age at which marriage was consummated have been given by some of the Hindu women in place of the age when the menses first appeared? I put this query without, however, feeling sure that it deserves any weight.

"5th. That should it ultimately appear, from a sufficiently ample body of facts, that Hindu women reach the age of puberty earlier, *on the average*, than happens in Europe, this will be no conclusive evidence that the influence of climate is the cause. Jamaica, Antigua,* Barbadoes, and Granada,† are farther south, and have a higher mean annual temperature than Calcutta, and yet the facts derived from those islands shew that the age of puberty, in blacks and whites alike, is no earlier than in England. Upon this subject I will not now stay to enlarge, because I trust, in the course of a few months, to be in possession of the result of inquiries made in Surinam, British Guiana, and the West Indies, which will probably suffice to settle so much of this question as respects the alleged influence of climate in hastening or retarding puberty.

"If a difference of this nature exists between the European and the Hindu, it must probably be sought in race. When it is recollected that the consummation of marriage among the Hindus has taken place, at the latest, on the arrival of puberty, during the lapse of more than three thousand years, and that the practice is sanctioned by ancient laws, and consecrated by custom, it is easy to conceive that those females who were the latest in reaching puberty would be the least sought after for wives—that such women would not unlikely, in many instances, remain unmarried; and that thus (owing to the origination of a preference on this ground in the selection of wives, operating through a long period of time), Hindu women would gradually come

"* See "On the Period of Puberty in Negro Women," in the Edinburgh Medical and Surgical Journal, No. 152, 1842.

"† Dr. Robert Lee, in Lond. Med. Gazette, vol. xxxi. p. 162.

to consist, in a proportion different from that in Europe, of such as by constitution are early nubile. To me there seems nothing extravagant or far-fetched in this supposition. The production of a like state of things in England, in any particular district, is quite conceivable. Nothing is better established than that early puberty is a family peculiarity. Let us then only suppose the families possessing this kind of constitution to intermarry, and the peculiarity in question would be propagated, extended, and transmitted, and so a race distinguished by it would be produced.

"6th. That the very infantile age at which child-bearing has been known to occur in Hindustan, namely ten years, is not to be wondered at, considering the odious practice of premature sexual intercourse, the consequence of early marriage. Did the same obtain to an equal extent in England, the like consequence (well known facts warrant us in concluding) would unquestionably, to some extent at least, ensue. Mr. Wenger remarks that the birth of a child, even at fourteen and fifteen years, is a rare occurrence in Bengal. This, however, is not borne out by Dr. Goodeve, who affirms that a large portion of Hindu women give birth to a child before they are fifteen. That the latter is the more correct account there can be little doubt; for such a result must follow, of course, where marriage is universally consummated at puberty, or even, there is reason to infer, in many cases, earlier.

"Dr. Goodeve states that he has known menstruation in the Hindu continue to the age of fifty. Upon this point our information as yet is extremely limited. It would be nearly as important (for the determination of the question as to the age of puberty) that a full table of the ages when menstruation ceases, should be procured, as it would be to obtain more data respecting the ages when it begins, for if it should appear that Hindus menstruate, on the average, to as advanced a period as occurs in Europe, it would afford strong presumption in favour of there being no difference as to the age when this function commences. Moveover, facts regarding the ages when menstruation terminates are readily obtained, and their accuracy is generally more to be relied on than those which have reference to puberty."

After his paper had been printed, Mr. Roberton received from Dr. Webb, Professor of Surgery in the Calcutta College of Medicine, some additional documents which he published in an appendix. The first of these is an article

"*On Menstruation among Hindu Females.* By Baboo Modusoodun Gupta, Native Demonstrator of Anatomy to the Medical College, Calcutta, and Honorary Member of the Medical and Physical Society.

"At the request of my friend Dr. Webb, I have the pleasure to

forward the testimony afforded by our most authoritative ancient writers upon this subject, and also the result of my own observations.

"1st. SUSHRUTA says, 'The menstrual discharge begins after the twelfth, and ceases after the fiftieth year. The discharge returns every month, and lasts for three days.'

"Again, SUSHRUTA says, 'If a man under twenty-five deposit his germ (*garbha*) in a woman younger than sixteen, it will (most likely) die in the womb. Even if it be born alive, it will either soon die, or he will be imbecile and weakly so long as he lives.'

"2nd. ANGIRA, one of the Hindu lawgivers, says, 'that females are called *Gouree* when they are eight years old; they are called *Rohinee* at the ninth year; *Kangaka* at the tenth year; and after the tenth they are called *Rajaswalla*, or a female with menses.'

"3rd. ATRI and KASYAPA (Hindu sages) state, that 'if an unmarried girl discharges the menstrual fluid at her father's house, the father incurs a guilt similar to that of destroying a fœtus, and the daughter becomes *Brisalee*, or degraded in rank.'*

"I find it enjoined in the Hindu Shastras, that females should be given in marriage before their first menstrual discharge, and that, should marriage not take place until after this event, the marriage is regarded in a sinful light."

The remainder of the Baboo's paper we omit, as the substance of it is given in Professor Webb's observations, which we shall quote in full. The tables of menstruation, &c., drawn up by the Baboo Modusoodun Gupta, and Dwarikanauth-das Bosu, Assistant Curator, Medical College, Calcutta, we prefer combining in the following tabular form.

Age at First Menstruation.	8	9	10	11	12	13	14	15	16	17
Number of each mentioned in the Tables, .	2	2	5	21	29	30	34	4	1	2
Number in which the first menstruation preceded, by less than 12 months, the first birth, ...	0	0	0	9	13	17	8	0	0	0
Number of cases in which conception occurred, ...	1	2	1	14	26	26	17	1	0	0

Dwarikanauth-das Bosu also gives the names of thirteen individuals who continued to menstruate up to from sixty to eighty years of age. Mr. Roberton proceeds:

"Time does not permit me to offer more than one or two remarks on these Hindu tables, illustrative of the age of puberty, and of the age of first pregnancy in Hindu females; nor is this material, as they so entirely agree with, and corroborate in all particulars, the table of

"* The Baboo has supplied the original Sanscrit for each of the foregoing extracts from ancient Hindu authors, which, being unable to transcribe, I am compelled to omit."

Dr. Goodeve, to be found in the body of my paper. The average age of puberty for the ninety instances of Dr. Goodeve is twelve years and four months; and for the 149 instances in the two foregoing tables, the average is (omitting fractions) twelve years and seven months. The whole added together, amounting to 239 instances, gives the average age for the commencement of menstruation as twelve years and six months nearly.

"The average age for a first pregnancy, calculated from ninety-five instances supplied in these tables, is scarcely two years higher than the average age of puberty, a very remarkable and astonishing fact, as it proves the universal prevalence of marriage, or sexual intercourse at, or, as it would seem, *before* the age of puberty.

"I must likewise decline (for want of time) attempting to comment on what the reader finds in the Memoir of Baboo Modusoodun Gupta, though this will readily be admitted to furnish various particulars for serious reflection, with reference to the strange and affecting condition of native society in Bengal. The following remarks by Professor Webb, which I extract from his memoir entitled 'Pathologica Indica,' will, however, be found to supply a better comment than any which I could pretend to offer.

"'As my object is the illustration of *Indian* pathology, I shall consider it my province to give especial prominence to all that relates to India.

"'Now, it was upon an ancient theory respecting generation, very much resembling our own, that early marriages seem to have been instituted in India. It was said that if an unmarried girl has the menstrual secretion in her father's house, he incurs a guilt equal to the destruction of the fœtus; that is, according to the doctrine of Pythagoras and the theory of the ovists, all the material of the new ovum, and the ovum itself, is formed by the female; menstruation was, therefore, the loss of the ovum, or loss of the fœtus.

"'How strange, that a doctrine professing such regard for the generative germs, should lead eventually to a reckless destruction of the fœtus itself. The ovum of the female, passing off unimpregnated, is equal to child-murder. To escape this great sin, *children* are married; and at the tender age of eight, nine, or ten, before even this menstruation appears, are subjected to sexual intercourse; which, in some instances, is fatal to them. By law they cannot marry again upon the death of the *boy spouse*. Nay, if a Hindu girl be but one only of the 100 wives of a Koolin Brahmin, whose only trade is marriage, she can never be released at his death even, but must always remain a widow. And unless the Government should vindicate nature's law, and do as much to suppress polygamy as polyandry, there seems no hope for them. Thousands of women are thus living in hopeless celibacy, surrounded by institutions and practices, if not wholly subversive of chastity, at least very unfavourable to it: indeed it has no other safeguard than the dread consequences of losing caste.

"'The result of this state of things is a fearful amount of crime. Perhaps no country on earth has immolated so many new-born infants as India, nor has any race of mankind more generally practised the abominable art of murdering children when yet in the womb of the mother. The art of procuring abortion, and all its long train of evils, at once subverting both the order of nature and the end of being, is but too openly practised even now. Whilst the strong arm of a humane government has done much to cleanse the land from the foul stain of child-murder, it has not been able to reach this more common and secret practice of abortion, as many of the preparations in the museum sufficiently attest, and also that the death of the unfortunate mother is no uncommon result of this crime, which in other instances leads to hopeless sterility.

"'Climate has generally been the apology for these early marriages, which the more enlightened Hindus call the 'monster evils' of their country. But it is not common for girls in India to menstruate until after the twelfth year. I have known instances also in England of its taking place in the twelfth year. Those writers who lived in Europe before the fifteenth century, as the celebrated Michaelus Scotus and Albertus Magnus, speak of the twelfth year as that from which menstruation begins. Mr. Roberton, of Manchester, has been at much pains to prove that the age when this function begins, which is supposed to mark the commencement of the generative faculty in women, does not vary much in any part of the world; and I am happy to be able to confirm his views as respects this country. Girls, even in India, do not at once step from childhood to womanhood unless unnaturally *forced*. Out of a list of 127 Hindu females with which I have been favoured, it began only in six girls under twelve years of age, and as many of them did not again menstruate until a year after this, which they believed a *first appearance*, it is probable, as suggested by Baboo Modusoodun Gupta, that a ruptured hymen would better account for that. Thus 81 out of 127 are stated to have been twelve years old or upwards.

"Out of eighty cases thus furnished who had probably been subjected to the influence of impregnation from the age of nine years, there were only twenty-eight births under fourteen years of age; but similar results would perhaps have followed similar circumstances even in Europe, as may be inferred from what occurs in the semi-barbarous conditions of society there, or where the bands of decency and order are rent asunder, during the great revolutions and convulsions of states. Besides what we have seen in the records of the French Revolution, Aldrovandus (1642) cites observations that prove births to have occurred in Europe at eight and nine years. Home speaks of births at twelve and thirteen. Out of 127 cases reported to me of Bengalees, one birth is stated at eight and one at nine. I have not found that East Indian girls, and European bred girls, born in India, menstruate earlier than in Europe, and I have had, for nearly three years, a wide field of observation in the hospitals of the Government

Orphan School (under my charge), in which there are rarely less than 200 girls. It is not common for menstruation among them to begin until fourteen. The fact of a first menstruation is always reported to the head mistress, who has never known one single instance of its occurrence before the age of thirteen. Very often it is delayed till sixteen, seventeen, or eighteen. There is no difference in this respect between European, European-bred girls, and East Indian. Between thirteen and fourteen it is most common. It follows, therefore, that climate has less to do with this function than has been supposed, especially when we add, that instances occur in Bengal of native women having children at fifty and sixty. Twins were born as late in life as fifty-eight years in one instance, and sixty-five in another. In the last case, however, the mother died.

"'I believe that even the fact of the existence of this function having been well established, is no proof of the girl being fit to become a mother, that is, to bear a living child. Almost the only instances I have known here, of instrumental labour in European-bred females, were from their having married too young. Whilst if we look at the Europeans, Armenians, and Jews, among whom these childish marriages do not occur, we may infer that the Bengalee owes his physical inferiority less to the climate, than to this system of children begetting children. It was long ago asserted by Sushruta, that such unions can only lead to imbecility. And long before him, the Greek sages and lawgivers had acted upon it as an established truth.'

"The printed memoir, from which the above has been taken, as also the tables, I received direct by post from Calcutta, and it would seem to be part of a volume of Transactions now in course of publication, the first page in it being numbered 205. I feel myself under deep obligation to Professor Webb for having forwarded me so acceptable, I may say invaluable, a present as his packet contained."

"The above extract is illustrated by several learned notes, which I have been compelled for want of space to exclude. For the same reason also I have had to omit a number of facts scattered through the memoir which would have illustrated my subject. As a specimen of these I may mention the account given of a preparation contained in the museum of the College shewing the cause of death in a young Mahommedan female barely twelve years old, who died on the night of her nuptials, owing to laceration of the perineum and a considerable portion of the vagina, produced by violence inflicted in the consummation of the marriage.

The Pharmaceutical Latin Grammar, being an easy Introduction to Medical Latin, the London Pharmacopœia, and the Perusal of Physicians' Prescriptions. By Arnold James Cooley. London: R. Groombridge and Sons, 1845. 8vo. pp. 132.

We would recommend this little book to the attention of medical students, as well as to those who have already entered the Profession; it will well repay the perusal, being illustrated by numerous examples taken from the London Pharmacopœia, as well as the standard classics, and contains a copious list of abbreviations, exemplifying the construction of medical prescriptions. To the student it is plain and intelligible, the language simple, and the examples well chosen; and to the medical man, it is concise and easy of reference. Under the head of the "Translation of Physicians' Prescriptions," we find the following very just remark:

"The study of *written* prescriptions will be found more profitable than *printed* ones; as the student frequently finds less difficulty in the translation, than in deciphering the *nearly illegible*, though *fashionable*, writing of some of our principal physicians."—p. 108.

Many accidents have occurred from this cause, some of which have led to very serious consequences, the blame of which is too often laid on the wrong shoulders. And again:

"When medicine ordered in a prescription has been properly made up, the directions as to dose, &c., should immediately be attached, to prevent the possibility of mistake."—p. 113.

The importance of the above cannot be too strongly enforced; to which we might add that there should never be more medicines removed from their places than are absolutely necessary, and each should be immediately returned on being used; as accidents are continually occurring, and lives may be lost, by neglect of this simple but important rule.

A Treatise on the Diseases and special Hygiène of Females. By Colombat de L'Isere. Translated by Dr. Meigs of Philadelphia. Philadelphia: 8vo. pp. 718.

This volume constitutes another of our obligations to our brethren of America, which we should not be slow in acknow-

ledging. Next to a rich literature of their own, it is best to translate the best produce of other nations, and this our friends are doing. Dr. Meigs himself is of no small note in his own city and country, and very favourably known in Great Britain by his translation of Velpeau and his Philadelphic Practice of Midwifery, nor will his recent translation of Colombat lessen his credit.

Most of our readers are probably acquainted with the original, and therefore we need not enter into any lengthened analysis. It exhibits most of the excellencies of French medical writers, with some of their defects.

Dr. Meigs has interpolated a section on rheumatism which we are tempted to extract, both on account of the interest of the subject and because it affords a good example of the way the translator has executed his task.

"'Rheumatism of the womb,' says M. C., 'after having long attracted the attention of the German practitioners, was but little known in France, when M. Dezeimeris, in his journal (*l'Experience*), made public a series of facts already known and published by certain German authors. About the same time, M. Stolz, who had become acquainted with the labours of our neighbours on this subject, studied the affection at the Clinical Hospital at Strasburg, and communicated the results of his researches to his pupils. One of these gentlemen, Dr. Salathé, has very recently defended a thesis on this topic. To his work, and to the bibliographical researches of M. Dezeimeris, I am indebted for what I am about to say upon this disorder, which is hitherto unknown to our French nosologists.

"'According to Radamel, rheumatism may attack the non-gravid womb; but our business here is to study it only as occurring in pregnant women. It may attack at any stage of gestation, and we shall, therefore, after some general considerations on the subject, point out the influence it may exert in pregnancy, in labour, and in the lying-in.

"'*Causes.*—All such circumstances as are favourable to the development of rheumatic affections, may likewise lead to an attack of rheumatism of the womb. Thus exposure, whether momentary or prolonged, to dampness and cold, insufficient clothing, sudden transposition from an elevated to a very low temperature, and all other causes, constitutional and atmospheric, regarded by medical authors as occasional or predisposing causes of rheumatism, may also produce that of the uterus. But, besides these general causes, there is one peculiar malady under consideration. I allude to the facility with which this organ, under the thinned integuments of the abdomen, feels the impression of cold in the latter months of pregnancy; the abdomen being guarded, where it encloses the uterus, by extremely light garments, which are closely in contact with it, and the antero-sacral region being often badly protected by jackets of insufficient length.

"'*Symptoms.*—Rheumatism of the womb often attacks persons constitutionally predisposed to nephritis. It may coexist with a general affection of the same nature; but, in a majority of cases, the uterus alone, and the adjacent structures, are the seats of disorder. It has, besides, been frequently found to be a consequence of the sudden cessation of rheumatic pain originally situated in some other part, and suddenly transposed to the womb. Whatever may be the mode of its onset, the disorder is easily recognized by very decided characteristic features. Its principal symptom is pain; where not the least violence has been offered to the organ, the womb becomes the seat of a general or partial pain, the intensity of which varies from the very slighest sense of weight up to the most insupportable agony. It may affect the uterus wholly, or only attack some particular part of it, as the orifice, the fundus, or the cervix. Where the rheumatism is fixed in the fundus only, the pain is felt in the region above the umbilicus. It is increased by pressure, by the contraction of the abdominal muscles, and sometimes by the mere weight of the clothes; the patient, often, is unable to move; if the disorder is seated lower down there are shooting pains that run from the loins towards the pelvis, the thighs, the external genitals, and the sacral region, along the ligaments of the uterus. Lastly, when the cervix is the affected part, it may be known by the vaginal touch, which gives rise to excessive suffering. But of all the causes that serve to exasperate the pain, none is so distressing as the incessant motions of the child.

"'Like other rheumatic pains, those of the womb are moveable, and are observed occasionally to pass suddenly from one portion of the organ to another. They often suddenly cease, and proceed to attack some other organ. This is most apt to happen, when the uterine rheumatism has been preceded by a fixed pain of some other part of the body, and where remedies are in use calculated to recall the pain to its original seat.

"'These pains are characterized by frequent exacerbations that are variable as to their duration and intensity; according to the stage of the malady, they are succeeded by remissions, during which the patient scarcely complains of a vague sense of weight.

"'The pains of uterine rheumatism are generally attended with a degree of recto-vesical tenesmus, which is violent in proportion to the severity of the pains and the approximation of the seat of the rheumatism to the lower segment of the organ. In such cases, the patient is tormented by perpetual desire to urinate. The discharge of the urine is accompanied with smarting pain, sometimes with severe pains, and in some instances the discharge cannot be effected at all; the efforts to discharge the contents of the rectum are, in some cases, equally fruitless. Most of the German authors attribute this double recto-vaginal tenesmus to the rheumatic disease, which is not always confined strictly to the uterus alone, but may likewise invade the circumjacent organs. M. Stolz seems disposed to think that it arises from the close sympathetic relations of parts so nearly approximated to each other. Should these new pains be owing to a vesical or rectal

rheumatism, those of the womb would disappear, or, at least, be diminished in degree, according to the views of M. Salathé in his Thesis.

" ' It is to be supposed that there is a degree of heat and swelling of the affected parts; but it is easy to perceive the difficulty of absolutely determining this point, one which we are compelled to admit from analogy.

" ' Pains of such violence, situated in an organ so important, must of necessity produce a pretty severe general reaction. The disorder, like most of the inflammatory diseases, generally commences with a slight rigor, which lasts fifteen or twenty minutes. The succeeding fever diminishes, or may even wholly cease during the interval between the attacks, yet while they last it is commonly quite severe; the pulse is hard and frequent, the face flushed and excited, the tongue red and dry, the thirst urgent; the skin is hot, and the patient is often found to be extremely agitated and restless. Towards the close of the paroxysm, there frequently supervenes a copious sweat, which seems to be the harbinger of a decided improvement. After this, these general symptoms are appeased, together with the uterine pains, only to reappear with them, after the lapse of a few hours, or even of several days.

" ' 1st. *Influence of Rheumatism on the Progress of Pregnancy.*—Where the attacks may have persisted for a length of time, or where they have been very violent, they are followed by uterine contractions, and may, in this way, bring on premature delivery. In such a case, the patient suffers from severe tensive pain. This feeling of tension is not equable, for it rises to a great height, and then subsides—to begin again and pursue the same course at different intervals. At first the womb becomes partially, and afterwards universally hardened during the pain. The cervix becomes rigid and partially dilated, but its dilation is at first slow and difficult, and its subsequent progress does not correspond with the pace of the pains. The abortion, with which she is now menaced, is more likely to take place in the febrile than in the apyretic form of rheumatism. Indeed, abortion is not so common an occurrence in the case as might be presumed. In some instances the os uteri has been observed to dilate to the extent of two or three centimeters in diameter, the bag of waters has been formed, and afterwards withdrawn little by little, the orifice closing again, and all symptoms of labour wholly to disappear. As long as the diameter of the os uteri does not reach the extent of five centimeters, we may reasonably hope to put off the labour. These uterine rheumatic pains may simulate labour pains, and lead to the belief that they are really labour pains, while in fact they are not at all so. The characteristic signs of the rheumatic pains, given in the following paragraph, should serve to prevent such a mistake. It is surely to mistakes of this kind that we ought to refer those cases of supposed protracted pregnancy, and those instances of real labour, begun, and suspended again for weeks, and even for months together."

"On the 29th January, 1842, Mrs. O., aged twenty-eight, in her first pregnancy eight and a half months, was suffering with the symptoms of severe rheumatism of the womb, which had afflicted her since about the 12th of the month. On the 15th of the month, fearing that labour was begun, I examined and found the os uteri dilated fully a quarter of an inch, and the cylindrical tubule of the cervix wholly gone; but on the 29th of the month, or fourteen days later, during all which time she suffered more or less, the os uteri was not only closed up, but the cylindrical tubule of the cervix was reproduced, and continued so until her child was born on the 16th day of February.

"About three years since, a lady, a missionary, landed here from a voyage from Madras, of one hundred and twenty days. She walked a good deal on the day of her debarkation, and was seized with the signs of labour the same evening, being not quite eight months gone with child. The pains were strong; I found the os uteri an inch and a half in diameter, with the membranes tensely drawn across the opening. The labour was suspended in the night, but returned again the next afternoon; and during twenty-four days that she continued to be annoyed, more or less, with signs of labour, the os uteri never closed, and at the end of that time she gave birth to a small, but healthy male child. I have had many occasions to see persons threatened with labour, and even precipitated into it, by rheumatism of the womb.

"M. Cazeaux says nothing of the diagnosis, which I regard as one among the most difficult that can be presented to the mind of a physician. To make the diagnosis between pleurisy and pleurodyne, is often a very difficult task, and one of considerable moment, too; but to make out satisfactorily all the points of difference betwixt rheumatism of the womb and the acute inflammations of the organ, especially in the lying-in, is still more momentous. Rheumatism is, so far as my experience of it enables me to speak, most apt to attack very nervous and susceptible women who have become weakened and reduced in strength, from whatever cause. In such subjects, it is highly desirable to get through the case without much resort to the stronger antiphlogistic measures: but if we mistake an intense metro-peritonitis for a case of rheumatism of the uterus, we shall abstain from any vigorous and eradicative employment of the lancet, under the vain hope of curing our patient by milder and less costly processes than the exhausting venesections which are so indispensable in the true inflammation.

"I have had such great difficulty in settling, to the satisfaction of my own judgment, the diagnostic differences betwixt the two maladies, in several violent cases that have fallen under my notice, within a few years, that I should be thankful for the indication of a clear method of coming to the decision. In both maladies is the fever often violent; in rheumatismus uteri there is rheumatic neuralgia of other parts, and a preceding history, that may enlighten the practitioner to his decision. In the two diseases there is equal sensibility of the abdomen; meteorismus may accompany both. The heat of skin, and frequency and volume of the pulse, are alike

in each, the decubitus similar; but the tongue is clean so far as I have noticed it in the rheumatic case. Distracted with the uncertainty and doubt in which the case is involved, I have commonly been able to satisfy my mind by a direct appeal to the organ itself, in the operation of *touching*. In both maladies the *touch* is at first painful; in metritis and metro-peritonitis it is so under all circumstances, but in rheumatismus uteri, though the first touch of the womb is painful and *quick*, yet, when the organ is gently and slowly raised upwards with the index and medius, the pain either ceases wholly, or is much mitigated, by taking off in this way the tenesmus uteri; not so in the inflammation, where every touch is more painful the more it is prolonged. I may be permitted to add, that I have heard of several cases of death from puerperal fever, where, upon an autopsy, not the least vestige of inflammation was discovered, either in the peritoneum, the uterine veins, the substance of the uterus, or any of its appendages. Is it uncharitable to suppose that such patients died, not with the malady for which they were treated, but with another disorder, to wit, rheumatismus uteri, which demanded quite a different mode of cure?* But I fear to extend this note too far, and, therefore, M. Cazeaux proceeds as follows: M.

"'2nd. *Influence of Rheumatism upon Labour.*—An attack of uterine rheumatism generally retards the progress of a labour, and sometimes even renders the spontaneous expulsion of the fœtus wholly impossible. In addition to the general phenomena I have described, there are here some special ones to be met with. 1st. It is well known that a normal contraction does not begin to be painful until it has accomplished the greater part of its task, and is in the act of dilating and distending the os uteri; in other words, the true pains of labour do not begin until the instant at which the energy of the corpus uteri begins to overcome the resistance of the cervix. In rheumatism of the womb, on the other hand, the uterine contraction begins to be painful from the start, and before the least power is exerted on the neck, so that the cause of the pain is not in the violent distention of the orifice, but in the contraction itself, in other morbid circumstances, and in other relations of the nerves and contractile fibres of the womb. 2nd. In a natural labour the contractions commence at the fundus uteri, and are directed towards the lower segment. In rheumatism, instead of commencing at the fundus, they commence at the painful point, and run towards the neck in an irregular manner. Again, the pains exist before the contractions of the womb, and, under their influence, when they are established, acquire a high degree of intensity. Their violence sometimes arrests the contractions before they have run through their ordinary cycle.

* M. Cazeaux himself, near the end of this article says, that it is often liable to be mistaken for a pure inflammation, and then treated by remedies more likely to be injurious than beneficial. If it be true that the danger to life from rheumatismus uteri be but small, as Mr. C. supposes, it is at least dangerous when improperly treated under a false apprehension of its dangerously inflammatory and destructive character.

They are, in such a case, brisk, short, and grow less and less frequent. 3rd. Towards the close of the labour, when the action of the womb requires to be sustained by the voluntary contraction of the abdominal muscles, the woman, for fear of increasing her sufferings, refrains from contracting her abdominal muscles, which causes the labour to be excessively slow. The patient is in a state of extreme anxiety; the frequent pulse, the hot skin, the thirst, the urinary tenesmus, are much augmented. When the sufferings are too much protracted, she at last falls into a collapse (which is often a fortunate event for her), during which the pain is suspended. Under these circumstances, a profuse sweat has been observed, which has had the happiest effect on the rest of the labour. But in other instances the womb grows more and more painful; it is rather in a state of permanent contraction or fibrillar vibration, than of real contraction; the pulse becomes accelerated, and now the woman is under the influence of a metritis which renders the labour extremely painful.

"'3rd. *Influence of Rheumatism of the Womb on the puerperal Functions.*—One may conceive, *a priori*, that uterine rheumatism, by causing irregular or partial contractions of the organ, immediately subsequent to the birth of the child, might be the occasion of much difficulty in the delivery of the placenta; but this is not the place to discuss that point.

"'In health, after the delivery, the womb contracts, and thus prevents hæmorrhage. But in rheumatism this return of the organ is very incomplete; it remains above the pubis, and is large. The after-pains are now very painful, and continue for a long time. The uterine vessels are less compressed, whence may arise very copious floodings. On the other hand, the state of suffering in which the organ is placed diminishes the lochial discharge and the secretion of milk. The persistence of abdominal pain, added to the symptoms of a general reaction, might lead to the diagnosis of a peritoneal inflammation, though none such should really exist.

"'*Prognosis.*—Rheumatism of the womb is not a disease capable of causing the loss of the mother's life, but, from the pain it occasions, and the mistakes to which it leads, it nevertheless merits all the attention of the physician. In pregnancy it may cause abortion, and though it does not generally exhibit itself until the sixth month, it is always unfortunate for the child to be born before full term. We have already remarked upon the unfavourable effect produced by the disorder on the course and character of labour-pains. On many occasions it has led to the necessity of artificial delivery. It may likewise render the delivery of the after-birth difficult, and derange the course of the phenomena that ought naturally to follow after the birth of the child. At this period it is often confounded with phenomena that are purely inflammatory, and is then treated by measures that are hurtful rather than beneficial.

"'The disorder is for the most part less favourable when attacking at an early than a late period of gestation, because it has a more unfavourable influence on the progress of the gestation, as yet incompletely established and settled, and also because it has a tendency to

be reproduced again and again, before the completion of the term, and on account of its disposition to return during the labour, which it is apt to render laborious.

"'*Treatment.*—1st. During pregnancy, blood-letting, intestinal revulsives (ipecac., castor oil), baths, opiated lotions for the abdomen, anodyne potions, sudorific drinks. Such are the measures which have been most constantly successful. In cases where the affection of the uterus had followed the sudden disappearance of a rheumatic pain of some other part, revulsives should be applied to the part first affected. 2nd. During labour the same means are applicable; should they fail, and the os uteri, as to its dilatation, admit of it, let the delivery be effected by means of turning, or the forceps. 3rd. After delivery, sudorific drinks, anointing the abdomen with opiated ointments, baths, leeches to the vulva, and when the lochial discharge has failed, ipecac. and opium combined.'"—pp. 287–293.

SCIENTIFIC INTELLIGENCE.

SELECTIONS FROM THE REPORTS OF THE ROYAL ACADEMY OF MEDICINE, OF PARIS.

[Communicated by Dr. J. O. Curran.]

M. Paul Dubois on the Operation for Hare-Lip: at what Period should we operate?—In the Academy of Medicine, on the 27th of May, the distinguished Professor of Midwifery at the Hospital of the Cliniques, entered into an *extempore* detail of his views as to operating on very young children, and described the method which he prefers. M. Dubois first detailed the particulars of a considerable number of cases of infants operated on by himself or his friends, at intervals varying from a few minutes to several days or weeks after birth, and all of which had proved completely successful; he then proceeded to say:

The mode of operation which I adopt is that preferred by all surgeons of the present day. I pare the edges of the lips, and then unite the bleeding parts by a twisted suture. I make use of very fine pins called insect pins,* and the ordinary waxed thread; I shall make but one remark with reference to the pins, viz., that those which I employ are exceedingly thin; the pins got at instrument makers are too long in proportion to their thickness; though the tissues to be pierced offer but slight resistance, that resistance is sufficient to make long and slender pins bend, which increases both the suffering and the length of the operation. It appears to me, then, much better to diminish considerably the ordinary length of the pins.

I have not had recourse to the proceeding advised by M. Clemot of Rochfort, and which my colleague, M. Roux, has sometimes employed, but for its acquaintance with which the medical public is solely indebted to M. Malgaigne. This proceeding, which has for its object to restore the median lobe of the upper lip, did not appear to me necessary in the cases which I have detailed to the Academy; and I was apprehensive also of complicating an operation, the success of which appears to me to depend on avoiding all important loss of blood, and in the simplicity and rapidity of its performance. In none of the cases which I have described, did I employ an uniting bandage

* Mr. Wilde has been in the habit of employing those entomological pins in his plastic operations on the face, for some years past, we believe they were rst introduced by Dieffenbach, of Berlin.

in addition to the sutures. In this particular I have followed the example of my father, who never used one, either with infants or with adults. Neither have I substituted for the bandage the means employed by M. Bonfils de Nancy, which consists in having a person to compress with his hands the cheeks of the little patient in a manner analogous to the uniting bandage. I think that M. Bonfils' precaution is unnecessary, and may even prove a source of annoyance and agitation to the child; whilst the uniting bandage is attended with the same inconveniences, with this additional one, that it is almost certain to be displaced by the movements provoked by its presence, and then it is more injurious than beneficial.

The pain produced by the operation was strongly expressed, that is to say, by energetic cries; it is but right to add, that the cries indicative of real suffering were notwithstanding not more violent than they often were when the child was suffering much less, or even influenced only by desire. You understand, Gentlemen, that I have no intention of disputing the reality or even the acuteness of the pain resulting from the operation in the case of very young children, such as I have brought before you; but I may be permitted to say, that in their case the physical suffering is not combined with what would be added by the intelligence of a riper age; it is therefore very probable that they have but the mere faint consciousness of suffering; and certain it is, that in my cases they did not retain the recollection or anticipation of it. This circumstance is not one of the least important of the advantages of operating early; and I shall by-and-by allude to its value in reference to the after-treatment. On the other hand, I believe, I may say that the feeling of pain is very rapidly dissipated in very young children; in all, in fact, sleep quickly followed the operation; two fell asleep immediately after the insertion of the last pin, and before more than a single turn of thread was put round it; the rest of the dressing was completed whilst they were asleep, and they were carried from the operation table to their cradle without awaking them.

In all the little patients the hæmorrhage, inseparable from the division of the tissues, was very slight; I will except one, however, in whom it produced a little paleness. In two of these infants the blood, despite my precautions, passed into the mouth, and was swallowed; a faint sign of deglutition informed me of its occurrence. One of these vomited the blood half an hour after the operation; in the case of the other it passed into the alimentary canal, and was rejected by stool the following day. Swallowing the blood was followed by none of the colics, or other accidents, which have been represented by some surgeons as likely to compromise the success of the operation. In all the cases the after treatment was very easy."

M. A. Berard—"Will M. Dubois have the goodness to mention the treatment to which he alludes?"

M. P. Dubois.—That is just what I am going to do. In all the infants I removed the first ligatures twenty, and more frequently twenty-four hours after the operation, and substituted in their place others less binding. This treatment was repeated every day, until the withdrawal of the pins, diminishing gradually the constriction. In these dressings I was assisted by a person who secured the head of the child, and gently compressed the cheeks when it began to cry. The dressing caused some to cry; but to get them to stop it was only necessary to wait a few minutes before continuing to unroll the threads. It was often completed without awaking the child, especially where the parent, in expectation of my arrival, had obeyed my injunction, previously, to moisten the threads with warm milk. This liquid was preferred; since, if it penetrated into the mouth, which was almost inevitable, it might be swallowed with impunity.

The upper pins were generally withdrawn after the sixty-second hour, and the lower after from eighty to ninety-six hours. The differences, in this respect, depended on the greater or less apparent firmness of union. The Academy will doubtless remark, that the removal of the pins did not take place earlier than in subjects of a more advanced age; but it will also see, that the gradual slackening of the ligatures lessens the inconvenience of leaving the pins in a long time; and, besides, their presence is a useful safeguard, in the absence of other means of keeping the parts in apposition.

Only in one case, after the removal of the pins, did I apply a narrow stripe of court plaster, and even that was removed in a few hours. I think its use was not called for. I employed it because, deviating from my usual practice, I had removed all the pins sixty-two hours after the operation. This was in the youngest of the patients that I presented to the Academy; it was operated on five days ago, and the pins were withdrawn within the last forty-eight hours.

In all the children union took place rapidly and firmly; in none were the tissues cut, either by the pins or ligatures; and I dwell on this circumstance, because it seems to me to remove an objection long ago started by a great number of surgeons, and brought forward again in our own day by Dupuytren, viz., that in very young infants the tissues have a softness which renders them too easily cut by the needles or the ligatures. This objection, advanced by men of such eminence, merits the more attention, as the premises are true, although the conclusion is false. It is indeed true, that the tissues of new born infants are soft in a remarkable degree; but this softness, as Busch has, with great justness, remarked, is due to their extreme vascularity; and the circumstance, far from having an unfavourable influence on the operation, is one of the conditions the most advantageous for prompt union. As to secability, it is quite imaginary, if supposed, as I believe it was, to be so great that the tissues would not bear without tearing the traction necessary to bring the cut surfaces into apposition; but it is real in so far as ulceration, rapidly produced by foreign bodies introduced into the tissues, is concerned; and this ulceration may be very much accelerated by the

compression exercised by tight ligatures. Still the effects of this tendency may be easily diminished, or even totally obviated, by the rapidity with which adhesion is effected, allowing the ligatures to be changed after the lapse of twenty-four hours.

In none of my cases was the giving of nourishment suspended; all were supported by means requiring considerable efforts of suction; two by the bottle, and the rest by the breast as usual; one ceased to take the breast only during the operation and the sleep that followed it; the others were fed by the bottle and artificial nipple for the first day only. I am happy to have the opportunity of mentioning that, in the two cases in which my father practised this operation on children younger than any I have presented to the Academy, the use of the breast was not at all interfered with. The Academy will permit me to delay for a moment on the result of these operations.

Of the difficulties which have been supposed inseparable from the operation practised on very young children, there are none which have excited more attention and alarm in the minds of surgeons than those which depend on the efforts of suction, instinctively provoked, by the introduction into the mouth either of the natural or artificial nipple. I must also add, that even the partisans of the operation have admitted the reality of all these dangers. They first get rid of the difficulty by proscribing the operation; the second by extravagant caution, in permitting only a few drops of milk to be introduced into the child's mouth, or even compelling the little patient to fast for several days.

The facts which I have just detailed will prove, I hope, that the apprehensions entertained both by the adversaries and the partisans of the operation for hare-lip in very young children, are greatly exaggerated, and neither justify the objections of the one, nor the excessive caution of the other. Permit me also to add, that these very precautions are much more injurious than the dangers they were intended to obviate. I do not at all believe that a fast of two or three days can produce, as has been pretended, rapid marasmus, followed by yielding of the sutures, but I am confident that it is very hard to be borne by infants, and excites in them agitation and prolonged crying, as dangerous, in reference to the operation, as any effort of suction. Such was the case with those infants who were separated from their nurse for nearly an entire day, and when again allowed to take the nurse's breast, their tranquillity was restored. One of these was the eldest of the children brought before you.

One only, of the patients I exhibited to the Academy, cried violently and continuously for some days after the operation; I shall return to it in an instant; the others cried but little, and at long intervals. Sleep is the state which is almost habitual to infants during the first days of their existence. It is broken only to satisfy their wants, by suffering, or by desire. It has been evident that the operation, in those who underwent it, but little altered that happy state of things, which must tend to produce a favourable result. I have said that one

only of these patients was an exception, it was the second in age of those I brought before the Academy; its cries, doubtless excited by artificial alimentation, which it endured with difficulty, were violent and often continued during several hours; this circumstance alarmed me very much for the success of the operation, and made me sometimes regret that I had attempted it in this case; the result was, notwithstanding, most favourable, and you have doubtless remarked, that of the three infants which were presented to the Academy the one of which I am speaking presents the least observable cicatrix, the mark left by the operation being, in fact, so slight, that considerable attention is necessary to discover it. Therefore it follows from these facts that the cries of infants operated on for bare-lip, are less frequent than have been supposed, and that, even when most violent and prolonged, they do not hinder the success of the operation when the lips of the wound have been kept properly in contact.

It has been asserted that this operation, when practised on very young children, leaves after it as evident marks as when had recourse to at a more advanced age. I do not wish to exaggerate the importance of the facts I have brought forward, and of which you have all been witnesses, but this assertion appears to me opposed to truth, and had the Academy been able to watch the modifications undergone by the cicatrix in the two youngest of the three patients I brought before it, and to observe the very rapid obliteration of the traces left by the operation, I am confident it would be of my opinion in regard to this matter. Lastly, I will examine the opinion advanced by Dupuytren in his lectures, that by operating for hare-lip, the mortality, naturally so great in the early period of life, is increased. I do not wish to misrepresent the importance and gravity of the operation in question, but I would only remark to the Academy that in none of the cases I have brought before it was the health sensibly interfered with: a trifling increase of temperature and a slight acceleration of the pulse was all that could be observed. Many operations analogous to mine have been performed, especially by M. Bonfils (de Nancy), and in them the harmlessness of the operation was as evident as in my own; I admit that the objection of Dupuytren should not be overlooked, and on this subject I will remark that there is one thing which should not be forgotten: viz., that probably the mortality of infants affected with hare-lip is greater than that of others not so affected: in fact we know that this deformity is often accompanied by other evident defects, and it is not impossible that often it is combined with defects with which we are not acquained, although sufficient to compromise eventually the infant's life. Certainly the injurious consequences of these last would not be increased by the operation, and in divining their existence it should be done with considerable reserve. Still, taking Dupuytren's objection in its proper sense, we may, I think, make this legitimate concession to it, that where a child is very delicate, or born before the full term, we should delay operating for a few days, and always refuse to operate at periods when erysipelas, &c. follows operations on adults.

If to the considerations which I have dwelt upon already, I add, that the operation for hare-lip is exceedingly easy of performance, that the after treatment is also very simple, that union of the edges of the wound is ordinarily rapid and sure, that to all appearance the traces left by the operation are inversely as the interval elapsed since the birth of the child, that instruction is rendered more easy, and that separation of the bones, if any have existed, is more rapidly effaced, I believe that I have assigned quite enough of motives to justify operating for hare lip in infants a few days after birth. And yet I cannot help adding another consideration, which does not seem to have made sufficient impression on professional men who have occupied themselves with this important subject. Gentlemen, to a family from its intelligence or fortune occupying a certain rank in society, the birth of a child with so evident and disgusting a deformity as hare-lip is viewed as a severe misfortune. It is a never-failing source of annoyance and grief to the mother, increased every moment by the sight of the evil and by the painful contrast of, perhaps, another child free from such an affliction. If the speedy performance of an operation can change this painful state of mind and of the affections into one more happy, I believe that it is a real benefit superadded to the personal advantage accruing to the child.

It will, doubtless, excite surprise that in so short a period of time I should have had occasion to operate on three infants for hare-lip. It is indeed a singular coincidence, of which I can mention one more recent and still more remarkable. From the 11th to the 19th of this month (May), we have observed at the Hospital of the Clinique, where the number of accouchements is from 90 to 100 per month, one case of hare-lip, three of club-foot, one of complete absence of the hand, and one of supernumerary fingers.

M. Husson.—Did not M. Dubois say that he would explain the greater frequency of hare-lip affecting the left side?

M. Dubois.—No. I have not pretended to explain this phenomenon. I only mentioned to the Academy the fact suggested by my cases, and which doubtless has before now attracted the attention of my colleague, M. Roux, and of other surgeons.

M. Roux.—I have had occasion to see a very large number of cases of hare-lip, and I have met them at least ten times out of twelve at the left side. This is not peculiar to hare-lip, however, all deformities are more frequent at the left than at the right side, which perhaps may result from the relative feebleness of that side.

The question raised by M. Dubois applies not merely to simple hare-lip, but also to double hare-lip. I was formerly opposed to operating immediately after birth, but my opinion within the last fifteen or twenty years has very much changed. Being often compelled by circumstances to operate early, which I did with very great apprehension, I at length saw that the results in such cases were fully as favourable as at a more advanced age. M. Roux then gave the particulars of ten cases operated on by him during the previous year, in order to

shew that accidents are as frequent after the operation performed late as when had recourse to early. He was in favour of operating immediately where there was double hare-lip, rendering suction difficult or impossible; but, fully admitting the moral influence on the mother of the sight of the deformity, he did not think there was any good ground for haste when the hare-lip was simple.

M. Dubois was glad of an opportunity of supplying an omission which he had made from his apprehensions of being tedious. He had entirely abandoned the operation for double hare-lip in very young children. In infants such as he spoke of, facility of execution and despatch appeared to be the essentials to success, hence he had even abandoned the method of Malgaigne, which, in other circumstances, must be an improvement. But, continued M. Dubois, I wish to make another remark; I know of no sure and efficacious means of stopping hæmorrhage but by bringing the whole of the edges of the wound into complete contact, and by making no wound but the paring of the edges of the lip. I never detach the lip from the gum in order to bring the edges into contact. In every case that I have met with the natural extensibility of the parts allowed coaptation to be effected without it. The bleeding surface resulting from the separation of the lip from the gum being but imperfectly applied against the gum, may, from the extreme vascularity of the gums, become a source of real danger, and in very young children will only make itself known when beyond remedy.

June 3rd.

Pellagra.—Nearly the whole of this sitting was occupied in hearing the report of a commission, consisting of MM. Alard, Emery, Gerdy, and Jolly, on Pellagra.* Most of our readers are aware that this disease, very closely resembling *icthyosis*, but with marked periodic remissions, and severe visceral derangement, followed eventually by mania and death, has been for above a century endemic in a part of Lombardy, lying between the Alps and the Po, and especially in the district between the Lago Maggiore, and the Lago di Como. Its existence here has been attributed to the necessary irrigation of the rice-growing lands, misery, and the use of maize, imperfectly baked, as the food of the inhabitants. In 1829 this frightful malady made its appearance for the first time in France, in the departments of the Gironde and Landes. The first instance of it in Paris was published by M. Roussel in 1841; and in 1842 or 1843, some more cases were met with by MM. Gibert and Devergie, at the Hospital of St. Louis, in the same city. The central Council of Health of the Gironde, having collected a number of documents referring to pellagra, had them transmitted to the Minister of Public Instruction, who at once applied to the Academy of Medicine for information, as to the propriety of their publication, &c., in consequence of which a Commission

* The best English description of Pellagra is that by Dr. Holland, in the 8th Vol. of the London Medico-Chirurgical Transactions.

was appointed to examine the documents and to report on the disease. The following is a description of pellagra, by M. Léon Marchand, as given in the Report of the Commissioners.

The most remarkable external character of this affection is, a squamous erythema, occupying the parts of the body not covered by clothing, and principally the backs of the hands, which appears in the spring of each year, always accompanied by a series of symptoms, the intensity of which is proportioned to the duration of the disease. This eruption, which may assume successively the papular, vesicular, and pustular form, disappears completely in autumn, leaving cicatrices of a shining appearance, like the marks of burns. All the general symptoms accompanying the affection at the same time fade away, to reappear in the following spring, with intensity greater in proportion to the shortness of the period of remission, and with infallible certainty, so long as the predisposing causes remain unchanged, until at length remedies are useless, and death alone can terminate the period of suffering. The general symptoms most constantly attending pellagra, are characterized by M. L. Marchand under the appellation of gastero-entero-rachalgia, and arise from two sources, first, the digestive organs; marked by a red and fissured state of the tongue and lips, with scorbutic and bleeding gums, ptyalism, dyspepsia, vomiting, and diarrhœa. Second, the cerebro-spinal system, shewn by pains and weakness of the limbs, stuttering, vertigo, loss of sense and intelligence, raving, delirium, or madness, generally assuming the form of suicidal monomania, with an inclination to terminate life by drowning.

According to M. Marchand, pathological anatomy has, as yet, thrown no light on the actual nature of pellagra. It is in the etiology, in the study of topographical circumstances, and local influences, that we must look for information as to its true nature.

The epidemic of pellagra is chiefly confined to the borders of the Gulf of Gascony, i. e. to a region where the soil is more sterile and inhospitable than in any other part of the country, amid the most depressing and debilitating influences, and where men, animals, and plants all droop before their time. The deleterious emanations of marshes and lagunes, unhealthy habitations, bad food, insufficient clothing, and neglect of personal cleanliness, in a word, every element of misery, may, in the opinion of M. Jolly, give rise to pellagra, which by some authors has been called the *disease of misery*. Since, however, these circumstances do not in other places originate the disease, M. Jolly supposes that there is besides a peculiar endemic cause requiring certain conditions for its being called into action.

As to the influence of the solar rays (which has been assigned as a cause of the disease) we need but reflect that pellagra was not known previous to the early part of the last century, and that it does not exist in those countries most subject to violent solar heats, to convince us of the very unimportant part it can play in this case. Certain it is, however, that the symptoms are very much influenced by the action of the sun disapearing in autumn to reappear in spring. M. Gibert supposes that the skin has undergone such a burning, and has been so changed in its intimate texture, that, like a part from which the cuticle has been stripped of, the slightest application of the solar heat suffices to light up the dormant disease. However this may be, the disease makes its appearance, and, whatever the treatment adopted (and every variety of medication has been tried), the symptoms become worse and worse, and death sooner or later is the result, being generally preceded by mental aberration.

Some discussion followed, but it elicited nothing novel or interesting.

June 10.

Cow-pock in Cows.—The subject of pellagra was again brought under discussion, after which was read a letter from M. Huzard announcing to the Academy the existence of cow-pock, among the cows of Senanches. The disease affected only one girl, who had not been vaccinated, whilst all the other milkers, who had previously undergone vaccination, enjoyed a perfect immunity from it. Some specimens of the matter of this cow-pock were also presented to the Academy.

Hæmostatic Powers of Sheep's Brains.—In the report of the proceedings of the 17th of June, the following occurs:—M. Dupuy directed attention to a hæmostatic power of great efficacy, recently proposed by him. The cerebral matter of the common sheep possesses, in a very high degree, the property of coagulating blood, and of immediately arresting hæmorrhage. M. Dupuy made the following experiment:—"A solution of cerebral matter was injected into the crural vein of an animal, and death took place in a few minutes. I had predicted that the blood would be found coagulated in the heart and great vessels, and such was found to be the case on examination. The experiment was witnessed by MM. de Blainville and Rousseau.

Sheep's brain kills animals more rapidly than even corrosive sublimate. You are all aware that the bichloride of mercury coagulates the albumen; an analogous effect is produced by cerebral matter. It appears to me that surgeons might usefully avail themselves of the knowledge of this fact."

Wound of the Liver.—M. Gerdy reported on a memoir by M. Roux, of St. Petersburg, on a case of *wound of the liver*, in which all the questions relating to an accident of this kind are fully discussed. The author seems to have established that in such cases the indications are, first, to arrest the hæmorrhage, and second to give issue to the effused blood, and thereby to prevent the occurrence of the peritonitic inflammation which, in wounds of the liver, is the usual cause of death. M. Castel remarked that M. Roux's memoir shewed that, 1st, some of the organs subserving to the purposes of organic life may lose a very large portion of their substance without destroying life; and, 2nd, that death, when it does follow, is the result of the hæmorrhage, and not of the loss of substance. All organs are not of equal importance, some being very subordinate, indeed,

compared to others, so that the intermission of the functions performed by the one was but little felt by the system, whilst the integrity of others was essential to its very existence.

July 22.

Plastic anatomical Preparations.—M. Renault, in the name of MM. Dumeril, Blaudin, Girard, Barthelemy, and Bouley, Jun., read a report on a figure of a horse executed by that distinguished artist, M. Auroux. The preparation exhibits the entire anatomy of the animal to a very great degree of minuteness. It is as if the skin had been removed, but the muscles acting on the integument are left well displayed. The different layers of fascia and muscle can be turned aside, or altogether removed, and the nerves, arteries, veins, &c., which are all represented in their natural relations, and as near as possible in their natural colour, can be similarly disposed of, in order to reach the deeper structures. The same arrangement is adopted in reference to the thoracic and abdominal viscera. They may be studied *in situ*, or may be taken out and examined individually, and most of the more important organs, as the stomach, intestines, heart, &c., open so as to offer to the view, without any trouble, the appearances presented by sections in different directions. Great pains had been taken to represent, with faithfulness, the minute anatomy of the foot, and the means for obtaining elasticity, and for securing a proper secretion, so as to convey to the student an accurate conception of the structure of that important part. The Commission bestowed much praise on M. Auroux for the ingenuity and skill displayed in this and other similar achievements, and earnestly exhorted him to persevere in the useful work which he has hitherto pursued with such success. It was also resolved to direct the attention of the Government to M. Auroux's invention, suggesting the propriety of placing one of his preparations in each of the veterinary schools in the empire.

July 31.

Inoculation preventive of Typhus.—Amongst other matters, a Memoir by M. Audré, of Vienna, on Epizootics, was read by M. Parisot. M. Audré, during a recent epizootic of typhus, in Germany, reasoning from the analogy of typhus to small-pox, was led to try the effects of inoculation with the saliva of animals, labouring under typhus fever. A very large number of domestic animals were inoculated in this manner, and a disease was produced of so mild a character, that but one case terminated fatally. None of the animals so treated were afterwards affected by the epidemic.

The communication was referred to a commission composed of MM. Roger, Bouley, and Renault.

Revolutions in the Climate of France.—M. Fuster, in a very elaborate memoir on this subject, proves that the climate of France has undergone and continues to undergo very great changes. In the time of Julius Cæsar, it was intensely cold, subject to very sudden

changes, deluges of rain, and terrible storms. Amelioration continued to take place steadily and uniformly, until the middle of the ninth century, when improvement was arrested, and the contrary change has been going on ever since.

M. Fuster's memoir was listened to throughout with the most intense interest, and will shortly be presented to the public.

August 5th.

Analogy between Small-Pox and Cow-Pox.—From the "Annual Report of the Vaccine Committee," which was read by M. Castel, we extract the following: "If small-pox and cow-pox be not identical in their nature, they have at least a very great analogy to each other. This analogy is shewn by the time of incubation, the turgescence of the mucous tissue, the characters of the inflammation, the changes undergone by the eruption, and also, though less evidently, by the form of the pustules, and the matter which they contain.

"Vaccinia, when it occurs under all the necessary conditions, usually neutralizes in our organization all disposition to contract variola, and modifies it when it does not neutralize it. The names varioloid and varicella express only so much; for if these modifications suffice to establish a variety, they cannot be made distinctive of generic differences. We repeat that the eruption of varioloid in persons vaccinated, proves the existence of the same germ, the same predisposition as precedes the evolution of variola; the symptoms of both are the same, or differ extremely little during the first stages; the remarkable differences only appear at a more advanced period in what might be called the excrementitial stage of the disease. They prove that the animal fluids had undergone a commencement of purgation; thus, before the discovery of vaccination, the sporadic forms of variola (*variolæ spuriæ*) were almost always less malignant than the true small-pox.

"The influence of vaccination in modifying small-pox is incontestable; if we assign to this its true value, it will furnish us with an explanation of an anomaly which was remarked in the Academy's Report on Vaccination in 1842, viz., that *a recurrence of variola is much more dangerous than an attack of variola after vaccination.** The first of these cases shews a return of the same disease, under the influence of the same causes; the second exhibits the first attack of a disease against which the constitution has been previously fortified.

"The eruptions which vaccination has not prevented from appearing, ought, of whatever kind they may be, to be considered as supplemental, not to the impotence, but to the insufficiency of vaccine process; they effect a purgation which cow-pox had commenced, if we are to believe that the predisposition to variola is congenital; or they oppose an additional barrier to contagion, if it be true that

* We remember hearing this remark made by Dr. Graves at the Meath Hospital many years ago.

variola is only propagated by contagion. Taken in this point of view, such eruptions will cease to cause any alarm; they will even offer an additional pledge of security.

Even when the influence of vaccination is but temporary it usually lasts until adult age. In general, those who have been attacked by variola after vaccination, have passed the age of childhood.

"During an epidemic of variola, the protective influence of vaccination is inversely as the period which has elapsed since it was practised; whence we may conclude, first, that the process which has predisposed to variola has not been put a stop to by vaccinia; second, that the influence of the latter is impaired, but not altogether effaced, by time. It is still able to render the symptoms less intense, the convalescence more prompt; and the termination almost always more happy.

"The names of varioloid and varicella should not be given indiscriminately to all the eruptions that we meet with in persons who have been vaccinated, and which may happen to present some one or two of the characters of variola, these eruptions have not all the same appearance, phenomena, or character: they are all benign, but in different degrees, and they are all contagious. Transmitted from one person to another, they may even lose their benignity; thus, in an individual previously vaccinated, variola may by communication arise from varioloid.

"Every kind of virus is liable to degenerate. Reasoning only from analogy, we should be led to infer the tendency of vaccinia to degenerate. Whatever may be the opinion entertained by practitioners on this subject, they will act prudently in omitting no opportunity of renewing their vaccine matter from the disease occurring in the cow.

"The insufficiency of vaccination is more frequently observed during epidemics than in the sporadic form of variola.

"Who is ignorant of the fact, that the genus and semeiology of a disease, remaining the same, its intensity is proportioned to the number of persons whom it attacks?

"In like manner, as the character and danger of a small-pock eruption depends on the temperament, so this latter is itself modified by the degree of susceptibility to variola retained after vaccination.

"The ravages of variola have, in all countries, been directly proportioned to the indifference with which vaccination has been received, and to the want of care displayed in practising it, &c."

The subject of the alleged difference between typhus and typhoid fever was again brought before the Academy at this and several previous sittings, but no new facts were elicited. Their identity was ably argued by MM. Castel and Gaultier de Claubry, and a majority of the Academy seemed to coincide in this view. We have, in a previous Number, entered so largely into this subject, that we shall not make any further quotations, since, as we have already stated, no new *facts* were brought forward.

SPIRIT OF THE PERIODICALS.

French and Irish Surgery.—Desirous of avoiding literary as well as medico-political controversies, we have ever abstained from editorial remarks, except where such were drawn from us by glaring plagiarism, or direct detraction from the labours of others. Our attention has been lately called to an instance of this description, wherein a larceny has been attempted on the opinion and practice of one of the most distinguished surgeons, and one of the most honest men that adorned the Irish metropolis for the last half century.

Our readers are well aware of the result that almost invariably follows any lesion of the walls of the urethra, viz., a diminution of its calibre, and ultimately, a stricture of a most inveterate nature. This may be the result of specific ulceration, accidental rupture, or surgical operation, as in amputation of the penis, &c., and to prevent or remedy this lamentable disease has been a desideratum with all practical surgeons for some years past; for the introduction of a catheter or bougie, though retained in ever so long, is unavailing. In the Lancet for the 8th March last (and subsequently the same article is quoted in Braithwaite's Retrospect for June), Mr. R. Barnes published an account of a mode of operation adopted by M. Ricord for preventing contraction of the orifice of the urethra, after amputation of the penis. "The proceeding" he says, "is this;—having performed the amputation, with the precaution of preserving sufficient skin, and no more, to sheathe the corpora cavernosa, and secured the vessels, the surgeon seizes, with the forceps, the mucous membrane of the urethra, and with a pair of scissors makes four slight incisions, so as to form four equal flaps; then, using a fine needle, carrying a silk ligature, he unites each flap to the skin by a suture. The wound unites by the first intention; adhesions being formed between the skin and mucous membrane, which become continuous, a condition analogous to what is observed at the other natural outlets of the body. The cicatrix then contracting, instead of operating prejudicially, as in the old methods, tends, on the contrary, constantly to open the urethra, whilst a perfect covering is provided for the ends of the corpora cavernosa." Mr. Barnes states that he saw this operation performed by M. Ricord in 1843.

Now, on turning to the late Professor Colles's "Practical Observations on the Venereal Disease, and on the Use of Mercury," published in January, 1837, we find precisely the same mode of operation applied to avert or cure a similar kind of stricture, occurring from circumstances somewhat different, remotely, but certainly, depending on an identical proximate cause, viz., breach of surface of the orifice of the urethra. At page 95, after having described the phagedenic disposition which chancres situated in the orifice of the urethra sometimes assume, and the ill consequences which are oftentimes the result, he says: "In treating such a case, we should use every effort to prevent the extension of the ulceration to the entire circle of the orifice, for unless it entirely

encircle the orifice, contraction will not follow; this can with certainty be accomplished by touching the ulcer, as soon as it begins to extend, with the colourless muriate of antimony, or with nitric acid; these applications are no doubt severe, but the evil they avert is one of great magnitude; for I will venture to assert that of all forms of stricture, this is one most apt to recur; indeed it does not in any instance admit of a cure by the ordinary treatment of strictures." And then he goes on to describe the identical operation of M. Ricord and Mr. Barnes, thus: "I am happy to say that I have lately discovered a mode of treating this stricture which has proved eminently successful in the few cases in which I adopted it. This plan of treatment consists in this simple operation.—Having detached the skin from the end of the urethra, to which it is generally intimately adherent, I divide the urethra below, to the length of more than half an inch. I raise the mucous membrane from each lip of the incision, then cut away a portion of the bared corpus spongiosum, to such an extent as will allow the raised mucous membrane to cover the cut edge. I stitch down this membrane upon the corpus spongiosum; and thus having covered each lip of the wound by mucous membrane, I have effectually guarded against the possibility of reunion of the lips of the wound, or subsequent contraction of the opening. The opening of the urethra thus produced, is, of course, of a size larger than natural."

We are quite sure Mr. Barnes only requires to have this inadvertence pointed out to him to procure his acknowledgment of Mr. Colles's priority; but M. Ricord has, we think, been too much in the habit of underrating, or pretending ignorance of the writings of the surgeons of Great Britain.

Case of Hermaphrodism.—Mr. Grigor, of Nairn, states that when called on some years ago to reduce a large inguinal hernia in a poor woman, he was surprised at feeling "a penis-like organ (clitoris) becoming erect." "The woman died on the 4th April, 1845, aged 50. After some difficulty, I obtained leave to make a limited examination of the dead body; which I did on the 6th. Time and opportunity were not afforded me of making so careful an inspection as I could have wished.

"An immense inguinal hernia, enclosed in a scrotal-like bag, nearly covered the upper third of the left thigh; and on the contents being returned into the abdomen, it remained large, and like what a scrotum would have been in similar circumstances. I believe it, however, to have been the left labium major, though I certainly could distinguish little or no trace of a right one. There was a right inguinal hernia; but it had not descended below the external ring. The pubes was well covered with hair. The penis-like organ, though tightly bound down by the frænum, measured an inch and a half; its gland was imperforate, and the prepuce could not be drawn over the gland; the corona, gland, frænum, and prepuce, were all very distinct. A little below the penis-like organ, there was a quill-sized foramen. No trace of a vagina was seen; and in addition to what has been described, a long-looking perineum, with some relaxed integuments, formed the external genitals. A probe introduced into the foramen passed downwards for about an inch and a half; this passage was laid open by cutting through the skin and a few muscular fibres. The urethra proper and vagina were in this way made visible; they were situated nearer the anus than was normal, and thus obliterated the perineum. The vagina was capable of great dilatation; was about three inches in length; and terminated in a *cul de sac*. The uterus was a mere rudimentary organ, barely capable of admitting a crow-quill; it contained a small quantity of mucous. I could distinguish neither ovaries nor Fallopian tubes; but observed very large, round ligaments. The other contents of the abdomen, so far as I saw, presented nothing worthy of remark. The mammary glands were not to be seen; and the nipples were diminutive. The thyroid cartilage was prominent. The pelvis was small. The outline of the bones was prominent. The muscles were well developed.

"This pauper was not seen by any medical man in her last illness; but I am inclined to think that she suffered, before death, from symptoms of strangulated hernia. I have ascertained that she was never known to have had vicarious menstruation, or amorous desires. When I first saw the external genitals and bodily configuration, I believed this person to have been as much male as female; and although the preponderance of female organs may entitle *her*, in popular language, to be called a woman, yet, in strict scientific phrase, this *lusus naturæ* must be termed *neuter*, because the essential organs of both sexes—the testicles and ovaries—were wanting.

"In jurisprudence this person would be regarded as a female; for Coke thus lays down the common law: 'Every heir is either a male or a female, or an hermaphrodite; that is, both male and female. And an hermaphrodite shall be heir, either as a male or female, according to that kind of sex which does prevail.' (*Coke, Littleton* 8, a.) I apprehend that at birth, and indeed during the whole of her life, it would have been difficult to have determined which sex would—during the life of the subject—be apt to puzzle the investigations of the medical jurist."—*The London and Edinburgh Monthly Journal of Medical Science. No. LV., July*, 1845.

Vestiges of the Natural History of Creation.—There are strange facts in the metamorphoses of the lower invertebrate animals; but all of them are governed by an undeviating cycle of organic laws; and none of them gives so much as the shadow of an argument for the hypothesis of transmutation from one species to another. As a general rule, these changes (like the gradual change in the fœtus of a mammal) are from a lower to a more perfect organic structure. But there are some striking exceptions, or apparent exceptions, to the rule. For example, the myriapods have, at first, three pairs of feet, and in that respect conform to the type of the higher insects; but

afterwards the feet increase in number. So that we have here a creature of a lower grade passing during its early stages through the type which is permanent in the higher. Again, the larvæ of some creatures are locomotive, and have eyes; but in the more fully developed state, when they reach the condition of perfect animals, they become fixed to one spot, and lose the sense of sight. Facts like these are of the deepest interest; but they make nothing for our general argument, and we must leave them. No vertebrate animal, after the first rudiments of its structure are laid down, conforms to the type of an invertebrate. In the beginnings of life, we find a general similitude; but the fundamental rudiments of organic structure are laid down upon an entirely separate plan. The whole animal existence of a vertebrate and invertebrate creature does, however, admit of a general comparison. In each case we have the ovum, the embryo, the larva, and the perfect animal, with the power of continuing its species. But by no contrivance or fostering can we make a larva fruitful, or obtain from it a new animal of some lower type: the attempt must fail, because it involves a physical impossibility. Neither can we, by any artifice of breeding, push the perfect organic form of the complete animal beyond the limits of its species. Numberless attempts of this kind have been made, but they have all failed, and must ever fail, because they are contrary to nature's laws. There is, therefore, a grand unity in the works of nature, proving an unity of creative will; but there is no confusion or mixture of species, when species are well ascertained; neither have the natural laws of atomic action in dead matter ever produced so much as one undoubted case even of the lowest condition of organic structure endowed with life. All nature, then, at whatever point we meet her, and during whatever age in the past history of the earth, tells us, with one unhesitating voice, that she has not enacted any law of spontaneous generation, and that she will not allow any power inferior to herself to mar her vestiges, or blot out her fixed organic types.*

We have now done with the author of the "Vestiges of Creation." We have examined fairly, and on common natural ground, every material point of his argument. He fails from his first beginnings, he understands not the present condition of the Nebular Hypothesis, and, admitting the truth of the hypothesis, he has drawn from it the most unwarrantable conclusions. He understands not the present condition of Geology, and he has strangely, and to all appearance un-

* We contend that many cases of ambiguous generation are readily explained, by supposing the *ova* to have passed into a properly prepared infusion through the air. From some recent experiments we learn, that when the air, which has access to such an infusion, is made in the first instance to pass through sulphuric acid, no *infusoria* are produced, the floating *ova* having been destroyed during their passage through the acid. Connected with the subjects discussed in the preceding pages, we refer to an elaborate Report by Dr. Clark, Professor of Anatomy in the University of Cambridge, read to the British Association in 1834, and published in their third volume.

fairly, distorted such facts as were before him, to serve the purpose of his hypothesis. He has not brought one allowed fact from actual nature to bear upon his theory. He seems not to have consulted one good authority on the Fœtal Question; and he has, consequently, misconceived it, or misrepresented it at every turn of his professed argument. "Men, like Von Baer and Valentin, far from favouring the cry of some eager followers, (now feebly re-echoed in this country),—that the higher animals pass through stages of development, which are permanent in the lower,—expressly tells us that such views are one-sided and insufficient. The views they offer towards a system of nature are not made up of materialism, but are the offspring of that grand (but sometimes mistaken) idealism which prevades the philosophy of their country."—*Dr. Clark.*

We conclude, then, that our author's work is not merely shallow and superficial, but utterly false throughout to all the principles of sound philosophy. Of all the books we have ever read, it puts before us the largest congeries of positive misstatements, and positively false conclusions. But it is pleasantly written, it is systematic, and it has been prepared for the press with no common care; so that its errors are not the mere errors of inadvertency; and its language (with one or two gross exceptions, which we have pointed out) is so reverent, and so like the solemnity of truth, that we are compelled (almost against our senses) to believe that the author is actually labouring under some strange delusion, whereby he cheats himself, while he is doing his best to cheat others; by turning upside down every rule of sound induction, and by affirming, again and again, and in every solemn form of language, that which is at direct variance with the plainest acknowledged facts of nature.

For our own part we trust, in all good hope, that human knowledge will go on in the right road of sober inductive truth; and if that be its direction, we can look for no consequences but such as will tend to the good of the human race. But woe to the world if our knowledge is to be made up of idle speculations, like those we have been reviewing—"as endless as spider's thread, and of no substance or profit." Instead of this, we must seek knowledge at the fountain head, in the order of nature, and in an humble contemplation of her works; so may we rise, step by step, to a more lofty knowledge; which, if we be right-minded, "will not be a tower of strength for a proud mind to raise itself upon—or a fort or commanding ground for strife and contention—or a shop for profit or sale—but a rich storehouse for the glory of the Creator, and the relief of man's estate."*—*Edinburgh Review, No. CLXV. July*, 1845.

* Lord Bacon.—Connected with this part of the article, we earnestly recommend to our readers, a small volume by Dr. Whewell, Master of Trinity College, Cambridge, entitled *Indications of the Creator*, very recently published. Though, with the exception of the preface, it consists of extracts from works published some time before the appearance of the "Vestiges of Creation," it meets the author's argument at many of its most important points.

Malformation of the Heart.—Communication between the Ventricles. The Aorta arising from both Ventricles. By Charles Bertody, Worcester, U. S.—The subject of this peculiar malformation was an Irish girl, 21 years of age, who was a resident in the Worcester Alms House for a year previous to her death. "During her residence there, she was unable to perform any work, or take exercise of any kind, as upon the least exertion or excitement she was attacked with palpitation and dyspnœa, accompanied with some blueness of the skin, all which gradually disappeared on her remaining at perfect rest. She was also subject to attacks of the same kind after dinner, which, during the latter part of her life, came on every day, continuing for two or three hours, even though she remained perfectly quiet, being apparently excited by the mere stimulus of food. She had also a constant and strong rasping *bruit*, accompanying the first sound of the heart, and masking it partially. She suffered much from headach, which, a few days before her death, became greatly increased, accompanied with high febrile excitement, followed by delirium, coma, and death. On examination, the septum ventriculorum was found deficient just at the orifice of the aorta, giving that vessel an origin from both ventricles; the pulmonary artery was contracted so as barely to admit the little finger; the lungs were of natural colour, but both were studded from top to bottom with crude and miliary tubercles, none of which were softened; the left lateral ventricle of the brain was filled with pus, the lining membrane being inflamed and thickened, and in the posterior lobe of the same hemisphere was found a cyst the size of a robin's egg, also filled with pus, but having no connexion with the ventricle. The substance of the brain presented numerous red points, but was not altered in consistence. No other morbid appearances whatever were observed in the organs examined, which were the lungs, heart, and brain. At the time of her death she was menstruating profusely. Blueness of surface was at no time considerable; and it was only observed upon some exertion or excitement, and always in connexion with palpitation and dyspnœa, coming on and disappearing with them."—*Philadelphia Medical Examiner*, for May, 1845.

A Statistical Summary of Aural Diseases (Read before the Southern Branch of the Provincial Medical and Surgical Association, held at Reading, June 26th, 1845) by Isaac Harrison, Esq.—It is somewhat curious to observe the way in which surgeons and physicians of the highest eminence, in their recent works, have treated, or rather passed over, the subject of aural diseases. For example, Professor Liston, in speaking of ascertaining the condition of the meatus and membrana tympani by the speculum, says: "But it is perhaps unnecessary to enlarge further here on this subject, for such is the division of labour in these days, that a distinct profession is founded on the operation of squirting water into the external ear. It is true that other operations are talked of by these aurists, as they style themselves, but the advantage to be derived from any of them is often very doubtful," and yet this same surgeon describes three different modes of everting the upper eyelid. Diseases of the eye, in his Surgery, occupy sixty-four pages, while those of the ear barely engage six.

Professor Ferguson remarks in his Surgery: "The ordinary principles of surgery will serve to point out the routine of practice in most of these cases."

Dr. Marshall Hall, also, in his last book has a chapter headed, "Case of inflammatory Cold, Otitis, &c." The paper is taken up with an account of the "genial atmosphere produced by Arnott's stove," "inverted teapots," "the sad effects which might have followed putting boiling water into a flat pint bottle had it cracked or broken," but not a word is said about the ear itself; though pain in the ear was the gravamen of the "little patient's" complaint, its relief the burden of the physician's solicitude. Nothing is narrated to lead you to infer that the ear was ever looked into, much less accurately examined, in order to ascertain whether the case was one of external otitis, relievable by simple means, or of internal otitis, intractable, and jeopardizing the patient's very existence. The conclusion of the case and chapter is remarkable:—"The little patient," he says, "was slightly deaf before, but I have now to deplore deafness augmented to a serious degree." Such a result is not surprising.

No age appears to be exempt; the cases range from two months to eighty years. Three-fourths, however, occur between five and fifty; more than one-fifth from ten to twenty, when the constitution is being developed, and the causes of disease are most in operation.

The greatest number of cases were from ten to twenty years' duration; the next from five to ten; nearly one-third between five and twenty years' duration. This is a lamentable fact, and shews one of two things, either that they had been unsuccessfully treated, or had not been treated at all. There is a prevailing popular prejudice that nothing can be done for diseases of the ear, and therefore no attention is paid to them; they are let alone, and left to pursue their destructive course unheeded.

Ear affected.—The right and left were affected singly in sixty-nine cases; the right in thirty-six, the left in thirty-three. Both were affected in one hundred and twenty-one cases; the right most in twenty-nine, the left most in thirty-seven cases. Both equally in fifty-five cases.

The left is usually considered to be more frequently affected than the right: various reasons have been assigned, but not, I think, satisfactorily. The fact that both are affected nearly twice as frequently as both singly, would serve to show the operation of a general, not a local cause.

Degree of Deafness.—The degree varied from the slightest impairment to the most complete surdity. The phases were infinite: the circumstances ever varied. Some (the majority), could hear better in dry weather, a few in wet; some in hot, others in cold; some when a loud noise prevailed, others when all was still. Two might hear a watch at equal distances, but of these, one would catch very word of a sermon, the other none. The hearing point of a lady

The case of hypertrophy of the auricle was singular. It occurred in the right ear of a boy six years of age, was of four years' duration, arose from eczema, and the affected part was about three times its natural size. It was cured by the repeated application of leeches, the continued use of lead lotion, and the exhibition of mercurial alteratives and iodine mixture.

The cases of periodic deafness occurred in a girl, aged 16, who had never menstruated. She was seized every night, at seven o'clock, with giddiness, loud tinnitus, and almost complete deafness, and awoke in the same condition. It disappeared after breakfast to return again in the evening. This was continued for some weeks. Nothing abnormal could be seen about the ears. She was immediately relieved of all her symptoms by the appearance of the catamenia.

A remarkable case of periodic aural disease was related to me by our esteemed and experienced President. He was called to a young lady with an intermittent otalgia. The paroxysms were regular, daily, and the pain was most intense; with the pain there came a puriform discharge, so profuse as to run down the cheek; during the paroxysm there were heat, redness, &c., and all the symptoms of inflammation. With the paroxysm every symptom disappeared to be renewed the next day, and again to disappear. He advised a full dose of opium at the time of the paroxysm, and in the interval full doses of quinine, and with the most complete success. She was quickly cured.

Treatment.—The successful treatment of aural diseases requires all the skill of the anatomist, the learning of the pathologist, the ingenuity and dexterity of the surgeon, and the ample resources of the accomplished physician. It includes operations requiring as much tact and delicacy as in most other organs, and affections as painful and dangerous as any to which the human body is liable. It comprehends general treatment of varied application, and special treatment of great variety and interest.

Some modes which, a few years ago, were to do every thing, as catheterism of the Eustachian tubes, and the air press, have taken that level to which further experience has reduced them, as occasionally useful auxiliaries, or have fallen into almost undisturbed desuetude. This must necessarily be the fate of all remedies unduly used, and indiscriminately applied. There is yet room, however, for further additions, for it must be confessed that our means are not equal to our wants. A majority, it is true, of the sum of the cases may submit to our remedial measures, others may be much relieved, yet it must not be withheld that there are entire classes which wholly refuse to obey our best directed efforts. It may be replied, the mischief is already done; it cannot be removed. But what does this imply? either that the disease advanced unsuspected or undiscovered, or if observed, unchecked by treatment too feeble or inadequate.

The duration, of course, will vary in the different classes; and in some it will be short, conclusive, and exceedingly gratifying; in others, prolonged, irregular, and making large demands on our patience and resources.

The summary of the result of 190 cases is:—

Cured	102
Improved (much, 23; little, 12)	35
Incurable (treated, 6; not treated, 35)	41
Irregular	6
Death	1
Under treatment	5

This shews that little more than one-half were cured, a result which, I venture to assert, does not obtain in the treatment of disease of any other organ, and presents not a very flattering view of our success.

The cured comprehended cases, chiefly of accumulated cerumen and throat-deafness—those most amenable to treatment.

A majority of those marked improved only admitted of improvement, having one or both membranæ tympani perforated or destroyed. This may be considered a trifling accident, not influencing ordinary audition to any very inconvenient extent; yet by it the patient is constantly exposed to mischief, severe in kind and perilous in result. For example, a female aged 30 had perforation of the right membrana tympani: the deafness was slight, otorhœa occasional, and thought unworthy of attention. Accidentally, on a hot summer's evening, she sat for a short time with the ear next a broken window. Severe pain almost immediately followed; otitis of a grave character was quickly established; it proved intractable, and ended in death. On examination the temporal and occipital bones were found riddled with caries, and, together with the neighbouring sinuses and structures, bathed in pus. It will not serve our purpose to say that this is a rare extreme case, it is enough to know that it is liable to occur.

The incurable cases mean those incurable in the present state of our knowledge. They include those cases where extensive disorganization is evident, or principally where there is no visible organic alteration. These latter are those generally styled nervous deafness, a species I have not admitted in my classification; they depend more probably (from the researches of Toynbee) on deposit of lymph in some part of the tympanum. Other deposits are also said to occur in this situation, as cholesterine, carbonate of lime, &c. The catheter, etherial vapour, injections, galvanism, &c., were vaunted not long ago as specifics here, but they have shared the fate of all remedies, the agency of which has been rather guessed at than inferred and rigidly deduced. If this species of deafness, I may say with Heberden, be not incurable, a discovery of the proper remedies is one of the many desiderata in the art of healing.—*Provincial Medical and Surgical Journal for July*, 1845.

Discovery of the nine missing Books of Galen's principal anatomical Work.—It is well known that Galen's principal anatomical work, called Περὶ Ἀνατομικῶν Ἐγχειρέσεων, *De Administrationi-*

bus Anatomicis, consisted originally of fifteen books, of which only eight, and part of the ninth, have come down to us. The contents of each book are mentioned by himself (*De Libris Propriis*, cap. 3, tom. xix. pp. 24, 25, ed. Kühn), from which account it appeared that the last six treated of the eyes, tongue, œsophagus, larynx, os hyoides, the nerves belonging to these parts, the arteries, the veins, the nerves arising from the brain, those arising from the spinal marrow, and the organs of generation; so that Galen's account of several of the most important parts of the body is contained in the lost books. In Ackermann's *Historia Literaria*, prefixed to Kühn's edition of Galen (p. lxxxiv.), we find the following notice:—"E Golii Arabico codice libros xi. usque ad xv. editurum se promiserat Thomas Bartholinus, *De Libris Legendis*, Dissert. iii. p. 75 [p. 58, ed. 1711]. Erant Galeni *De Administr. Anatom.* libri sex postremi cum adnotationibus Jacobi Golii in Bibliotheca Narcissi, Archiepiscopi Dubliniensis, n. 1787." No further information on the subject could Ackermann, who was a most diligent and accurate inquirer, obtain; nor, apparently, could Kühn himself, who, in the last volume of his edition of Galen, corrects some errors and supplies some omissions. In turning over the pages of a very different work, J. G. Wentrich's Dissertation "De Auctorum Græcorum Versionibus et Commentariis Syriacis, Arabicis, Armeniacis, Persicisque" (Lips. 1842, 8vo.), we noticed that two copies of the Arabic translation were said (p. 245) to exist in the Bodleian Library at Oxford, one consisting of fifteen books, the other only of the last six. Upon referring to Uri's Catalogue of the Oriental Manuscripts of the Bodleian (p. 135), we found that the latter manuscript was said to be in the handwriting of Golius himself; that it had belonged at one time to Narcissus Marsh, Archbishop of Dublin, and was therefore, probably, the very MS. spoken of by Ackermann; and the actual examination of the two MSS. in question has shewn us that the modern one was copied from the other, the pages of the original being marked in the margin of the transcript. The original MS. is written on Oriental paper, and by an Oriental scribe, and contains the complete works of Galen, in fifteen books. It was bought at Constantinople for forty-eight florins, rather a large price, but by whom is uncertain, nor is anything else known of its history, except that it once belonged to the Archbishop of Dublin, though it does not appear in the list of his MSS. contained in the *Catalogus Librorum MSS. Angliæ et Hiberniæ*, printed in 1697. It appears to have been seen and used by Golius, a celebrated Arabic scholar at Leyden, who must have known that the Greek copies of the work contained only nine books, and accordingly copied the remaining six with a view to publication. He did not, however, transcribe the remainder of the ninth book, which is wanting in the Greek copies, and which is about twice as long as the portion hitherto known in Europe. The MS. was either given as a present by Golius, or bequeathed as a legacy at his death, in 1667, to Thomas Bartholinus the elder, Professor of Anatomy at

Copenhagen, and was in his possession in the year 1762, when he wrote his work *De Libris Legendis*. Probably after his death in 1680 it came into the hands of Narcissus Marsh, Archbishop of Dublin, and appears in the Catalogue quoted above. From him it came, either by gift or legacy, to the Bodleian Library at Oxford, where it still remains, together with the original MS. from which it was transcribed. It should be added that, as far as we are aware, no other copy of the Arabic translation is to be found in any European library; nor do any of the old Latin translations contain the last six books of the treatise."—*London Med. Gazette.*

[Since the above was published, we have made careful inquiry at Marsh's Library, in this city, for some trace of this MS. having ever been in that collection, but without success. Bale informs us that Golius brought several valuable MSS. with him from the East, and this was probably one of them.]

The Dublin Natural History Society.—This rising Institution has progressed rapidly during the past session, and its seventh Annual Report contains so much interesting zoological matter, that we gladly quote from its pages notices of many valuable additions to the Fauna of Ireland lately made by its members, particularly Messrs. Allman, Andrews, Scouler, M'Coy, Farran, M'Calla, &c. &c. In his opening address Professor Allman, while congratulating the Society on its eminently successful career and present prosperous condition, says that "In judging of the causes of that condition, and of the increasing interest in the study of natural history which its meetings excite, it must be borne in mind, that the Dublin Natural History Society is one peculiarly adapted to awaken general interest, for it does not confine itself to any one branch of natural science. It is not exclusively a zoological, or a botanical, or a geological society, but one and all of these at the same time. Natural history is not mere descriptions of forms or of objects, but a history of the various relations of natural bodies to one another, and to themselves, when contemplated at distinct periods of time. The result of this universality of the subject-matter of the Society is, that while its popularity is increased, its power of applying itself to each individual branch is lessened, and it therefore in no degree interferes with the excellent Societies established in this city for the cultivation of particular branches of natural history. The Society, therefore, afforded most excellent opportunities for the communication of original matter, and was peculiarly adapted to awaken among the public a taste for the natural history sciences. Natural history has been making gigantic strides. The school of Gilbert White, of Selborne, has yielded, in a philosophic point of view, to that of Cuvier and of Owen. Characters derived from external conformation are now but of secondary importance. Anatomy and physiology must lend their unerring guidance to the inquiries of the zoologist, who, in his investigation, must know all departments of natural history to aim at excellence in any one. The study of animal and vegetable struc-

ture was so important in relation to each other, that botany and zoology are now embraced under the one term, *biology*."—pp. 11, 12.

Among the contributors to the botanical department, "Mr. Andrews presented to the notice of the Society an exceedingly interesting addition to the Fungi of this country, the Morell—*Morchella esculenta*, of Hooker and of Greville. A few years before, a specimen was found by Simon Foot, Esq., but the interest of the discovery was not at that time attended to. In the middle of last month Mr. Foot again met with several specimens of the Morell in Glen Southwell, known as the Little Dargle, adjoining Hollypark. Were those localities to be well searched, that valuable article of food would, no doubt, be abundantly met with. The *Morchella esculenta* is easily known from the other species of the genus by its ovate-roundish pileus, and by the adnate and compressed state of the base of the pileus to the stipe. It is to be regretted that so little is known of the fungi of this country, few communications having been made since the publication of Dr. Taylor's enumeration of the species, in the collection of the late John Templeton, Esq., and that of an excellent statement published in this year, in 'Contributions towards a Fauna and Flora of the County of Cork.'"—pp. 5, 6.

"Dr. Scouler exhibited specimens of a rare form of sponge, found at the low tide mark in one of those shallow, muddy inlets of Roundstone Bay, Connemara. He stated that the species had already been named *Halichondria Carnosa* by Dr. Johnston, to whom specimens had been communicated; but Dr. Scouler, having received recent specimens from its original discoverer, Mr. William M'Calla, considered it, upon more minute examination, to present such characters as to justify its removal from *Halichondria*, and to place it in the genus *Geodia*, or probably to form a new genus for its reception. Its form is fig-shaped, terminated by a pedicle, by which it is affixed to marine bodies. On a section being made, it is found to consist of two distinct substances,—the one may be termed the cortical, the other the axis. The cortical portion is compact, and, when divided, resembling a liver in texture and colour; the substance is fibrous, and permeated by very small, slender canals, which, however, do not terminate in any distinct superficial orifices. The second substance is of a white appearance, fibrous, and similar to soft cartilage. This cartilaginous substance, the axis, extends through the entire sponge, and forms also the base and pedicle of the sponge. The distribution of the variously-shaped spicula is characteristic of generic distinction; thus in *Halichondria* the existence of siliceous spicula in the fibre of the parenchyma, not radiating in fasciculi, but distributed throughout its homologous body, is an essential character. In *Tethea* the spicula are collected in a nucleus in the centre, from which they radiate to the circumference, and producing a villosity of surface.

"Mr. Andrews exhibited specimens of a fungus belonging to the genus *Rhizomorpha* of Roth, which were detected in the vaults of the Custom House Dock Stores. He conceived it to be the *R. subriegata* of Sowerby, from the very long thallus, of uniform thickness, and the bundles of light-coloured, and, in the recent state, almost silky branches. It also approached in character the *R. medullaris* of Smith.

"He also brought forward specimens of the *Characeæ*, a tribe of plants possessing extreme interest in the vegetable kingdom. The species were those of *Chara delicatula*, and *β setacea* of Agardh, and the beautiful little *Nitella hyalina* of the same author. These were the first records of these extremely rare British plants occurring in this country. The *C. delicatula* was found in September, 1841, in the county of Kerry, growing abundantly in a drain between Smerwick Harbour and Gallerus. It is an exceedingly beautiful Chra, the stems being very delicate, slender, and of nearly two feet in length, and well agreeing with Agardh's description 'Caulo tenuiter strisio glabro fragilissimo.' With it was found *Gomphonema Berkeleii*, and which has been recorded by Mr. Ralfs, in the twelfth volume of the Annals of Natural History, page 464; but the station should have been noted, 'West of Brandon mountain,' not 'Bandon mountains.' The *C. hyalina* was met with in September, 1842, in a deep drain communicating with Goul-na-cappee Lake. These observations were merely intended as confirmatory of the extreme botanical interest that this country still presented. Dr. Scouler observed that it was no small object to have the announcement of the addition of two new plants to the Irish Flora, and those belonging to a genus so interesting, in a physiological point of view, as that of chara. He was happy to state the discovery of one of the species, the *Chara hyalina* was confirmed and extended by his having received several specimens of that beautiful plant from Mr. William M'Calla, who found it in the lakes of Connemara."—pp. 7–9.

"Mr. Andrews also read a paper upon a new British *Cerastium*, and upon the characteristic features of the coast of Kerry. In recording the occurrence of this plant, the *Cerastium strictum* of Continental authors, it was more for the object of dwelling upon the characteristic features and geological formation of that part of Kerry where the plant was discovered, and of the interest of its geographical distribution. The plant, whose specific characters are, 'Stems declinate; leaves linear, lanceolate, glabrous, rigid, and densely covering the stems and branches; panicle dichotomous; flowers large, delicate pearl white, on short peduncles; petals broad, more than twice as long as the calyx,' was found growing most exposed to the storms and sprays of the ocean, on rocks, in the western Blasket Island, coast of Kerry. Plants identical with the Kerry Cerastium have been brought from the Falkland Islands, and from Terra del Fuego; and it is singular that its nearest ally, the *C. arvense*, has not been detected on the mainland along the western coast, being local in this country, and principally confined to parts of the eastern coast.

The descriptions of the exposed peat lands of the coast of Kerry

led to the notice of the *Tussac grass* of the Falkland Islands, and of the importance of its introduction into localities now valueless to the peasant. A fine specimen of this noble grass (*Dactylis Cæspitosa*) was exhibited to the meeting, the first brought to this country, and which, through the kindness of Dr. Harvey, of Trinity College, was obtained from Dr. Joseph Hooker, the botanist to the Antarctic expedition of Her Majesty's discovery ships, Erebus and Terror. Mr. Andrews then alluded to the extensive sand-banks which form a prominent feature along the western coast, and to the ravages, of increasing occurrence during winter storms, by the shifting of those sands and by the inroads of the sea. Among the plants whose creeping and binding rhizomata were protection to the banks, none appeared of more promising security than the *Lathyrus maritimus*, the beautiful sea-pea, whose strong roots penetrated to a considerable depth into the sands, and also formed net-like ramifications near the surface; its luxuriant growth would also prove excellent as a fodder for cattle. The climate of Kerry was remarkably mild, and well adapted for the growth of the finest pines. In the grounds of Lord Kenmare, at Killarney, the beautiful American swamp pine, *Pinus palustris*, and the *Auracaria Braziliensis*, grew as luxuriantly as in the mild region of western Portugal."—pp. 12–14.

"Specimens were exhibited of *Berkeleya fragilis*, discovered by Mr. M'Calla in Roundstone Bay, and a delicately beautiful species of conferva, named *Kaneana*, most deservedly in honour of Mrs. Kane, the authoress of the Irish Flora, published in 1833. A fine specimen of *Trichomanes* was also shewn, having been gathered, in October last, in the Hermitage Glen, county of Wicklow, by John Nuttall, Esq., of Tittour, who originally discovered it in that station in September, 1809. This confirmation of its existence, after a lapse of so many years, is interesting, and is of importance as to the wide, although exceedingly local distribution of that rare and beautiful Fern in this country."—p. 18.

"Mr. Frederick M'Coy read a Paper upon the Irish species of torpedo noticed by him in February, 1841, the *Torpedo emarginata* of M'Coy; and to shew its differences from all other described species, he stated that there were three distinct species of the genus found in the British seas, two of which are Irish. The *Torpedo emarginata*, he believed, differed materially from the species *T. nobiliana*, and from the American species, *T. occidentalis* of Storer, by its remarkably slender form, the singularly great proportional length of the tail, the very small, almost rudimentary, ventral fins, and by having the anterior dorsal fin placed entirely behind the posterior attachment of the ventrals. Two deep marginal notches, one at each side, separated the head from the pectoral fins, which suggested the specific name *emarginata*. These specific characters are the more fully given, having been misunderstood by subsequent writers. Mr. Yarrell is of opinion that *Torpedo nobiliana* is identical with *T. Walshii* of Thompson, and probably with *T. emarginata* of M'Coy. The species is exceedingly rare, the only known specimen being in the Museum of the Royal Dublin Society."—pp. 6, 7.

"Mr. M'Coy, in detailing the *Vertebrata* in the Society's collection, observed that some specimens were of so much interest to the Irish naturalist, that he thought it desirable to bring them fully before the Society. Among them are two birds, one the buff-breasted sandpiper (*Tringa rufescens*), not hitherto observed in Ireland; and the other a species of tern, or sea-swallow, entirely new to Britain. Of the buff-breasted sandpiper but four specimens appear to have occurred in England; in Scotland and in Ireland it was wholly unknown; and from its great rarity on the European continent, the meeting of this beautiful American species in this country must be considered a most interesting addition to the Fauna. It is chiefly distinguished from all the other Tringæ by the beautiful variegated markings of the under side of the wings. The other, the *sterna leucoptera* (tern), had remained unnoticed in the Society's collection, as a species of the black tern, until recognized as distinct by Mr. M'Coy, to whom much commendation is due for his discrimination of the objects of interest in the collections of the Society. The form, proportions, and size of this species are very nearly those of the black tern (*Sterna nigra*); like that species, too, the webs of the toes are very deeply indented, being reduced to a mere rudiment between the inner and middle toes. The two species are, however, easily distinguished: the under wing-coverts of *S. nigra* are white, of the *S. leucoptera* black; the tail of the former is dark gray, of the latter pure white; in the *S. nigra* the throat is white, breast and abdomen dark gray, and the back lead colour, while in the *S. leucoptera* all those parts are black. These beautiful birds were presented to the Society by the kindness of J. Hill, Esq., who had the good fortune to shoot the former, near the Pigeon House, Dublin, and to obtain the latter on the Shannon, in 1841."—pp. 9–11.

The same industrious naturalist "exhibited a large section of oak wood which had been perforated by the larvæ or caterpillars of the goat moth, *Cossus ligniperda*, and read a Paper 'On the Injuries to Oak Plantations caused by those Larvæ.' Entering minutely into their habits, growth, and mode of boring those long tortuous passages, which eventually prove destructive to the strength and vitality of the tree, he suggested that attention to those points might afford a preventative, and lead to the preservation of much valuable property. It was of paramount importance to attend to the development, manner of life, and relation to vegetable productions of the insect enemies of the forester and of the agriculturist. From the ravages being so extensive, there is reason to suppose that the injurious operations of the *cossi* were encouraged by the predisposed unhealthy state of the trees from unsuitableness of soil or locality."—p. 14.

"At the last meeting of the session, Mr. M'Coy read a paper 'Upon a new Irish Species of Bat,' the reddish-gray bat (*Vespertilio nattereri*), and which was killed at Enniskerry. In noticing the sin-

gular zoological difference between this country and Great Britain, in the very limited number of species known as Irish, he was of opinion that the mild temperature of this climate did not induce that state of torpor which was necessary for animals having no migratory powers, and whose principal food was insects. In England, and on the Continent, the approach of cold weather renders the bat torpid long before the disappearance of the insects, and they do not again waken until their prey is abundant in the spring. The temperature, therefore, did did not sink sufficiently to cause these animals to hybernate; consequently in some months they would be without food, although active and hungry. Of the other three species that had been found in Ireland, the little *pipistrelle* (*Vespertilio pipistrellus*) and the long-eared bat (*Plecotus auritus*) were abundant; but one specimen of the third had been met, Daubenton's bat (*Vespertilio Daubentonii*) obtained by the Ordnance Survey collectors in the north of Ireland. He also alluded to the notice of the horse-shoe bat (*Rhinolophus*), given by James Hone, Esq., and there is no reason to doubt but that the occurrence of this remarkable bat, whose characters are so distinct from those of the genus *Barbastellus*, may yet be more fully confirmed."—pp. 18, 19.

"Dr. Farran read a Paper 'Upon the rare Species and peculiar Habits of the Shells of the western Coast, and of the characteristic Features of Roundstone and Birterbie Bays, Connemara.' Within the range of these two bays 143 species of shells are enumerated, some the most rare and most beautiful of British marine molluscs. The peculiar characters of Roundstone Bay, which is separated from that of Birterbie by the Island of Innisnee, is that it abounds in Nullipores, (among them the magnificent *Nullipora agariciformis*, its only known station), and with but few molluscs; while in Birterbie the nullipores are absent, but it is prolific in molluscs. It may be proper to mention a few of the more important.—*Anatiferi vitrea* was found abundantly adhering in a living state to *Fucus vesiculosus*, thus confirming its being strictly native. The beautiful little gasteropodous mollusc (*Velutina otis*) was seen in abundance restlessly gliding through the masses of mussels which cover the granitic rocks, and which are exposed to the most violent surges of the Atlantic, yet this apperantly delicate and fragile creature enjoyed its station in perfect safety. The animal Doctor Farran describes as being four times the size of its shell, of a milk white colour, and having its two antennæ tipped with black. In the same locality was found *Venerupis irus* attached to the rocks by threads, similar to the byssus of the mussel (Mytilus). That of great interest is the detection in the living state of *Gastrochæna pholadia* upon the valve of *Lutraria*, and protected by its calcareous dome-like covering. He had the good fortune to witness the action of the little animal in its most active state, projecting and contracting its tube through its calcareous passage. The *Gastrochæna* is excellently figured and described in Sowerby's Conchology from specimens obtained from the Mediterranean. Among

others of extreme interest to the zoologist, collected by Doctor Farran in a living state, are *Bulla hydatis*, *Modiola tulipa*, *Arca fusca*, *Petricola ochrolenca*, abundance of fine specimens of *Myrtea spinifera*, a beautiful little undetermined Pecten, resembling *P. glaber*, and particularly the beautiful *Kellia sub-orbicularis* was found occurring plentifully between the valves of deserted shells. This desirable addition to a cabinet is of interest to the Irish naturalist. It was constituted a genus by the late Dr. Turton, in honour of Matthias O'Kelly, Esq., who first instilled into the mind of his friend and companion, Dr. Turton, a love of natural history, and stimulated his perseverance in that science.

"The specimens of *Mediola tulipa* were satisfactorily confirmatory of its existence in our seas; and with regard to *Antifa vitrea*, Mr. Warren had presented to the Society, in 1838, specimens attached to *Fucus vesiculosus*, thus confirming the habitat given by Doctor Farran.

"Doctor Harvey mentioned that quantities of *Venerupis irus* had been collected by him in a living state, attached to the roots of *Laminaria bulbosa*, and Mr. Warren wished the record to be noted of the capture by Mr. R. Glennon of *Pholas striata* and *Spirula australis*, at Killala, in the county Mayo.

"Doctor Farran also read a Paper—'Observations on the productions of Roundstone and Birterbie Bays, Connemara, chiefly the Crustacea, Sponges, and Zoophytes, by Mr. M'Calla, being a continuation of Doctor Farran's Paper on the rare Shells of that district. In that Paper a well-arranged list was given of Irish Brachyura, detailing twenty-seven species, and one undetermined species and genus. To the list Mr. M'Calla has added a species to the Fauna of Ireland, *Porturus Marmorens*, and another not appearing referrible to any known genus of British Crustacea. The additions to those already recorded make the Irish Brachyura to amount to thirty-three species. Among the other sections of the Crustacea, he alluded to the localities of *Nesæa bidentata*, particularly occurring in the button-like frond of *Himanthalia lorea*, and also to that of the very interesting species, *Nebalia herbstii*, found under stones and lumps of turf at the heads of the bays. It is also worthy of notice that the *Mysus spinulosis* (opposum shrimp), has been abundantly met with by Mr. M'Calla, in two localities in the neighbourhood of Dublin. Twenty-one species of *Echinodermata* were enumerated, and remarks on the stations and peculiarities of several species of interest were described.'"—pp. 14–17.—*Annual Report of Dublin Nat. Hist. Society.*

On the Treatment of Fractures which usually unite in a defective Manner.—By M. Guerin de Vaunes, Anatomical Assistant of the Faculty of Medicine.—(*Archives Generales de Médicine*, Mar. and June, 1845.)—The author's principal aim in publishing these papers is to prove, that if certain fractures only unite by means of fibrous tissue, or by the formation of a more or less deformed callus, it is

owing to a radical defect in their treatment. In fractures of the clavicle, which first engage his attention, most authors, from Hippocrates down, allow that the union is generally accompanied by some deformity, but he affirms that all writers to the present time have overlooked one of the most important indications of treatment. We need not follow M. Guerin through the lists of the different methods employed by surgeons at various periods, as these are sufficiently known to our readers; but many of his critical observations on this subject are worthy of being quoted, and naturally lead to the enunciation of his own views. "Hippocrates," he says, "in order to put the fragments of the clavicle in contact, had already advised a cushion to be applied between the shoulders, with a view of carrying outwards the external end of the clavicle. Paulus Ægineta, to attain this object, put under the armpit of the patient a pad of wool, which, according to Bichat, had carried art to its perfection; if employed to reduce the fragments, this process had been continued to maintain them; but Desault alone understood the mechanism of the displacement, and to fulfil the indications of this fracture, he made use of the humerus as a lever to push the shoulder backwards, upwards, and outwards, in acting according to the natural direction of the bone.

"I partake the admiration of Bichat for the apparatus of Dessult, which bears, says he, the stamp of true genius. I believe, nevertheless, that his bandage is insufficient; I wish it to be preserved entire, but with an addition to it, the nature of which will be presently better understood.

"If I admit that Desault has fulfilled the indications which consist in carrying the shoulder upwards, backwards, and outwards, to be consistent with what I have said, I must prove that there are others which have escaped him. That will not be difficult. Desault, in fact, like all the surgeons who have preceded and followed him, has only occupied himself with one thing, to put the external fragment in contact with the internal, and to maintain this apposition in acting on the arm or shoulder of the affected side. But nobody has thought *of preventing the mobility of the internal fragment.* Yet this is a fundamental principle in the treatment of these fractures, which has been overlooked. When the masters of art shew the point where the light ought to appear, all eyes remain fixed in that direction, till some one turns round and perceives a light on the opposite side. It is what has happened in the treatment of the fracture under consideration, for I read in the posthumous work of Desault: 'The power which carries downwards the top of the shoulder had appeared illusory to the ancient Greek physicians, who attributed the apparent depression of this part to the *elevation of the sternal fragment*, and in this belief sought, by compressing it, to re-establish its lost level with the other. More judicious than those who went before him, Hippocrates demonstrated that their doctrine, false in its principles, was more dangerous in its consequences, and that the *immoveable sternal fragment* only lost its relative position with the humerus, because this was depressed by the weight of the arm, a doctrine evidently proved by the comparison of the sound shoulder with that of the affected side, which all practitioners have since admitted. The predecessors of Hippocrates attributed too much to the elevation of the sternal fragment, and the father of medicine deserves great credit for having shewn the inefficacy, and even the danger, of compression applied on this fragment. But he led into error those who followed him, in sustaining that the inner fragment is immoveable. You will soon be convinced, if you repeat, on the dead subject, the following experiment, which I have performed several times.

"Break a collar bone by letting a dead body fall on the shoulder, then raise the arm of the opposite side; you will then see that the sternal fragment is not immoveable, and that it glides up and down on the outer fragment; if you carry back the arm of the sound side, the sternal fragment will glide on the other from behind forwards, whilst it will follow an opposite direction if you carry the arm forwards.

"This is not all: if you say to a man, having a fracture of the clavicle, and whose two arms hang down by the side of the body, to turn the head round to the healthy side, you will then see the internal fragment carried from below upwards, which is a consequence of the traction exercised on it by the sterno-cleido-mastoid muscle.

"These experiments prove, in an undeniable manner, that there is a connected action between the sound clavicle and the sternal fragment of the injured side; in the second place, that the riding of the fragments is not only on account of the external being drawn by the weight of the arm, but also to the raising of the sternal fragment, which is drawn up by the sterno-cleido mastoid.

"I now speak of ordinary cases, in which the clavicle is broken transversely, and not of those rare cases in which the external fragment, fractured obliquely, at the expense of its inferior surface, is found placed above the inner fragment.

"In repeating these experiments several times, I am convinced that the mobility of the sternal fragment is in an inverse ratio to its length, that is to say, so much the less as the fracture has taken place further from the insertion of the cleido-mastoid muscle.

"This agreement existing between the healthy arm and the sternal fragment of the clavicle, I am bound to inquire if the different bandages and apparatus employed in the treatment of this fracture tend to maintain the inner fragment."

After having done so, M. Guerin asserts that he has not seen any apparatus which prevents this fragment being carried upwards, forwards, or backwards, according to the motions of the sound arm. It now remains for us to give, in the author's own words, a description of the means of securing a fractured clavicle in proper apposition, and to obviate the causes of displacement which he has pointed out. Like most persons who have hit on a novelty, perhaps he is disposed to invest it with more importance than it deserves, yet there can be no doubt but that his observations deserve attention for their truth

and rationality, and his apparatus, cumbersome and disagreeable to the patient as it must be, may be found serviceable in cases of fractured clavicle, attended with considerable displacement of the broken ends of the bone.

"1st. The affected shoulder ought to be carried upwards, outwards, or backwards, as Desault has indicated, and, I believe, there is not a better bandage for this object than that invented by that surgeon, provided it be rendered immoveable by dextrine or starch.

"2nd. The thoracic extremity of the opposite side ought to be fixed to the chest, so as to prevent its movements. I know that the patient will thus find himself often embarrassed, not being able to eat without the aid of a nurse or friend, unable as he will be of raising himself, &c., he must always have near him a kind person charged to assist him in all his movements.

"A final indication yet remains to be accomplished; we must, in fact, oppose the contraction of the sterno-cleido-mastoid muscle. This end is attained in keeping the face of the patient turned on the side of the fracture, by means of starched bandages embracing the head and the affected shoulder, and thus putting the muscle in a state of relaxation. I do not conceal from myself the inconvenience of a mode of treatment like this, which, during a month, paralyses all the motions of the upper part of the body; but many a woman of the world would submit to it willingly, in order to have a fracture united in a regular manner, and not deformed. Moreover, this bone, spongy, and penetrated by a grand number of vessels, has in itself a great disposition to produce callus, and it will be possible, at the end of some days, in which the fragments are kept in exact apposition, to permit the motions of the head without injury to the union."

General Emphysema, and Death in a few Hours from sub-peritoneal Rupture of the Stomach.—In the "*Annales et Bulletin de la Societé de Médecine de Gand*," Professor Burggraeve gives a case of very great interest, both to the pathologist and to the medical jurist, of which the following are the particulars, as far as they can be learned from the Professor's description.

"A surgeon of active and temperate habits, but occasionally guilty of errors in regard to diet, had been complaining, during six months, of what he believed to be gastralgia, when he was summoned to serve on a jury at Gaud. Suddenly, after partaking of a hearty dinner, he felt himself alarmingly unwell. His skin was cold, corrugated, and covered with perspiration; the pulse contracted, and scarcely perceptible; the voice almost gone; respiration anxious; abdomen tense, and enormously dilated; an emollient lavement was administered, when suddenly, during the efforts at defæcation, emphysema made its appearance, and, extending to the neck, rapidly gave rise to the most alarming symptoms of suffocation. The action of the lungs became partially suspended; the surface assumed a purple hue; the swelling increased with each effort of inspiration, and the patient, apparently involuntarily, was unceasingly engaged in efforts of deglutition. Soon all semblance of human shape almost completely disappeared, but occasionally a plaintive voice gave indication that the patient continued to suffer. Still intelligence was unaffected, and the patient calmly and collectedly took part in the consultation of three of his brethren as to the means to be opposed to such sudden and alarming indications, and, although hopeless of relief, strongly expressed his disapprobation of the proposal to practise paracentesis abdominis. From the very first a constant burning sensation of thirst caused the patient to cry out continually for cold water, which was swallowed with constantly increasing difficulty, although the involuntary efforts of deglutition were going on with ceaseless rapidity. Death took place immediately after an attempt to drink, but for a long time the chest continued to heave at gradually lengthening intervals, and every such effort swelled the body still more.

"*Sectio Cadaveris.*—The lungs were pressed back against the spinal column, and the heart was gorged with black blood. In the pericardium and right pleura there was some yellow serum, but no other lesion was observed in the chest. The anterior abdominal wall, enormously distended with gas did not collapse when the peritoneal cavity (which contained no air) was cut into.

"A cruciform incision shewed the stomach so distended as to occupy almost the whole abdomen, and its muscular coat appeared hypertrophied. On drawing it forward the gastro-hepatic omentum gave way and gas made its escape from the stomach through a large opening extending the whole length of the smaller curvature, from the cardia to the pylorus. At the place of rupture the muscular and mucous coats were in a state of puttaceous softening; the mucous coat, in proportion as it approached the opening, became injected with blueish blood, and sensibly thinned; there was no trace whatever either of engorgement, ulceration, or adhesion; no other lesion could be discovered."

It is very much to be regretted that in his account of this important case, the Belgian Professor has not displayed more of that minute accuracy and precision which is the just boast of the French pathological school. We should like to know how long the patient lived after the alarming symptoms commenced, and the order of occurrence and exact nature of those symptoms; what were the means taken to test the integrity of the air passages, what were the contents of the stomach, and in what state, with many other questions necessary to satisfy our minds as to the exact nature of the lesion in question. The Editor of the *Gazette Medicale de Paris*, after quoting this case (which he considers *unique*), expresses doubts whether the air were actually effused from an orifice in the stomach, and seems inclined to believe that some lesion in the air passages had been overlooked, that the rupture occurred, not in the small, but in the large curvature of the stomach, and that the rupture of the muscular and mucous coats was caused by the same violence that tore through the peritoneum, or was wholly or partially occasioned by post-mortem erosion by the gastric juice, as in the cases described by Hunter. The following case, however, is so analogous, both in the excito-motary phenomena during life,

and in the lesions found after death, that we are inclined to take the Professor's facts as he gives them, the more especially as we have read in Haller's *Opuscula Pathologica*, and also in the *Archives Generales de Medecine* (Vol. X. or XI., by M. Marjolin), of emphysema arising from a breach of continuity in the intestinal canal, although we have not the volumes at hand to refer to. Many observers have testified that emphysema from this cause is not rare in the inferior animals. (*Obs. sur les Animaux domestiques par* MM. Chabert and Huzard).

"Last month a coachman, twenty years of age, whilst on a journey to Limeburg got ill on the way, but continued to follow his master, although the weather at the time was very inclement. Increasing weakness compelled him, however, to remain at Helmstadt, where he was seen by Heister and others. The patient complained chiefly of difficulty of breathing and inability to swallow, but in particular he was continually affected with a peculiar suffocating sensation which made him feel as if drowning, and cry out to that effect (*quasi mox aqua suffocaturus esset*). His eyes were fixed and dim, and he had so much the appearance of a mad person, that it was difficult to say whether he cried out under the influence of delirium or not. The fauces were examined, and no swelling or other abnormal appearance could be discovered, but a soft puffy tumour, such as is called *emphysema*, occupied from the chin to the chest, and on being pressed a noise was produced, whilst the patient *kept continually spitting out*. The pulse was perfectly natural though rather weak, and the temperature of the body was not sensibly raised."

The patient being almost unable to swallow enemata, and embrocations were employed, and he was directed to sip tea and barley water. He died during the night.

No lesion of the air passages could be discovered. The lungs, liver, and stomach were inflamed where they respectively touched the diaphragm, and on drawing the stomach to one side a rent formed in it large enough to admit two fingers, the part that ruptured being completely *gangrened*. "Examinavimus hoc foramen atque ventriculum ibi putridum sphaceloque corruptum deprehendimus."—*Heisteri Obs. Medicæ. Miscellaneæ, &c., in Haller's Disputationum Anat. Select.* vol. vi.

The following is Professor Burgqraeve's exposition of the cause of death in the case which he has reported: "A rupture of the stomach took place under the peritoneum, and the air, forced through the opening by the movements of the chest, found its way into the general cellular tissue, chiefly along the spinal column, where this tissue is loosest, and was thence diffused over the trunk and extremities, hence the rapid efforts of deglutition which were remarked during life. The thoracic viscera and the large vessels were the first exposed to compression, chiefly from the air passing up through the posterior mediastinum. Compression was greatest in the neck, on account of the aponeurotic layers, amongst which are situated the trachea and great arterial and venous trunks. The air was arrested by the vault of the cranium, none of the foramina of which allowed it to pass, and in consequence the brain was left intact, and was only eventually affected by the incessant advance of asphyxia."

Cæsarian Section: both Mother and Child saved.—At the Medical Society of the Upper Rhine, M. Dittmar, at the request of the President, gave the following verbal account of a case in which he performed this operation with complete success:

"Barbe Gerber, aged 38, living near St. Marie-aux-mines, of apparently a good constitution; is the wife of a poor day labourer, who supports, with difficulty, a numerous family; her parents, as well as her brothers and sisters, four in number, have always enjoyed good health. In six pregnancies, previous to that of which we are speaking, she carried her infants to the full term, but after the fourth malacostion, accompanied with chronic bronchitis, made its appearance, recurring with increased severity at every succeeding confinement, so that during the sixth she completely lost the use of her lower extremities; notwithstanding, under the use of cod-liver oil, her state improved very much. The consequence of this disease was a remarkable diminution of stature, and a deformity of the pelvis, rendering the sixth accouchement very tedious; it was, however, accomplished without the aid of a physician.

"During the whole period of the seventh pregnancy, the patient found herself very well, with the exception of some little difficulty in walking. On the 1st of August last she felt labour pains, and on the 2nd, at six in the evening, the membranes ruptured, and a left hand presented. M. Dittmar was not sent for until midnight, when the following was what he found: through the belly, which was very prominent, he felt the head of a fœtus above the upper strait of the pelvis, resting on the pubic arch. The vulva was enormously swollen, and between the labia appeared the left hand of the child. The '*toucher*' astonished M. Dittmar by informing him of the extreme narrowing of the bisischiadic diameter, and of the closing in of the pubic arch, which would barely admit of the passage of two fingers. It was with great difficulty that he was able to satisfy himself as to the position of the child; the occiput rested on the right half of the symphysis pubis, with the forehead turned toward the left sacro-iliac synchondrosis, also resting on the brim of the pelvis. Strong uterine contractions, quickly succeeding each other, only increased the tumour on the head of the child; the head itself remained fixed. M. Dittmar at first thought of breaking up the head, and then extracting it with the cephalotribe, as he had done in a similar case a few weeks before, but being soon convinced, from the state of the pelvis, that even this operation was impracticable, he had a consultation on the case with M. Wolf.

"The first thing to be done was to learn accurately the dimensions of the pelvis, and the following are the conclusions at which they arrived: The height of the woman is 1m, 40 (4f, 9·11),* the vertebral column presents no deviation from the normal state, the last false ribs on each side touch the internal margin of the crest of the ilium.

* The numbers in parentheses are the French measures reduced to English inches and decimal parts

"From one anterior superior iliac spine to the other is but 0m·27 10·63 in.)

"From sacrum to symphysis pubis, 0m·18 (7·08 in.)

"From one trochanter to the other, 0m·27 (10·63 in.)

"The sub-pubic antero-posterior diameter, 0m·026(3·38in.), from which 0·006 (0·23. in), must be deducted for the soft parts. The right oblique diameter, approximately estimated from external measurement, is 0m·06 (2·26 in.), and the left a few millimetres more. The coxysub-pubic diameter, 0m·053 (1·86 in.), and lastly the biischiadic diameter, 0m·06 (2·26 in.)

The ilio-pubic arch, in place of being widened, presents a marked convexity inwards, greater at right than at left side; in consequence of this deformity the symphysis is very prominent, projecting in a beak-like process, and its plane is nearly horizontal, its inferior edge being turned towards the sacro-vertebral angle.

These measurements having convinced both practitioners that it was absolutely impossible for the head to pass down into the pelvis and clear the inferior aperture, they thought of the Cæsarian operation as the only means of safety to both mother and child, and proceeded to practise it at noon on the 3rd of August.

The incision was made in the linea alba, and extended four or five centimètres (one and a half to two inches), beyond the umbilicus; a small omental hernia occurred at the superior extremity of the wound, but was easily reduced. The bladder, rising about six centimètres above the pubis, prevented the incision being extended in that direction, and the uterus had to be swayed forward a little in order to carry the incision sufficiently far upwards. A female infant, at the full term and in perfect health, with the exception of a slight depression of the parietal, produced by pressure against the sacro-vertebral angle, was easily removed through the wound which had been made. The umbilical cord was very short, and so frangible that on extending it a little it ruptured in two places. The uterus contracted strongly after being emptied of its contents, but M. Dittmar, apprehensive that the wound would close so much as to prevent the removal of the placenta, brought it away by introducing his hand, it having some points of adherence. The uterine contraction afterwards relaxing unequally at the two edges of the wound, it remained gaping and bossed at one side; to prevent the intestines insinuating themselves into it, it was closed by a single point of interrupted suture, the integuments were brought together by four points of interrupted suture, and the dressing was completed by slips of adhesive plaster covered by charpie and a bandage.

The reaction following the operation was very slight, the lochia made their appearance on the third day, and soon became purulent, at the same time the breasts enlarged, and gave milk freely. Circumscribed peritonitis appeared several times in the hypogastric region, but was dissipated by leeches, cataplasms, and mercurial frictions, constipation was combated by castor-oil and calomel. The only alarming symptom that presented itself was in the chest; the patient, being affected with mucous catarrh, had the respiration very much impeded by the intestines being pushed up towards the chest, and by the copious mucus choking up the bronchi; this state of things was very much improved on the removal of the bandage. Cicatrization of the wound went on rapidly and was completed on the twenty-fifth day, with the exception of a small fistulous opening, which it took two weeks longer to heal. Six weeks after the operation the patient was able to work.—*Gazette Medicale de Strasbourg.*

Iodide of Potassium.—At the same Society M. Jaenger related the case of a man afflicted with chronic coryza, subject to frequent aggravation of intensity, which had been treated ineffectually some fifty times. M. Jaenger, being led to suspect old syphilitic taint, ordered him iodide of potassium, which effected a cure in three or four days.

Some cases of neuralgia, of long standing, and giving rise to partial derangement, as well as a case of enormous enlargement of the thigh, with fistulous orifices, reaching to the bone, the sequel of a blenorrhagia, were also related in proof of the therapeutic efficacy of iodide of potassium in doses of from 10 to 15 gr. per day.

A Child saved by the Cæsarian Operation performed on a Woman after Death.—On the 23rd August, 1843, M. Loweg was sent for to attend a pregnant woman who had been ill for some time. She died before his arrival, but, thinking the child might possibly still survive, he practised the operation in the ordinary manner. A child at full term, which had evidently lived up to the period of the death of the mother, was removed apparently dead. Without cutting the cord, the placenta and child were put into a warm bath; after keeping up artificial respiration for eight or ten minutes, animation was completely restored.—*Gazette des Hopitaux.*

Cure of Laryngismus Stridulus by Cod-Liver Oil.—M. E. Roesch, in *Hufeland's Journal*, t. xc., gives several cases of this disease cured by cod-liver oil, in doses of a desert-spoonful four times a day. In some, other means were previously tried without the least benefit. The author concludes, from the rapidity of the cure, that enlargement of the thymus gland could not have been the organic cause of the disease, and he believes, that the curative effect of the cod-liver oil is due to its *facilitating digestion*, and improving the tone of the constitution, and thus causing the nervous system to exercise only its normal influence.

Treatment of Burns.—Several papers recently published in the *Journal de Pharmacie et de Chimie*, and the *Repertoire de Pharmacie*, attest the superior efficacy of the common lime-water and oil liniment, spread on carded cotton, over either of these applications singly in the case of burns and scalds.

Milan Flies (ceretto vesicatoris) Formula of Terrari.—Several formulæ for this preparation have been recently published, and are much employed. The following I owe to M. Pessina, of Milan, correspondent of the Societé de Pharmacie of Paris, and I think it good:

Take choice Colophon, clear Turpentine, āā 135 gram.
Melt and add:
Finely powdered Cantharides, 90 gram.
Euphorbium powdered, 15 gram.
Mix carefully with the melted mass, and then add,
Liquid styrax, 15 gram.

The plastic mass is spread hot on black taffetas, to about the thickness of a shilling.

N. B.—In summer the quantity of colophon should be increased, and the turpentine diminished.—*Journal de Phamacie et de Chim.*

Treatment of scrofulous Ulcers.—M. Brefeld praises very highly the following ointment, which he uses spread on lint, in the treatment of scrofulous ulcers:

Cod-liver oil, 15.
Euphorbii .8.
Lard, 15. Mix.—*Idem.*

Detection of Arsenic in a Mineral Spring, in Africa.—In 1839, M. Tripier, a pharmacien in the French army, which took Constantine, published in the *Journal de Pharmacie*, an account of the waters of Hammammescoutine (or the Accursed Baths), situated near the ancient city of Guelma. M. Tripier then stated, that these waters contain arsenic, but as that substance had never before been found in mineral springs, his analysis was much controverted. Recently, however, some specimens brought to Paris have been examined by M. O. Henry, and M. Tripier's statements fully substantiated. M. E. Boudet, who sent home the specimens (which were duly sealed, &c., at the springs, in the presence of credible witnesses), informs us, that the waters in question have a temperature of above 200° F., and flowing to the surface of the soil, leave there a calcareous deposit, which, accumulating, forms pyramids of fifteen, twenty, and even twenty-five feet high.

M. Henry concludes the paper from which these particulars are extracted, as follows:

"The principle which these waters dissolve, doubtless in the soil which they traverse, must be in the state of arsenite with a calcareous or barytic base. The proportion found in them is very minute, and does not seem capable of producing any injurious effect on the health of men, or of the inferior animals, for the natives of the country bathe in the water in question, cook their victuals with it, and drink it with impunity, whilst, despite its high temperature, *even fish are found to live in it.* Although these facts dispel the idea of any poisonous qualities in these interesting waters, it is not the less highly curious to meet with a fact which is unique in history of mineral springs, and to prove the presence of an arsenite amongst the mineral constituents of thermal waters. The honour of the discovery belongs entirely to M. Tripier; we are satisfied with reproducing the fact, and establishing it by fresh proofs."—*Idem.*

Compiled by Robt Houston 32

A GENERAL INDEX

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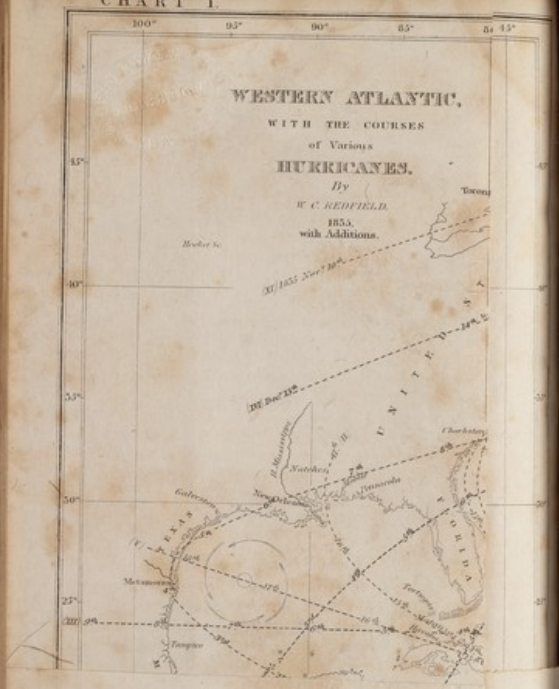
CHART I.



THE

AMERICAN

JOURNAL OF SCIENCE AND ARTS.

[SECOND SERIES.]

ART. I.—*On Three several Hurricanes of the American Seas and their Relations to the Northers, so called, of the Gulf of Mexico and the Bay of Honduras, with Charts illustrating the same;* by W. C. REDFIELD.

Introduction.

In some former investigations of the hurricanes of the Atlantic Ocean and other seas, I have been enabled to trace the progress of these tempests in a westerly direction while in the intertropical latitudes, and thence in a recurved or northeasterly direction through a portion of the temperate zone.* The routes pursued by several of these storms have been delineated on my chart of 1835, which, with several additions, is appended to this communication.†

Of the storms which have been thus examined, some have been traced in their daily progress for a distance of 2500 or 3000 miles; while the places of their first origin, as well as of their final disappearance, remain still undetermined.

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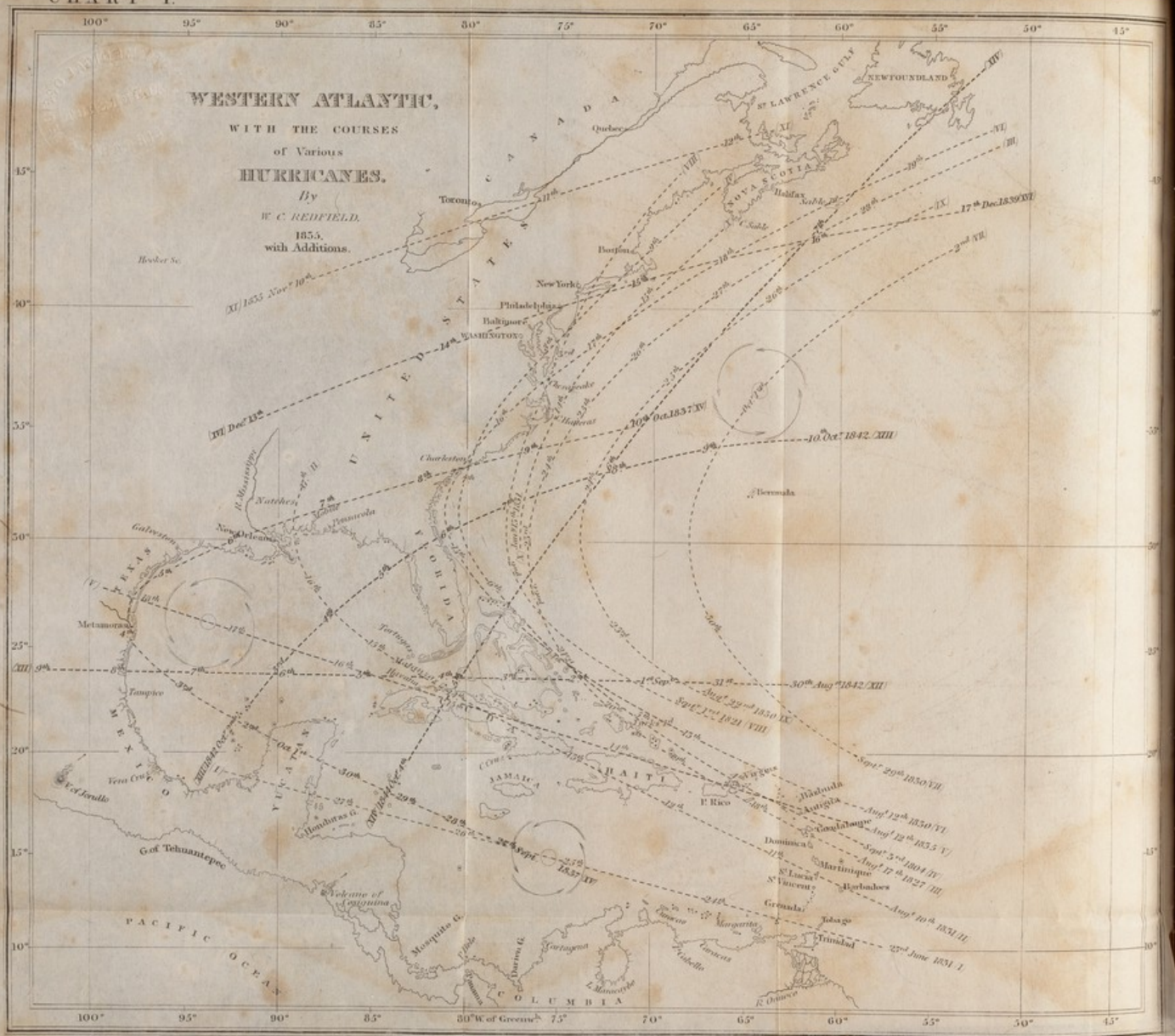
* See this Journal, (first series,) April, 1831, (Vol. XX,) Art. IV;—October, 1833, (Vol. XXV,) Art. XV;—October, 1836, (Vol. XXXI,) Art. VIII;—January, 1839, (Vol. XXXV,) Art. II, p. 201;—January, 1842, (Vol. XLII,) Art. XII.

† Chart II.

CHART I.


WESTERN ATLANTIC,
WITH THE COURSES
of Various
HURRICANES.
By
W. C. REDFIELD.
1855.
with Additions.
Hooker Sc.
CANADA
UNITED STATES
MEXICO
PACIFIC OCEAN
COLUMBIA
NEWFOUNDLAND
St LAWRENCE GULF
NOVA SCOTIA
Quebec
Toronto
Halifax
Sable I.
Boston
New York
Philadelphia
Baltimore
WASHINGTON
Charleston
Hatteras
Chesapeake
Bermuda
New Orleans
Galveston
Pensacola
Natchez
Metamoras
Tampico
Vera Cruz
Tortugas
Havana
JAMAICA
HAITI
P. Rico
Barbadoes
Martinique
Guadaloupe
Antigua
Barbuda
Dominica
St Lucia
St Vincent
Grenada
Tobago
Trinidad
Margarita
Curacoa
Orinoco
Gulf of Tehuantepec
Volcano of Conguina
Mosquito G.
Darien G.
Cartagena
Maracaibo
L. Maracaibo
Honduras G.
Yucatan
Florida
Texas
(XI) 1855 Nov.r 10th
XII Dec.r 13th
(V)
XIII 1844 Oct.r
(XI)
(VIII)
(IX)
17th Dec.1839 (X)
2nd (VII)
20th Oct.1837 (XV)
10th Oct.r 1842 (XIII)
30th Aug.st 1842 (XII)
Aug.st 29th 1830 (IX)
Sept.r 3rd 1821 (VIII)
Sept.r 29th 1830 (VII)
Aug.st 12th 1830 (VI)
Aug.st 12th 1835 (V)
Sept.r 5th 1804 (IV)
Aug.st 17th 1827 (III)
Aug.st 10th 1831 (II)
23rd June 1831 (I)
100° 95° 90° 85° 80° W. of Greenw.h 75° 70° 65° 60° 55° 50° 45°
45° 40° 35° 30° 25° 20° 15° 10°

The nearly symmetrical forms of the semi-orbital curves which are shown in the routes of these storms, and their obvious relations to the observed courses of the great aerial currents, both in the intertropical and temperate latitudes, appear to warrant the conclusion that they all pertain to one prevalent system of atmospheric dynamics, and that these several storm-routes indicate, with much certainty and precision, the general or aggregated course of circulation pursued by the great currents or moving strata of the lower atmosphere, at the several periods and localities in which these storms have appeared.

Some of these storms, however, have been traced only in their westerly course in the lower latitudes, and have not been followed in a subsequent northeasterly course; but in these cases there appears no good reason to doubt the ultimate extension of the semi-orbital curve of the storm-path into higher latitudes.

The storm-routes which have been established by the inquiries of Col. REID, on both sides of the equator, constitute an important addition to our knowledge on this subject, and are found on the charts which accompany his valuable work on the law of storms.* The elaborate investigations made by Mr. PIDDINGTON of Calcutta, have also contributed much to our knowledge of the courses pursued by Asiatic storms.† Other and distinguished writers have shown, to some extent and at different periods, a corresponding course in other tempests, while moving through a portion of the temperate latitudes, but with no clear indications of an orbital or semi-orbital course of progression in the body of the storm.‡

Antje's Hurricane of August and September, 1842.

Three several storms, the routes of which are marked I, II and V, on my storm chart of 1835, were traced only in their westerly course and in the lower latitudes.* To this group I have now to add the observed route of the storm which appeared in the American seas at the end of August and in the early days of September, 1842, the route of which is marked XII on the same chart.

This hurricane is distinguished as having pursued a course which is nearly due west, so far as it has been successfully followed by our inquiries, and its progress and observed phenomena will now be considered.

Our earliest notice of this gale is August 30th, in lat. 25° 54′ N., lon. 63° W., where the schooner *Antje* was dismasted by it, and our latest is September 8th, in Mexico, lat. 23° 28′ N., lon. 102° W.; the meridional distance between these points being equal to thirty nine degrees of longitude.

In submitting a condensed statement of the various observations obtained, I shall first exhibit the reports from places which were on or near the right margin or border of the gale as it proceeded westward; second, those reports which relate to the left margin or southern border of the storm's path; and, lastly, those which relate to the right center and left center of the advancing gale.

Right Margin of the Gale.

1. From Bermuda, which is over 400 miles† N. 13° W. from the position assigned to the Antje on the 30th of August, and apparently beyond the direct influence of the gale, we have the following observations.

Date.	Hours.	Winds.	Force of wind.	Aspect of weather.	Barometer.
August 30.	noon.	W. N. W.	2 (light breeze.)	blue sky.	30·07 inches.
31.	noon.	W.	2 " "	blue sky.	30·11 "
September 1.	5 A. M.	N. E. by N.	6 (single reef gale.)	cloudy.	30·05 "
"	noon.	N. E.	4 (moderate breeze.)	cloudy.	30·09 "
"	9 P. M.	N. E.	6 (single reef gale.)	cloudy and rain.	30·09 "
2.	noon.	N. E.	5 (fresh breeze.)	blue sky.	30·13 "

(We find here a moderately high barometer throughout, with light and faint winds on the 30th and 31st. On the 1st of September, when the gale should have passed far to the westward in its course, we have fresh winds from northeast, which winds existed in like

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* "An attempt to develop the Law of Storms, by means of facts arranged according to place and time;" by Lieut. Col. W. REID, C. B., F. R. S.; WEALE, London, 1838 and 1841.

† See eleven successive Memoirs "on the Law of Storms in India;" published by Mr. PIDDINGTON, at Calcutta. Mr P. infers that some storms of the China sea have probably pursued a southwesterly course; but we can hardly admit this anomaly without full evidence derived solely from the progress of the storm over successive and extended localities.

‡ Since these pages have been preparing for the press, I have met with Mr. THOM'S "Inquiry into the Nature and Course of Storms in the Indian Ocean south of the Equator." (London, 1845.) This interesting work fully confirms the vorticular rotation and orbital progression of the Mauritius hurricanes, in directions of revolution which are counterwise to the storms of the northern hemisphere, as had been shown by Col. REID. It will doubtless prove valuable to navigators.

* See Chart I.

† The miles referred to in this paper will be statute miles of 5280 English feet, unless otherwise expressed.

force, at that time, as far west as the American shores and over a large extent of country, north of Florida and bordering on the Gulf of Mexico.]*

2. Savannah, Geo., lat. 32° 05′, lon. 81° 07′, Sept. 1st, wind N. E., A. M. *cloudy*, P. M. fair; 2d, cloudy, A. M., wind E., P. M. N. E.; 3d, wind N. E., fair; 4th, wind N. E., P. M. cloudy; 5th, fair, A. M. wind E., P. M. S. E.†

3. St. Augustine, E. Florida, lat. 29° 40′, lon. 81° 35′, Sept. 1st, fair, with high winds from E.; 2d, cloudy, high winds from N. E.; 3d, wind N. E.; 4th, *rain* A. M., *fair* P. M., wind *N. E.*; 5th, fair, wind N. E.; 6th the same.

4. Palatka, East Florida, on the river St. John, lat. 29° 38′, lon. 81° 47′, Sept. 1st, wind E., cloudy, N. E., fair; 2d, wind W., fair, N. E., rain; 3d, wind N., cloudy, N. E., fair; 4th, *wind N. E., fair*; 5th and 6th, wind N. E., fair.

5. Fort Micanopy, East Florida, lat. 29° 5′, lon. 82° 5′, Sept. 1st, A. M. wind N. E., fair, P. M. N., *rain*; 2d, A. M. wind E., P. M. N. E., fair; 3d, S. E., fair; 4th, *N. E., fair*; 5th, *S., fair*; 6th, S. E., cloudy.

6. Fort Brooke, Tampa Bay, (west coast of Florida peninsula,) lat. 27° 57′, lon. 82° 35′, Sept. 1st, wind E., P. M. cloudy; 2d, E., fair; 3d, E., P. M. cloudy; 4th, A. M. N. E., fair, P. M. *E., rainy*; 5th, *E., cloudy*; 6th, E., fair.

7. Cedar Keys, East Florida, (northeast angle of the Gulf of Mexico,) lat. 29° 9′, lon. 82° 56′, Sept. 1st, A. M. wind S. W., fair, P. M. N. E., rain; 2d, E., fair, P. M. rain, high winds; 3d, E., fair; 4th, E., fair; 5th, A. M. *N. E.*, P. M. *E., fair*; 6th, E., fair.

8. Fort Fanning, Florida, lat. 29° 38′, lon. 83° 9′, Sept. 1st, A. M. wind S., fair, P. M. E., rain; 2d, S., fair; 3d, A. M. N. E., P. M. E, fair; 4th, A. M. N., P. M. E., fair; 5th, A. M. S. E., P. M. S., fair; 6th, E., fair.

9. Fort Stansbury, Middle Florida, lat. 30° 18′, lon. 84° 8′, Sept. 1st, wind E., rain; 2d, A. M. E., P. M. S. E., rain; 3d, A. M. S. E., P. M. E., cloudy; 4th, E., fair; 5th, A. M. N., P. M. S., fair; 6th, A. M. E., P. M. S. E., fair.

10. Fort Pickens, Pensacola Bay, West Florida, lat. 30° 18′, lon. 87° 12′, Sept. 1st, wind N. E., rain; 2d, A. M. N. E., rainy, P. M. E., cloudy; 3d, A. M. N. E., P. M. E., cloudy; 4th, A. M. E., P. M. S. E., fair; 5th, E., fair; 6th, E., fair; 7th, S. E., fair.

11. Fort Morgan, Mobile Bay, Ala., lat. 30° 16′, lon. 88° 10′, Sept. 2d, A. M. wind S., fair, P. M. S. E., rain; 3d, S. E. rainy; 4th, S. E., fair; 5th, S. E., fair, rainy P. M.; 6th, S. E., fair; 7th, S. E., fair; 8th the same.

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* Capt. Beaufort's symbols for denoting the strength of winds and the state of weather, which are very generally adopted by English authorities, and to which we must often refer, are substantially as follows:—

The scale of the winds is from 0 to 12, the first indicating a calm and the last the full force of a hurricane. These numbers are not used with precision, but 5 and 6 may be viewed as pertaining to a storm-wind, when found in proximity with a gale or hurricane and in directions which are accordant with its winds, and even 4 or 3 may sometimes be thus viewed.

The state of the weather is denoted as follows:—

b. Blue sky, with or without clouds.	*p.* Passing showers.
c. Detached or opening clouds.	*q.* Squally.
d. Drizzling rain.	*r.* Continuous rain.
f. Fog.	*s.* Snow.
g. Gloomy dark weather.	*t.* Thunder.
h. Hail.	*u.* Ugly and threatening appearance.
l. Lightening.	* Under any letter denotes an extraordinary degree.
ss. Misty or hazy, intercepting view.	
o. Overcast with impervious cloud.	

The reader will find frequent occasion to refer to this note.

† Most of the following observations in the United States are from the returns made to the Surgeon General's Office, from the military posts, kindly furnished by Surgeon General Lawson.

The scale of the wind's force prescribed for the United States military posts consists of ten numbers, in which 9 denotes a hurricane force, and 10 a violent hurricane. Thus a like force may be sometimes expressed by a number which is lower by two than in the English scale, which is next mentioned, so far as relates to the higher numbers.

There are some observers who use a scale of only six numbers to express the force of the wind, instances of which will occur in this article.

12. New Orleans Barracks, La., lat. 30°, lon. 90° 9′, Sept. 2d, wind N. E., P. M. rainy; 3d, N. W., P. M. rainy; 4th, N., cloudy; 5th, N. E., cloudy; 6th, A. M. N. E., P. M. S. W., cloudy; 7th, A. M. N. W., P. M. S. W., cloudy.

13. Fort Jessup, La., lat. 31°, lon. 93°, Sept. 3d, wind S., fair; 4th, S., fair; 5th, S., cloudy; 6th, S. E., cloudy; 7th, S. E., cloudy; 8th, A. M. N., P. M. S., cloudy.

With reference to the foregoing observations it is well to state here that the body of the hurricane passed over the southern part of the peninsula of Florida on the 4th day of September, on its route to Mexico. From the 1st to 4th a rain passed over part of Florida in a nearly opposite direction.

Left Border of the Gale.

14. Nassau, N. P., (Bahamas,) Sept. 10th.—The brig *Rolla*, from Glasgow, arrived this morning, having touched at Antigua. She encountered none of the severe weather which was experienced here and at the adjacent islands on the 2d and 3d instant. On the contrary it was a perfect calm. [We must suppose that this vessel first made the latitude of Antigua and then ran to the westward in the usual way. Thus the storm might pass down to the westward on a more northern parallel, without being noticed by the *Rolla* either before or after her arrival at Antigua. See Chart II.]

15. We come next to the well kept log of H. M. S. *Pilot*, then on her passage from Jamaica to Nassau, N. P., the full insertion of which our limits preclude. The *Pilot* was westward of Hayti on the second and third of September, when the gale passed her meridian, working up for the passage between Hayti and Cuba, with easterly and variable winds, moderate in force, "and just feeling it enough to make her testimony highly interesting," as shewn by the following extract: "Sept. 2d, A. M., wind N. E.; out first reef of topsails, set royals and flying-jib: Noon, Cape Maize, [E. end of Cuba,] bore N. 22° E., distant 99 miles; at 2 P. M. taken aback, wind N. N. E.; turned round on the starboard tack; 3 P. M. in royals; 3h 40m. set royals; 5 P. M., wind southward; 7 P. M., wind S. W., in royals; ends calm. Sept. 3d, light variable winds, N. W. to E.; 5 A. M., a breeze from E.; 6 A. M., E. b. S.; 10 A. M., E. S. E.: Noon, Cape Maize, N. 2° W. 58 miles; wind light from E.; 7. P. M., in royals, flying-jib and reef in topsails, wore ship, in top gt. sails; 9h. 50m. P. M., set fore-topmast staysail, down jib, up foresail, lowered topsails to a squall; 11h. 40m. in two reef fore-topsail. Sept. 4th, 1 A. M. hoisted topsail, set foresail, wind S. E. varying to W. and calm, no stars visible; A. M., winds S. E., to E. by N." On the 4th and 5th, from E. end of Cuba to Fortune Island, winds light and moderate, from S. to S. E. [I consider the changes of wind on the afternoon and night of the second as due to the influence of the gale in passing; and the squally or cloudy weather on the night of the 3d as due to the recurrence of the lower trade wind, as disturbed by the passage of the storm on the N. side of Cuba.]

16. From the logbook of H. M. S. *Ringdove*,* sailing from Vera Cruz to Laguna des Terminos on the southern side of the Gulf of Mexico:—Sept. 5th, calms and variable winds in the forenoon, lat. 19° 15′, lon. 95° 8′; P. M., winds northerly, force 4 and 5; Sept. 6th, latter part of night calm, A. M. winds N. N. E., N. W. and westerly, lat. 19° 9′, lon. 93° 31′, P. M. wind W. N. W., 3; Sept. 7th, winds W. S. W. and S. W. by W., 3, lat. 18° 37′ lon. 91° 45′; P. M., light, variable, 1, and calm. On the 8th the wind freshened from S. E.; with a heavy swell from S. E. on the 9th. [The storm appears to have passed the meridian of the *Ringdove* on the 7th, but at a considerable distance to the northward.

17. At Vera Cruz, lat. 19° 12′, lon. 96° 04′, there was no gale at this period.

18. At Tampico, lat. 22° 15′, lon. 97° 50′, the gale was not felt in any force, although this point was near the left centre of the storm. [Had we barometrical observations from

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* The logs of the *Pilot* and *Ringdove*, with those of other British ships of war, were kindly furnished by Col. Reid, of the Royal Engineers, now Governor of Bermuda.

Tampico they might serve to show the true state of the storm at that point, which from its position on the eastern coast is sheltered from the force of the westerly winds, which constituted the left hand side of the storm.]

After careful inquiry I cannot find that this gale appeared to the southward of the chain of islands which forms the northern boundary of the Caribbean Sea, nor in that southern portion of the Gulf of Mexico which is known as the Gulf of Campeche.

We will now follow the course of the storm, directly in its path of violence.

Right and Left Center of the Gale.

19. Our first report is that of the Dutch Schr. *Antje*, already mentioned as having been dismasted, Aug. 30th, in lat. 25° 54′, lon. 63°, "in a violent gale from S. and E." [Perhaps this report of the wind's direction is intended for southeastward; *i. e.* "*southward and eastward*," as the phrase is often used by seamen. It is probable that the date is given in nautical time, and applies more especially to the time of the casualty. Thus it may refer to the afternoon of the 29th, and to the latter part of the gale. This will agree better with the next report.]

20. At Turk's Island, lat. 21° 20′, lon. 71° 4′, Aug. 30th, "heavy tempest from S. to S. W."

21. The Brig *Helen and Elizabeth* reports a hurricane on the evening and night of Sept. 2d, at Rum Cay and Watling's Island. The latter island is in lat. 24°, lon. 74° 28′, and the effects of the gale were here most disastrous; not a house on the island but had been more or less seriously injured, and most of them were in ruins.

22*a*. A Nassau account, already quoted, shows that the hurricane passed over the Bahama Islands on the 2d and 3d of September. The loss of life and property at these islands is represented to have been very great.

A comparison of the above accounts and positions will show that the Turk's Island date is given erroneously, perhaps in nautical time. These reports are sufficient, however, to show the arrival of the gale on the evening of Sept. 2d at the eastern portion of the Bahama Islands. From these islands to the center of the Gulf of Mexico the reports are sufficiently numerous and full for the objects of this inquiry. The next report, though much abridged, affords a good account of the access and progressive phases of the storm, first on the northern margin and then in the more central portion of its track; showing the direction and modifications of the wind successively induced as the ship and the storm advanced westward in their respective, and, in part, coincident courses.

22*b*. Ship *St. Mary*, Foster, for New Orleans, at noon of Sept. 2d was in lat. 27°, lon. 76°, [then in advance of the northern border of the gale,] "a favorable N. E. wind wafting the ship swiftly to the southward." . . "Low fleecy clouds flew swiftly to the west;" "*a high sea, without any apparent cause*, rolling furiously from E. N. E." On the morning of Sept. 3d, [front centre of the gale then nearly as far westward as the ship,] the wind increased, the east sea had swelled to mountains, the sun shone silvery bright, and the clouds displayed fiery copper tints. At 8 A. M. passed near the Hole in the Wall, [S. E. end of

Abaco, lat. 25° 51′, lon. 77° 11′,] tem. of air 82°, water 81½°, wind increasing, in sudden gusts; sails reduced and well secured. Shortly after noon of the 3d, passed Stirrup Key and entered upon the great Bahama Bank. The wind, from E. N. E., continued to increase, but was fair for crossing these smooth shallow waters. Appearances now altered and the clouds flew to the west with great velocity and low elevation; ship reduced to close-reefed topsails and reefed fore courses. At half-past 8 P. M., departed from the Bank and encountered, in the Gulf of Florida, a heavy breaking sea. The night was dismal in the extreme, but the ship scudded with safety.

After daylight on the 4th, the sea ran very dangerously, and during the morning the clouds came flying from the east with heavy squalls of wind, lightning and torrents of rain. By 10 A. M. the Florida Reef, near to Loo Key, was seen, over which the sea was breaking frightfully, the wind blowing E. by S. About noon the wind had increased to a perfect hurricane; to run was no longer safe, and the ship was hove to with head to the south, under a storm mizen topsail, which soon blew to fragments. At 6 P. M. had drifted into shoal water, but to set sail was impossible, as no canvass could stand, and for four anxious hours the ship drifted to the west. The wind during that long night blew steadily from E. by S. with increasing violence. Towards morning of the 5th it veered gradually to the S. E. and moderated to a hard gale, with heavy rain. Finally, the morning of the 6th brought, in the Gulf of Mexico, a clear sky and a gentle breeze.—(*Jour. of Capt.* FOSTER.)

[The veering of the wind from N. E. to S. E., to the *right* on the compass card, during the storm, together with its force, shows the ship to have been in the right center of the gale, as will appear also from a collation of the other reports. The duration of the gale and the slowness of the changes of its direction, with this ship, are largely due to her westerly progress, which in the later part coincided with the course of the storm.]

23. Brig *Florida Banco*, at noon of Sept. 2d, was in lat. 29° 30′, lon. 75° 54′; took the first of the gale about 10 P. M., wind N. E., veering afterwards to E., at which point it stood at noon of the 3d, about six miles south of the Hole in the Wall. Had the hardest of the gale between Stirrup Keys and the Banks in the afternoon and night of the 3d. (*Journal of Capt.* ELDRIDGE.)

24*a*. Barque *Rapid*, WARD, bound for Havanna, Sept. 2d, A. M., wind E., five and six knot breeze; lat. obs. 26° 31′. P. M., wind N. E., begins fresh gales and clear weather. At 4 P. M. made the Hole in the Wall, S. W. by W., 15 miles. At 8 P. M. the Hole bore N. E. by E., 7 miles; ends with fresh gales and squally appearance.

Sept. 3d, at 1 A. M., made the Berry Islands bearing W. S. W., five miles, fresh gales and squally, took in main-top gallant sails. P. M., fresh gales and squally; at 2h. 30m. P. M., went off the Bank; wind N. E. by N.; at midnight made the Doubled-Headed Shot Keys and hauled up west.

Sept. 4th, at 2 A. M., the Double Shots bearing E. N. E. about nine miles distant, close reefed topsails and sent down fore-royal yard; at 5 A. M., finding the gale increasing sent down top gt. yards and took in flying-jib boom; reefed all sails and furled them as fast as possible; running before the wind under bare poles, wind N. N. E. At 8 A. M., still scudding, and judging the land of Cuba at not more than ten miles distance, brought the barque to under the main spencer. In less than ten minutes she was hove on her beam ends, the water rushed into the cabin, and every thing was soon washed from the deck. Finding no relief, cut away the mizen topmast to get her off before the wind, rather than founder. Lost the fore-topmast staysail, fore-topmast and head of the foremast, could not get the barque before the wind, and the sea constantly breaking heavily over her. By this time it was noon, and the wind, *which had suddenly shifted*, was blowing a tremendous hurricane from S. to S. W. At 1 P. M. the force of the hurricane began to abate, still blowing very heavy and in squalls. At 4 P. M. more moderate, and at 6 P. M. kept away S. W. under foresail, the wind at S. E. Sept. 5th, at daylight made the Pan of Matanzas. (*Logbook.*)

[It will be seen that the *Rapid* was further south while exposed to the gale, than either of the three vessels last mentioned. The sudden shift of the wind to an opposite direction shows that the barque was at that time near to the axis of the gale, and that this axis passed near to the north coast of Cuba in its westerly progress.]

24*b*. Capt. WARD states that a Spanish ship was dismasted at Ginger Key, [lat. 22° 53′, lon. 78°,] the hurricane shifting "round the compass."

25. Barque *William Engs*, sailed from Key West, Sept. 3d, at 6 A. M., wind light from N. E. and fine clear weather; at noon sixteen miles S. S. E. from Key West light; barometer 30·10. At 6 P. M. the wind began to freshen, with dark clouds rising at N. and barometer fell rapidly till 8 P. M., when it stood at 29·70. Took in all light sails and put the ship under double reefed topsails; weather continuing to wear the same appearances.

Sept. 4th, at 2 A. M. took a heavy squall from N., which reduced us to close-reefed main topsail; barometer still at 29·70. The wind continued to blow with great violence from N. till 4 A. M., when it began to haul gradually to the eastward, which continued till 8 A. M., when it stood at E. S. E. and blew, if possible, with increased violence. We were now on soundings on the Florida Reef, and gaining nothing off shore, the sea breaking over us and preventing all communication with the cabin, so that the barometer could not be observed. At noon still blowing a hurricane from E. S. E. and continued steady at that point, with squalls of rain, till about 3 P. M., when it began gradually to subside, and at 10 P. M. had so far moderated that we could get up new sails from below and bend them; the wind continued to die away at E. S. E. till it fell calm. The barometer near the close of the gale stood at 30 inches. At noon of the 5th was in lat. 24° 15′, lon. 83° 25′. We judged our position at the commencement of the gale to be in lat. 24° 5′, lon. 81° 25′, making a drift of one hundred and eight miles to the west, which we could account for only by our being on soundings and having a strong counter current. We afterwards made Key West and found our chronometer correct.—(*Letter from Capt.* Coe.) [This vessel was clearly in the right side of the gale.]

26. Capt. Smith of ship *Christoval Colon*, states that on the 4th of Sept. a very heavy gale was experienced at Havanna and Matanzas, commencing at N. about sunrise, at Havanna, and veering westward round to S. S. W., and blowing with great violence for ten hours; causing much damage to the shipping in port. This is confirmed in substance by Capt. Boss of the barque Merchant, from Havanna, who states that by noon the gale had veered to N. W., increasing in force: and also by the statement of Lieut. McClure, commanding H. M. S. Roman, furnished to Col. Reid, from which we learn that in the afternoon the gale blew furiously from S. W., and continued from this quarter till 1 A. M. of the 5th, when the wind ceased, but heavy rain continued till 3 A. M.

27. Ship *Hilah*, from New Orleans for New York; Sept. 4th, 11 A. M., in sight of Havanna, a tremendous hurricane from N. W. At 5 P. M. gale increasing, saw the land about 300 yards to leeward; attempted to work the ship off, *when the wind suddenly shifted to S. W.* and blew still heavier. Cut away sails and rigging to save the spars.

28. Brig *Harriet*, in lat. 25° 1′, lon. 84° 9′, experienced a hurricane, lost spars, sails, &c.

29. Schr. *Emporium*, lat. 24°, lon. 84° 15′, in a severe hurricane, lost topmast, sails, &c., and sprung lower masts.

30. The barque *Euphrates*, from New Orleans for Marseilles, was dismasted on the 5th of Sept. in lon. 85° 30′.

31. Ship *Oconee*, from New Orleans, Sept. 5th, 6th, experienced a heavy gale, 100 to 150 miles S. E. of Balize, from N. E. by E. to E. by N., *with a heavy sea running from S. E.* Laid to *with head to S. E.* under close-reefed maintopsail for twenty four hours.—(*Statement of Capt.* Jackson.)

32. Barque *Columbia*, from New Orleans, crossed the N. E. bar Sept. 1st, and had light winds from E. and E. S. E. till Sept. 4th, when the wind became fresh and squally from N. N. E., lat. 28° 8′, lon. 87° 28′. Sept. 5th, commenced blowing from N. E. with squalls and rain; lat 26° 49′, lon. 86° 51′, the gale increasing and veering to E. N. E. with a heavy sea. Sept. 6th, lat. 25° 31′, lon. 85° 30′; shortened sail to a three reefed maintopsail and main spenser; continued blowing a complete hurricane; from 6 to 10 P. M. expected every moment to see the masts go over the side. Sept. 7th the wind veered E. and abated; lat. 24° 35′, lon. 85° 2′: for two days after the hurrricane *had a very heavy sea from W. S. W.* which led us to expect a renewal of the gale from that quarter, the winds at the time being light from E. S. E. and E.—(*Statement of Capt.* Trussel.)

We now pass to the left side of the storm.

33. The royal mail steamship *Solway*, left Vera Cruz for Havanna in the morning of Sept. 2d, and for the following two days had very fine weather. On the morning of the 5th a strong breeze commenced from E. N. E., (shifting afterwards to N., N. W., W., S. W. and S. E.,) which continued increasing all day, till at night it had amounted to a perfect hurrricane; the heaviest of which was from midnight till 4 A. M. of the 6th. The ship lost her sails, but behaved admirably, and during the height of the gale was laid to without steam. The barometer fell from about 30·10 to 29·28, and gradually rose again towards morning of the 6th. The gale subsided as rapidly as it came on, and the morning of the 7th was as fine and the sea as smooth as it had been two days previously. The position of the Solway at noon of the 4th was in lat. 22° 29′, lon. 89° 44′; noon of 5th, lat. 23° 20′, lon. 86° 50′; 6th not given.—(*Letter from Capt.* Duncan *to Gov.* Reid.—Capt. D. informed Lieut. McClure, commander of the *Roman*, that "he had never witnessed a more terrific breeze or heavy cross sea.")

34. The master of a Hamburg brig informed Capt. Coe, of the *Wm. Engs*, that near Cape Antonio [west end of Cuba] the gale commenced at N. and veered by N. W. and W. to S. W.; and that his barometer here fell but 3-10ths of an inch.

35. H. M. S. *Rover*, Keele, from Tampico for Bermuda; Sept. 5th, lat. at noon 23° 53′, lon. 93°, wind E. N. E., 4, cloudy, barometer 30·05. At 4 P. M. N. by E., 5, clouds and blue sky. Sept. 6th, at 5 A. M. wind N., ship steering E. by N.; the wind increasing and veering to the westward, with a heavy swell from N. W., strength of wind 8 [gale] with rain and ugly appearances, barometer falling. At noon, lat. 23° 42′, lon. 90° 27′, wind 9 [strong gale] with rain and a heavy sea; barometer 29·50. At 2 P. M. wind W. S. W., 10, [whole gale,] o. r. v. At 3 P. M. barometer 29·41, wind 11, o. r. u., with tremendous gusts, the surface sea greatly smoothed by the violence of the wind. I now considered the storm to be at its height, as the barometer began slowly to rise, still blowing hard till 5 P. M. It then gradually decreased and veered round to the S. W., S. S. W., and S., leaving a very heavy sea. At midnight, wind S., 7-9, rain; barometer 29·80. Sept. 7th, begins wind S., 7, o. g.; at 4 A. M. wind S., 6, o. p.; barometer 30; sea greatly abated. At noon, lat. observed 24° 2′, lon. 88° 21′, wind S. E., 5, c. g. Current since noon of the 6th, S. 35° W., 24 miles.—(*Logbook.*)

Our next report is from the right side of the storm.

36. The sloop *Dream*, from Texas for New Orleans, was sunk during the gale, on the 7th of Sept., off Raccoon Point, near lat. 28°, lon. 91°.

Having thus followed the storm over the Bahamas and the Mexican sea, we come now to the reports of its appearance in the northern provinces of Mexico, as found in the Bermuda Royal Gazette.

37. The hurricane reached the town of Victoria,* situated below the table land of Mexico, in lat. 23° 28′, lon. 102°, at 6 A. M., Sept. 8th, 1842. The wind set in at *north*, and increased in violence, from the same quarter, until 1 P. M. It then fell a *profound calm* for five or six minutes, when immediately afterwards the wind came from the *south* with renewed fury. Victoria is a town containing about 4000 inhabitants. Between two and three hundred houses were blown down. Oaks and other stately forest trees were uprooted, and some of them transported 50 or 60 yards. At Victoria the storm set in with heavy rain.—This account is from the Russian Baron Karwinsky, travelling for his government in Mexico.

38. "At Soto de la Marina, [lat. 23° 42′, lon. 98° 10′,] within 7 or 8 miles of the sea coast, the wind blew as it did at Victoria. Baron Karwinsky made every inquiry in order to trace its progress in Mexico. He found it proceeded westward but only 60 miles [from Victoria] and there he supposes it to have ceased, and at that distance it must have encountered the high table land.

* La Ciudad de Victoria, or Durango.

39. Mr. STEWART JOLLY, the British Consul at Tampico, to whom we are indebted for Baron KARWINSKY's report, states that at Tampico, during the time when the storm was passing so near there to the north, "it was a dead calm and the air insufferably hot and oppressive."

From the observations above recited, we may derive the deductions and remarks which follow.

Daily Progression of the Storm.

If we take the storm date of the *Antje* as noon of August 30th, we find the rate of the storm's progress from thence to Victoria to have been four and one third degrees of longitude per day; but if this date be for the afternoon of 30th in *sea reckoning*, 29th in civil time, then the rate is about four degrees per day.* From the meridian of Havanna, lon. 82° 20′, to the place of the *Rover* at 2 P. M. of Sept. 6th, near lon. 90° 27′, the storm was about two days in its progress, which also shows an advance of four degrees per day.

This rate of progression would bring the storm to Soto de la Marina, in lon. 98° 10′, on the 8th of Sept., which is the date given above for its appearance at Victoria in lon. 102°, where it should arrive on the 9th, according to the above rate of advance. Still there can be little or no doubt that the storm of both Soto de la Marina and Victoria was identical with that which was passing through the Gulf of Mexico on the 5th, 6th, and 7th; and we must leave it to Mr. JOLLY or the Baron KARWINSKY to reconcile or explain the dates, as they appear in the Bermuda Gazette.

Course of the Storm and Route of its Vortical Axis.

The course pursued by this storm, as deduced from the foregoing reports, was nearly due west; and the route of its vortical axis, at least from the Bahamas, must have been between 23° 30′ and 24° north lat.; being nearly parallel and coincident with the tropic of Cancer. The axis appears to have been nearer to the

* The daily sea reckoning is made up at noon, commencing from noon of the preceding day; and the absurd custom still prevails of affixing to the afternoon, or first twelve hours of the reckoning, the date of the succeeding day. This useless and perplexing practice has, for many years, been excluded from the English navy, but I am sorry to find that it is still continued in our own naval service. Many intelligent masters in our merchant service have abandoned it. To attain fully this desirable end nothing more is necessary than to affix their true dates to each of the twelve-hour tables of the logbook.

In this article, to avoid confusion of dates, care has been taken to reduce the several nautical dates to civil time, in all cases where it has been practicable.

tropic when off the point of Florida and in Mexico, than when off the Campeche Bank in lon. 90°.

On the north coast of Cuba we find two vessels, the *Rapid* and *Hilah*, which had the first part of the gale from the northward and then shifting suddenly to the southern quarter and blowing with like violence, which shows them to have been near the line pursued by the axis of the gale. At Soto de la Marina on the coast of Mexico and at Victoria in the interior, we find the gale blowing first from the north, then a short *lull*, such as appears to mark the axis in all great hurricanes, and then the recurrence of the blast in full violence from the south as the gale advanced; which fixes the course of the axis at or near these points, and shows, also, the rotative character of the gale.*

It is well to bear in mind the direction of these successive winds, as not being first from the west and then from the east, parallel to the route of the storm, but on the contrary, *crossing*, in succession the path of its axis.

Hourly Progress, and Prolonged Duration with Vessels moving Westward.

We have seen that the rate of progression in this hurricane was about four degrees of longitude per day; which, if we estimate the degree on the parallel pursued by its axis at 63·2237 statute miles, shows an advance but little exceeding ten and a half miles per hour. This will fully account for the increased duration of the gale with those vessels which were running or drifting westward while exposed to its violence.—See cases 22 *b*, 24 *a*, 25, and 32.

Vorticular Character of the Gale.

The continuance of violent easterly winds in this gale on the northern side of its axis, the simultaneous presence of violent and accordant winds from northern points of the horizon in the front side of the gale, the westward veering of the northwesterly winds on the southern side of the storm's axis, and the further sweeping of the winds across the center path of the storm, in the rear side of the gale, from southern points of the horizon,—all go to sustain the conclusion that it was one vast whirlwind, blowing around a vortical axis, which advanced with the storm.†

* This unfailing "*experimentum crucis*" of the character of storms appears to have been sufficiently obvious from the time of the first inquiries on their rotatory action.

† Had the violent winds which were exhibited in the front portion of this gale been found blowing from the west, in the more central portions of its path, and had the later

Strength and Extension of the Trade or Northeasterly Wind on the Northern Side of the Storm.

It has been seen that along an extensive portion of its path and on its northern side, this storm was preceded and attended by a strong northeasterly wind, which appears to have coincided with the right front of the stormy vortex and to have extended as far northward as the Carolinas. This coincident wind, pressing upon the northern border and right front of the hurricane, may have contributed to the vortica extent and activity of this portion of the storm, and doubtless had no small influence in producing its unusually western course.

Eccentrical Position of the Vortical Axis in the Storm.

The greater extent of the gale on the right or northern side of its axis of revolution, or axis route, as compared with its extent on the left side of the axis line, constitutes a remarkable feature in this storm. One probable, if not principal cause of this unequal extension has just been noticed.

This extension of the sensible effects of the storm on the right of its axis path, conforms very strikingly to the effects which have been observed in the paths of small and destructive whirlwinds or tornadoes. This is shown in the case of the tornado which visited New Brunswick, N. J., in June, 1835,* and in that which passed near Providence, R. I., in August, 1838;† and these agree with other observed cases which have not been published. This characteristic has pertained, likewise, to other great storms; owing, probably, to causes which differ somewhat from those which produce the like effect in smaller whirlwinds. But this peculiarity in great storms appears not so common and so strongly marked as in the tornadoes.

winds of the storm blown along the path of its axis from the east and with still greater force, or had two set of winds, from opposite sides of a central or axial east and west line, blown severally and simultaneously towards that line or some point on the same, in direct opposition to each other, and each set been found limited to its own side of the axis line, instead of blowing *in succession across extensive portions of the same path*, then might it have been claimed that the winds from all sides of the storm blew towards a central point or line, in the body of the storm. But the facts which have been observed appear to forbid such a supposition; not only as relates to this storm, but also as regards every other American tempest which has been duly examined.

* See this Journal for 1841, Vol. XLI, pp. 73, 79, with diagram of survey.

† This Journal for 1842, Vol. XLII, pp. 269 to 273.

Absence of a Brisk Trade Wind on the Southern Margin of the Storm.

We may infer from the reports of the Brig *Rolla* and H. M. Ships *Pilot* and *Ringdove*, that calms and light winds prevailed in the Caribbean Sea and on the southern margin of the storm during the observed progress of the latter. The usual prevailing course or tendency of the lower currents of air, in these regions, at least in the hurricane months, *appears to be from a point south of east*, instead of north of east, as is often supposed.* This general tendency towards some point which is north of west must usually control the courses of the storms in this region. But the lightness of the surface winds of the Caribbean Sea at this period,

* I have ascertained, long since, from logbooks, published journals and nautical directories, that the course of the trade-winds, at their inferior surface, is often parallel to and even one point or more *from* the equator; particularly inside the tropics. From the reported courses of the lower clouds and squalls, by intelligent voyagers and residents in the West Indies, I have also learned, that the course of the lower cloud currents is often, if not generally from southeastward, at least during the northern summer: while the observed courses of the West India hurricanes has demonstrated the northwesterly tendency or courses of of the lower currents, viewed as a whole, in these regions.

Mr. LAWSON, in JAMESON'S Edinburgh Phil. Journal, for July, 1845, has given the results of his observations both on the surface winds and cloud currents at Barbadoes, lat. 13° 10′ N., in 1841; from which it appears that from May to September inclusive, the observations on the surface winds, made at regular periods, have resulted, numerically, as follows: viz. N. W. winds, 3; N., 2; N. N. E., 4; N. E., 13; E. N. E., 106; E., 122; E. S. E., 66; S. E., 41; S. S. E., 13; S., 1; S. W., 2: the E. N. E. being the most frequent wind north of east, while the S. E. and S. S. E. winds greatly predominate over those from N. E. and N. N. E.

His observations on the cloud currents are still more interesting and important. Complete tables of these are given for September and October, which may be taken for nearly average months, as between summer and winter. Two or more currents commonly appeared, above the surface wind; a lower current from south of east and a higher one from S. W.; *both* of which, as well as all *cloud currents* in non-mountainous regions, should be viewed as pertaining solely to the lower atmosphere. The numerical results for the two months were as follows: viz.

Abstract of Observations of the Surface Winds and Cloud Currents at Barbadoes, in September and October, 1841. (Observations taken at 5 A. M.; 10 A. M.; 3 P. M., and 9 P. M.)

From what direction.	Winds.	Cloud currents.	Totals.	From what direction.	Winds.	Cloud currents.	Totals.
W. N. W.		1	1	E. S. E.	21	8	29
N. W.		5	5	S. E.	29	26	55
N. N. W.	1	16	17	S. S. E.	4	31	35
N.	1	18	19	S.	3	11	14
N. N. E.	5	4	9	S. S. W.	1	6	7
N. E.	12	9	21	S. W.		89	89
E. N. E.	90	16	106	W. S. W.	1	6	7
Northeasterly & northerly obs.	109	69	178	*Southeasterly & southerly obs.*	59	177	236
	East obs.		30		15		45

These, with a vast extension of similar phenomena, merit the serious attention of those naturalists who rest on the calorific theory of the general and trade winds; and they seem fully to account for the northwesterly courses of storms in the West Indies.

when viewed in connection with the strong trade or northeasterly wind which we have noticed as then existing in more northern parallels of latitude, may be deemed sufficient to account for the unusual west course of this hurricane.

The hurricane of August and September, 1842, which has now been considered, caused great injury to commerce and the total loss of many vessels with their crews.

What is meant by Rotary or Vortical Action in Storms.

When in 1830 I first attempted to establish by direct evidence the rotative character of gales or tempests, I had only to encounter the then prevailing idea of a general rectilinear movement in these winds. Hence I have deemed it sufficient to describe the rotation in general terms, not doubting that on different sides of a rotary storm, as in common rains or sluggish storms, might be found any course of wind, from the rotative to the rectilinear, together with varying conditions as regards clouds and rain.

But I have never been able to conceive, that the wind in violent storms moves only in *circles*. On the contrary, a vortical movement, approaching to that which may be seen in all lesser vortices, aerial or aqueous, appears to be an essential element of their violent and long continued action, of their increased energy towards the center or axis, and of the accompanying rain. In conformity with this view, the storm figure on my chart of the storm of 1830* was directed to be engraved in spiral or involute lines, but this point was yielded for the convenience of the engraver. Some indication of the character of a great vortical movement is found in the arrows of the storm figures on my chart of 1835, on tracks I, V, and VII.† In Vol. xxxv, pp. 203–205, of this Journal, and Vol. xlii, p. 114, I have noticed, cursorily, the variable as well as vortical conditions which pertain to great storms. Some of the effects of vortical rotation are also discussed in my account of the Providence tornado.‡

The common idea of rotation in circles, however, is sufficiently correct for practical purposes and for the construction of diagrams, whether for the use of mariners or for determining be-

* This Journal, Vol. xx. The dotted part of this figure was intended to indicate the area of rain.

† See also the storm figures in this Journal, Vol. xxxi, p. 117, and Vol. xxxv, p. 214.

‡ Vol. xliii, p. 271–275.

tween a general rectilinear wind, on one hand, or the lately alleged centripetal winds, on the other. The *degree* of vorticular inclination in violent storms must be subject, locally, to great variations; but it is not probable that, on an average of the different sides, it ever comes near to forty five degrees from the tangent of a circle,—and that such average inclination ever exceeds two points of the compass, may well be doubted.

Second Hurricane of September, 1842.

Between the 18th and 22d of September another storm of violent character crossed the Gulf of Mexico, probably in a northeasterly direction and at a slow rate of progress; but I have not sufficient means for tracing its further advance with much accuracy. This storm also occasioned much injury to the vessels which were exposed to its violence.

Rate of Progression in Storms observed only in the Tropical and Lower Latitudes.

In the following table I have presented some of the principal facts relating to the progress of four several storms of the American seas, the courses of which have been observed only in the lower latitudes. I have also added to this table a storm of the Bengal Sea and Indian Ocean, described by Mr. Piddington in his Eighth Memoir on the Law of Storms in India. This storm is also distinguished as having moved nearly to the west, but in much lower latitudes than the *Antje's* hurricane.

No. of the tracks as Plate I.	Date of Storm.	Approximate position of the storms.	Approximate lat. made of known route.	Direction of the vorticular rotation in the storm.		Length of known track in Statute miles.	Average rate of progress per hour.
I.	June 23d—27th, 1831.	N. 74° w.	14° 30′ N.	Right to	Left.	1900 miles.	18·5 miles.
II.	Aug. 10th—17th, 1831.	N. 64° w.	20° 30′ N.	"	"	2150 "	14·4 "
V.	Aug. 12th—18th, 1835.	N. 73° w.	21° 45′ N.	"	"	2430 "	16·5 "
XII.	Aug. 30th—Sept. 9th, 1842.	w.	23° 45′ N.	"	"	2650 "	10·5 "
	Oct. 22d—Nov. 1st, 1842.	w.	12° N.	"	"	2100 "	9 "

The average progression of the four American storms of this table somewhat exceeds fifteen miles an hour. It will be seen that the East Indian storm advanced only at the rate of nine miles per hour, which is one of the slowest rates yet observed, and is much below the average rate of progression of storms in the Asiatic

seas.* Perhaps the tardy progression in this case was owing to the proximity of the storm to the equatorial region and to a sluggish state of the aerial currents then prevailing on its track.

These five storms may be viewed as belonging to one group in the great system of storm paths; a system which appears to me as resulting *directly* from the dynamical influence of the diurnal and orbital revolutions of our planet.

Gales distinguished as Northers, in the Seas of Mexico and Central America.

The term *Northers* may well be applied locally to such storms as the first four comprised in the above table, which passed westwardly through the Mexican sea; for their vorticular rotation being in the direction from right to left, thus, ↺, they necessarily, on arriving near the coast, commenced to blow from some northern point of the horizon.

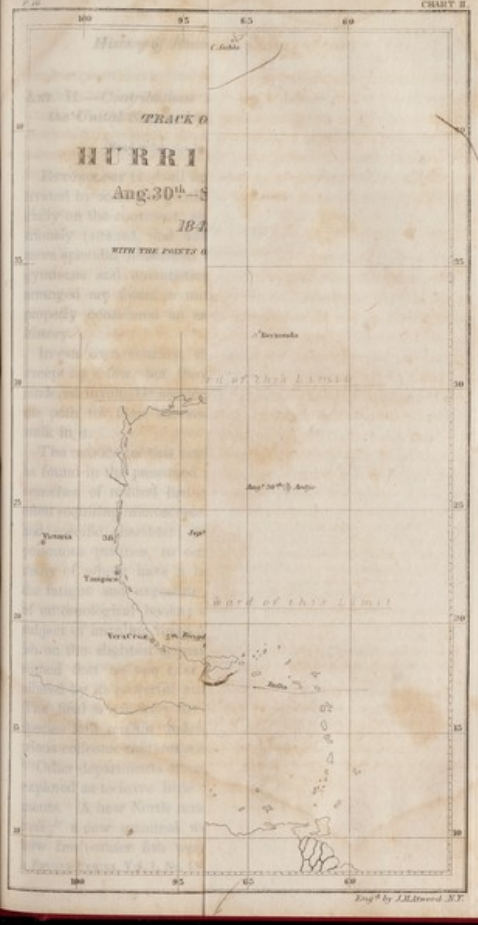
But the term is most frequently and technically applied to the numerous gales which visit the seas of Mexico and Central America from September to April, and which are almost unknown among the islands of the Antilles or West Indies. Two of these Northers, of much interest, will next claim our attention.

* Mr. Thom computes the diurnal progression of the Rodriguez hurricane of April, 1843, in the South Indian Ocean, at about 220 or 230 miles, or between nine and ten miles an hour, during its early stages in the lower latitudes; and that it gradually diminished till, when near the tropic, it scarcely exceeded fifty miles per day.

Mr. Thom appears to think that the hurricanes of that region probably break up and disappear near the southern margin of the southeast trade wind. This view I cannot reconcile with previous observations in the two hemispheres. A wider scope of observation than was had in the Rodriguez storm would probably show that these hurricanes turn eastward in their course, after crossing the tropic, and that they are identical with some of the violent gales which China ships fall in with while running eastward in the Southern Ocean, between 36° and 40° of south latitude.

The Rodriguez hurricane may have commenced its *easterly* course soon after crossing the tropic; and its slow rate in this region I ascribe, chiefly, if not wholly, to the gradual cessation of its westerly progression.

I apprehend that to a like change in the winds from a westerly to an easterly progression, and *vice versa*, is also to be ascribed, mainly, the several parallel belts of calms and variables which are found on the exterior borders of the trade winds, between the trades and the monsoon winds, and on the equator. Such a system of changes in the great winds of the globe, in the regions referred to, I deem may be fully established by a proper analysis of existing authorities and observations.




TRACK OF THE
HURRICANE.
Aug. 30th—Sept. 8th
1842,
WITH THE POINTS OF OBSERVATION.
Toronto
C. Sable
New York
C. Hatteras
Savannah
St Augustine
Bermuda
New Orleans
Victoria
Tampico
Vera Cruz
Storm Southward of this Limit
Storm Northward of this Limit
Sept 4th
Sept 5th
Sept 7th
Sept 2nd
Aug 30th
Aug 31st
Columbia
Rapid
Salwey
Ringdove
Pilot
Bella
Eng.d by J.H.Attwood N.Y.

ART. II.—*Contributions toward a History of Entomology in the United States;* by JOHN G. MORRIS, D. D., Baltimore.

(Read before the National Institute, April meeting, 1844.)

ENTOMOLOGY is of all branches of natural history the least cultivated by scientific gentlemen in our country. In Europe, especially on the continent, no department of zoology is more industriously pursued, and none has called forth more numerous or more splendid illustrated works. The science is taught in the gymnasia and universities, collections of insects systematically arranged are found in most of the literary institutions, and are properly considered an essential part of a museum of natural history.

In our own country, the subject has been totally neglected, except by a few, but they have accomplished much, and have rendered invaluable service to the science. They have smoothed the path for their successors, who, it is hoped, will diligently walk in it.

The reasons for this neglect of the science in our country, may be found in the presumed greater economical importance of other branches of natural history; in the diminutive size of insects, often requiring microscopic observation to determine their generic and specific character; in the unfounded apprehension of their poisonous qualities, so common even among educated persons, many of whom have a horror of every thing called a *bug;* in the fatigue and exposure endured in their capture; in the want of entomological books; and in the morbid sensitiveness on the subject of impaling them on a pin. But all these objections vanish on the slightest acquaintance with the subject; and it is presumed that no one ever began the study of it, who was not allured by its powerful attractions to prosecute it to some extent. The field is still very inviting in this country, for thousands of species still remain undescribed—in every excursion the industrious collector captures something new.

Other departments of natural history have been so thoroughly explored as to leave little room for new discoveries or improvements. A new North American bird would be literally a "*rara avis;*" a new mammal would be deemed extraordinary; and a new fresh-water fish would verily be a *queer* one. Indeed, it

may well be a ground of exultation that our naturalists have done so much to illustrate the Fauna of our country. The works of some of them exceed in magnificence and pictorial execution those of any other country, and the literary portions will compare with the most finished scientific compositions of the world. Our mammals have in part been described and figured by Gordman, Harlan, Bachman, Dekay, Say, and Ord, and another splendid work on this order is in preparation by Audubon and Bachman. Our birds have been represented almost to the life by Wilson, Bonaparte, Audubon, Ord, Nuttall, Bachman, Townsend, and the two Bairds. Our reptiles have been described and figured by Green, Leconte, Say, Harlan, Lesueur, and Holbrook; our fishes by Mitchill, Lesueur, Storer, Dekay, Smith, Rafinesque, Kirtland, Ayres, and Haldeman; our shells by Say, Rafinesque, Conrad, Lea, Gould, Binney, Hildreth, Barnes, Haldeman, Adams, and Mighles; our crustacea by Say, Gould, and Haldeman, (the fresh-water microscopian species, especially by the latter.) All these orders have been industriously studied, and he who desires to pursue them still further, has been furnished with books by these accomplished naturalists that will be indispensable.

Entomology has had the fewest cultivators, but still, as was before observed, much has been done. It is my design to give a brief history of the science in the United States, as far as the facts could be ascertained.

The father of American entomology is the Rev. F. V. Melsheimer, a Lutheran clergyman who resided in Hanover, York Co., Pa. He was a German by birth, and came to this country in 1777 as chaplain to the Brunswick troops. He was taken prisoner by the Americans at the defeat of Burgoyne, and like many of his countrymen in that expedition, he preferred remaining in the land of his captors to returning to Europe. After performing ministerial functions in several towns of Pennsylvania, he removed to Hanover, where he commenced his entomological pursuits, more than fifty years ago. Some of his first collections are still in the possession of his son. He soon after began an entomological correspondence and exchange with his countryman, Prof. Knoch of Brunswick, which continued without interruption to within a year of his death in 1810. He published no entomological work except his celebrated catalogue of the

Coleoptera of Pennsylvania, which is quoted as authority by every writer on our insects. His manuscripts are numerous, the principal of which is a definition of the species enumerated in the catalogue, and of about six hundred other species not noticed in it. He wrote a work on mineralogy and a journal of a tour in Pennsylvania, which were published in Germany, besides several books on controversial divinity which were printed in this country. At his death, his collection and manuscripts passed into the hands of his son, the Rev. John Melsheimer, who also succeeded to the pastoral care of his father's church. This is the gentleman so frequently mentioned by Say in his writings. He contributed considerably to the promotion of the science by adding many new species to the collection, and furnishing Say with such as he wanted, and his observations on them. At his death in 1829, the original collection, the books and manuscripts of father and son, became the property of another son, Dr. F. E. Melsheimer, now residing near Dover, York Co., Pa. This gentleman is a most industrious prosecutor of the science, and must be considered one of the best entomologists of the country. His nice discrimination and laborious research have shed much light on the subject; he has cleared away many difficulties—he has discovered the habits of many known, and determined the specific character of many unknown species. He has described more than six hundred new species of *Coleoptera*, which are now in the course of publication in the Proceedings of the Academy of Natural Sciences at Philadelphia. His manuscripts on our *Lepidoptera*, particularly the *Noctuidæ*, are voluminous, which it is hoped will also be eventually published.

The late Prof. Wm. D. Peck of Cambridge, Mass., was perhaps the next person after the elder Melsheimer, who paid any considerable attention to the subject. He described various species which are injurious to vegetation, in "The Massachusetts Agricultural Repository and Journal." He seemed to confine his attention chiefly to the economical department of the science. His writings contributed much to enlighten agriculturists on this branch of their profession; for their forest and fruit trees, their garden vegetables, grains and other products, are often subject to the ravages of insects whose nature and habits they do not know, and of course, they are ignorant of the best methods of destroying them. As far as could be ascertained, the following are the titles

of his papers. 1. Natural history of the slug worm, (*Blennocampa Cerasi.*) Bost. 1799. 8vo, pp. 14, with a plate. 2. A history of the pine weevil, (*Rhynchænus Strobi,*) with a figure of the insect. 3. A history of the pear tree *Scolytus,* (*S. Pyri,*) with a figure. 4. A history of the oak pruner, (*Elaphidion putator,*) with a plate. 5. The natural history of the canker worm, (*Phalæna* (*anisopteryx*) *vernata,*) the larva of a moth, which in New England is injurious to the apple and elm trees.* 6. A description of the Cossus of the locust tree, (*Cossus Robiniæ.*) This gentleman may have written other papers, but they are unknown to me. They were published in agricultural journals which had not a wide circulation out of New England, and difficult, perhaps impossible, to be procured at the present time.

The first illustrated work on American insects that ever appeared, is *The Natural History of the rarer Lepidopterous Insects of Georgia, collected from the drawings and observations of* Mr. John Abbot. This splendid work appeared in London in 1797, in two large folios, and was edited by Sir James E. Smith. There are but few copies in this country, one of which is in the library of Congress. It contains figures and short descriptions of one hundred and three of our Lepidopterous insects. Swainson pronounces it "to be one of the most beautiful and most valuable illustrated publications that England or any other country can boast of. The plates are the last and best of Moses Harris's performances." Abbot sent many other figures of the same order of insects to London, but they have never been published.

Catesby's great work on the natural history of Carolina, Florida, and the Bahama Isles, appeared some years before Abbot's, but as a small portion of it only is devoted to entomology, it scarcely belongs to our department. There are but twenty four insects figured and described in the two immense folios.

The next laborer in this inviting and interesting field, is the celebrated Say. He has acquired an undying fame by his indefatigable industry and enthusiastic devotion to this pursuit—by his extensive travels in our country in its prosecution—by his numerous writings and his extensive correspondence with foreign

* The larva which commits such ravages on the foliage of the elm in the South is not the canker worm of Prof. Peck. It is the larva of a beetle unknown in New England, (*Galeruca Calmariensis,*) and identical with that of Europe, whence it has been imported.

entomologists. Various scientific journals of our country are enriched with his papers on this and various other branches of natural history. He furnished fifty four contributions for the journals, besides three 8vo volumes on entomology exclusively. Besides insects, he described numerous fresh-water, marine, and land shells, crustacea, arachnides, reptiles, several species of mammals, radiata, zoophytes, annulosa, myriopoda, and entozoa. He wrote also a valuable paper on fossil geology, but his principal and favorite study was entomology. He described eleven hundred and fifty *Coleoptera*, two hundred and twenty five *Diptera*, one hundred *Hemiptera*, and one hundred species of other orders. He established several new genera, made many valuable observations on those already recognized, and numerous interesting and curious remarks on the habits and transformations of insects.

It is to be regretted that his papers are scattered through a variety of publications, from the Transactions of the American Philosophical Society, through Keating's Narrative of Long's Expedition, down to a village newspaper, so that it is impossible for the student to procure them all, and some of them are irrecoverably lost. A proposal was issued by M. Gory of Paris, a few years ago, to collect them all and translate them into French, but it is believed the work was suspended after the publication of four thin *livraisons.*

I have thought it well to give the titles of his papers on insects and the work in which they are published. It may be of benefit to those who desire to consult them or possibly to collect them.

1. Description of several new species of North American insects.—Jour. Acad. Nat. Sciences, Phila., Vol. I, p. 19, 1817.

2. Some account of the insect known by the name of the Hessian fly, and of a parasite insect that feeds on it.—Jour. Acad., Vol. I, p. 45.

3. Monograph of the North American insects of the genus *Cicindela.*—Amer. Phil. Soc. Trans., New Series, Vol. I, p. 401, 1818.

4. Description of the *Thysanoura* of the United States.—Jour. Acad., Vol. II, p. 11, 1821.

5. On the South American species of *Oestrus*, which infests the human body.—Jour. Acad., Vol. II. p. 353, 1822.

6. Descriptions of insects of the families *Carabici* and *Hydrocanthari* inhabiting North America.—Am. Phil. Soc. Trans., New Series, Vol. II, p. 1.

7. Descriptions of some new species of *Hymenopterous* insects, collected during the expedition to the Rocky Mountains, under the command of Maj. Long in 1819–20.—Western Quarterly Reporter, Vol. II, No. 1.

8. Descriptions of insects belonging to the order *Neuroptera*, collected by the expedition under the command of Maj. Long.—Western Quarterly Reporter, Vol. II, p. 160.

9. Descriptions of *Dipterous* insects of the United States.—Jour. Acad., Vol. III, p. 9, 1823.

10. Descriptions of *Coleopterous* insects collected in the expedition to the Rocky Mountains.—Jour. Acad., Vol. III, p. 139, Vol. IV, p. 83.

11. Account of the insect (*Ægeria exitiosa*) so injurious to the peach tree.—Jour. Acad., Vol. III, p. 216, 1823.

12. The appendix to Keating's narrative of an expedition to the source of St. Peter's river, contains descriptions of insects by Say, Vol. II, 1824, 8vo, Phil.

13. American Entomology. 3 vols. royal 8vo, 1817–28.

14. Descriptions of new American species of the genera *Buprestis*, *Trachys*, and *Elater*.—Annals of the Lyceum of New York, Vol. I, p. 249, 1825.

15. Descriptions of new *Hemipterous* (and *Orthopterous*) insects, collected in the expedition to the Rocky Mountains.—Jour. Acad., Vol. IV, p. 307.

16. Descriptions of new species of *Hister* and *Hololepta* inhabiting the United States.—Jour. Acad., Vol. V, p. 32, 1825.

17. Descriptions of new species of *Coleopterous* insects inhabiting the United States.—Jour. Acad., Vol. V, p. 160, 1825–6.

18. Note on Lecontе's *Coleopterous* insects of North America.

19. Descriptions of new species of *Hymenoptera* of the United States.—Two papers published in a periodical entitled "Contributions to the Maclurean Lyceum of Philadelphia," 1827–28.

20. Descriptions of North American *Dipterous* insects.—Jour. Acad., Vol. VI., part 1., p. 149, Vol. VI, part 2, p. 183, 1829–30.

21. Correspondence relative to the insect that destroys the cotton plant.—New Harmony Disseminator, 1830.

22. Descriptions of North American insects, and observations on some already described.

This paper was printed at New Harmony, forming an 8vo volume of 81 pages. Part of it was reprinted in Amer. Phil. Soc. Trans., Vol. IV, New Series.

23. Descriptions of new species of *Curculionites* of North America, with observations on some of the species already known. 8vo, pp. 30. New Harmony, Indiana, 1831.

24. Descriptions of new species of the *Heteropterous Hemiptera* of the United States.—8vo, pp. 39. New Harmony, 1831.

25. New species of North American insects, found by Joseph Barabino, chiefly in Louisiana.—8vo, pp. 16. New Harmony, 1832.

26. Descriptions of new North American *Hemipterous* insects, belonging to the first family of the section *Homoptera* of Latreille.—Jour. Acad., Vol. VI, p. 235, 1830–31.

27. Descriptions of new North American *Coleopterous* insects, with observations on some already described.—Boston Jour. of Nat. Hist., Vol. I, p. 2, 1835.

28. Descriptions of new species of North American *Hymenoptera* and observations on some already described.—Boston Jour. Nat. Hist., Vol. I, No. 3, 1836, No. 4, 1837.

29. Descriptions of new North American *Neuropterous* insects and observations on others already described.*

Say's most costly, though not most valuable work, is the American Entomology, in three fine 8vo volumes. It contains the figures and descriptions of one hundred and thirty two insects of various orders, but unhappily, more regard seems to have been paid to the typographical beauty and external decoration of the work than was necessary, for its consequent high price prevented its general circulation.

Say died in the full vigor of manhood, (aged 46.) If his valuable life had been spared a few years longer, our science would have reached a lofty eminence through his untiring zeal and persevering energy.

He was one of the original founders of that distinguished institution, the Academy of Natural Sciences of Philadelphia, and for thirteen years was one of its most industrious members and voluminous contributors to its invaluable journal. He rendered distinguished service to the Academy in every respect, but especially in the commencement, in describing, classifying, arrang-

* For this list of Say's entomological writings I am indebted to the Magazine of Natural History, New Series, Vol. III, p. 139, (London,) to which it was contributed by Mr. Doubleday.

ing, and cataloguing its collections. The institution, in fact, was in a great degree the work of his hands.

Maj. LECONTE's labors in this field properly belong to this period. This eminent naturalist has never published much on the subject, but his services have been invaluable. There is one paper from his pen, describing some southern Coleoptera, in the Annals of the New York Lyceum of 1824, and a monograph of the family *Histeridæ* with outline figures, in the Boston Academy's Journal of 1845. He contributed largely to that splendid foreign work, BOISDUVAL et LECONTE *Histoire Generale des Lépidoptères de l'Amerique septentrionale*, and I presume furnished most of the specimens and drawings with observations on the larvæ and their transformations. His son, JOHN LECONTE, Jr., is an industrious young entomologist, who bids fair to become eminent in the science.

The entomologist next claiming our attention in the order of time is Dr. THADDEUS W. HARRIS of Harvard University. For many years he has contributed much to the advancement of the science by his valuable papers in the journals. His published writings, as far as they have fallen under my notice, are: 1. A catalogue of the insects of Massachusetts, appended to Prof. HITCHCOCK's Report on the Geology of that state, 1835. 2. A description of some Coleopterous insects, in the Transactions of the Natural History Society of Hartford. 3. A prize essay on the noxious insects of the genus *Melolontha*, in the Massachusetts Agricultural Repository and Journal, Vol. X, 1826. 4. A discourse before the Massachusetts Horticultural Society, 1832. 5. A paper on the genus *Hispa*, in the Journal of the Boston Nat. Hist. Soc. 6. Description of *Tettigonia vitis*, in the Encyclopedia Americana, Vol. VIII. 7. The article *Locusta* in the same work. 8. Descriptions of *Coccus*, (bark louse,) in the New England Farmer, 1828. 9. Description of *Pontia oleracea*, Ibid., 1829. 10. A descriptive catalogue of American *Sphingidæ*, Silliman's Journal, Vol. XXXVI. 11. History of *Ægeria exitiosa*, an insect destructive to peach trees.—New England Farmer, Vol. V. 12. Description of *Ægeria Pyri*, Ibid., Vol. XII. 13. Description of *Arctia pseuderminea*, (salt-marsh caterpillar and butterfly,) 1823. 14. Description of *Sirex Columba*, New England Farmer, 1827. 15. Observations on the insects in the barley straw, Ibid., 1830. 16. Observations on wheat insects, Ibid., 1831. 17. Remarks on *Scarabæus Goliathus* and other African insects allied to it. 18. A paper on the genera *Cremastocheilus*, in Jour. Acad., Phila.

But the most important work of Dr. HARRIS is a treatise on some of the insects of New England which are injurious to vegetation. It is an octavo volume of 459 pages, (Boston, 1841,) and conveys invaluable information to the agriculturist on a subject very little understood among that respectable portion of the community. The beginner in entomology may also derive much important assistance from it. The enlightened state of Massachusetts, I believe, took the lead of other states in appropriating funds for a complete zoological survey of her territory, and this work of Dr. HARRIS's is one of its invaluable fruits. It is to be regretted, however, that it is not illustrated by figures. This would have rendered it much more valuable to the farmer and horticulturist, who, if unacquainted with entomology, do not easily recognize an insect from a bare description, however accurate. The work treats of the insects most injurious to vegetation, and displays most diligent observation and industrious research.

Various other papers on insects have appeared in the journals; several by Prof. HENTZ in the Transactions of the American Philosophical Society and in the Boston Journal; by Dr. GOULD and Mr. RANDALL in the same publication; by Dr. MELSHEIMER in the Journal of the Academy, Phila.; by Rev. Mr. ZIEGLER of York, Pa., and young LECONTE, in the same; by Prof. HALDEMAN, so favorably known by his splendid work on the fresh-water univalve mollusca of our country, and his "Zoological Contributions." This gentleman has completed a full monograph of the family *Longicornia*, which will be published this year in the Trans. of the Am. Phil. Soc. Prof. POTTER, late of Baltimore, published a pamphlet on the *Cicada septendecim*, most of the observations of which were furnished by Dr. GIDEON B. SMITH, of the same city. This gentleman is extending his observations on that remarkable insect, and has collected a large number of interesting facts, especially in relation to its periodical appearance in different sections of the country. Mr. A. HALSEY of New York also published several papers in the journals. An attempt was made some years ago, by Mr. TITIAN R. PEALE of Philadelphia, to publish an illustrated work on our *Lepidoptera*. Several

numbers were issued, but the laudable enterprise failed for want of support.

Kirby, in the Fauna Boreali-Americana, has described and figured a considerable number of our insects. The older writers of Europe, LINNE, FABRICIUS, HERBST, CRAMER, GODART and others, with the moderns, DEJEAN, GERMAR, ERICHSON, BURMEISTER, &c. &c., have included a large number of our species in their works; but still the cultivation of our field may be said to have been just begun, thousands of our insects still remaining undescribed.

In August, 1842, the Entomological Society of Pennsylvania was formed at York, by a few energetic naturalists, who are pursuing the subject with a very commendable zeal. They have already described and published in the Proceedings of Acad. Nat. Sci. of Phil. more than six hundred new species of *Coleoptera*, and many more still remain to be determined. They have prepared a Catalogue of the *Coleoptera* of the United States, which will be of great value to all who study this subject. This institution, though yet in its infancy, will contribute much to the promotion of the science in our country, especially in the discovery of new species. All the active members have been honored by election to membership of various scientific societies at home, and two of them have received diplomas from abroad. The members are in possession of valuable books on the subject of entomology, and their collections of insects are large and constantly increasing.

Not a few gentlemen of taste in our country collect insects merely as objects of beauty, who do not study the science; but they promote it in some degree, for they sometimes capture species entirely unknown to entomologists.

There are not a few foreign collectors in our country, sent out by learned societies or universities. They send home an immense number, many of which are described and published in foreign journals and books. I lately saw a work of the celebrated ERICHSON, of Berlin, in which more than three hundred species of but a single family (*Brachelytra*) of North American *Coleoptera* are described. He of course will have the credit of doing that which should long ago have been done by our *native* naturalists.

The science is taught at several of our colleges. Dr. HARRIS delivers a course of lectures on the subject at Cambridge, Prof. ADAMS at Middlebury, the writer of this article at Pennsylvania College, Gettysburg, and probably other institutions have made similar provision.

The collections of insects in this country, though not numerous, are in many instances very respectable. Dr. MELSHEIMER'S is the richest in native species that I have seen in this country. Dr. HARRIS'S is doubtless very extensive. Major LECONTE'S must be valuable. Prof. HALDEMAN, in addition to that made by himself, now possesses the collection formerly owned by Prof. HENTZ, containing many of our rarest species. Mr. ZIEGLER'S of York, is increasing. My own contains upwards of seven thousand species of native and foreign *Coleoptera*, and a large number of *Lepidoptera*. Mr. PEALE'S, of Washington, is large and splendid, consisting chiefly of *Lepidoptera*. He has them arranged geographically, and not systematically, as most other collectors have. Dr. WILKENS of New Jersey, and Mr. WILCOX late of Brooklyn, N. Y. had magnificent collections; but it is not known to the writer whether they still retain them.

There are doubtless other *private* collections in the country, but they have not come within my observation. The *public* collections are not numerous. Several of our colleges are engaged in establishing them, and it is hoped that soon no cabinet of natural history will be considered to be complete, without a well arranged and correctly systematized collection of insects. That of Count CASTELNAU (M. LAPORTE) now deposited in the National Institute, Washington, is the largest and richest in the country. It is gratifying to learn that the Association of Geologists and Naturalists, at their last meeting in New Haven, directed their attention to this subject. A committee was appointed to prepare a Manual of North American *Coleoptera*, and MELSHEIMER, HALDEMAN, and LECONTE, jr., are just the men to whom such a work may be entrusted. We may before long look for something worthy of their distinguished abilities.

This, as far as could be ascertained, is an imperfect sketch of the past and present state of entomology in our country. It will be seen that little, in comparison with other natural sciences, has been accomplished; but it is advancing, and new laborers are entering the field. It is hoped that it will soon occupy the high position which its interest and importance demand.

ART. III.—*Experiments and Observations on the Solar Rays;* by EDWIN C. LEEDOM, M. D., of Plymouth, Montgomery Co., Pennsylvania.

THE difference of heat acquired by a white and a black body, when both are equally exposed to the sun's rays, has long attracted the attention of observers. "If a black and a white glove are worn by the same person in the sun, the hand with the black glove will acquire the greatest degree of heat. Dr. WATSON, the present Bishop of Landaff, covered the bulb of a thermometer with a black coating of Indian ink, and the mercury presently rose 10°. Black clothes heat more and dry sooner in the sun than white clothes."*

The following experiment was performed by FRANKLIN.

"On a winter's day when the ground is covered with snow, take four pieces of woollen cloth of equal dimensions but of different colors, black, blue, brown and white, and lay them on the surface of the snow in the immediate neighborhood of each other. In a few hours the black cloth will have sunk considerably below the surface; the blue almost as much; the brown evidently less; and the white will remain precisely in its former situation."†

Having described upon a piece of black paper, a circle one fifth of an inch in diameter, I condensed the sun's rays with a lens upon the paper, so as just to fill this circle, which quickly produced an emission of smoke accompanied by the odor of burning paper. The rays were then concentrated upon a piece of white and perfectly clean paper, so as just to fill a circle about one twentieth of an inch in diameter; but no discoloration of the paper, emission of smoke, or any thing indicating an approach to combustion, could be observed. Now, it is apparent that the condensation of the rays within the smaller circle, must have been to that within the larger circle, as the area of the latter to that of the former, which, upon computation, will be found to be as 16 : 1.

From these experiments it appears that there is a vast difference between white and black opaque bodies, as regards the effects of the sun's rays upon them. Philosophers explain this difference, by supposing that white bodies reflect the greater part of the incident rays, and black bodies absorb them all or nearly all. "In black bodies, such as coal, &c. all the rays which enter their substance are absorbed, and hence we see the reason why such bodies are more easily heated and inflamed by the action of the luminous rays."* Sir DAVID BREWSTER here speaks as if the visible rays contribute as much to the increase of heat as the calorific rays, and also, as if both are acted upon by the coal, &c. in the same manner. But it is certain that the coal acts very differently on the former from what it does on the latter. The moment the rays fall on the coal, the white light which enters its substance disappears—it completely escapes the cognizance of the senses; but the caloric exists within the pores of the coal in a free state, and then escapes in a sensible manner.

It was the opinion of Sir ISAAC NEWTON, that the light which passes into the substance of an opaque body, is "variously reflected to and fro within the body till it happens to be stifled and lost." Later philosophers assert that the particles of bodies exercise a specific attraction over the particles of light. "When a portion of light," says the celebrated Sir DAVID BREWSTER, "enters a body and is never again seen, we are entitled to say that it is detained by some power exerted over the light by the particles of the body. That it is attracted by the particles seems extremely probable, and that it enters into combination with them and produces various chemical and physical effects, cannot well be doubted."† Now, as when the sun's rays fall upon coal or any black body, the greater part of the rays enter the substance of the body, as the intromitted white light is never again seen; but as the caloric exists in a free state, there is every reason to believe that the former, but not the latter, enters into combination with the body. The circumstance of the caloric's quickly effecting its escape from the internal parts of the body, by radiation and otherwise, affords positive proof that it is not acted upon by that specific attraction which, in all probability, detains the white light; nevertheless, it must be acted upon slightly by an attractive force of another kind, or else its total discharge from the in-

* Greg. Dict. of Arts and Sci., Article Black.
† Webster's Manual Chem. (Henry 105.)

* Brewster's Opt., chap. XXXIV. † Opt., chap. XXXIV.

ternal parts of the body would be instantaneous, contrary to what is observed to occur.

Since coal and all black opaque bodies appear to have the power of separating the intromitted white light from the caloric, of detaining the former and rendering it latent, and allowing the latter to exist within the pores in a free state, and since white opacity is the reverse of black opacity, it seems rational to infer that the action of white bodies upon light is the reverse of that of black bodies, that their particles attract and detain the caloric, but, having little affinity for the white light, a large proportion of the latter exists within the pores in a free state, and then escapes by radiation.

"Those bodies which possess the power of reflection in the highest degree, such as white metals, chalk and plaster of Paris, never reflect more than one half of the light which falls upon them; and coal reflects from its first surface only one twenty fifth of the white light."* Now, supposing that black paper possesses the same absorptive power as charcoal, and that the rays which pass into the substance of white paper are disposed of in the same manner as those which pass into the substance of black paper, it follows, that a condensation of rays equal to $1\frac{2}{3}$ upon white paper, should produce the same heating effect as a condensation of rays equal to 1 upon black paper. But it has already been shown, that, when the rays are condensed sixteen times as forcibly on white as on black paper, less tendency to combustion is produced in the former than in the latter. How can the disappearance of so much caloric be accounted for, unless it be supposed that the particles of the white paper attract and detain it, in the same manner that those of coal and other black bodies do the intromitted white light?

The opacity of blackness was ascribed by Sir Isaac Newton to an inability in black bodies to reflect light, owing to the extreme smallness of their particles. But it is now well known that black bodies reflect a considerable quantity of light. Coal reflects one twenty fifth of the rays which fall upon it, and other black bodies of greater density appear to reflect a larger quantity than this. Black marble or any dense black body, when highly polished, possesses sufficient reflecting power to form a tolerably

* Brewster's Life of Newton, chap. vii.

good mirror. If a piece of white paper on which the colors of the spectrum are painted, be held before a highly polished black surface and viewed by reflection, the white paper and all the different colors will be distinctly seen. Having procured a piece of anthracite which possessed a smooth, glossy surface, I concentrated the sun's rays with a lens alternately upon the smooth surface of the coal, and a piece of white china of very fine grain and good polish, and threw the reflected rays upon a piece of black paper at a small distance from the focus. The rays which were reflected from the black surface, appeared to act upon the paper as quickly and as forcibly as those reflected from the china; a copious emission of smoke, accompanied with the odor of burning paper, being the result in each case. Pieces of phosphorus also were inflamed as quickly, and apparently at as great a distance, by the rays reflected from the coal, as by those reflected from the china. Indeed, when the two reflecting surfaces were examined by the microscope, the polish of the coal appeared to be inferior to that of the china.

Hence it appears that black bodies possess the power of reflection in a high degree. Black opacity, then, cannot be owing to an inability in the particles of black bodies to reflect the sun's rays. But, since "coal does not transmit to the eye a single ray out of those which enter its substance,"* it must be admitted that the phenomenon of blackness is produced by the absence of free light from the pores of an opaque body.

As white opacity is the reverse of black opacity, and as white bodies appear to detain the greater part of the solar caloric which enters their substance, in the same manner that charcoal and other black bodies do the intromitted white light, there is strong reason to believe, that the white light being but feebly attracted by the particles of white bodies, a large proportion of it exists within such bodies in a free state, and then escapes from their pores by radiation, as caloric does from heated bodies, and that this radiation of free white light from the pores of opaque bodies produces the phenomenon of whiteness. That the existence of free white light within the pores of an opaque body, even coal, would produce whiteness, is admitted by Sir David Brewster himself. In his refutation of that part of the Newtonian theory

* Brewster's Life of Newton, chap. vii.

which ascribes opacity to a multitude of reflections within the internal parts of bodies, he says: "If the particles of light were reflected or merely turned out of their direction by the action of the particles, it seems to be quite demonstrable that a portion of the most opaque matter, such as charcoal, would when exposed to a strong beam of light, become actually phosphorescent during its illumination, or would at least appear white."*

The circumstance of the caloric's existing in a free state in the pores of black bodies, and becoming latent in white bodies, affords a ready explanation of the difference of heat acquired by a white and a black body, when both are equally exposed to the sun's rays. It is free, uncombined caloric which occasions the sensation of heat, causes the mercury to rise in the tube of the thermometer, overcomes the cohesive attraction of the particles of coal, &c. and enables them to combine with oxygen and produce the phenomenon of ordinary combustion.

Philosophers, for a long time, supposed the action of natural bodies upon light to be purely mechanical. Sir Isaac Newton, finding the least parts of many bodies to be in some measure transparent, supposed the colors of all bodies to be produced by their power of reflecting some rays and transmitting others, and their "opacity to arise from a multitude of reflections caused within their internal parts." "The transparent parts of bodies," says that great philosopher, "according to their several sizes, reflect rays of one color, and transmit those of another, on the same ground that thin plates or bubbles do reflect or transmit these rays; and this I take to be the ground of all their colors."†

Sir David Brewster, although he doubts not that the "Newtonian theory is applicable to colors of the wings of insects, the feathers of birds, the scales of fishes, the oxidated films on metal and glass, and certain opalescences, still believes that the colors of vegetable life, and those of various kinds of solids, arise from a specific attraction which the particles of these bodies exercise over the differently colored rays of light." "When," says he, "colored bodies are opaque, so as to exhibit their colors principally by reflection, the light which is reflected back to the observer, has received its color from transmission through part of the

* Brewster's Opt. chap. xvi. † Opt. chap. xxxiv.

thickness of the body, or, what is the same thing, the color reflected to the eye, is complementary to that which has been detained by the particles of the body, while the light is passing and repassing through a thickness terminated by the reflecting surfaces," &c.*

The arguments advanced by this philosopher, in support of the opinion that the particles of bodies exercise a specific attraction over the particles of light, are forcible and convincing; but that part of his theory, which has for its object the determination of the manner in which the colored light is discharged from colored opaque bodies, will not, it appears to me, bear a thorough examination. When he says that "the color reflected to the eye is complementary to that which has been detained by the particles of the body, while the light is passing and repassing through a thickness terminated by the reflecting surfaces," he means, I presume, that the colored light is reflected to the eye from the second surface of a thin transparent stratum, the complementary light having been detained by the particles composing this stratum. According to this theory, the thinnest strata of all colored opaque bodies are transparent. But this is by no means certain. There is reason to believe that the thinnest film which can be formed of any metal is opaque. Gold leaf, it is true, transmits a portion of colored light, but, when it is examined by the solar microscope, it is said that innumerable rents can be perceived within it; wherefore, it is probable that the light which is transmitted passes through openings which have been caused by a forcible separation of the particles. The gold which covers the silver of which gold wire is formed, is vastly thinner than gold leaf. According to the computation of Dr. Halley, the ten thousandth part of a grain of gold covers a piece of wire one eighth of an inch in length, "and yet, though the gold with which such wire is coated is stretched to such a degree, so intimately do its parts cohere, that there is not any appearance of the silver underneath."† Even supposing a colored opaque body, a piece of gold for instance, to be composed of thin transparent strata, still, it is difficult to conceive how there can be any reflection except from the first surface of the gold, unless it be supposed that the layers

* Life of Newton, chap. vii.
† Greg. Dict. of Arts and Sci., Articles Ductility and Wire.

are separated from each other by interstices filled with a medium of less density than the gold itself. As gold is a simple substance, the layers must all be equally refracting media. If the strata be supposed to be closely joined together, without any interstices between them, there certainly can be no reflection at their intervening planes; for, it was established by Sir Isaac Newton as a fundamental principle, that within "the confines of equally refracting media there is no reflection." Indeed, that there is underneath the first surface of gold any other surface which reflects light, appears to me in the highest degree doubtful. Unless I misapprehend the passage quoted on the preceding page from Sir David Brewster, his explanation of the mode in which the colored light is discharged from colored opaque bodies, is based altogether on imaginary data, and must therefore fail to give entire satisfaction to the true inquirer.

When the sun's rays fall upon a piece of anthracite or any dense black opaque body, part of the caloric, as has been already demonstrated, is reflected from the outer surface, and part of it enters the body. A large proportion of that which enters the body exists within it in a free state, and then escapes from its pores by radiation and otherwise. Except as regards their effects upon animal bodies, the one causing the sensation of heat, the other that of vision, the rays of caloric and the rays of color bear the greatest resemblance to each other. They both come from the sun to the earth in the same time; they are both refracted in the same manner by lenses, and reflected by specula; and are equally the products of ordinary combustion. Now it appears to me, that this analogy gives strong support to the opinion, that a part of the light which enters into the substance of colored opaque bodies, exists within them in a free state, and then escapes from their pores by radiation.

It will be admitted that the outer and inner particles of any simple body possess the same properties. When light falls upon an opaque body, "part of it is reflected or driven back, and part of it enters the body." If, as is maintained by Sir David Brewster, and other eminent modern philosophers, the particles of bodies exercise a specific attraction over the particles of light, the outer particles of any colored, opaque, simple body, must attract and detain the same sort of rays that the inner particles do. The light which is complementary to that which has been detained by the outer particles of the body, must necessarily be driven off

from the outer surface of the body together with the undecomposed white light. Also, it can readily be conceived that that part of the intromitted light, which is complementary to that which has been detained by the inner particles of the body, must exist within the body in a free state, and then effect its escape from the pores, by that self-repellent power of its particles which is known to exist, and is the cause of radiation.

That a part of the colored light which is discharged from any colored opaque body, proceeds from the outer surface of the body, there can be little doubt. Procure an opaque body whose color is one of the primary colors of the spectrum, a piece of gold for instance, possessing a flat surface highly polished. The greater part of the light which is reflected from such a surface, is known to be reflected regularly. Throw the sun's rays obliquely upon the polished surface of the gold, and receive the reflected light upon white paper, which will be tinged of a yellow color. But, the yellow color thus given to the paper by the reflected light, will be very faint in comparison to the color of the gold itself—too faint to admit the belief that all the yellow light which is discharged from the gold proceeds from its outer surface; but no more vivid than can readily be accounted for, by supposing it to be complementary to the light which has been detained by the outer particles of the gold.

The brilliant colors of certain solid bodies, such as chromate of lead, indigo, &c., cannot, I think, be explained unless we call in to the aid of reflection a copious radiation of colored light from the internal parts of these bodies.

To the opinion that part of the light which enters the substance of colored opaque bodies exists within them in a free state, and then escapes from their pores by radiation, as caloric does from heated bodies, it might be objected, that the discharge by the bodies in question of all the light which is not permanently detained by the specific attraction of their particles, is instantaneous, but that a heated body requires some time to part with all its free caloric. But there is no proof that the discharge by the bodies in question, of all their free light, is instantaneous. When the color of a body ceases to make an impression upon the organ of vision, that is no proof that no more visible rays are discharged from the body. The human perceptions are not always unerring guides in tracing the operations of nature. It is well known that a body may feel cool to the touch, and yet, at the same time,

radiate caloric. There is reason to believe that white and colored opaque bodies continue to discharge visible rays some time after they are deprived of all accessions of light from any external source. When there is snow on the ground, its whiteness is perceptible, let the night be ever so dark and cloudy. This opinion is also strengthened by the circumstance of some of the lower animals, owing to a more delicate structure of the eye, being able readily to distinguish objects in what would be total darkness to man. "The pupil admits of greater dilation in the cat, in the owl, in night birds, and in general in all animals that see in the dark. The retina likewise appears more sensitive in those animals; several of them appear incommoded by the light of day, and never pursue their prey but in the most obscure darkness."*

That light, after being absorbed by opaque bodies, can exist within them in a free state, and then escape from their pores by a self-repellent power of its particles, is admitted by Sir DAVID BREWSTER. In the latter part of the eighth chapter of his Life of Newton, in which he advances a new theory of inflection, I find the following passage.

"That the particles of light, like those of heat, are endowed with a repulsive force which prevents them from accumulating when in a state of condensation, or when they are detained by the absorptive action of opaque bodies, will be readily admitted." It appears to me somewhat remarkable, that this important idea was excluded from his "New Theory of Colors."

The proper colors of opaque bodies certainly depend but little upon the light which is reflected from their external surfaces. Let a small piece of black marble which has a flat surface well polished, be held in a particular manner between the eye and a sheet of white paper. Every part of the flat surface of the marble will reflect to the eye a part of the image of the paper, so that the whole of the surface will appear white. Instead of the sheet of paper, substitute a large piece of red cloth, and the surface of the marble will appear red; if yellow cloth be substituted for the red cloth, the surface of the marble will appear yellow, and so on. Now this shows that the native blackness of the marble is owing to no deficiency of reflecting power. But further, coal reflects from its external surface one twenty fifth of the incident light; and a white body, such as chalk, reflects about

* Richerand's Physiology, chap. VII, p. 215.

one half of the light which falls upon it. Let a quantity of white light equal to two, fall upon a piece of chalk, and another quantity of white light equal to twenty five, fall in the same direction on a piece of charcoal of the same size and shape as the chalk, and which has the same position. Under these circumstances the charcoal must reflect as much white light as the chalk. But the coal will still appear black, while the chalk will preserve its whiteness.

The explanation of white and black opacity given by optical writers, must be erroneous; for, the whiteness of chalk is perceptible in a dark, cloudy night, whereas charcoal appears intensely black, even though viewed by the direct light of the sun, when the sky is cloudless and the ground covered with snow.

It is asserted by Sir DAVID BREWSTER, that "coal does not transmit to the eye a single ray out of those which enter its substance." Now, if when an opaque body discharges no light whatever from its internal parts, we have the phenomenon of blackness, even though the quantity of light reflected from its external surface is considerable, it must I think be admitted, that when such a body possesses a proper color, its color is owing to the radiation of colored light from its pores.

In making a brief recapitulation of the views unfolded in this paper, I would say that the particles of all opaque bodies exercise over the intromitted rays a specific attractive power. Those of coal and other black bodies attract and detain the white light, but, having a feeble affinity for the caloric, the latter exists within such bodies in a free state, and then escapes from their pores by radiation and otherwise; the particles of white bodies detain the caloric, but, having less affinity for the white light, a large proportion of the latter exists within these bodies in a free state, and then escapes from their pores by radiation; and the particles of a body whose color is one of the primary colors of the spectrum, attract and detain the light which is complementary to that which gives the body its proper color, the latter, being left free, escapes from the internal parts of the body, by that self-repellent power of its particles which is known to exist, and is the cause of radiation.

This theory is one of extreme simplicity; but it is not for that reason the less likely to be true. We are taught by Sir ISAAC NEWTON, that "Nature does nothing in vain, but is simple, and delights not in superfluous causes of things."

ART. IV.—*Some facts respecting the Geology of Tampa Bay, Florida;* by JOHN H. ALLEN, Principal of Chilicothe Academy, Ohio, and late Lieut. of Artillery in the U. S. Army in Florida.

THE peninsula of Florida presents many interesting geological features; it is evidently of an origin comparatively recent, and its rocks and marl beds are replete with a vast quantity and rich variety of organic remains, which have as yet been but imperfectly examined. This region is not only attractive to the geologist, but to the naturalist in every department. Along the borders of its rivers and in its rich hammock lands, are found a profusion and variety of trees, shrubs and plants, which excite admiration by their magnificence and beauty. It swarms with beautiful insects of every hue; and in the shallow waters of its bays live myriads of shell fish, belonging to a great variety of species.

One of the most interesting points in Florida to the geologist is the neighborhood of Fort Brooke at the head of Tampa Bay. The first layer of solid rock beneath the soil is a stratum of limestone; it is hard and white, has an earthy texture, and appears to have resulted from comminuted and decomposed shells. The surface of this rock is exposed in several places in the vicinity of Fort Brooke, about two miles north, near the Hillsboro' river, four miles west on the shore of the bay, and six or seven miles east in the banks of a small stream. This rock has a very extensive range. I have seen it in many parts of the territory;—in some places it is soft and friable, very much resembling chalk, all traces of organic remains having been obliterated by the decomposition of its material previously to its consolidation. I have noticed it at points more than one hundred and fifty miles distant from each other, presenting the same lithological characters. It constitutes the bottom of the many ponds and lakes in the interior, and I have been informed, that its white and jagged surface can be seen throughout the whole extent of the everglades, that singular sea of fresh water and coarse grass, that covers an area of several thousand square miles in the southern part of the peninsula. This immense volume of fresh water must be forced up through crevices in this rock.

This limestone in some places is destitute of organic remains, in others it contains a great abundance of them, such as univalves, bivalves and echini; where it has been exposed to the disintegrating influences of the atmosphere, beautiful specimens can be detached. It has in many places sunk down and left depressions called *limesinks;* which often have a small area and are several feet in depth, appearing more like artificial wells than natural productions. The loose texture and proximity of this rock to the surface accounts for the fact, that the sandy soil of the country contains a large proportion of lime in its composition and possesses a greater fertility than its aspect promises. I have never seen any chert in the limestone, but from the frequent occurrence of nodules of that mineral on the surface, I should infer that they came from it. This rock must be several feet in thickness, for extensive caverns and galleries are found in it, worn out by subterranean streams; there is a small excavation near Fort Brooke, running many feet horizontally and nearly high enough for a man to stand upright.

There is another rock that probably dips beneath the limestone—a dark bluish, silicious rock, of a compact texture, somewhat vesicular, the vesicles containing minute crystals of quartz. This rock can be seen at the rapids of the Hillsboro', about nine miles north of its mouth. I have noticed bowlders of it at several places in the interior, particularly near the forks of the Withlacoochee river, containing beautiful impressions of bivalve shells. This and the limestone are the only compact rocks I have ever seen in the peninsula. Small bowlders of a gray sandstone occur a few miles north of Fort King.

In the vicinity of the Hillsboro' river and other streams that discharge their waters into Tampa Bay, are several sulphur springs, which issue from crevices in the rocks, and supply a copious quantity of water charged with sulphureted hydrogen gas. There is a very large one near the west bank of Hillsboro' river, about eight miles north of Fort Brooke; it is thirty feet or more in diameter and twelve feet deep, and issues from a crevice in the underlying rock, throwing out sufficient water to form a stream more than twenty feet wide and eighteen inches deep, which bubbles up with so much force as to keep the surface in a constant agitation like the boiling of a large caldron. The waters of this spring are so pellucid that minute fragments of shell glisten on the bottom like pearls, and large turtles with a great variety of fish

are seen swimming about; from the number of fish, I inferred that they are fond of frequenting sulphureted waters. When I visited this spring, the stream flowing from it into the Hillsboro' river was literally crowded with them. These springs are very abundant; there is a small one southwest of the fort, near the western shore of the bay, and a large one about seven miles east; some species of shell fish live in the streams that flow from them. A species of Neritina, that is very abundant in the brackish waters at the head of the bay, seems to have a great predilection for these sulphurous waters, in which the individuals grow to a greater size than they attain elsewhere.

There is a peculiar beauty and placidity in the springs of Florida, embosomed as they are with a perennial foliage, that might well have confirmed the Spanish adventurer Ponce De Leon in the belief that some one of them possessed the power of removing the decrepitude of age, and restoring the freshness and elasticity of youth.

Along the shore of Tampa Bay, the country is low, seldom attaining a height of more than ten feet above the surface of the water; it is generally sandy, but in some places there are beds of marl, which when they form the surface, constitute a rich and fertile soil. These beds differ materially in their composition and organic contents; they evidently belong to different geological periods. One of the most ancient and interesting of these deposits can be seen about two miles west of Fort Brooke, where a section a few hundred feet in length has been exposed by the washing of the waters of the bay. Immediately back from the shore it is covered by three or four feet of loam and sand. This bed consists of blue marly clay, interlaminated with seams of carbonate of lime, which probably has resulted from the decomposition of shells; that which renders this deposit unusually interesting is the remarkably beautiful petrifactions that it contains, and that surpass any thing of the kind I ever saw. Interspersed throughout the marl are masses of silex presenting a great variety of shapes and colors; some have a rough and jagged surface and wine yellow color, some are hollow cylindrical tubes of different colors, straight or bent, from one to six inches in length, and from one fourth of an inch to one inch in diameter, with a fine drusy interior; others are beautifully agatized, having that moss-like appearance that agates sometimes possess; these silicious concretions are both opaque and translucent, and are probably of organic

origin. There are also found in this bed round cylindrical stems, fluted and gradually tapering to a point with a slight curve, they are from three to four inches in length; likewise a species of large radiated coral, shaped like the segment of a sphere, petrified with wine colored silex, and having a mammillary interior of carnelian or chalcedony.* The most beautiful petrifactions of this deposite are various species of shells that are so perfectly petrified with clear wine colored silex, that all their most minute and delicate markings are preserved; so great is their translucency, one can nearly read through them. They appear to have petrified before having suffered the least from attrition or decomposition; the spiral univalves taper to a transparent needle-like point. I found one petrified with carnelian. I obtained more than twenty specimens, among others some of the following genera: *Murex*, *Oliva*, *Cyprea*, *Buccinum*, *Cardita*, *Trochus*, *Cerithium*, *Pura* and *Helix*, a few of which are found living at present in the bay, some are indigenous to the West Indies; they are washed out of the marl and strown along the shore by the constant action of the water. There are other beds of marl, apparently of a much more recent origin, one of which extends along the shore at Fort Brooke; it is an earthy mass containing vast quantities of oysters and other shells, extends a few hundred feet back from the shore, and is several feet in thickness. I have seen dug out of it bones of the *Manatus* or sea cow, an animal that still exists in the southern part of the peninsula.

Deposits of marl, and shell banks, occur at many places on the western coast of Florida. About thirty five miles south of Fort Brooke, near the mouth of the Manatu river, there is an extensive bank of shells ten feet or more in thickness, composed almost wholly of large unbroken univalves, belonging principally to a species of *Pyrula*, without any admixture of earth. I never before saw shells of this kind in such large quantities, and from their volume and position, I should infer that they had been

* These beautiful fossils are well known in mineralogical cabinets as "chalcedony from Tampa Bay." In most of the geodes which we have seen from this locality, the zoophytic structure of the mass could be readily detected. One large hollow spheroidal or pyramidal specimen which we have, has numerous stalactical masses rising inward from its base of the size and length of a man's finger. These have arisen from the perforation of the original animal structure by saxicavous shells who had there taken up their quarters. When the silicifying influence (whatever it was) came on, the silica penetrated evenly all the cavities and inequalities of the original, copying with surprising delicacy, all the minute markings of the zoophyte.—*Eds.*

amassed by the action of violent storms; they are abundant in the bay. All however which I have seen alive are of a smaller size, from which I should judge that the larger ones lived at some remote period, when a warmer climate and other circumstances were highly favorable to the development of molluscous life. I noticed fragments of Indian pottery amongst them; their immense quantity precludes the idea of their having been accumulated by the aborigines of the country.*

This place possesses much interest on account of its being the spot where De Soto landed his army. A short distance from the shell bank, are the remains of ancient fortifications, probably built on this occasion or subsequently by the Spaniards.

There are found along the shore at Fort Brooke, small beautiful fortification agates, which probably are washed out of the marl bed that contains the siliceous petrifactions. Deposites of ochre are found between the head of Tampa Bay and the Gulf of Mexico; and I have noticed near the marl bed, large masses of sand cemented by the oxide of iron.

To the botanist Florida presents a rich field of research; here he can behold in their native beauty and magnificence, a great variety of trees and plants—the lofty Gordonia, the gorgeous Magnolia, that perfumes the atmosphere with its fragrance, and the tall Palmetto, that gives an oriental appearance to the country. The ground in many places is carpeted with the delicate sensitive plant, and upon the trees grow a great variety of parasites, the most conspicuous and showy of which is the *Tillandsia utriculata*, whose long subulate leaves form at their base a depression, out of which rises a stem three feet high, covered with a profusion of white flowers, that produce a fine effect amidst the long moss (*Tillandsia usneoides*) that frequently invests the trees. The Hydrangea and the beautiful coral tree, (*Erythrina,*) are seen in their native luxuriance; and many vines, such as the Bignonia, Passiflora and Ipomea, trailing from trees and shrubs, delight the eye with their splendid flowers. Along the coast the mangrove (*Rhizophora*) forms an almost impenetrable mass of vegetation, by sending down from its branches vertical stems that take root in the soil.

* It probably requires more investigation and comparison before we can safely say that the shells mentioned by Mr. Allen, are identical with those now living on the coast. It is quite probable that a large proportion of them are so.—*Eds.*

Art. V.—*Review of the New York Geological Reports.*

(Continued from Vol. xlviii, p. 316.)

In continuation of the New York Geological Reports, we proceed with the description of the

Onondaga Salt Group. (Not recognized in the Pennsylvania survey.)—In the geographical subdivisions of the New York System adopted by most of the New York geologists, this group forms the lowest member of the Helderberg series;* in the chronological table, it forms the second member of the middle division in the ascending scale.

As a whole it is an immense mass of argillo-calcareous shaly rocks, enclosing veins and beds of gypsum; hence this has been designated by some as the "gypseous shales." From the lithological character of these beds, their outcrop has suffered much from denudation, and their superficial area occupies a wider district of country than most of the preceding members, especially along the valley of the Clyde,—covered up from view, however, to a great extent, by accumulations of drift. To the east it runs out near Sharon Springs; west it extends into Canada, being coextensive with, and running parallel to the Niagara group, upon which it rests. Its superficial area is represented on the geological chart by a light ochre.

Four divisions have been distinguished in the description of the Onondaga salt group, though the lines of separation are by no means well defined.

1. Red and greenish shale below.

2. Green and red marl, shale and shaly limestone, with some veins of gypsum.

3. Shaly and compact impure limestone, with shale and marl, embracing two ranges of plaster beds, with hopper shaped cavities between.

4. Drab colored impure limestone with fibrous cavities; the "Magnesian deposit" of Vanuxem.

* In Emmons's tabular view of the New York System, the "Onondaga salt and plaster rocks" are placed in the Ontario division. In a *geographical* arrangement this is perhaps the more correct grouping, since these formations are in full force along the valley of Lake Ontario, and are almost absent in the first geological district, where the Helderberg Mountains are situated.

Of these, the third is the only one that has yielded gypsum in profitable quantities. The included masses of gypsum, though, for the most part, even-bedded at their base, are usually very irregular at their upper surface, often conical. The plaster beds are supposed to be segregations by molecular attraction from the marl. Might it not have originated in the introduction of subterranean springs, charged with sulphuric acid or sulphates, bursting up through fissures in the inferior strata, and mingling with the waters of the ocean holding lime in solution, by which mounds and irregular beds of the resulting precipitated sulphate of lime would accumulate, isolated in a great measure from the deposites of calcareous mud going on around? Most of the gypsum is of a dull earthy color, and it usually effervesces with acids from the presence of carbonate of lime.

This third division contains not only the gypseous beds, but is, most probably, the source also of all the salt so extensively manufactured at Onondaga, Cayuga and Madison; at least VANUXEM informs us, that, except in these gypseous beds, there is no evidence of salt existing in the solid state in any of the other divisions of the Onondaga salt group. This author believes that the hopper-shaped cavities situated between the two plaster beds prove that salt has crystallized during the desiccation of the waters in which the surrounding deposite of argillaceous and calcareous matter was going forward, since, during the evaporation of brines, cubes of salt aggregate so as to form groups of crystals corresponding perfectly to such a matrix. Near the same geological position is the *Vermicular lime rock* of EATON, so called from numerous, disseminated, tubular cavities, which VANUXEM thinks are also due to previously existing common salt.

The fourth division is remarkable for a fine columnar structure or needle formed cavities dispersed through the mass. These VANUXEM believes to have been caused by crystallizations of sulphate of magnesia during the consolidation of the rock, and subsequently removed by percolation of water; for this reason he has denominated this part of the Onondaga salt group the "*Magnesian deposite*," and its cavities "*Epsomites*."

Connected with this formation, "between the two porous masses," the geologist of the third district has described "a mass of *altered* rock extending for many rods," which in structure partakes, in part, of the character of serpentine, and, in part, that of granite and sienite, whilst some of the adjacent calcareous portions show a crystalline grain with streaks of a light bluish shale. These metamorphic products he conceives were not formed by a "dry heat or fire," but were the result of solution and crystallization from a thermal water.

We would inquire, is there unequivocal evidence that the metamorphic rocks are entirely cut off from all connection with inferior intrusive veins?—because, unless there is, we can perceive no good reason for denying to them an origin which is generally conceded to belong to geological formations of similar structure. A microscopic, crystalline texture is certainly not incompatible with fluidity or semi-fluidity by dry heat. Is it not rather evidence of sudden consolidation?

The thickness of the first division of the Onondaga salt group on Steele's Creek, is estimated at eighty feet, but in Onondaga County its maximum is five hundred feet, unproductive of any valuable mineral. The exact thickness of the other divisions does not appear to have been ascertained, probably for the want of favorable sections. We are informed, however, that a well had been sunk at the Indian Reservation to the south of Vernon Village, eighty feet through strata belonging to the second division; these borings were commenced below the range of the plaster beds. Some of the plaster quarries in the third division have exposed from twenty to sixty feet of strata above the gypsum deposite. In Madison County the upper and lower porous or vermicular limestones are together twenty four feet. In the middle counties the entire thickness of the Onondaga salt group must be from six hundred to a thousand feet.*

Notwithstanding its great thickness, this formation is very barren in fossils. The corals and shells of the Niagara group suddenly ceased to exist, perhaps, as HALL suggests, being overwhelmed by the sudden outbreak of a mud volcano at the bottom of the ocean, by which the waters became surcharged, not only with argillaceous sediment, but became contaminated either with free sulphuric acid, or sulphate of magnesia and soda.

* HALL, at p. 133 of the Report of the Fourth District, speaking of the immense accumulation of mud on the top of the Niagara limestone as caused by a mud volcano, estimates it at a thousand feet.

The only organic remains yet discovered in the group in question, are, the head of a trilobite, *Eurypterus remipes*, and the forms represented beneath.

Hall's Report, p. 137.

Fig. 1. *Cornulites*, n. s. 2. *Orthoceras laxe*, H. 3. *Lozonema Boydii*, H. 4. *Euomphalus sulcatus*, H. 5. *Delthyris* ——? 6. *Atrypa* ——? 7. *Avicula triquetra*, H.

"These all occur at a single locality, and but one other shell has been seen in the group."

If any portion of the Onondaga salt group exists in the West, it is but obscurely marked. None of the above fossils have come under our notice in the Western States; but in the Du Buque district of Iowa, and on the opposite side of the Mississippi in Illinois, on section fourteen, township twenty five north, range seven east of the fourth principal meridian, a vermicular lime rock was discovered, answering to the description of the porous beds of the third division of the Onondaga salt group. If this has originated, as has been suggested, in crystallizations of muriate of soda, it cannot be considered much evidence in favor of the identity of the two formations; but the transverse septa and lamelliferous, cellular structure, visible in some specimens from the western formation, leaves little room to doubt *their* organic origin.

The country through which the Onondaga salt group extends, is usually marked by a series of low gravelly hills and clayey valleys, on which a stunted growth of timber prevails, known by the name of "Oak openings."

Small portions of sulphate of strontia, galena and blende, with rhomb spar, occur in the upper portion of the group. Gypsum and salt are, however, the only minerals of economical value; of the former many thousand tons are annually excavated. Several acidulous springs issuing from these deposites, have been found to contain free sulphuric acid.

Water Lime Group. (A part of No. 6 of the Pennsylvania survey.)—For better distinction known also as the "Manlius water lime," since the terminal division of the last group, according to HALL, assumes, in the region around Cayuga Lake, the character of a water lime, and is employed, like the rock now to be described, as a hydraulic cement.

The Manlius water limestone consists of drab colored layers interstratified in a mass of darker blue limestone. The thickness of the whole varies from thirty to a hundred feet, but only a few feet of this is suitable for hydraulic purposes. The layer most highly esteemed for cement, is from four to five feet thick, of a drab color, and fine grained, traversed by oblique cracks in at least three directions, which causes it to break into irregular fragments. At some localities siliceous nodules are interspersed; then it is no longer fit for a water lime. An interlamination of shale is also destructive of its economical value, since an excess of argillaceous matter is very injurious to such cements.

The individual layers are not unfrequently interlocked by a notched surface not unlike the sutures of a skull; this appearance VANUXEM attributes to crystallizations of sulphate of magnesia.

On the chart, the water lime is represented by a grayish blue band, narrow and rather tortuous in its course, whose general direction is nearly west and east, from Niagara river to Schoharie, thence with a southerly curve along the Helderberg range to the Mamakating Valley. It exists also out of this general range in the base of Becraft's Mountain and Mount Bob, outliers of the Helderberg, east of North River, near the city of Hudson.

The typical fossils of the group given in the Reports, are embraced in the following wood cut.

Vanuxem's Report, p. 112.

Fig. 1. *Delthyris plicatus.* 2. *Avicula rugosa*, CONRAD. 3. *Tentaculites ornatus*, Sil. Res., p. 12, fig. 25. 4. *Littorina antiqua*, CONRAD. 5. *Atrypa sulcata*, VANUXEM. 6. *Cytherina alta*, CONRAD.

Fig. 3 is believed to be identical with a fossil found in slabs of limestone at Dudley in England, whose origin is still a matter of speculation. Some suppose the *Tentaculites* to be arms of *Crinoïdea;* others think they may be spines of *Leptæna.*

A *columnaria,* a peculiar *Strophomena,* and an *Agnostis,* perhaps the *pisiformis,* are enumerated as occurring in this formation.

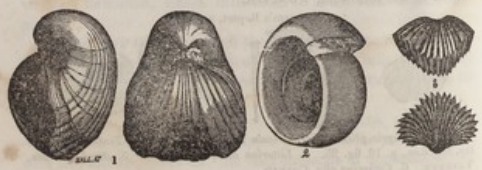
It is doubtful whether any strata identical with the water lime group of New York, exists in the West. It is true that one of the uppermost beds on the Falls of the Ohio is lithologically the same, and contains a *Tentaculites* and an *Avicula;* but they appear to be of species distinct from those which have been found in the New York water lime; besides, as we shall by and by see, the western hydraulic limestone is superimposed on beds which contain fossils identical with some in the upper Helderberg series, which proves it to occupy a higher geological position.

Pentamerus Limestone. (Part of No. 6 of the Pennsylvania survey.)—This, the third member of the Helderberg series, has received its name from the constant occurrence of a helmet-shaped *Pentamerus,* fig. 1 of the following wood cut. The name however is very objectionable, inasmuch as it does not distinguish it from other Pentamerus beds both below and above it.

This limestone, though well developed in the southern part of the state all along the Helderberg range, and in some of the middle counties, is not a universal formation. In thickness it varies from ten to eighty feet, and usually presents the appearance of an uneven bedded, rough, subcrystalline and highly fossiliferous, blackish gray, slaty limestone, with an interlamination of shale.

The fossils figured in Vanuxem's report, as characteristic of the Pentamerus limestone, are here given.

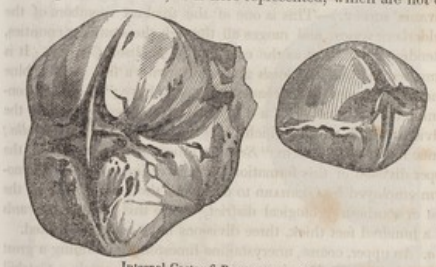
Vanuxem's Report, p. 117.



1 2

Fig. 1. *Pentamerus galeatus.* *Atrypa galeata,* Dalm. 2. *Euomphalus profundus,* Conrad. 3. *Atrypa lacunosa? Terebratula lacunosa* of Europe. 4. *Lepocrinites Gebhardii.*

It is supposed that Fig. 1 may be identical with the *Atrypa galeatus* of the Wenlock limestone. The English fossil seems, from a comparison of figures, to be of a more globular form, and to have its ribs more strongly marked, than the New York specimens; but these shades of difference are, perhaps, no more than we have reason to expect in the same species at distant points in their geographical range. The disparity in their generic names arises from the *Atrypa* and *Pentamerus* being distinguishable only by their internal structure, the latter being provided with internal vertical laminæ or projections, which give to its internal cast for a certain distance from the hinge five divisions, as is here represented, which are not observable in casts of the former. But it may be asked, may not this internal structure vary with the circumstances under which the fossilization has taken place? Might not the internal supports, under certain conditions, be absorbed during petrifaction without leaving any impress, either on the internal cast or inner concavity of the fossil shell? Is it not the rarest thing to find the spiral appendage of the *Spirifer* preserved? And has not its synonym *Delthyris* originated from this very cause?



Internal Casts of *Pentamerus.* Iowa.

Fig. 4 shows the outer and *inner* (?) structure of a *Crinoïdean* figured in a more perfected condition in Mather's report, p. 346, and first known as the Mulberry *Encrinite.* It is characteristic of

the middle part of the *Pentamerus* limestone, according to that author, whilst the *Asterocrinites pachydactylus*, fig. 6, p. 346, of the same report, is confined to the base of this limestone.

The other fossils named and described found in this formation, are, *Strophomena raristriata, S. rectilateris, S. depressa, S. elongata, Avicula naviformis, A. manticula.* "It also contains, according to VANUXEM, two *atrypæ* of a kind which first appear in this district and State in this rock, and there are three in all. Beyond this State there are others, one of which, being *A. capax* of CONRAD, exists in a lower position in Ohio and Indiana; the third, *A. cuboides*, is confined to the *Tully* limestone. The two found in the *Pentamerus* limestone closely resemble the *Terebratula Wilsoni* of English geologists." Nothing has yet been identified in the West, corresponding to this *Pentamerus* limestone.

Catskill Shaly Limestone, (Delthyris Shaly Limestone, and Scutella Limestone of the yearly reports.) (Part of No. 6 of Pennsylvania survey.)—This is one of the thickest members of the Helderberg series, and ranges all through the southern counties, extending as far west as the east end of Madison County. It is composed of "a dark bluish grey shale, with a fine grained blue limestone beneath, and a coarse limestone above;" the latter containing a great number of a discoidal-shaped fossil, probably the pelvis of an *Encrinite*, which bears a resemblance to a *Scutella*; hence has arisen the term, "*Scutella* limestone," as applied to the upper division of this formation. "Sparry limestone" is a synonym employed by GEBHARD to designate the same rock. In the first or southern geological district, where this group is upwards of a hundred feet thick, three divisions have been recognized.

a. An upper, coarse, uncrystalline limestone, containing a great many shells and *Encrinites* along with some corals,—Catskill shaly limestone.*

b. A middle slaty limestone equally fossiliferous.

c. A lower slaty argillo-siliceous limestone, abounding in *Strophomena rugosa*,† fig. 2, p. 312 of Vol. XLVIII, of this Journal.

The whole comprises, according to MATHER, a series of strata, perhaps, more highly fossiliferous than any rock of equal thickness in the state. Many of its organic remains are in a wonderful state of preservation, so that under the lens, the most minute structure of the smallest corals can be discerned.

The best sections are exposed on Catskill Creek, in Greene County, along the railroad. This locality gave origin to the name by which this formation is usually designated. It is also well exposed near the village of Schoharie, at Sharon Springs; near the Great Falls of Esopus, and at Rochester in Ulster County. Outliers of all the three divisions, besides other members of the Helderberg series, exist on the east side of North River, on Becraft Mountain and Mount Bob near Hudson, lying unconformably on the subjacent slaty rocks.

A few of the most common fossils are embraced in the following wood cuts.

Fig. 1. *Strophomena punctulifera*, CONRAD. 2. *Strophomena radiata*, CONRAD.

"These fossils occur in the *Delthyris* shaly limestone of New York, but at the West the *S. punctulifera* holds a higher position."*

Hall's Report.

* Does Mr. HALL mean by "West," the Western States or the western part of the State of New York? We are not aware of the *S. punctulifera* having been found in the Western States.

We understand Mr. HALL to say that he found *Strophomena* near the Falls of Ohio, which at the time he considered *S. punctulifera*; but all the *Strophomenæ* are *punctate* or *striato-punctate* when the shell is removed or partly removed, and there is great difficulty in identifying the one intended by CONRAD as *S. punctulifera*, which is not *punctate* when the shell is perfect. By "West" Mr. HALL means the Western States.—*Eds. Am. Jour. Sci.*

* In HALL's report this division is described as a distinct formation under the name of "Encrinital limestone."

† Since the former number of the Review was written, we have seen specimens of this fossil. It is much larger and more strongly wrinkled than the western fossil there spoken of.

Hall's Report, p. 120.

Fig. 1. *Delthyris macropleura.* 2. *Atrypa lævis.* 3. *Atrypa singularis.* 4. *Atrypa medialis.*

We have not been able to identify these forms with any western fossils which have as yet come under our notice. There is, therefore, neither palæontological nor lithological evidence, at present, of the existence of equivalent beds in the Western States or Territories.

Amongst the numerous beautiful fossils of the Catskill shaly limestone not yet published, there are several which HALL informs us are very analogous to the following forms figured on Pl. 13 of the Silurian Researches, and found in the Wenlock shale of England,—*Orthis hybrida, O. canalis, Atrypa rotunda, A. linguifera*, and several others.

The following is a list of fossils of this formation which have been described by CONRAD in the annual reports:—*Acidaspis tuberculatus, Acanthaloma, Asaphus pleuroptyx, Asaphus nasutus, Dicranurus, Calamopora (favosites) favosa, Delthyris bilobata, D. granulosa, D. macropleura, D. pachyoptera, Orthis, Strophomena indentata, Atrypa prisca, A. inflata, A. concentrica, Platyceras ventricosum, P. Gebhardii, Calceola plicata, Conularia quadrisulcata, Tentaculites scalaris.*

GEBHARD, jr., has distinguished a limestone resting upon, yet distinct from the Catskill shaly limestone, under the name of the "upper *Pentamerus* limestone," which contains a smooth species of *Pentamerus*, in its general form like *P. galeatus;* also several forms of *Atrypa* similar to those which occur in the inferior beds of this group.

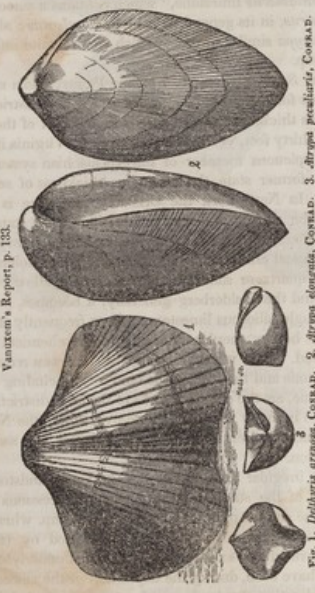
Oriskany Sandstone. (No. 7 of the Pennsylvania survey.)—Though this formation, in some parts of the first district, is only a few inches thick, and never exceeds in any part of the State of New York thirty feet, yet in Pennsylvania and Virginia it becomes a very conspicuous member of the Appalachian system, attaining, in the former state, the enormous thickness of seven hundred feet. In New York the Oriskany sandstone is confined chiefly to the middle and southern portion of the state, not extending further west than Morganville, Genesee County.

Its lithological character is, for the most part, a tolerably pure siliceous or quartzose sandstone of a white or yellow color. At Schoharie and the Helderberg generally, it becomes, however, a compact, tough, siliceous limestone. Very frequently it is full of cavities, the hollow moulds of shells which chemical agencies have removed. It is worthy of note, as VANUXEM remarks, that "this sandstone and the calciferous sand rock, including the Potsdam sandstone, are the only two rocks of the third district, (and we presume also in every part of the state over which the New York system extends,) which presents unaltered the pure sand of the primary region."

From the irregular thickness of the Oriskany sandstone in the middle part of the state, and the apparent depressions which it fills up on the surface of the Onondaga salt group, where the intervening strata are absent, it has been suggested by HALL that the more elevated and exposed portions of this underlying formation might have been, during the deposition of the siliceous rocks under consideration, dry land, or at least was beyond the reach of

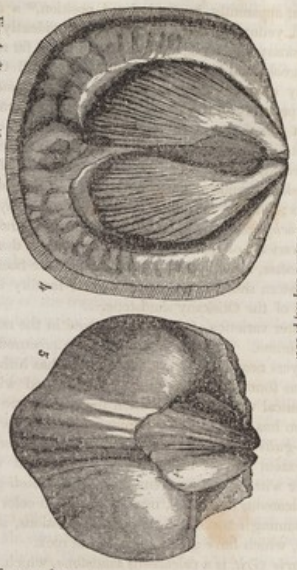
detrital deposition, and that too for a long period, viz. whilst the deposition of the two *Pentamerus* limestones and interposed *Delthyris* shaly limestone was going forward; each of which formations must have required an immense lapse of time, since each contains a peculiar assemblage of fossils.

These are the most abundant organic remains of the Oriskany sandstone.



Vanuxem's Report, p. 133.

Fig. 1. *Delthyris arenosa*, Conrad. 2. *Atrypa elongata*, Conrad. 3. *Atrypa peculiaris*, Conrad.



Vanuxem's Report, p. 134.

Fig. 4. *Atrypa unguiformis*, Conrad. (*Hipparionyx proximus*, Vanuxem.) 5. Cast of *Delthyris arenosa*, fig. 1.

Casts are of more frequent occurrence than perfect fossil shells, as is apt to be the case both in sandstones and magnesian limestones. One of these, fig. 4, from its strong resemblance to a colt's foot, has been called by Vanuxem, *Hipparionyx proximus*, believing it to be a genus intermediate between the *Atrypa*, *Strophomena*, *Orthis* and *Pentamerus*.

None of these forms, as far as we know, have been discovered, either in the western U. S. or England. It is remarkable, however, seeing that no other rocks of like lithological character are found in the upper or middle part of the New York system, that there exists at the falls of Fall Creek, near the central part of the State

of Indiana, apparently in an isolated position,* a fine grained, white and yellowish siliceous sandstone, evidently very similar to the Oriskany sandstone, and which cannot be far removed from the same geological horizon; yet, since this Fall Creek rock is particularly characterized by casts of *Pleurorhyncus*, (one of which is, probably, the *cuneatus*,) and postabdomens of a *Calymene*, that it is the western representative of the Schoharie grit. It is not at all improbable, however, that here are blended together the three adjacent siliceous formations of the Helderberg series, —the Oriskany sandstone, and overlying *Cauda-galli* and Schoharie grits; for we find that though the upper layers in which the *Pleurorhyncus* occurs, effervesce with acids, there is beneath a whiter variety, of quite a different appearance, destitute of calcareous matter, in which, as yet, no fossils have been observed.

The eastern shore of Cayuga is a good locality for collecting the fossils of the Oriskany sandstone.

The purer varieties of this rock are used in the manufacture of glass at Vernon. Some iron ore has been procured in the ferruginous layers near Perryville; but all that has hitherto been obtained, was found to be too much contaminated with sand to be of economical value, as is too often the case where hydrated oxide of iron has been infiltrated amongst sandstones.

Caudi-galli Grit.—This and the succeeding formation are of limited extent and of little importance; so that we shall pass them over with only a few remarks. The *Caudi-galli* grit is an argillo-calcareous sandstone, usually of a drab color or brownish hue, containing remarkable plumose impressions, supposed to be *Fucoides*, which have given name to the rock.

Schoharie Grit, is a calcareous sandstone, which, when weathered, becomes porous and colored with ferruginous stains. "It abounds in a species of *Pleurorhyncus* and *Orthoceras*, along with many corals, and is well developed at Schoharie and the Helderberg.

Besides the siliceo-calcareous, *Pleurorhyncus* rock above cited, as occurring in the middle of Indiana, there is a porous siliceous rock full of casts of corals found in the southern part of the same state, particularly near Vernon, in Jennings County, and on Raccoon Creek, where it is quarried for millstones and sold under the name of the Racoon Creek burr; they are however, for the most part, too soft, owing to the presence of calcareous matter. This is, very likely, the western equivalent of the porous part of the Schoharie grit.

* The extensive drift formation of this part of Indiana, renders it difficult to ascertain the area over which these siliceous rocks prevail.

Onondaga Limestone.—Though not exceeding ten or fourteen feet in thickness, this rock is wonderfully persistant. In consequence of the absence of the strata which intervene between it and the Onondaga salt group, through a great part of Western New York, this limestone often rests on the impure limestone, the terminal mass of the salt group, with sometimes a few inches of sandstone, or a band of non-fossiliferous bluish grey limestone intervening.

The Onondaga limestone is, for the most part, a pure calcareous rock, with thin partings of greenish shale between the beds, often made up of the fragments of *Crinoïdea* and corals, particularly species belonging to the genera *Cyathophyllum* and *Favosites*. These are not unfrequently of a pink or reddish color, which gives the rock a pretty variegated appearance, and renders it well suited for a marble. "When thinly laminated by these seams of shale, and the surface covered with encrinital columns and plates, as it usually is," Hall informs us, "the rock bears most striking resemblance to the Wenlock limestone of England, as seen in some specimens from Wenlock which were presented by Mr. Lyell. So complete is the resemblance in some instances, that one might almost be mistaken for the other. Judging, however, from the general character of specimens and the description of Mr. Murchison, there is a greater amount of shale intermixed with the Wenlock limestone, than with our rocks at the same period."

"The similarity or even identity of specimens from Dudley in England with those from the Niagara group, has been remarked; if this inference be correct, of which there seems no doubt, then we find a wide separation here between rocks which in England constitute one group. That such is the fact appears plain; for there are many fossils of the limestones above the salt group, which are identical with the Wenlock formation, while the identity of so many species of the Niagara group leaves no doubt of perfect correspondence. We are therefore to look upon the salt group as a formation, on this continent, coming in at a period du-

ring which, in England, the rocks are supposed to belong to a continuous group, or to be parts of one formation." (HALL's report, pp. 152, 153.)

This seems to be also the case in the Western States of North America; for, on comparing the eastern and western formations, it is difficult to say where the geological horizon lies in the West, that separates the beds representing the Niagara and Onondaga formations. Speaking of the former of these in a previous part of this Review, we expressed an opinion that the coralline beds of the vicinity of the Falls of the Ohio might be the equivalent of the Niagara group, but that, until more of the corals of this New York formation were described and figured, the absolute identity could not be established. We should have said, *part* of the coralline beds, instead of coralline beds; for we shall see, on comparing the corals of the Onondaga limestone with western fossils, that many of them are the same species which occur in these same coralline beds. The fact is, these strata probably admit, as Dr. CLAPP has suggested, of a twofold division into upper and lower beds; and a minute comparison of eastern and western specimens, will most likely prove the lower of these to be the equivalent of the Niagara group, whilst the upper represents the Onondaga limestone; the intervening salt group and Manlius water limestone having no western representative. The coralline beds of the magnesian limestones of the northwest, most probably belong to the lower or Niagara division.

The range of the Onondaga limestone is coëxtensive with the limits of the state, and is represented, together with the succeeding formation, on the chart by a light blue band, whose general course is nearly east and west to Schoharie, thence, with a southerly curve coincident with the Helderberg range, to the Mamakating Valley.

Well defined joints in two directions, are particularly characteristic of this formation, which admits of its being got out in very regular blocks. A fine example of this is seen at Split-rock quarry, southwest of Syracuse.

The large, smooth *Entrochites*, fig. 3, p. 59, provisionally called *Encrinites lævis*, is an exceedingly abundant fossil of the Onondaga limestone. The same encrinite "exists in prodigious numbers," according to VANUXEM, "ten miles north of Nashville, Tennessee. The following corals are also very common.

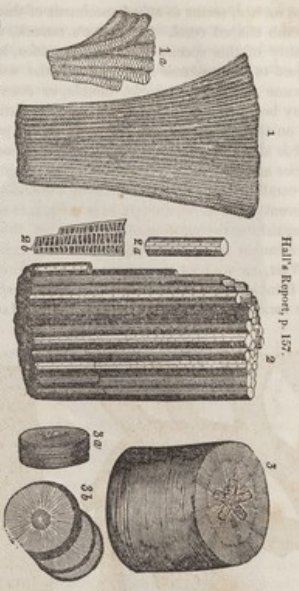


Fig. 1 and 1a. *Favosites alveolaris*. 2. *F. Gothlandica*. 2a. A single tube magnified twice, and presenting a double row of pores upon the side. 2b. A fragment from a honey-comb specimen, showing the transverse lamellæ. 3, 3a and 3b. Fragments of crinoidal columns, showing the pentapetalous canal and crenulated edges of the plates.

Perhaps no protozoic fossil has a wider range than Fig. 2 of this illustration, *Favosites Gothlandica*. Not only does it occur in the limestones of Gothland, the Eifel and Groningen, as well as the magnesian limestones of Gerolstein in Europe, but also in the Wenlock limestones of England. In this country it is by no means confined to the State of New York, but is found in great perfection in the coralline beds in the vicinity of the Falls of the Ohio, in Kentucky, Tennessee and Indiana, and also in the magnesian limestone of the lead regions of Iowa and Wisconsin. Indeed every locality in the West where the middle protozoic strata

reach the surface, seems to afford specimens of this columnar and honey-comb shaped coral. LONSDALE's remark, with regard to the identity of this species and the *Basaltica*, holds good also with regard to the structure it exhibits in the western country. On the same specimen, a single, double, or even triple row of pores may be observed; so that no specific distinction can be founded on the number of rows of pores on the partition walls.

Fig. 1 is also a western fossil; at least, Dr. TROOST enumerates this species amongst corals found in Perry County, Tennessee, and the coralline beds near the Falls of the Ohio furnish a species apparently the same, though, in consequence of the difficulty of distinguishing the position of the pores in the specimens on hand, we cannot speak positively. The last mentioned locality in the West, as well as the magnesian limestones of the northwest of Illinois, near the lead region, afford fine specimens of the tuberose varieties of Fig. 1. (No. 62, p. 159, HALL's report.)

Hall's Report, p. 159.

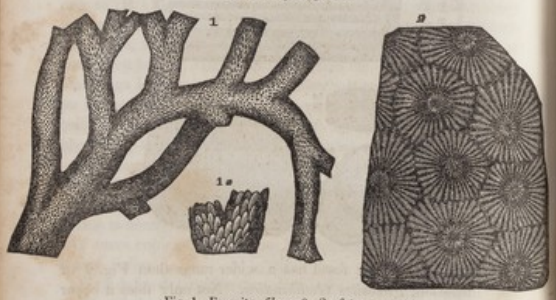


Fig. 1. *Favosites fibrosa?* 2. *Astrea ragosa.*

The limestone of Iowa City, (known as the Iowa City marble,) in the southwest part of the Du Buque district of Iowa, is almost made up of coral, the transverse section of which closely resembles Fig. 2 of the above wood cut, except that the stars are only about three twelfths of an inch across. The Iowa fossil is however not lamelliferous, but presents the appearance of long, irregular hexagonal columns, grouped close together after the manner of basaltic columns. A magnificent coral of snowy whiteness, of similar structure, with the prisms more than a foot long, and in masses weighing nearly a ton, was discovered many years ago at Charleston Landing, about eight miles above the Falls of the Ohio, in the coralline beds already referred to.

Fig. 1. Cyathophyllum ——? 2. Cyathophyllum dianthus. 3. Syringopora ——?

Hall's Report, p. 160.

Until the internal structure of Fig. 1 is described, it would be premature to decide upon its identity with fossils of other localities; but in its general form and external appearance it resembles a species found in abundance at Utica, a few miles above the Falls of the Ohio, and elsewhere in that vicinity. The same locality also furnishes specimens that are doubtless the same as Fig. 2.

On the Mississippi, a little below the mouth of Rock River, in limestone, probably an extension of the Iowa City rock, a coral abounds resembling Fig. 3, but the cylinders of which the group is composed are of larger size. We have been disposed to consider it *Cyathophyllum cæspitosum*, inasmuch as it shows no appearance of a syphon nor transverse connecting tubes.

Along with these are found *Cyathophyllum flexuosum*, and *C. ceratites;* hence Eaton's name for this limestone, "ceratial rock."

Corals are far more numerous than shells in the Onondaga limestone; in Vanuxem's report, however, the following *Testacea* are figured, which we are informed are generally diffused in, and appear to be confined to this rock in the third district. They do not appear, however, to have a wide range beyond this region of the state.

Vanuxem's Report, p. 137.

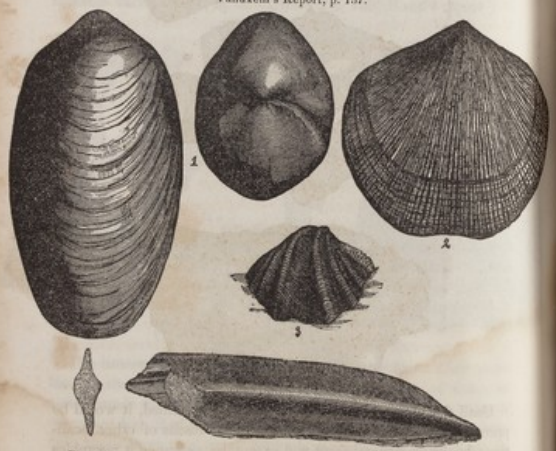


Fig. 1. *Pentamerus elongata.* 2. *Hipparionyx (Atrypa?) consimilaris.* 3. *Delthyris undulatus.*

In the shell strata on the Falls of the Ohio, there are vast numbers of *Delthyris,* which, in their general form, resemble Fig. 3 of this wood cut; but they are much smaller than this figure, and its ribs are finer and more numerous, (from sixteen to eighteen.) Dr. Clapp has called it *Delthyris gregaria.*

This is the lowest position in the State of New York, in which any remains have been found of animals higher in the scale of organized beings than *Crustacea*, with the exception of an imperfectly preserved fish-bone discovered by Hall in the Oriskany sandstone. That specimen, together with the defensive fin bone, Fig. 4, found in this part of the New York system, furnishes evidence of the existence of animals belonging to the class *Vertebrata*, during the deposition of the middle part of the protozoic strata. Besides these, Vanuxem mentions a gigantic species of *Cyathophyllum*, (*C. gigantea,*) as peculiar to this rock, some over eight inches long. On the Falls of the Ohio, *Cyathophylla* occur nearly as long as a man's arm, (*C. gigas* of Clapp.) Perhaps the western and eastern species may be found to be identical.

Conrad has also described and named the following fossils from the Onondaga limestone: *Asaphus aspectans, Delthyris raricostata, Strophomena gibbosa, S. perplana, Atrypa nasuta, A. unisulcata, A. acutiplicata, Avicula pecteniformis, Cypricardites inflata, Bellerophon curvilineatus, Pleurotomaria Poulsoni, P. unisulcata.*

The foregoing affords strong presumptive evidence that the upper coralline beds of the Falls of the Ohio are equivalent to the Onondaga limestone of New York. Since many more corals than have been described or enumerated occur in these formations, we shall be better able to judge of their parallelism after the publication of the volume on the palæontology of the State of New York. Dr. Troost's description of the fossil corals found in the limestone of Perry County, Tennessee, leaves little room to doubt that there, and at the locality of the *Encrinites lævis*, ten miles from Nashville, mentioned by Vanuxem, will be found their south western representative. Dr. Troost enumerates, amongst other fossils of that part of Tennessee, *Calamopora (favosites) favosa, basaltica, alveolaris* and *spongites;* besides several species of *Cyathophylla.*

The upper calcareous bed near the falls of Fall Creek, (Pendleton marble,) agrees in lithological character, external appear-

ance, and geological position, with the Onondaga limestone; but we have, as yet, no evidence derived from organic remains.

Thus it would appear that the Onondaga limestone, though of no great thickness, has still a vast range both west and south, hundreds of miles beyond the limits of the State of New York.

At many localities, particularly in the vicinity of Cherry Valley, the rock in question receives a good polish and forms a handsome marble.

HALL suggests, what is highly probable, that the origin of this formation has been a coral reef; where it is thickest, he thinks the larger and more hardy species existed; where thinnest, the tender corals and *Crinoidea* flourished in sheltered situations, most of which were, by the action of a troubled sea, overturned, broken down and scattered over the bed of the primeval ocean.

The best localities in the state for studying this formation and its organic remains, are, near Williamsville, on the farm of Mr. Youngs, in the town of Amherst, Erie County; in Clarence, in the same county; at the quarries of Le Roy, Genesee County; in Caledonia, west side of the Genesee, and at Vienna; on the road from Fort Plain to Cherry Valley, Otsego County; near Syracuse, Onondaga County; and at the falls of Perryville and Cazenovia. On the Helderberg Mountains, in Sharon, Bern and Bethlehem, are some of the best localities in the first district for collecting specimens of its fossil corals.

Speaking of its mineral contents, HALL says: "Crystallized carbonate of lime, quartz in crystals lining cavities, chalcedony and hornstone, with iron pyrites, are the only minerals noticed in this rock." Its thickness, the same author informs us, is very variable, being from one to twenty, or even forty feet; but VANUXEM says, it very rarely exceeds ten or fourteen feet.

Corniferous Limestone of EATON, (embracing the Seneca limestone.)—This name was given to the member of the New York system now to come under review, by EATON, in consequence of the number of flinty and hornstone nodules which it contains. These are arranged usually in layers something like flints in chalk, and accompany the rock, according to VANUXEM, throughout its entire range. It was not separated by EATON from the Onondaga limestone, both being included under this head; now they are separated into two formations, because each is found to contain a peculiar assemblage of fossils, besides differing in lithological

aspect; for the corniferous limestone is more compact, of a finer grain, and contains many more flinty layers and nodules than the last described formation. Though mostly of light grey or bluish tints, the corniferous rock assumes, at some localities, especially at Black Rock, a very dark color. It is more persistent in its lithological character than the Onondaga limestone, and of greater thickness, varying from twenty to seventy feet.

Along with the last formation, it forms the upper calcareous terrace of the Helderberg range, and with the Onondaga salt group forms the second limestone terrace south of Lake Ontario in HALL's district.

Its range and outcrop are represented on the chart by the same blue band that marks the limits of the last formation which it immediately overlies, and with which it is coëxtensive, appearing, however, always as the thicker and more prominent member. These together with the previously described members of this division, have a southerly dip and pass under the Marcellus shale.

The corniferous limestone imparts to the scenery of a country where it prevails, a peculiar and constant feature; for "all the small streams as they pass over it, form rapids or cascades of more or less extent." It is the barrier at the outlet of Lake Erie, and the rapids at Black Rock are produced by the descent of the waters of the Niagara River over its beds.

Like the preceding, it often lies regularly jointed in the quarries. At Seneca there are dislocations of such a nature that seem to indicate an undermining; this has been attributed to the removal of the soft gypsum rock beneath.

Instead of the corals and *Crinoïdea* of the last formation, we find in the corniferous hardly any thing but shells. HALL is of opinion that about the time of the deposition of this rock, the bed of the ocean sunk beyond the influence of the light and the particular temperature favorable for the growth of *Polypariæ;* and by oscillations of the surface, the previously existing tribes of that order were overwhelmed and covered up by a calcareous mud.

The most fossiliferous part of this rock is the upper portion, when free from hornstone and chert. "Amongst these are two trilobites, the *Odontocephalus selenurus* of Green, Fig. 1, Pl. 33, (VANUXEM's report,) and a *Calymene.* So abundant is the former of these at Schoharie and other places, that it alone is the

fossil entirely relied on, and the rock is known as the 'Selenurus rock.' The other trilobite is scarcely less characteristic. In many places in the third district, and in Seneca County in the fourth district, the *Strophomena lineata* of CONRAD is the typical fossil, but it rarely occurs at any point west of the last named locality."*

Some of the most abundant fossils of Western New York, figured in HALL's report, are given below.

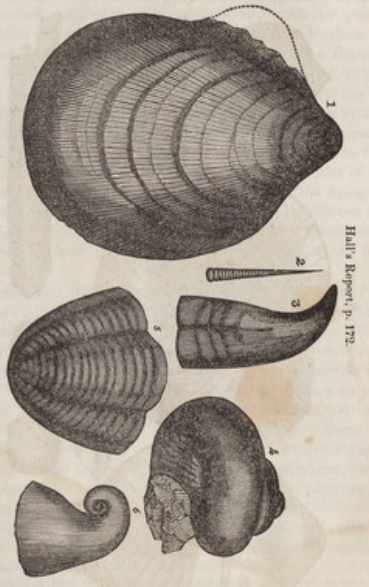
Hall's Report, p. 171.

Fig. 1. *Atrypa setula*, H. 2. *Paracyclas elliptica*, (like *Cyclas*.) 3. *Strophomena acutiradiata*, H. 4. *Strophomena crenistria*, H. 5. *Dalmanites duodenaria*, H. 6. *Pleurorhyncus trigonalis*, H.

* Hall's report, p. 170.

Of these the *Pleurorhyncus*, fig. 5, has probably the widest range; at least there is a *Pleurorhyncus* found in the shell strata of the Falls of the Ohio, which bears a strong resemblance to this figure. The principal difference is, that the full grown western species seems to have a greater number of ribs than the eastern, fig. 25. There are other shells in the same rock of a type analogous to figs. 2 and 4, but the specific identity cannot at present be established.

In the report of the fourth district, the following characteristic fossils occur in the rock at Williamsville, Erie County.



Hall's Report, p. 172.

Fig. 1. *Pterinea (?) cordiformis*, H. 2. *Pentamerites scalaris*, SCHAFF. S. R. 3. *Orthonychia*, a new genus, from its resemblance to a claw or talon. 4. *Exomphalus (?) rotundus*. 5. *Calymene crassimarginata*. 6. *Serpula erecta*.

Figs. 4 and 5 are identical with specimens in our possession from the shell strata of the Falls. Fig. 2 is supposed to be of

the same species as one which is abundant both in the Caradoc formation of England, and the Hudson River group of New York. The Ludlow formation of England, affords a species which MURCHISON informs us, cannot be distinguished from that of the Caradoc. The blue limestone of Cincinnati contains a *tentaculites*, but the specimens on hand are not sufficiently distinct to enable one to decide on specific identity. Dr. CLAPP has found a *tentaculites* in the water limestone, but he supposes it to be a new species.

The figures given by VANUXEM as most abundant in the corniferous limestone in his district, are the following:

Fig. 1. *Odontocephalus selenurus*, CONRAD. 2. *Cyrtoceras undulatus*, VANUXEM. 3. *Strophomena undulata*. 4. *Orthis lenticularis*. 5. *Atrypa prisca*. 6 and 7. *Ichthyodorulite*. 8. *Strophomena lineata*, CONRAD.

Fig 5 is the only one of these which we know has been found West; it occurs in great abundance in the shell strata of the Falls of the Ohio, and, at some localities, is common also in the water limestone above; in fact it is by far the most conspicuous fossil in both these rocks. Speaking of the organic remains of the corniferous limestone in the vicinity of Williamsville and several points between that place and Buffalo, HALL remarks: "It is particularly interesting from containing numerous fossils of the genera *Strophomena*, *Delthyris* and *Pleurorhyncus*;" if he had added *Atrypa*, this observation would have been equally applicable to the shell strata on the Falls of the Ohio.* All this goes to show, almost conclusively, that these shell beds, the western water limestone, and the corniferous rock, were deposited at the same period of time; the more especially since they are overlaid, at both localities, by a black bituminous shale so different from the underlying members of the middle division of the New York system.

There are numerous localities where the corniferous limestone can be studied: we may mention particularly the quarries in Seneca County, the bed of Flint Creek at Vienna, the outlet of Canandaigua Lake, and the bed of Mud Creek. At the village of West Mendon, near the village of Caledonia, and between this and Le Roy, the strata are well exhibited, but few fossils occur. At Clarence Hollow, this rock contains a few fossils not elsewhere seen.

In consequence of the fissured, or rather disjointed state of the beds constituting this rock formation, water often percolates to a considerable depth before it reaches an impervious stratum; there accumulating, it at length flows out some distance down the northern outcrop in copious and refreshing springs, imparting verdure and beauty to the scene beneath, which forms a striking contrast to the arid and barren ledges above. Streams, too, often disappear in the vacant spaces of the creviced rock. From the same cause, the vegetation over the limestone is more vigorous immediately above the cracks of the rock than elsewhere, owing to the moisture beneath rising by evaporation and capillary attraction to the rootlets of the overgrowing plants.

"Few simple minerals present themselves in this formation; hornstone sometimes passes into chalcedony, and crystallized

* In a crystalline layer of limestone interposed between the shell stratum and the water limestone, we found a *Conularia* which seems to be the same species as the *quadrisulcatus* of the Wenlock limestone.

quartz is rarely found. In its cavities at Black Rock, dog-tooth spar sometimes occurs; at the same place, fluid bitumen or petroleum is found, usually filling the cells of the *Favosites.*"

The upper coralline beds of the Falls of the Ohio, include a "black stratum," containing many corals; this is, in all probability, the western representative of these dark colored beds at Black Rock.

With the Seneca limestone, the uppermost bed of the cornif-erous formation, terminates upwards the Helderberg series of the geographical division; so also is it the last member, in the ascending scale, of the the transition series between the middle and upper division, according to the chronological scale. Here also is the close of all the important *limestones* of the New York system, for the calcareous deposites above are but thin and local in their extent. D. D. O.

(To be continued.)

ART. VI.—*Musci Alleghanienses, sive Spicilegia Muscorum atque Hepaticarum quos in itinere a Marylandia usque ad Georgiam per tractus montium A. D.* MDCCCXLIII, *decerpserunt* ASA GRAY *et* W. S. SULLIVANT: (*interjectis nonnullis aliunde collectis:*) *Concinnavit et exposuit* W. S. SULLIVANT. Fascis I, II. Columbus in Ohione, MDCCCXLV.

THIS beautiful *publication*, as it may be justly called, although not intended for sale, consists of about fifty presentation copies, or sets of the specimens themselves, with printed labels, title-pages, and index, prepared at no small labor and expense, and in an unusually elegant style, for distribution among the principal muscologists abroad, and those most interested in these pursuits at home. A *work* it may with literal propriety be termed, since, beside the labor of collection, of which the writer may speak from some actual knowledge, the manual preparation, arrangement, and critical study of the materials, with the subsequent journeys that have been required for the sake of rendering certain portions more complete, have fully occupied all the zealous author's available time for the two years which have elapsed since the plants were gathered.

The collection fills two large quarto volumes, and comprises 215 species or marked varieties of true Mosses, and 77 of Hepaticæ,—in all 292. We should render a service to this beautiful and too much neglected department of American botany by copying the whole list: we will at least find room for the new species which are here proposed and characterized; since the work must, from the necessity of the case, have but a limited circulation, and may fail to reach many who are interested in the subject. In these instances we copy the original tickets entire, with the numbers under which they appear, as follows.

7. HYPNUM PALUDOSUM (*n. sp.*).

Dioicum; caule procumbente flexuoso radiculoso-tomentoso diviso, divisionibus elongatis ascendentibus simpliciter pinnatis; ramulis compressiusculis; foliis cordato-lanceolatis acuminatis erecto-patentibus plicatis margine reflexis costa ad apicem evanida carinatis.

Medium inter *H. Blandovii* et *H. plicatum.*

HAB. in editoribus Ohionis septentrionalis paludibus *Cranberry Marshes* dictis.

62. LESKEA DENTICULATA (*n. sp.*).

Caule repente fastigiato-ramoso; ramis erectis confertis compressiusculis; foliis dense imbricatis subsecundis ovatis subito longeque acuminatis ecostatis concavis denticulatis rhomboideo-areolatis; capsula ovali-oblonga, operculo oblique rostellato.—Pterogonium filiforme, var.? HOOK. et WILS.! *in Drumm. Musc. Amer. n.* 86.

HAB. ad arbores in jugo excelso *Balsam Mountain* dicto, Carolinæ Superioris.

89. LEPTODON OHIOENSE (*n. sp.*).

Caule repente; ramis julaceis vage ramosis; foliis dense imbricatis madore horizontaliter patentibus costa valida ultra medium abrupte desinente instructis: cætera, excepta statura minore, *L. trichomitrii.*

HAB. circa urbem *Columbus* in Ohione; rarum.

170. SYRRHOPODON? EXCELSUS (*n. sp.*).

Densissme cæspitosum, fastigiato-ramosum; ramis corpusculorum (fl. abortiv.) congestis acervulis terminatis; foliis lineari-

subulatis convoluto-canaliculatis ecostatis subsecundis nitidis albido-viridibus, e compluribus stratis tubulosarum cellularum formatis. . . . . .

Hab. in sylvaticis depressis inter montes Alleghanienses, ad arborum truncos putredine decompositos; necnon in Ohione haud infrequens, at semper sterile. Beat. T. G. Lea, scrutator muscorum in vicinia urbis *Cincinnati* indefessus primum detexit.

176. Trichostomum vaginans (*n. sp.*).

Dioicum, innovando-ramosum; ramis erecto-flexuosis gracilibus; foliis erecto-adpressis ovato-lanceolatis, perichæthialibus longe vaginantibus apice subito attenuatis patentibus costa valida excurrente instructis, areolatione mediocri; capsula ovali-oblonga; operculo longe obtusque conico; dentibus peristomii breviusculi binatim inter se anastomosantibus; membrana basilari haud emergente; annulo speciosissimo; flore masculo terminali; antheridiis elongatis paraphysatis.—*T. pusillum*, Hook. et Wils. *in Drumm. Musc. Amer. No.* 60 *et* 61.

Hab. in terra argillacea ad loca *Swananoa Gap* et *Hickory-Nut Gap* dicta, in Carolina Superiore.

182. Fissidens exiguus (*n. sp.*).

Annuus, dioicus; caule simplici; foliis 5–9-jugis oblongo-lanceolatis immarginatis integerrimis, costa ab apicem dissoluta; capsula terminali subobliqua vel erecta; operculo conico-rostellato; calyptra cuculliformi; flore masculo terminali.

Hab. in sylvis, ad rivulorum exsiccatorum lapides, prope *Columbus* Ohionis copiosissimus.

183. Fissidens minutulus (*n. sp.*).

Annuus, dioicus; floribus terminalibus; caule simplici; foliis 5–12-jugis, superioribus lineari-lanceolatis margine limbo subrepando haud incrassato plus minus circumdatis; costa sub apice evanida; capsula erecta ovali; operculo elongati-conico; calyptra cuculliformi.

Hab. iisdem in locis cum præcedente, rarius.

201. Sphagnum strictum (*n. sp.*).

Caule erecto subsimplici rigidiusculo; ramulis 4–5-natim fasciculatis, duobus æqualibus strictis obtusis horizontaliter patentibus, reliquiis deflexis, fasciculis confertis; foliis oblongo-acuminatis recurvis apice eroso 6–9-dentatis.

Hab. in montibus Carolinæ Superioris, ad scopulum mirabilem *Devil's Court House* dictum.

204. Sphagnum tabulare (*n. sp.*).

Pusillum; caule erecto; ramulis substrictis æqualibus 3–4-natim fasciculatis; fasciculis approximatis; foliis ovato-lanceolatis reflexiusculis apice truncato 3–5-denticulatis.

Hab. in locis irriguis ad cacumen scopuli *Table Mountain* dicti, Carolinæ Septentrionalis, altitudine circ. 2500 ped.

205. Sphagnum molle (*n. sp.*).

Tenellum, dense cæpitosum; caule erecto subindiviso; ramulis erecto-patentibus confertissimis indistincte fasciculatis; foliis oblongo-ovatis apice eroso-3–5-denticulatis.

Hab. in eodem loco ac No. 201.

221. Plagiochila macrostoma (*n. sp.*).

Amphigastriis parvis subulato-bifidis, aut nullis; perianthio obconico ore compresso: cætera *P. interruptæ*, cujus forsan sit insignis varietas.

Hab. in ligno putrido humique circa Columbus Ohionis, rarissima.

222. Plagiochila undata (*n. sp.*).

Caule repente; ramis adscendentibus simpliciusculis rigidulis; foliis arcte imbricatis horizontaliter divergentibus subhomomallis semicordatis apice obtusis vel emarginatis ibidemque parce dentatis, margine dorsali reflexa integerrima, ventrali basique in cristam reflexa repando-undulata; amphigastriis linearibus bipartitis dentatis.

Hab. in rupibus humo tectis ad flumen *Savannah*, prope Augustam Georgiæ.

223. Plagiochila Ludoviciana (*n. sp.*).

Caule repente; ramis adscendentibus parce ramosis flexuosis; foliis imbricatis patenti-divergentibus dimidiato-ovatis apice sub-

emarginato-bi-tridentatis basi subtus in cristam conniventibus margine dorsali reflexis integerrimis, reliquo ambitu spinuloso-dentatis; amphigastriis profunde bi-trifidis, laciniis linearibus ciliato-dentatis; flore fœmineo terminali.—*Jungermannia spinulosa*, Hook. et Wils! *in Drumm. Musc. Amer.* No. 160.

Hab. ad cortice arborum in Ludovicia et Alabama.

270. Frullania Caroliniana (*n. sp.*).

Caule repente irregulariter bi-tripinnato; foliis dense imbricatis ovali-rotundis, auriculis parvis elongatis a caule distantibus, plica styliformi interjecta; amphigastriis ovato-rotundis caule duplo latioribus bifidis, laciniis subrepandis; perianthio compresso-pyriformi ventre obtuso carinato.

Hab. in cortice arborum prope Wilmington, Carolinæ Septentrionalis.

286. Marchantia disjuncta (*n. sp.*).

Dioica; receptaculo fœmineo excentrico subsepteno-radiato, radiis apice cuneato-dilatatis emarginato-crenulatis subtus dense barbatis; involucro mono-tricarpo subintegerrimo; receptaculo masculo semicirculari 7-radiato, radiis usque ad brevem pedunculum discretis; fronde dichotoma et articulatim innovante: cætera *Marchantiæ polymorphæ*.

Hab. ad ripas præruptas fluminis *Alabama* prope *Clairborne*.

And finally we have a newly characterized genus, which is however equivalent to a badly described one established by the late Mr. Schweinitz, under a name already preöccupied.

NOTOTHYLAS, *Sulliv.*

Carpobolus, Schweinitz *in Jour. Acad. Nat. Sci. Philad.*, 2 *p.* 336 (1822). *Targioniæ spec.* Schweinitz, *Hepat. Am. Sept. p.* 23. *N. ab E. Europ. Leberm. 4, p.* 317.

Monoica. Fructus dorsales sparsi. *Involucrum* sessile, frondi continuum initio clausum, tandem superne fatiscens. *Perianthium nullum. Calyptra* . . . . . *Capsula* involucro inclusa, oblongo-sphæroidea, compressa vel ovato-cylindrica, brevissime pedicellata, pedicello in bulbo incrassato affixo, sutura longitudinali ab apice ad medium subbivalvatim vel (sutura deficiente) frustulatim dehiscens. *Columella* linearis. *Sporæ* quaternatim aggregatæ, subglobosæ, læviusculæ. *Antheridia* frondi immersa, elliptico-globosa. Frons orbicularis, laciniata, tenera, papuloso-reticulata, margine undulato-crispa, subtus radiculosa, massis granulatis hic illic immersis.

Plantæ annuæ, terrestres, limicolæ, in umbrosis Ohionis Carolinæque Septentrionalis observatæ.

289. Nototthylas valvata (*n. sp.*).

Fronde diametro 3–8-lineari; involucro horizontali deflexo corniformi; capsula elongato-cylindrica curvula sutura colorata semper instructa; sporis luteolis subfuscisve.

Hab. in humidiusculis circa Columbus Ohionis sat frequens.—Maturescit Æstate—Autumno.

290. Nototthylas melanospora (*n. sp.*).

Capsula sutura omnino nulla; columella appendiculata; sporis atro-fuscis dimidio majoribus quam in præcedente: cæteris conveniunt.

Hab. iisdem in locis cum priore, rarissima.

Spec. adject. Nototthylas orbicularis, *Sulliv. l. c.*

Involucro suberecto; capsula oblongo-ellipsoidea compressa cum vel absque sutura concolori: cætera ut in *N. valvata*.—Carpobolus orbicularis, *Schweinitz, l. c.* (Diagnosis secundum specimina *Schweinitziana* in *herb. Acad. Nat. Sci. Philad.*)

The collection also embraces many re-discoveries of no little interest, as well as brief critical remarks and rectifications of synonomy which will be valued by the muscologist. We note some of the points that strike us as we turn over the pages.

No. 2 is *Hypnum umbratum* of Ehrhart, collected on the Grandfather Mountain, and also since communicated by Mr. Oakes from the White Mountains of New Hampshire. It is here for the first time recorded as an American species. No. 48, *H. demissum* of Wilson, also from the rich sides of the rugged Grandfather, is equally new to America, and in fact is quite a recent discovery in Europe. No. 5, *H. gracile*, was intended as one of the new species of this work, but its publication has been anticipated by Bruch and Schimper. No. 6, *H. scitum*, is doubtfully referred to that species of Beauvois. If the reference prove

to be wrong, it must bear the name of *H. intertextum*, Muhl. Cat., which name Mr. SULLIVANT has authenticated by the inspection of the remains of the Muhlenbergian herbarium. No. 9, *H. alopecurum*, LINN.; to this Mr. SULLIVANT refers the *H. neckeroides* of HOOKER. Under No. 11, *H. strigosum*, HOFFM., two nominal species are reduced, namely, *H. attenuatum*, BRIDEL, described from Torreyan specimens, and *Leskea fasciculosa*, HEDW., furnished by MUHLENBERG. The synonomy of No. 14, *H. Haldanianum*, GREV., is for the first time set in order. It includes not only *H. curvirostrum* of BRIDEL, but also *H. pulchrum* of DRUMMOND, and *H. Cooleyanum* of SPRENGEL. No. 15, *H. suberectifolium*, BRIDEL, has not until now been heard of since it was detected by BOSC. No. 17, *H. recurvans*, SCHWÆGR., is a re-discovery of one of MICHAUX's mosses; and No. 19, *H. reptile*, is another species of MICHAUX. No. 20, *H. pratense*, KOCH., is very little known, except by its occurrence by mistake in some of the copies of DRUMMOND's Northern Mosses, under his *H. amœnum*. To No. 30, *H. varium*, BEAUV., a fine set of synonyms, too numerous to mention, are reduced; and it is hinted that perhaps the whole should be referred to *H. serpens;* which would be in accordance with the views of that acute botanist, Mr. ARNOTT. No. 31, *H. confervoides*, BRID., no doubt the same as the Pennsylvanian plant mentioned by SCHWÆGRICHEN, is perhaps distinct from the original European species. To No. 46, *H. riparioides*, HEDW., the *H. prolixum* of MICHAUX is referred. No. 50, *H. deplanatum*, SCHIMPER, Mss., seems to be a common moss, though as yet it is undescribed. To No. 57, *H. confertum*, DICKS., are reduced *H. serrulatum*, from MUHLENBERG, (which was previously suspected,) and *H. cupressetorum*, furnished to BRIDEL by TORREY. The specimens of No. 58, the pretty *Hookeria lucens*, were the first detected in the United States, but we believe Mr. SULLIVANT has quite recently found it in Ohio also.

No. 60 is published as a marked variety of *Leskea polyantha*, HEDW.; but it is very likely a new species. No. 64, *L. compressa*, is a re-discovery of a moss which HEDWIG received from MUHLENBERG. The ticket of No. 65, *L. adnata*, MICHAUX, is crowded with interesting synonomy, the result of acute research. To No. 68, *L. obscura*, HEDW., the *L. gracilescens* is referred, from actual examination of the original specimens of MUHLENBERG. No. 69, *L. nervosa*, is the *Pterogonium nervosum* of SCHWÆGRICHEN, &c., here removed to *Leskea*. No. 70, *L. flaccida*, is a re-discovery of a well marked species sent to BRIDEL by TORREY. No. 71, *L. fragilis*, HOOK. and WILS., which has a range from Montreal to New Orleans, is still distributed without fruit, which is a great desideratum. To No. 72, *L. intricatula*, HEDW., a goodly number of nominal species are referred.

No. 79, *Neckera breviseta* of HOOKER and WILSON, is deemed by Mr. SULLIVANT to be much more nearly allied to *N. Cladorrhizans*, than to the species with which these authors compare it.

To No. 80, *Clasmatodon pusillus*, HOOK. and WILS., Mr. SULLIVANT refers with some doubt the *Leskea parvula* of HAMPE, and also *Pterigynandrum marginatum* of MICHAUX; if incorrectly, then this species of MICHAUX still remains to be identified.

No. 81, *Cryphæa filiformis*, BRID., which is very common in the Southern States, is said to have spores four times larger than those of *Daltonia heteromalla*.

No. 82, *Anacamptodon splachnoides*, BRID. Mr. SULLIVANT has discovered that the genus *Campylodontium* of SCHWÆGRICHEN was founded on specimens of this moss, which had lost their opercula and inner peristome! (Cf. *Schwægr. Suppl. t. 52, cum t.* 211.)

No. 84, *Pterigynandrum intricatum*, HEDW., has as a synonym the *Pylaisæa heteromalla*, BR. and SCHIMP., which these authors detected in DRUMMOND's Northern Mosses, (given by mistake as *Hypnum polyanthum*,) but did not recognize. The *P. julacerem*, HEDW., here becomes No. 87, *Leucodon julaceus*.

No. 88, *Leptodon trichomitrion*, MOHR., is distinguished from the new species that follows it by "statura majore, ramis pinnatim ramosis, foliis humectatis erecto-patentibus ecostatis." SULLIV. *mss.*

No. 92, *Mnium affine*, var. *minor*, is the *M. Drummondii*, BR. and SCHIMP.

No. 115, *Pogonatum capillare*, BRID., the *Polytrichum capillare* of MICHAUX, is kept separate from *P. urnigerum*, and additional characters are given for distinguishing it. The specimens are from the White Mountains of New Hampshire.

No. 135, *Ptychomitrium pusillum*, BR. and SCHIMP., has some important synonyms for the first time referred to it, viz. *Grimmia incurva*, MUHL., *G. Muhlenbergi*, BRID., *G. Hookeri*, DRUMMOND, and *Notarisia Virginica*, HAMPE.

No. 139, *Grimmia conferta*, Funck, now first recorded as an American moss, was collected on the White Mountains of New Hampshire by the indefatigable Mr. Oakes.

No. 159, *Dicranum fulvum*, Hook., is a rare species; and 167, *D. cerviculatum*, Hedw., (Hoboken, New Jersey, Torrey,) here first appears as an American moss.

Besides the two new species of *Fissidens*, the No. 180, *F. hyalinus*, Wils. and Hook., and No. 181, *F. obtusifolius*, Wils., and also the rare *F. grandifolius* from Niagara, No. 186, are here for the first time distributed. But perhaps the most interesting moss in the collection, is the *Phyllogonium Norwegicum*, Brid., No. 108, which is found at Lancaster, Ohio, with female flowers, but, although closely watched for some years, it has not been known to produce the fruit.

The *Fontinalis disticha*, Hook. and Wils., is given under three forms, (No. 190–192,) which it is thought will sustain the species.

No. 196, *Physcomitrium sphæricum*, Br. and Schimp., var. *insignis*, capsula immersa foliis serratis, is very likely a new species.

No. 198, the curious *Schistidium serratum*, Hook. and Wils., is here provided with the following character: Annum, monoicum; flore masculo fœmino approximato nudo vel 1–2–3–phyllo in foliorum axillis comalium sessili; antheridiis 4–12; paraphysibus apice globoso-distentis.—Habitu, foliis, calyptra ut et florum situ structuraque *Phasco patenti* omnino simile, diversum tamen capsula operculata et pachyderma; hic ad *Physcomitrium*, illic ad *Pottiam* accedit.—The characters of the masculine flowers, as here indicated for this plant and the closely allied *Phascum patens*, are important, since their structure and position have been entirely misapprehended by Hedwig, Bruch and Schimper, and all former observers, who say that they are borne on proper branches arising from the base of the main stem, that there are no paraphyses, &c.

No. 207, *Sphagnum macrophyllum*, Brid., is a most remarkable species, as well in habit as in the absence of spiral-threaded cells. No. 208, *S. sedoides*, Brid., is a re-discovery of a plant found long since by La Pylaie in Newfoundland. Dr. Torrey recently brought it from Mount Marcy in Northern New York. These are the only localities known, except the moist top of that singular natural tower, *Table Rock*, South Carolina, which is completely edged with it. Its slender prostrate stems may be procured a foot or so in length.

No. 214, *Andræa Rothii*, is here first published as an American moss; but we believe that Schweinitz had found it in the mountains of Virginia.

Passing to the *Hepaticæ*, No. 220, *Plagiochila porelloides*, Lindenb., is here first made known in fruit, and with amphigastria, which had been overlooked. The proposed new species of the genus we have already given. No. 227, *Jungermannia Taylori*, Hook., collected by Mr. Oakes in New England, is here first enumerated as American. No. 260, *Radula complanata*, var.? sive n. sp.? and No. 261, *R. pallens*, are in the same case. No. 271, *Frullania Hutchinsiæ*, var. foliis subintegerrimis, is a striking variety of a very rare plant, not before found out of Ireland. It was detected in moist rocks at the Mountain Cataract of Pigeon River Falls, along with *Hookeria lucens* and (on the dried summits of the rocks) *Andræa Rothii*. No. 274, *Lejeunia cucullata*, N. ab E., 275, *L. calcarea*, N. ab E., and 276, *L. minutissima*, Dumort., are likewise new to North America. Nos. 289, 290, *Notothylas*; this interesting genus will probably soon be illustrated by Mr. Sullivant.

This work lays the foundation for the study of North American Muscology among us. We now only wait for a *Species Muscorum* of the United States, to facilitate the study of the family for students generally, and this we trust Mr. Sullivant will not be long in giving us.

The view of these beautifully prepared specimens as here presented to us, brings back to recollection their appearance as they grew in their fresh native wilds, and vividly recalls the varied incidents of the arduous but delightful journey during which they were principally collected,—the laborious mountain-ascents, the night bivouacs, the healthful woodland life and primitive fare, and the many amusing adventures, of a tour which extended along the principal length of the Alleghany Mountains, through much of their most picturesque scenery, and through regions which abound with the choicest botanical treasures which the country affords. A cursory indication of the particular routes pursued will not be deemed superfluous, since it is recorded by our author only in the general terms of the title page. The expedition, which had for its principal object, on the part of one of its members, the collection of live plants for the Cambridge Botanic Garden, may be said to have commenced, late in August, 1843, in the mountains

of Maryland and Pennsylvania, where they are traversed by the Cumberland road. From the Potomac at some distance above Cumberland, the great *Back Bone* of the Alleghanies was crossed in Maryland, where it presents a pretty formidable elevation, and several plants were observed which were thought to be confined to a more southern range, such as *Menziesia globularis* and *Galium latifolium*. The open *glades* on the other side presented many features of Kentucky vegetation. Virginia was entered near Mount Carmel Town, and a rude, wild region was traversed to Tygart's Valley River, in Randolph County. The high Cheat Mountain was then crossed nearly where it merges in the Green Brier range, and *Angelica Curtisii*, Buckl., as well as *Aconitum reclinatum*, Gray, were first met with. In the journey through Pocahontas County to Huntersville, fruiting specimens of the little known *Rhamnus parvifolius*, Torr. and Gr. Fl., were collected, a species which proves to be a perfectly distinct one, and has also been found by Mr. Buckley in Alabama. In the route eastward across the mountains from Huntersville to the Warm Springs, the rare *Helianthus laevigatus*, Torr. and Gr., and *Andromeda floribunda*, Pursh., (which is *A. montana* of Buckley,) were abundantly found. A mountain meadow on Nap's Creek, east of Huntersville, also furnished a stout *Gentian* with crowded ochroleucous flowers, and with much the habit of *G. Andrewsii*. It was naturally enough confounded with *G. ochroleuca*, and specimens have been distributed under this name. It is however quite a different species from the real *G. ochroleuca*, though it may be the plant figured under that name in *Sims. Bot. Mag. t.* 1551, as well as the form mentioned by Grisebach (in Hook. fl. Bor. Am.) as remarkable for its cordate-lanceolate leaves. Our *Gentians* will soon be cleared up, we trust. Meanwhile a temporary diagnostic character is given below.* From the Warm Springs the expedition pursued its course, by way of the Hot Springs and the White Sulphur Springs, along the base of Peter's Mountains to the Kanhawa River, which was crossed at Toney's

* Gentiana flavida, (Gray:) caule erecto lævi; foliis e basi cordata arcte semiamplexicauli ovato-lanceolatis sensim acuminatis subtrinerviis margine scabriusculis; floribus terminalibus aggregatis sessilibus; calycis lobis ovatis tubo plusquam dimidio corolla multo brevioribus; lobis corollæ apertæ ochroleucæ (intus haud viridi vel purpureo picta) ovatis plicas denticulsti-erosas integras subduplo excedentibus; capsula intra corollam persistentem fere inclusa; seminibus latissime alatis.—Stet inter *G. ochroleucam* et *G. Andrewsii*.

Ferry below Parisburg, and thence to Tazewell County. In Giles County, soon after crossing the river, live roots of the very rare and distinct *Heuchera hispida*, Pursh., were obtained, which have been preserved in cultivation. Clinch River was crossed above Saltville, and the North Fork of the Holston at Seven-mile Ford; the Middle Fork was ascended to within a few miles of the place where the writer crossed the Iron Mountains on a previous journey, and this range was ascended by a new road a little farther westward. In consequence of this, the remarkable *Carex Fraseriana* was met with, in immense quantities, through some miles of moist wood-land, within the borders of Virginia, whence an adequate supply has been secured for cultivation. Entering Ashe County, North Carolina, the Negro Mountain was first visited; the Grandfather sedulously re-explored; and then Table Mountain was visited by crossing the Blue Ridge into Burke County. Besides the plants before known at this locality, a single patch of the curious *Schweinitzia* was found. Continuing southward to the Catawba, the Blue Ridge was again traversed by Swananoa Gap into Buncombe County, and the route along the French Broad River explored to the Warm Springs, Paint Rock, and to within the borders of Tennessee; where, among the phanerogamous plants obtained for cultivation, the most interesting is the *Buckleya* of Torrey, a Santalaceous shrub, allied to *Pyrularia*. Here the expedition bifurcated, to use a botanical phrase,—one of its members crossing the Cumberland Mountains into Kentucky; the other, returning to Ashville, visited Hickory Nut Gap, then explored the high mountains in Haywood and Henderson Counties, near the sources of the French Broad and Pigeon Rivers, (the Great Balsam Mountain, the Devil's Court House, &c.;) again crossed the Blue Ridge to Cæsar's Head, in South Carolina, ascended the far-famed Table Rock, which is certainly one of the greatest curiosities in the United States; thence continued his course to Augusta, Georgia, and returned northward by the usually travelled route. We must not prolong this article by farther notices of the interesting plants, which the memory of this botanical journey so vividly recalls to mind.

A. Gr.

ART. VII.—*An attempt to refute the Reasoning of* LIEBIG *in favor of the Salt Radical Theory;* by ROBERT HARE, M. D., Prof. of Chem. in Univ. of Pennsylvania. (In a letter to the Editors.)

1. *Gentlemen*—My attention was lately drawn to two lectures delivered about eighteen months ago, by LIEBIG, in support of the salt radical theory. You are well acquainted with the efforts made by me to refute that hypothesis, in an essay published under your auspices.* Your opinions, as well as those of several of the more distinguished of our American chemists whom I have consulted, have been emphatically expressed in favor of the validity of my reasoning. Nevertheless from the lectures above mentioned, and from a text book lately published by GREGORY, the successor of HOPE, it appears that, by these eminent professors, innovations are to be supported which have, on this side the water, been deemed indefensible. Under these circumstances, I again raise my voice against this new doctrine, hoping that although an ocean rolls between those who may be led astray and the author of this communication, his warning may be neither unheard nor unheeded.

2. Pursuant to the new doctrine, every oxacid is to be considered as a hydruret of a compound radical, as those heretofore called hydracids are hydrurets of simple radicals, so that both of these classes are to bear the name of hydracids.

3. Agreeably to the nomenclature proposed by DANIELL, the hydrated sulphuric, nitric and phosphoric acids consist of hydrogen in union severally with oxysulphion, oxynitrion and oxyphosphion, their formulæ being respectively SO^4H, NO^6H, PO^6H.

4. According to a definition given by LIEBIG, at the close of his second lecture, "*acids are compounds of hydrogen with simple or compound radicals, in which the hydrogen may be replaced by its equivalent amount of metal.*"

5. Inferring that in those oxacids which unite with water as a base, the oxygen of the water goes to form a compound radical, the constitution of these acids is considered as quite analogous to that of the compounds formed with hydrogen by halogen bodies,†

* See this Journal, for Jan. 1843.

† Chlorine, bromine, iodine, fluorine and cyanogen, are by BERZELIUS distinguished by the generic name halogen, from Greek words which convey the idea of salt and to produce. Common salt, from which the notion of salt first originated, being a binary compound of chlorine and sodium, all other binary compounds of chlorine, or of any of its congeners which belong to his halogen class, are called salts, and the compounds of these double salts, although there are no bodies in nature more dissimilar in their properties than some of those thus constituted; as for instance the gaseous compounds formed with hydrogen, the volatile liquid and fuming chlorides of tin and arsenic, the butyraceous chlorides of zinc, bismuth and antimony, and such inert chlorides or fluorides as horn silver, horn lead, and fluor spar.

whether simple, like chlorine, bromine, iodine and fluorine, or compound, like cyanogen. Hence the term hydracid, heretofore confined to the haloid compounds of hydrogen, and those formed by this element with sulphur and selenium, is to be extended to all the hydrated oxacids. Moreover respecting oxacids which are incapable of uniting with water as a base, the distinguished lecturer holds the following language. "*I maintain that they are not acids. Do you find any of the characteristic properties of the hydrogen acids, in chromic acid, boracic acid, silicic acid, titanic acid, antimonic acid, or in their combinations with metallic oxides?*"

6. The lecturer also uses the following language. "*The compound which we denominate hydrated sulphuric acid, possesses properties analogous to hydrochloric acid.*" And again: "*There is no proof that our common sulphuric acid contains water; but we can prove that its chemical character, analogous to that of hydrochloric acid, depends, as in that acid, on the presence of hydrogen. We can prove that this hydrogen can be replaced by its equivalent of metal.*"

7. This celebrated author has, in a preceding paragraph, urged "*that the so called anhydrous sulphuric acid, and phosphoric acid, do not possess any of the characteristic properties of acids; these they obtain only by their combination with water.*"

8. As the characteristic properties of "the hydrogen acids" are not only in the instances here cited, but in others, repeatedly insisted on by LIEBIG as a corner stone of the new system, it is unfortunate that they are no where described. It is to be regretted that LIEBIG does not specify any properties characteristic of acidity, which belong both to the hydrated oxacids and the gaseous "*hydracids*" (so called) formed by the union of hydrogen with the halogen bodies of BERZELIUS. Neither the latter nor the former, while undiluted, are endowed with sourness, nor with the

ability to redden litmus; and were they thus endowed, it could not be of any importance to the argument, since according to Liebig, "*We have long since abandoned the position, that mere reaction with test paper should decide whether or not a body should be called an acid or not.*" But if reaction with test paper be thus set aside, the inferior test of sourness cannot but share the same fate.

9. It seems to me that there has been a lamentable deficiency of precision in Liebig's expressions respecting the resemblance between the hydrated oxacids and the haloid* hydracids. I call upon him, or any of the advocates of the salt radical theory, to point out any peculiar attributes of acidity belonging to them in common. The whole source of this idea would seem to be a vague conception, that the vulgar attributes of acidity belonging in common to diluted sulphuric and diluted muriatic acid, are attributable to the hydrogen of the basic water in one case, and that of the hydrogen of the gaseous chloride in the other. But to lay any stress on this resemblance, is irreconcilable with the above quoted allegation of the celebrated author, that the effect upn test paper is no longer to be considered as an evidence of acidity. Yet besides this attribute and that of sourness, what other common properties, distinctive of these diluted acids, can be imagined? The evolution of hydrogen by reaction with metals, cannot avail unless water, equally capable of that reaction, be made an hydracid, and oxygen consequently transferred to the halogen class. But if this transfer be made, the salts heretofore considered as simple amphide salts, become as well entitled to be deemed double haloid salts, as any of the double chlorides.

10. Is it not evident that the whole of this salt radical doctrine, as presented by Liebig, is founded on an unnatural and arbitrary peculiarity attached to oxygen on one side, and to hydrogen on the other, by which each of these elements is treated as a body *sui generis?* Upon what rational ground is oxygen separated from the other electro-negative elements forming the amphigen and halogen bodies of Berzelius?

11. If chlorine be a simple radical, wherefore is not oxygen a simple radical? But if oxygen be a simple radical, agreeably to Liebig's definition above quoted, (3,) water, the oxide of hydrogen, is as much entitled to be considered as an hydracid, as muriatic acid, (the chloride of hydrogen.) The oxide, no less than the chloride, consists of a "*radical in combination with hydrogen in which the hydrogen may be replaced by a metal.*" Hence, as no rational line of demarcation can be drawn about oxygen, so as to separate it from its congener chlorine, it follows either that all the compounds consisting of two chlorides, and hitherto called double chloro-salts by Berzelius, are consistently simple chloro-salts; *or*, that all compounds consisting of two oxides and called simple, should be considered as double oxysalts.

12. The supposed hydracids, consisting of oxacids containing only basic water, being liquid, while the hydracids proper, when equally devoid of water, are aëriform; had the comparison been made between them, neither being associated with water as a solvent, the idea of any similitude could hardly have arisen. Besides unless so associated, they are generally insusceptible of change by reaction with metals without heat, and when subjected to decomposition, there is no analogy in the result. In the case of hydracids proper, the halogen body uniting with any metal presented to it, hydrogen is evolved; but in that of the hydrated oxacids, the alleged compound radical is decomposed with an evolution of some combination of the non-metallic ingredient with oxygen. Thus instead of hydrogen, sulphuric acid yields sulphurous acid, nitric acid yields nitric oxide. It follows that the presence of basic water alone, does not fulfill the conditions of Liebig's definition, since *per se* the hydrogen entering into combination with the alleged compound radical, cannot be replaced by a metal.

13. It may be expedient here to advert to the fact that in the case of magnesium and aluminium, oxygen plays the same part in taking place of chlorine and causing the *chloride* of hydrogen to be evolved, that chlorine performs in the cases of various oxides in which oxygen is replaced by chlorine and the *oxide* of hydrogen is evolved. Again, the reaction of muriatic acid with any bromide or iodide of which the metallic ingredient prefers chlorine to bromine or iodine, is analogous to the reaction of the same hydracid with certain oxides which prefer chlorine to oxygen.

14. It is therefore clear that in the reaction of haloid compounds with each other and with oxides, there is a perfect analogy, and that the erection of a special genus for oxygen is unjustifiable.

* A haloid compound is one which contains a halogen body as an ingredient.

This conclusion is fortified when oxygen is considered in relation to sulphur or selenium, with which it is classified by Berzelius. There is, as I think, also a perfect analogy between the reaction of water with certain metallic sulphides, and of muriatic acid with certain oxides; and I presume that the same may be said of the reaction between water and some selenides.

15. As respects the propriety of holding up hydrogen as an element *sui generis*, the advocates of the salt radical doctrine do not agree with each other; since according to Kane, and Graham also if I remember right, hydrogen is an aëriform metal, an opinion which I embraced independently more than twenty years since. But I trust that in my essay above alluded to, Liebig's reasoning in reference to this question is shown to be founded upon this palpable inversion of the truth, that the capacity of acidifiable radicals for metals is assumed to be dependent on the quantity of hydrogen with which they are capable of combining; instead of the quantity of hydrogen which can unite with them, being directly as their capacity for it or any other body in the table of equivalents.*

In a communication which I intend to send you for the next number of your Journal, I hope to proceed with the refutation of Liebig's reasoning.

Art. VIII.—*Account of observations on Shooting Stars at the meteoric periods of August* 10 *and November* 13, *in the year* 1845; communicated by E. C. Herrick.

Arrangements were made here for meteoric observations during the nights of the 8th, 9th, 10th and 11th of August, 1845. Casually, on some of the earlier evenings of this month, meteors seemed by brief observation, to be more numerous than usual, but as there was no systematic watch, nothing definite can be stated concerning their numbers.

The evening of the 8th was almost wholly overcast, and the sky continued cloudy during the night.

On the evening of the 9th, Messrs. Geo. C. Murray, and Wm. Manl. Smith with myself, commenced observations in the open

* See paragraphs ninety one, &c. in my Essay in this Journal, for Jan. 1843.

air, at 10h. We saw some meteors previous to this time, but have not included them in our enumeration. Between 10h and 11h, we observed *sixty four* different meteors as follows, viz. in

N. N. E. 22. S. E. 20. S. W. 22.

During this hour the sky was not entirely clear, and our view was somewhat obstructed by trees. These obstacles may have occasioned a loss of about one tenth. Of the shooting stars observed many were conspicuous, and left brilliant trains. The apparent paths of the majority of them, if traced back, would meet near the sword-handle of *Perseus;* as has been observed on many former occasions, at this period. Soon after 11h the sky became much clouded, (but not until we had seen seventeen meteors more) and as late as 1 a. m. (10th) offered no chance for observation. At this hour we left the field, and have reason to suppose that the sky continued cloudy until daylight.

The night of the 10th was overcast and rainy. The night of the 11th was similar; and on neither was any observation practicable.

On referring to our observations at the August period in former years, it appears reasonable to conclude, even from the limited observations which the weather permitted us, that the expected display did not fail this year; and that had our sky been clear on the nights of the 9th and 10th, we might have seen (if four had been observing) shooting stars between midnight and dawn at a rate not less than 150 an hour.

By a notice in *L'Institut*, No. 606, Paris, 13 Août, 1845, it appears that in France, (at Paris?) M. Coulvier-Gravier, aided by two companions, observed and registered shooting stars, on the night of Aug. 9th, 1845, as follows:

from 9 to 10 p. m.	60	from 12 to 1 a. m. (10th)	77
" 10 " 11 "	63	" 1 " 2 " "	117
" 11 " 12 "	64	" 2 " 3 " "	136

As to direction it is merely remarked that the majority came from the northeast.

Observations at the November Meteoric period.

Since the year 1838, no decided return of the meteoric display of November has been announced; nor indeed does the theory proposed by Prof. Olmsted, require the annual occurrence of this phenomenon. It is nevertheless quite important that observa-

tions should be maintained, in order, either to determine the negative, or else to secure the first symptoms of a return of the grand meteoric shower, which sooner or later may be expected at this period.

November 11, 1845. Being called out by an alarm of fire, I watched for five minutes, about 2 A. M., and saw no meteors. The sky was very clear and the moon shone bright.

Nov. 12. On looking from an open window at $5^h\ 15^m$ A. M., I found about one third of the sky almost clear. The constellation *Leo* was wholly unobscured and also a large space around, quite enough for one observer. In a few minutes I was at my station in the open air and began the watch. The clear space gradually contracted, and within fifteen minutes the sky became wholly overcast. During this brief period, I did not certainly observe even *one* meteor, although I suspected that I caught glimpses of two.

Nov. 13. Mr. J. H. Lane and myself began the watch at $4^h\ 10^m$ A. M. The sky was clear, except there was a bank of clouds low in the northwestern horizon, not however interfering with observation. During the hour ending $5^h\ 10^m$ our region (from N. by way of E. to S. 10° W.) remained clear, and we observed *six* different meteors. One of the six was seen by both, but was only once counted. Of these six, five were conformable to the radiant in *Leo*, and four left luminous trains. Mr. Fr. Bradley, watching at a separate station, from $3^h\ 45^m$ to 5^h A. M., looking easterly, observed nine shooting stars, eight of which were conformable.

Nov. 14. At 3 A. M. I looked from an open window and found the sky so hazy that stars below the second magnitude were not visible. During a short period of observation, not exceeding five minutes, I saw not even a single meteor.

It should be remembered, that during this period, the moon, nearly full, was above the horizon, concealing about three fourths of the meteors that might have been seen in her absence. But even with this allowance, it must be admitted that the results above recorded indicate no recurrence of the meteoric shower of November.

New Haven, Conn., Nov. 1845.

Art. IX.—*Attempt to Demonstrate the Assumed Point in the Doctrine of Parallels;* by A. C. Twining, Prof. of Math., Nat. Philos. and Civil Engineering, in Middlebury College.

A concise and rigorous demonstration of what is called the *postulatum* of Euclid,—that is to say, that *two straight lines which make, with a third line, interior angles together less than two right angles, will meet if indefinitely produced*,—is still accounted among geometrical writers a desideratum. The author of the able Treatise on Geometry put forth in England by the "Society for the Diffusion of Useful Knowledge," not only announces the difficulty in the text itself, but declares, in a scholium, that it is agreed by geometers that some assumption is indispensable. The numerous although abortive attempts, however, to resolve the difficulty, extending from the earliest periods of the science quite down to our own times, and still in process of continuance, evince that a hope at least is still entertained by the lovers of exact reasoning of wiping away the reproach, as they esteem it, of their favorite branch of knowledge.

It is here worth an inquiry why the one difficulty in the doctrine of parallels has monopolized attention and anxiety to the exclusion (to say nothing of a plain assumption in the 21st of the first book of Euclid, and the same in the corresponding 9th of the first book of Legendre, which however I expect at some subsequent opportunity to exhibit, as reducible to demonstration in a distinct proposition) of two equally palpable infirmities that subsist in the definitions themselves; one in the ordinary definitions of the straight line, and the other in the definition of a plane surface. Proof, as it would seem, may justly be demanded that there can be lines of such a property that two cannot coincide in two points without coinciding throughout—or, as the axiom shapes it, cannot "enclose a space." Neither can the adopted "shortest distance between two points" relieve Legendre's system; for, although most evidently there is a "shortest distance" in *amount*, yet what geometer, unless a very late one, has shown that there is but *one specific path* in space to which that least amount can be attributed. Again, in what estimation shall the exact reasoner hold the ordinary definition of a plane? It would indeed be admissible, supposing a straight line properly defined,

to describe that species of surface to be one which can contain all lines that can pass through a given point to cut a given straight line indefinitely produced; but how is it to be ascertained, that any two points not in that given line being taken in that surface, the line joining them shall cut the lines between, that lie in and define the surface?

The undeniable existence of these defects, in addition to the vexed one of parallels, gives dignity and value to an attempt of Mr. T. PERRONET THOMPSON, of Cambridge University, in England, in his "Geometry without axioms," to deduce the elementary properties of the straight line and plane from the sphere alone. The same author has discussed with much sagacity, in his appendix, the methods and devices,—about thirty in all,—which, during the historical period of the science, have been proposed to obviate or evade the difficulty relating to parallelism; and he has exposed, with a clearness seemingly incontestible, fallacies in each. Mr. THOMPSON has also propounded, in his text, a series of propositions which purport to compose a rigorous proof of the entire doctrine; and this, not improbably, with justice; but the prolixity of the process is sufficient, in some instances, to deter one, for the moment, from pursuing it through the somewhat intricate figures.

The author who has made the most persevering and repeated endeavors to complete the doctrine of parallels—supplanting certain of his earlier methods by new ones, and pertinaciously maintaining to the last the rigorous character of others—is the celebrated LEGENDRE. The *conception* of the method first given in the twelfth edition of his Geometry is very elegant; as also its execution in all those steps which are rigorous, and by which it is in fact demonstrated, that if a triangle be given, there may be constructed another triangle having its three angles equal, in their sum, to the sum of the three of the original triangle, and two of its angles less than any assigned angle. Hence it was inferred that by the repeated bisection of one of the angles at the base, the whole triangle may be considered as coinciding with its base, and the exterior angle as less than any angle assigned. The weakness of the conclusion is found in this,—that, since the sides containing the continually bisected angle increase *pari passu* with the diminution of the angle, the apex of the triangle may, for aught that appears, be of any assignable length, and *may* be competent, therefore, to subtend an assignable angle.

With respect to the *analytical* proof proposed by the same author, based upon the theory of functions and the principle of homogeneity, I should have called it hardihood to defend its conclusiveness against the undeniable objection of Prof. LESLIE, that the identical argument by which LEGENDRE attempts to show that the third angle of a triangle is determined by the other two, would show that the third side is also determined alone by the other two, had not the attempt to defend its conclusiveness been made both by its author and by men in the same rank of talent. To what has been written on that subject, I may be permitted, perhaps, to add one or two brief inquiries, as follows: First, how conclusive so ever the proof in question may appear to analysts of a certain practiced and subtle penetration, yet, inasmuch as the purpose of a *demonstration* is to manifest truth to those who are in the capacity of being taught, can it be demanded of *ordinary reasoners* to conclude that, because two triangles having two equal angles adjacent to one equal side would coincide, and have their third angles equal, that, therefore, if the side were varied, *the other two sides would meet as before;* and, moreover, that the third angle in this and the former triangles would be *one and the same function* of the side and the angles adjacent to it,—that is to say, that there is *some specific arithmetical process* by which the third angle may be deduced from the three quantities or elements named? All this, however, is demanded in the outset of the proof under consideration. Again: it will be conceded, I presume, that no property *peculiar to straight lines* can be demonstrated without the introduction *somewhere* in the proof, either explicitly or implicitly, of at least one step dependent on some property known, either by definition or by antecedent evidence, to pertain exclusively to such lines. My second question, therefore, would be, what one step of the so called analytical argument embodies any such peculiar property?

Among LEGENDRE's methods of proof, there is one proposed in a note to Prop. XIX, of the 12th edition of his Geometry, which depends upon the equal division of an infinite plane by an infinite straight line, and the consequent necessity inferred in the argument, that a straight line contained in an angle must, if produced, eventually meet the containing sides (one side it should be) of the angle. But the argument, as Mr. T. P. THOMPSON in his examination has pointed out, equally proves that two parallels can not

exist,—and for this reason, probably, it may be that LEGENDRE himself, in his ultimate and general memoir on the subject of parallels contained in Vol. XII, of the "Mémoires de L'Académie Royale," has made no account of that method. Had the argument, however, turned upon the comparison of the contained angular space with the exterior space in the way of *ratio*, instead of *absolute excess or defect*, (as it will be obvious to all familiar with that argument that it might have been made to do by continually bisecting the interior angle until a part should be found less than the excess of the whole exterior over the interior,) the proof would have rested unapproachable by the objection named. The only possible doubt would then have been whether the space on the side of the contained line opposite to the angular point is certainly a part of the interior angular space alone; yet that it must be such is, if not perfectly axiomatic, at least so nearly axiomatic as to give to this simple method, so modified, in my own apprehension, at least, a superiority over all others, including those of LEGENDRE himself and the *suspicious* although certainly simple and specious method of BERTRAND.

But, not to prolong discussions and comparisons beyond the demands of my immediate object, I pass to the development of an attempt of my own by which I propose to complete the doctrine of parallels and to make the *postulatum* of EUCLID independent, in fact, (in the simple case in which one of the interior angles made with the third or cutting line is a right angle) of any antecedent proposition.

To this end I employ a particular relation—whether positively or negatively assumed in hypothesis—of lines containing an angle to the angular space; which relation, or *possible* relation, if that qualification should be insisted on, appears not to have been heretofore reflected upon, or even noticed for any purpose of demonstration or investigation,—and which constitutes, therefore, if I err not in my application of it, a novel element of geometrical reasoning; notwithstanding that I am not able to determine what other than the special applications I shall make, it may be expected to be susceptible of. The element or relation referred to is nothing more than the truism that, if two straight lines meet, either of them *belongs* or does *not belong* to—or (if that phraseology be preferable) *is* contained or is *not* contained by—the angular space bounded by the lines, and consequently, would be contained either by *both* or by *neither* of two such precisely similar spaces on opposite sides of the line. This is an assertion intelligibly true, without the requirement of any subtleties or even any conjectures as to the proper choice of sides in the alternative; but our argument, as will presently be seen, allows the objector to be dogmatical as to the one side or the other, or to stand in hesitancy between the two. But, if any one should deem it an additional satisfaction to conceive, with the utmost precision, what is intended by the expression "a line belonging to or contained by an angular space," I may, without involving the merits of the argument in any specific definition of which it and its fundamental principle are independent, explain my individual conception of the interpretation, which, moreover, I suppose to coincide with that interpretation and idea that would spontaneously suggest itself to a mind imbued with even no more than the most elementary geometrical conceptions. Every geometrical magnitude is a definite extension. A sphere, for example, which is given in dimensions and fixed in position, occupies, throughout its entire extension, *place* or *position*,—that is to say, throughout the whole, *points* may be taken,—and those *belong to* or *are contained by* the sphere. The same is true of points of an angular space, and, by consequence, of a line of the same. The idea, like the idea of *distance*, is simple and plain, and, like that, capable of being *referred to* and *recognized* but scarcely of being made plainer by definition.

If, however, any one should suppose, that a line which belongs to or is contained by an angular space must have a portion of that space on both sides of it, the reader can judge, after becoming possessed of the argument, whether, even in the sense of such a definition, he can deny my principle, as above stated, or subvert its conclusive application. Yet such a definition does, in effect, deny that a magnitude occupies *place* up to its extreme boundaries. A better definition would be, that the contained line must be *between* the bounding lines of the angular space; but this would compel the definer to adopt the *negation* of our alternative,—so as to begin, not like our argument, "the line *does* or does *not* belong," &c., but, "the line *does not* belong," &c.

One caution only is requisite to bespeak a due appreciation of the chain of proof I am about to offer. Lest the reader might, in the outset, enter upon it with a presumption that from such a truism as that above stated, no conclusion, and none, especially,

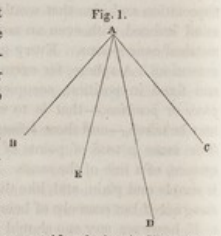
which has baffled the skill applied to it in so many forms, can legitimately spring, I would propose the inquiry whether, in case some one of the more recondite truths of geometry—as, for example, the ratio of a sphere to its circumscribing cylinder—should, by a flash of reasoning and through a brief step or two, be connected with the ordinary and unexceptionable definitions, the latter might not, just as unavoidably, seem inadequate to contain or give origin to such a conclusion as the former?

PROPOSITION.

Two straight lines which make, with a third line that cuts them, the two interior angles together less than two right angles will meet, if indefinitely produced.

Demonstration.—Let the straight line AD (fig. 1) divide the angle BAC; and, if it divides it unequally, cut off from the greater part, as DAB, an equal, DAE, to DAC the less.

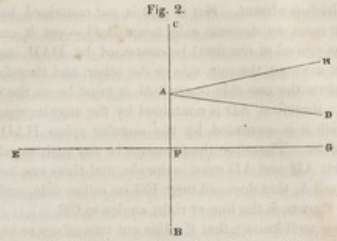
Fig. 1.



The straight line AD either belongs to, or, in other words, is contained by the angular space DAC or it is *not* contained by it. And if, by the nature of an angular space, it *is* contained by DAC it must evidently be, in like manner, contained by DAE; and if *not* contained by DAC it is not contained by DAE; but, if contained by DAE, the construction of an adjoining angle EAB cannot affect that fact nor, *mutatis mutandis*, the contrary. We therefore see that, if a line divides an angle, it must be contained by both parts or by neither,—so that either the two coincide in that line or are separated by it. On whatever condition, therefore, an angle, as DAC, shall have been constituted, (as, for example, by drawing AD and AC through fixed points,) it is not allowable to constitute an adjoining angle DAB on such a condition as shall exclude AD from either being contained by both angular spaces or else, by neither.

Let then EG (fig. 2) be an indefinite straight line, and A a point without it. Let AB be a line cutting EG at right angles in F, and produce BA to C.

Fig. 2.



Let the angle BAD be constituted by the condition that it can contain all the lines drawn through A that can meet FG infinitely produced on the one side of CB towards G. Then I say that the angle DAC cannot be constituted simply on the condition that it can contain all the lines that will *not* meet FG produced as before; for, then, whether AD be contained by *both* BAD and DAC, or by *neither*, it must meet and not meet FG at the same time; which is absurd. In searching, therefore, for the proper constitution of the angle DAC, we observe that, if some point, as E, on the other side of BC from G be united with A, and the line be produced, that line will lie in the angular space DAC; also, if a line be drawn at right angles to CB through A, it will not meet on either side; for if it be supposed to meet on one side, then, for the same reason, it must meet on the other; which is impossible.

There subsists, therefore, a threefold distinction in the lines that can be drawn in the entire angular space on the one side of BC towards G; first, lines that can meet the line EG on *that one side;* second, lines that can meet the same on *the other side;* and third, a line or lines that can meet on *neither side;* also, it is evident, that in relation to meeting EG, these *are all the distinctions that can subsist.*

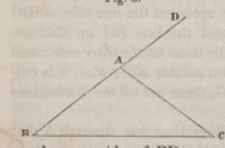
If, now, there can subsist more lines than one through A that meet on neither side, let the angle CAH be constituted so as to contain all that can meet on the other side from G, and of course, HAD must contain all that can meet on neither side. Now if AD *is* contained by BAD, it is also contained by DAH,—that is, it meets on the one side, towards G, and on neither side at the same

time; which is absurd. But if AD is *not* contained by BAD it does not meet on the one side towards G,—yet it cannot (by what was proved at the first) be contained by DAH, and therefore *must* meet on the one side or the other, and therefore, since that is not on the one side towards G, it must be on the other towards E: therefore, AD is contained by the angular space HAC, from which it is separated by the angular space HAD; which is impossible. Therefore there cannot be any such angular space HAD; but AH and AD must coincide, and there can be but one line through A, that does not meet EG on either side, and that, as has been shown, is the line at right angles to CB.

Now it is well known that if a line cut two others so as to make the two interior angles together equal to two right angles, and if the cutting line be bisected, and from the bisecting point a perpendicular to one of the two lines be drawn, it may be and is proved perpendicular to the other. But it cannot be perpendicular to any other line through either extremity of the cutting line—else one and the same triangle might have two angles both right angles, which is impossible. Therefore, *any other lines than those which make, with a third, the two interior angles together equal to two right angles will meet, if indefinitely produced.*

Corollary.—*The sides of triangles are not contained by the triangular spaces, but are mere dividing lines between the space within and the space without. Also the same is true of all superficial figures. Also the surfaces of solids are not contained by the solids, but are dividing surfaces between the space within and the space without.*

Fig. 3.



For let ABC (fig. 3) be a triangle. Produce BA to D. Now if the only *actual* distinction that subsists among all the lines passing through A, with reference to the limited line BC, is that lines of one class *meet* or *intersect* it and those of another do *not*, we have, on the one side of BD towards C, the angle BAC constituted or defined as that which can contain the *first* only, and the angle CAD as that which can contain the *second* only. Whether, therefore, the line AC is contained in both angular spaces or contained in neither, the absurdity arises that it must intersect and not intersect at the same time. A threefold distinction must, therefore, actually subsist, namely, lines that intersect BC, lines that do not intersect it, and a peculiar line limiting the two, or dividing between the spaces that can contain them; and which, with reference to the line BC, may not improperly be said to *touch* it in C.

The same may, in like manner, be proved respecting any rectilinear figures whatever. But if a figure be curvilinear, it may be circumscribed by a rectilinear figure whose boundary shall touch the curvilinear at any given point; or in other words, may coincide with the curve at that point. Then the curvilinear figure *at the point of coincidence*, is separated, equally with the rectilinear, from the spaces without, by the right line which contains the one given point, which point, therefore, belongs to neither the space within nor the space without, but to the boundary. Therefore any point whatever of the curve does not belong to the curvilinear space; which consequently is, as in the former case, a dividing line.

Lastly, if a solid be cut by a plane, there is a sectional figure which is constituted by all that is common to the plane and the solid, and no more. But the boundary of the section has been proved not to belong to its superficial extension and therefore does not belong to the solid. But it is the section of the solid's boundary by the plane which constitutes the boundary of the figure, and therefore the boundary of the solid does not, *at this line*, belong to the solid; and the same may be proved at any point whatever in the surface of the solid.

Scholium.—Besides the evidence which the principle and manner of reasoning employed above carry in themselves, there are two incidental *symptoms* or *indexes* of genuineness. One is that the resulting truth in relation to a parallel, is made to depend, *as it ought to depend*, upon a property of the infinite straight line in distinction from the finite. Thus, in comparing the proposition and the corollary, we find that the line AC in the latter cannot exist under the conditions of the former, because beyond every such line others may be drawn intersecting the indefinitely produced line. The other is that the truth of the corollary is deducible, at least in a partial case, by a method quite independent of its own argument. For if, in fig. 1 of the proposition, the angular space DAC, instead of being defined as that which *can con-*

tain certain lines, be defined as that which shall contain or be *full of* some physical substance, gold for example, while the adjoining angular space DAB, be defined to be full of some other, as silver, it is plain at once that the line AD is simply a dividing line between the gold and the silver. And—demonstration aside—reflection will perhaps make it apparent that an abrupt transition from that which can contain the lines of one specific property to that which can contain the lines of an opposite or distinct property, can no more take place, except through a *peculiar or dividing line*, than from that which is full of gold to that which is full of silver.

It is essential to observe farther, a twofold, but obvious requisite as to the distinctions that can be employed. First, they must not be *arbitrary*—that is to say, such as either *have no pertinence to the point at issue*, or *do not define the spaces:* Second, a specific distinction being once established as a basis of the argument, *no correlative or homogeneous distinction that can subsist must be overlooked*. Thus, in the corollary, if BC be produced and an angle adjoining BAC be constituted as that which can contain all the lines that will intersect *beyond* C, reason shows two correlatives, neither of which may be neglected, so that the three will stand, *beyond* C, *at* C, *and on this side of* C.

Finally, in the application of our elementary principle or *relation* to analytical geometry, the correlative distinctions of lines in a given case will be perceived to be threefold, manifold or even unlimited, according to the conditions of the application. In the case of lines through a point without a circle they would be threefold—lines that cut the circumference, lines that touch and lines that are capable of neither—or, otherwise they might be, lines that cut in *two* points, in *one*, and in *no* point. In the case of curves with different branches they might be manifold, and in that of a spiral cut by an unlimited straight line they must of necessity be unlimited. Whether, in any of the possible applications, valuable truths, other than the two I have developed, would be the result, there has not yet been opportunity sufficiently to consider.

Middlebury, June, 1845.

[For an editorial note to Prof. Twining's article, see p. 147 of this No.]

SCIENTIFIC INTELLIGENCE.

I. Chemistry.*

1. *Researches upon the Phenomena that attend the Projection of Bodies upon Hot Surfaces;* by M. Boutigny, (Ann. de Chim. et de Phys., Vol. ix, p. 350, and Vol. xi, p. 16.)—Notice would have been taken of these researches before, had it not been from a desire to present a review of all of his memoirs at one and the same time; the third has not yet appeared, but the results already obtained are too interesting to remain longer unnoticed.

The peculiar phenomenon that a drop of water or other liquid presents when thrown upon a red hot surface, that is to say, of assuming a spheroidal form and evaporating but slowly, has been known for a very great length of time, but has never been critically studied. The author has endeavored to determine

1st. The ultimate limit of temperature, at which this phenomenon takes place.

2d. The law of the evaporation of water in its spheroidal condition.

3d. The temperature of the liquids in their spheroidal state, as well as that of their vapors.

4th. If the radiated caloric traverses the spheroids or is reflected.

5th. If all bodies can pass to the spheroidal condition.

6th. If there is contact between bodies in their spheroidal condition and the surfaces upon which they are formed.

7th. If this phenomenon plays any part in the explosions (*fulminantes*) of steam boilers.

The first, concerning the limit of temperature at which the liquids become spheroidal, was determined by the following experiments among

* Dr. J. Lawrence Smith, of Charleston, (S. C.,) who is already well known to the readers of our first series as an able chemical contributor, has kindly consented to continue his labors under this head in the present. His abstracts will always be followed by his initials, to distinguish them from our own,—as those of Dr. Gray in botanical science and bibliography, are known by "A. Gr." It is our intention to follow closely the progress of the various departments of science at home and abroad, by giving condensed abstracts of all that is most interesting and valuable to American readers, diligently culled from the foreign journals, and presented in a readable form at the earliest possible moment. To effect this, we are in the regular receipt of all the most valuable European journals of all languages, besides having the kind aid of several gentlemen eminent in their several departments.

We shall follow the general order of—I. Chemistry. II. Mineralogy and Geology. III. Zoology. IV. Botany. V. General Physics.—*Eds.*

others. A drop of water was thrown into a polished silver capsule heated to 392° Fahr., then carefully transferred to an oil bath heated to 302° Fahr., and the water was found to maintain its spheroidal condition until the temperature of the bath descended to 288° Fahr.; then it moistened the surface and evaporated rapidly. This then has been found to be the lowest temperature at which water maintains the spheroidal state. If the quantity of water consisted of several drops, its *sphericity* was lost at 308°. It has been ascertained that the lowest point at which alcohol and ether retain the same form, bears the same proportion to their boiling point, as 308° does to the point of ebullition of water,—it being 272° for alcohol, and 142° Fahr. for ether. Anhydrous sulphurous acid does not follow this law, but it is not an easy substance to experiment with; it however assumes and retains the spheroidal condition much below the boiling point of water, which is ascertained by placing a capsule in boiling water and letting the acid fall into it; a large quantity may thus be made to assume the spheroidal shape, but it soon becomes hydrated in absorbing and congealing the watery vapor; thus we have the singular phenomenon of the congelation of the vapor of water in boiling water.

These facts establish that *the temperature necessary to cause a body to pass to the spherical state, is higher as its boiling point is greater.*

The next series of experiments were to ascertain the law of the evaporation of the water while in its spheroidal condition. At 392° Fahr. a grain and a half of water took 3·30 minutes to evaporate; at 752°, the same quantity of water was evaporated in 1·31 minutes; at a dull red heat, in 1·13 minutes; and at a bright red, in 0·50 minutes,—*the evaporation increasing with the temperature*, which is contrary to the rule laid down by Klaproth on the subject; but the experiments of the latter were made in iron vessels, and the oxidation of the metal interfered with the accuracy of the results. As regards the temperature of the body while in the spheroidal condition, the author has established the following general rule: *bodies in their spherical condition remain constantly at a temperature lower than that of their ebullition, without regard to the temperature of the containing vessel,*—

That of Water being	206°	Fahr.
" Absolute alcohol, . . .	168°	"
" Ether, ...	109°	"
" Chloric ether, . . .	51°	"
" Sulphurous acid, . . .	13°	"

M. Boutigny has been the first to experiment with sulphurous acid thrown on hot surfaces, and his results are exceedingly interesting. Heat to redness a platinum capsule, and pour into it several grammes of anhydrous sulphurous acid. On observing that part of the glass

from which the sulphurous acid is let drop, and opposite to the hand, it is seen to boil rapidly, which ebullition ceases instantly as it falls into the red hot capsule, and its evaporation goes on with an incredible slowness and without any signs of ebullition. If the weather be damp, the acid becomes turbid, and finally loses its transparency, then solidifies, and upon examination the solid is found composed almost entirely of water. If the weather be dry, then no residue is left. The singular phenomenon, of boiling sulphurous acid becoming colder when thrown into a red hot capsule, is not peculiar to it, as boiling water will exhibit the same fact, falling from 212° to 206° Fahr.

If we throw distilled water drop by drop into sulphurous acid in the spheroidal condition, it becomes frozen, even if the capsule be *white hot*; or if we plunge for about a half a minute a small glass bulb containing about fifteen grains of water into sulphurous acid in the spheroidal condition,—withdraw it, and break it, and a small lump of ice will be found within. A still more striking way of making the experiment, is to place the capsule containing the sulphurous acid, at the bottom of a muffle in a furnace heated to whiteness, when if the weather be dry, the evaporation goes on slowly without any residue,—if the weather be moist, ice will remain behind. Again, if a brick be placed upon the plate of an air-pump, around it a layer of binoxide of lead to absorb the acid vapor, and upon that a piece of brick heated red hot, having a cavity that contains a small capsule, into which sulphurous acid is poured, and a vacuum be rapidly produced; the sulphurous acid which ought, so to speak, to explode, does not boil, but evaporates slowly, just as in a white hot capsule, or as at the bottom of the muffle of the furnace; and what is still more remarkable is, that on a damp day the little water that the air of the receiver contains, congeals in the spheroidal sulphurous acid: all other liquids behave in the same way in the vacuum.

The vapors arising from the spheroidal liquids, have their temperature much elevated; and where water and an iron vessel is used, it is decomposed, furnishing hydrogen gas.

Does the heat traverse the liquids in their spherical condition without combining, or is it reflected? This is important to determine, for up to the time of M. Boutigny's experiments, it was pretty generally admitted that it did traverse them; but he has proved most clearly that the heat is *reflected* and not transmitted. A platinum capsule was made red hot, and by means of a support, a small glass bulb containing water was placed very near the bottom of the vessel; the radiated heat soon heated the vessel, and made the water boil; it was now withdrawn, and water poured in, when it immediately assumed the spheroidal condition, and into it was plunged the small bulb before alluded to; but no

signs of ebullition manifested themselves, showing clearly that no calorific rays penetrated the spheroid of water. Nor is this result at all affected, if small particles of wood, sand or iron be mixed with the water; and the iron, although so much heavier than the water, will not touch the capsule, but remains in the spheroid until its complete evaporation. If lampblack be mixed with the water, and into it the small bulb of water be plunged, no difference is seen from the former case.

Can all bodies pass to this spheroidal condition? From the author's experiments, he concludes that all bodies *can* pass to this state.

The experiment with iodine is brilliant, and can be easily repeated in a lecture room. Throw in about fifteen grains of iodine into a capsule (almost flat) heated to redness, when it at once assumes the spheroidal condition, and is surrounded with rare and transparent vapors of iodine; withdraw the source of heat, and in a moment after the iodine passes to its ordinary liquid state, moistens the capsule, boils with violence, and gives rise to an abundance of most beautiful vapors. This gives a good idea of the difference existing between the evaporation of a body in its spheroidal condition, and the evaporation of the same body by ebullition.

Experiments were made to ascertain whether the heated surface was touched or not. It is discovered that *the surface is not touched by the bodies in the spheroidal condition.* This was proved in various ways; among others, by placing a drop of water upon an almost flat capsule, (heated,) and on looking at a lighted candle placed at one side of the capsule, it can be seen perfectly without interruption between the capsule and spheroid.* J. L. S.

2. *New Chloride and Oxide of Chrome;* by E. Peligot, (Compt. Rend., Sept. 1844.)—Pass a current of chlorine gas over a mixture of oxide of chrome and charcoal heated to redness, and minute white silky crystals appear, composed of 1 equiv. chrome and 1 equiv. chlorine; it is a degree of oxidation of chrome till now unknown, corresponding to CrO. This chloride becomes green upon exposure to the air, absorbing at the same time the moisture; added to water it immediately dissolves, and imparts to it a green color, if the water happens to contain air, and blue, if the influence of oxygen is avoided; potash gives with this solution a brown precipitate, which is the protoxide CrO. Acetate of potash added to the solution, gives rise to a slow deposition of red transparent crystals, the acetate of the protoxide. It is necessary to take every precaution, in order to obtain these substances pure, so powerful is their attraction for oxygen.† J. L. S.

* The remainder of the notice, already sufficiently extended, will be furnished at another time.

† It will be seen that the process given by M. Peligot is the same which has been heretofore used for the production of sesquichloride of chromium, during which process the compound now first noticed by M. Peligot is also formed, and being mixed with the sesquichloride, has given rise to the discordant statements which have been made regarding this substance.—*Eds.*

3. *Atomic Weight of Iron,* (Journ. für Prakt. Chem., xxxiii, p. 1.)—The atomic weight of this metal has lately been the subject of investigation by Swanberg, Noklin, Berzelius, Erdmann and Marchand, and all agree by different methods in making it 350, oxygen = 100 or 28, hydrogen = 1. This is nearly 1 greater on the hydrogen scale than that adopted in the recent works on chemistry by Kane, Graham, &c. J. L. S.

4. *New Metals.**—There have been three new metals lately discovered,—*Pelopium, Niobium* and *Ruthenium;* the first two were procured from the Bavarian Tantalite by Prof. H. Rose, and the latter was found associated with the ore of platinum by Prof. Claus. Pelopium and Niobium exist in the mineral under the form of Pelopic and Niobic acids. (Comptes Rend., Dec. 1844.) They resemble the tantalic or columbic acid so closely in all their properties, that it becomes difficult to separate them from each other. Prof. Rose has however obtained the Niobic acid perfectly pure, and the greatest difference between it and columbic acid appears to be, that it forms when heated with charcoal and chlorine, a chloride that is colorless, infusible and very slightly volatile, whereas the tantalic acid affords a chloride yellow, very fusible and volatile.

The Niobium is readily obtained in its metallic state, by submitting the chloride to the action of dry ammonia, and applying heat, when the metal is reduced with the disengagement of the hydrochlorate of ammonia.

The Ruthenium discovered by Prof. Claus, (Chem. Gazet., Feb. 1845,) as already stated, is associated with native platinum, and is procured from what is called the platinum residue, (the residue after treating the platinum ore with nitromuriatic acid.) It is first fused with nitre at a red heat for about thirty minutes, and the fused mass treated with water and dilute acids, which extract the osmium and iridium; the solid matter left is now fused with its own weight of nitre, and kept at a white heat for two hours; the mass is taken out, while still red hot, with an iron spatula, and after cooling reduced to a coarse powder, which is extracted with distilled water; so soon as the water becomes clear, it is decanted. It contains ruthenate, chromate and silicate of potash. Nitric acid is added cautiously, until the alkaline reaction has disappeared; by this means, oxide of Ruthenium and potash, and some silicic acid, are precipitated, as a velvet black powder; after

* See Vol. xlviii, p. 400, of this Journal, for some previous notice of these metals.

washing this powder, it is dissolved in muriatic acid, evaporated until the silica separates as a gelatinous mass; it is then diluted with water and filtered. It must not be evaporated to dryness for the more complete separation of the silica, because the chloride of Ruthenium is thereby decomposed into an insoluble protochloride. The filtered solution, which is of a beautiful orange yellow color, is evaporated down to a very small volume, and mixed with a concentrated solution of chloride of potassium, when the salt $KCl+RuCl^2$ separates in reddish brown crystals. J. L. S.

5. *New Acid in Human Urine*, (Chem. Gaz., Nov. 1844, p. 479.)—W. Heintz has obtained a minute quantity of a new acid from fresh human urine; it contains nitrogen, and differs from hippuric acid. Its properties have not yet been fully investigated, nor is there any name given to it. J. L. S.

6. *Atomic Weight of Zinc;* by M. A. Erdmann, (Pogg. Ann., lxii, p. 611, and Chem. Gaz., Jan. 1845, p. 14.)—It was determined by ascertaining the amount of oxygen absorbed by a given weight of pure zinc. The number furnished by this method is 406·591, oxygen being 100. This is 3·365 higher than that admitted by Gay Lussac, and 7·409 lower than that announced by Jacquelin. J. L. S.

7. *Researches upon the Metallic Acids;* by M. Fremy, (Ann. de Chim. et de Phys., Nov. and Dec. 1844.)—It would be impossible to give here any thing like a sketch of these elaborate and highly interesting researches; all that can be done is to state the principal facts discovered by the author. The capacity of saturation of aluminic acid was determined by forming a crystallized aluminate of potash, which ought to be considered a neutral salt; an analysis of it, showed that the oxygen of the acid is to the oxygen of the base as 3 to 1. The *ferric acid* was discovered by M. Fremy, (FeO^3), and is prepared by a method already well known to chemists; but the one preferred by M. Fremy, will be mentioned in these abstracts. It was found that chlorine, passed over chromate of potash heated to redness, furnished beautiful crystals of oxide of chrome; it is an easy process. The *protoxide of tin* was obtained under different forms, brown, black and red. Two modifications of stannic acid were discovered, both having the same composition, but requiring different amounts of bases to form neutral salts; the acids are called stannic and metastannic. Bismuth was found to form an acid with oxygen, Bi^2O^4. The peroxide of lead, PbO^2, formerly thought to be indifferent, turns out to be a true metallic acid, combining with the various bases. The plumbate of potash is remarkable for its beautiful crystalline forms. By treating this last salt with a solution of the protoxide of lead in an alkali, hydrated minium is formed by double decomposition. Copper forms with oxygen an acid, which is very unstable, containing more oxygen than the deutoxide. The author's researches upon osmium and iridium have already been alluded to, as was the new osmious acid, OsO^3. J. L. S.

8. *Potash and Soda;* by M. Bizio, (Chem. Gaz., 1845, p. 46.)—This author recommends a new method of rendering these alkalies caustic. It is to mix one part of the carbonates in solution with one part of freshly prepared dry hydrate of lime, and allowing it to stand in a closed vessel for twenty four hours, at a temperature of 68° to 78° Fahr., frequently shaking it. The potash should be dissolved in 12 to 15, and the soda 7 to 15 parts of water. The carbonate of lime separates in a granular state, and the caustic ley may be decanted; a weaker ley may be obtained from the residue, by fresh treatment with water. J. L. S.

9. *Prussic Acid;* by M. Witting, (Chem. Gaz., Jan. 1845, p. 47.)—It is recommended to mix the matter taken from any one supposed to be poisoned by this acid, with one sixth its weight of alcohol, and distill over one fourth. If prussic acid be present, the distilled product generally evolves the peculiar smell; to the product a little caustic potash is added, and then a mixed acid solution of the protochloride and perchloride of iron, when prussian blue is formed. If the poisoning was effected by any of the cyanides, hydrochloric acid should be added along with the alcohol. J. L. S.

10. *New Test for Bile and Sugar;* by Dr. M. Pettenkoffer, (Ann. der Chem. und Pharm., Oct. 1844.)—This test is based upon the deep violet tint afforded by the addition of sulphuric acid and sugar to the bile, even when perfectly colorless. It is upon the choleic acid, (which forms the essential part of the bile,) that this reaction takes place. A little of the liquid suspected to contain the bile is poured into a test tube, and two thirds of its volume of sulphuric acid added by drops, so as not to allow the temperature of the mixture to exceed 144° Fahr., as a higher temperature would decompose the choleic acid; then add from 2 to 5 drops of a solution of one part of sugar to four fifths of water, and shake the mixture; if bile be present, the violet red color will appear in a shorter or longer space of time, according to the quantity present. The precautions necessary to succeed are, not to allow the temperature to exceed 144° Fahr.; not to add too much sugar; the sulphuric acid must be free from sulphurous acid. If albumen be present in the suspected liquor, it is best to coagulate it previous to testing, with a little alcohol or heat. If the bile be in small quantity, it should be concentrated in a water bath, extracted with alcohol, and this last evaporated to a small bulk, and the test applied to the solution when cold; this is particularly to be attended to, when the urine and other secretions are the subjects of experiment. By means of this test, bile was detected in the urine of a patient suffering under pneumonia. The

fæces of a healthy man when extracted with spirits and tested, did not show any indication of the presence of bile, whereas in adding a little bile previously to the fæces, the test did not fail to indicate it. In all cases of diarrhœa bile is found in the stools,—so after the administration of calomel and other purgatives. This test reversed, may be used for the detection of sugar, that is to say, a mixture of bile and sulphuric acid is first made, and the suspected liquid added; if sugar be present, the violet red color will appear. This is a ready way of testing diabetic urine.

To test the blood for bile, the albumen is first separated by boiling with alcohol, and the concentrated solution tested as already mentioned.

J. L. S.

11. *Ferrate of Potash;* by M. Fremy, (Ann. de Chim. et de Phys., Nov. 1844.)—After numerous experiments upon this salt, the author points out the following methods as the best for obtaining it. Surround a Hessian crucible with burning charcoal, and introduce 80 grains of pure iron filings; as soon as these are red hot, throw upon them 160 grains of pulverized nitre that has been fused; the action is instantaneous and violent. After allowing the crucible to cool, a reddish violet mass remains, containing a large quantity of ferrate of potash, with a little of the peroxide of potassium that becomes decomposed when mixed with water. The iron must not be heated too long before the addition of nitre, as the coat of oxide formed prevents the reaction. Another way proposed, is to pass a current of chlorine gas into a concentrated solution of potash, containing hydrated sesquioxide of iron in suspension; the liquid soon acquires a purplish red color, and the oxide is dissolved. When the potash is in great excess, a blackish powder is precipitated, which is the ferrate of potash, that has mixed with it a considerable quantity of chloride of potassium; to purify it, it is redissolved, and precipitated by a concentrated solution of potash. It must be dried on absorbent pieces of porcelain. The dry salt should be quickly inclosed in tubes hermetically sealed, as the moisture of the atmosphere decomposes it.

J. L. S.

12. *Separation of Oxide of Cobalt from the Oxide of Manganese;* by M. Clöz, (Jour. de Pharm., Feb. 1845.)—This is done by treating a neutral solution of the two oxides with an excess of the persulphuret of calcium or potassium, which dissolve the sulphuret of cobalt formed, the sulphuret of manganese remaining undissolved. This method is particularly well adapted to cases where the quantity of the oxide of cobalt present is very small.

J. L. S.

13. *Ashes of Human Blood and Saliva,* (Chemist, Feb. 1845, p. 88.)—One hundred parts of the human blood contain—

Tribasic phosphate of soda,	22·100
Chloride of sodium,	54·769
Chloride of potassium,	4·416
Sulphate of soda,	2·461
Phosphate of lime,	3·636
Phosphate of magnesia,	0·769
Oxide of iron with phosphate of iron,	10·770

One hundred parts of the ashes of the saliva contain—

Tribasic phosphate of soda,	28.122
Chlorides of sodium and potassium,	61.930
Sulphate of soda,	2.315
Phosphates of lime, magnesia and iron,	5.509

J. L. S.

14. *Separation of Tin from Antimony;* by A. Levol, (Ann. de Chim. et de Phys. Jan. 1845.)—If these two metals be in the form of an alloy, reduce to a thin plate, and heat with hydrochloric acid; after boiling for a few minutes, add chlorate of potash in small quantities at a time, until all the metal is taken into solution; now precipitate the metals with a bar of pure zinc, which must be withdrawn after this operation is completed; and then add a portion of concentrated hydrochloric acid about equal to the quantity first employed—this is done without removing the chloride of zinc—the whole is now boiled, and the tin is re-dissolved entirely at the expiration of about one hour, the antimony remaining in the form of a fine black powder, which may be collected on a filter and weighed; the tin can now be precipitated by sulphuretted hydrogen.

J. L. S.

15. *Formation of Lactic Acid from Cane Sugar;* by Prof. H. Von Blucher, (Chem. Gazet. Ap. 1845, p. 151, and Pogg. Annalen, Vol. lxiii, p. 425.)—It was formed by fermenting a solution of sugar with well washed caseine, and the following is one of the experiments performed—1400 grms. of cane sugar were dissolved in 6000 grms. water, and 400 grms. moist, (containing 94 grms. dry) caseine, and a sufficient quantity of finely pulverized chalk mixed with it, and the whole exposed to a temperature of 77° to 86° Fahr. In the course of four weeks the whole formed a crystalline paste. After one recrystallization, 870 grms. crystallized lactate of lime, were obtained; and the mother-ley somewhat evaporated yielded 162 grms. crystallized mannite. The latter, however, was not perfectly pure, and contained 3·6 per cent. lime, probably in combination with lactic acid. In the liquid separated by filtration from the mannite, there subsided, on evaporation over the water bath, a further quantity of minute

crystals of mannite, which however could not be isolated from the syrupy liquid, and the whole was therefore evaporated in the water bath. The residue obtained in this manner weighed 732 grms. and contained 12¾ per cent. lime; 350 grms. of this dry residue was dissolved in 1200 grms. of water mixed with caseine and pulverized chalk, and placed in a warm chamber; in 7 days it had become converted into a crystalline paste, from which were obtained on re-crystallization 210 grms. lactate of lime. If the product of 210 grms. be extended to the entire residue 732 grms., this would have yielded 439 grms. of the salt, consequently the above 1400 grms. of sugar would have produced 1309 grms. of lactate of lime, exclusive of loss. J. L. S.

16. *Acetate of Iron, remedy for Arsenical preparations;* by M. Duflos, (Ed. Phil. Mag. 1845.)—It appears from experiment that the hydrated peroxide of iron possesses no efficacy as an antidote where arsenite of potash, (Fowler's solution,) or arseniate of potash have been employed; it only acting where the uncombined acids have been used. The author recommends as a substitute in this case, the peracetate of iron, prepared by adding acetic acid of density 1·06 diluted with two or three parts of water, to the hydrated peroxide of iron prepared in the ordinary way, (there should be an excess of peroxide.) This preparation is administered largely, diluted with water, it being thus much more efficacious. J. L. S.

17. *Analysis of the Tungstates;* by M. Marguerite, (Comptes Rendus, Feb. 1845.)—To the salt to be analyzed, is added several times its weight of pure sulphuric acid, (in a platinum cruicible,) which is at first heated gently, and gradually raised to a red heat; the residue which consists of an acid sulphate and free tungstic acid, is thrown upon a filter, and washed with water charged with sal-ammoniac, by this means the tungstic acid is prevented from combining with the water and traversing the filter; after the washing is completed, the filter and its contents are ignited and weighed. J. L. S.

18. *Test for Nitric Acid;* by E. G. Schweitzer, (Proceed. Chem. Soc. Jan. 1845.)—It became necessary in the examination of the Bonnington mineral water, to test for nitric acid where bromine and iodine were present. It is known that if any fluid, containing even a very small quantity of nitric acid, be concentrated, and mixed with a little pure sulphuric acid, that a concentrated solution of the protoxide of iron when added affords a pink color; when the quantity of nitric acid is greater, the color became brown or black. The effect of this test, (sulphuric acid and protosulphate of iron,) upon salts of iodine and bromine, is to tinge the liquid with the peculiar color of these two substances, but an excess of the protosulphate destroys the colors, which is not the case with nitric acid. The author states that where the

quantity of nitric acid is very small, and that of the iodine predominates, it is necessary to make a comparison within a standard liquid; for this purpose 50 grains of distilled water containing half a grain of iodide of potassium, to which 50 grains of sulphuric has been added gradually, and afterwards 50 grains of a concentrated solution of protosulphate of iron is used; this fluid is of a yellowish tinge. If nitric acid be present, even to the amount of $\frac{1}{2000}$ part, it is made evident by the above test, a brownish color appearing, which becomes more evident to the eye by comparison with the standard liquid just described; when the quantity of nitric acid increases, the color becomes darker. If a bromide be present, instead of an iodide, the nitric acid is ascertained with the same facility, by its imparting a greenish hue to the liquid; 50 grains of pure water, containing half a grain bromide of potassium, to which 50 grains sulphuric acid are added, will indicate $\frac{1}{2000}$ part of nitric acid by the development of a brownish tinge; this being brought about first by the liberation of hydrobromic acid by the sulphuric acid, and the subsequent decomposition of it by the presence of free nitric acid. The presence of organic matter affects the delicacy of this test. J. L. S.

19. *Preparation of pure Phosphoric Acid;* by Dr. Gregory, (Med. Gazet. 1845, and Chem. Gazet. May, 1845, p. 216.)—This author has recommended in his recent work on chemistry, the preparation of phosphoric acid directly from burnt bones; the only difficulty attendant upon it, being the separation of the phosphate of magnesia, which he has advised to do by means of alcohol. This method, however, upon more recent experiments, has proved not to answer, and Dr. G. therefore recommends the following:—Having removed the lime by means of sulphuric acid, and evaporated the filtered liquid, (filtering again if any sulphate of lime separates during the evaporation,) to the consistency of syrup, a few drops of sulphuric acid are added to make sure that no lime remains. Of course if turbidness ensues, the lime has not been completely separated before, and the addition of sulphuric acid, filtration after adding some water, and evaporation must be repeated till the syrupy liquid continues quite clear, when sulphuric acid is added. This liquid now contains only the phosphoric acid, the magnesia, and the excess of sulphuric acid. It is concentrated, heated in a covered platinum crucible until the whole of the sulphuric acid has been expelled, and the residue has acquired a low red heat. On cooling it forms a glass perfectly colorless and transparent, which contains only phosphoric acid and the magnesia of the bones. This glass when boiled with water dissolves rather slowly but completely. When the solution is again concentrated in a capsule of platinum until most of the water is expelled, and the temperature rises to between 595° and 600° Fahr.,

it suddenly while hot, becomes turbid from the separation of a peculiar phosphate of magnesia; at the same moment the phosphoric acid begins to crystallize like granular sugar deposited in honey, a form ascribed by PELIGOT to the bibasic or pyrophosphoric acid. If the same temperature be kept up for fifteen minutes, the whole of the magnesia separates in the form of a powder which is quite insoluble in acids or water; when cold the mass is digested with water, which dissolves the phosphoric acid, leaving the phosphate of magnesia as a heavy, fine, snow-white powder, of a faint silky lustre. The filtered liquid is free from every trace of magnesia, and may be considered as pure phosphoric acid. If the bones contain chloride of sodium a trace of phosphate of soda will remain—in this case the burnt bones after being pulverized, should be boiled with water to remove the chloride. Dr. GREGORY recommends this process as a simple one for obtaining pure phosphoric acid. The phosphate of magnesia formed is a peculiar and anomalous salt. From six analyses Dr. GREGORY deduces the formula $2MgO+3P^2O^5$, that is, an acid sesquiphosphate of magnesia according to the older notions of phosphoric acid. It is insoluble in water or the acids, boiling nitric acid and aqua regia are almost entirely without action upon it. J. L. S.

20. *New Observation on the Chemico-dynamical action of Platinum*; by J. W. DOEBEREINER, (Annalen der Chem. und Pharm., Feb., 1845.)—Spongy platinum prepared in the ordinary way by heating the double chloride of platinum and ammonia, becomes ignited to redness when moistened with *formylic acid*, and decomposes it into carbonic acid and water, two atoms of oxygen being absorbed. It has no effect upon alcohol or pyroligneous spirit, except an alkali be mixed with them, then the sponge becomes incandescent, and the spirits are decomposed. So that by the presence of an alkali, the platinum sponge acquires the property possessed by platinum black, of absorbing oxygen largely. J. L. S.

21. *On the quantitative determination of Soda, and its separation from Potash*; by Dr. WITTSTEIN, (Buckner's Report, xxxvi, 3, and Chemist, May, 1845, p. 215.)—The two bases are first converted into sulphates, then calcined, weighed, and the sulphuric acid found in them determined by a salt of baryta. On subtracting the acid from the saline mixture, the sum of the quantities of the two alkalies becomes known.

The quantity of *potash* may be ascertained, if we first subtract from the sum of the weight of the two salts, the product obtained by multiplying the weight of the sum of the two bases by the quotient, resulting from the division of the atomic weight of the sulphate of soda by the atomic weight of soda, and then dividing this by the difference resulting, on subtracting the quotient obtained by dividing the atomic weight of

the sulphate of potash by the atomic weight of potash, from the quotient obtained, by dividing the atomic weight of sulphate of soda by the atomic weight of soda.

The amount of soda may be ascertained, if the sum of the weight of the two bases be multiplied by the quotient obtained on dividing the atomic weight of the sulphate of potash by the atomic weight of potash; and from the product thus obtained the weight of the two salts is subtracted, and what is left is divided just as in the case of the potash. It will be best understood when expressed in the following way:

K, the quantity of potash.
N, " soda.
S, " two salts.
b, " two bases.

q, quotient obtained by dividing the atomic weight of sulphate of potash by that of potash.

q', quotient obtained by dividing the atomic weight of sulphate of soda by that of soda.

Thus, $K=\frac{S-bq'}{q-q'}$; and $N=\frac{bq-S}{q-q'}$.

It is evident that q, q' and $q-q'$ are unchangeable quantities, q being equal to 1·84955, $q'=2·28209$, and $q-q'=-0·43254$. An example will render this much clearer. Let us suppose that the two sulphates weigh together 100 grains, the sulphuric acid (determined by baryta) 48 grains; consequently the two bases must weigh 52 grains. To find K, (the weight of the potash,) b (the weight of the two bases) $=52$ we multiply by $q'=2·28209$, and then subtract the product obtained $=118·66868$ from S (the weight of the two salts) $=100$, and divide the rest $=-18·66868$ by $q-q'=-0·43254$, by which 43·15 are obtained. These 43·15 of potash, to be converted into neutral sulphate of potash, will require 36·63 sulphuric acid. N (the weight of soda) can be ascertained by substituting the proper numbers for the letters in its formula, when it will be found to be 8·83, equivalent to 20·17 sulphate, which added to the sulphate of potash, furnish 99·95, the original amount being 100 grains.* J. L. S.

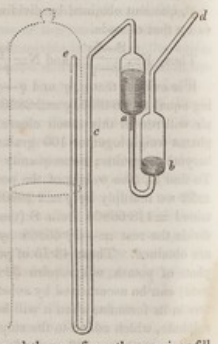
22. *Purifying Arseniferous Sulphuric Acid during its Manufacture*; by A. DUPASQUIER, (Compt. Rend., March, 1845, p. 794.)—In much of the sulphuric acid prepared from pyrites or from the sulphur obtained from pyrites, arsenic is present in the proportion of from 1 to $1\frac{1}{2}$ thousandths. The author recommends the use of the alkaline sul-

* This method I have found accurate and very easily performed; and if upon more extended experiments its accuracy be found to hold out, the analyst will require no better method. J. L. S.

phurets as a means of purification, (more especially the sulphuret of barium,) during the preparation of the acid. By this means also the nitric acid is necessarily destroyed, an acid occurring in most of the sulphuric acids of commerce. J. L. S.

23. *Observations on an Acid Rain;* by M. Ducres, (Journ. de Pharm., April, 1845.)—During the early part of June, 1842, a storm occurred in the town of Nismes, accompanied with much thunder and a large amount of hail. From some peculiarity in the taste of the hail, the author was led to examine it more closely. Having collected a quantity of it, and allowed it to melt, it was found to have an acid reaction, which upon examination was found to be due to nitric acid, formed no doubt by the action of electric fluid on the elements of the atmosphere. The occurrence of nitric acid in hail is not new, but the statement of this fact goes to confirm observations previously made. J. L. S.

24. *Gas Pipette;* by Dr. Ettling, (Ann. der Chem. und Pharm., Jan. 1845.)—This little instrument, easy of construction, will no doubt be found very serviceable for many purposes in the laboratory, as transferring gases from vessel to vessel without disturbing their position. Its construction and manner of operating is very readily understood by referring to the annexed figure. Previously to using the instrument, the extremity *c* is immersed in the liquid over which the gas has been collected, and the cylinder *a* filled by sucking at *d*, after which the branch *c* is passed beneath the receiver and the sucking continued,



when the water will pass from *a* to *b*, and the gas from the receiver fill the cylinder *a*. It may now be transferred to another vessel by introducing the same branch and blowing in air at *d*. J. L. S.

25. *Iridescent Silver.*—(In a note from Prof. John Brockelsby of Trinity College, Hartford, Conn., to B. Silliman, Jr.)—It is well known to those who are conversant with optical phenomena, that the brilliant play of prismatic colors exhibited by mother of pearl is due to the structure of the surface; provided the shell is cut and polished in a particular manner. This interesting fact was announced to the scientific world in 1829 by the discoverer, Dr. Brewster, who

successfully transferred by pressure the splendid tints of the pearl to black wax, fusible metal, balsam of tolu, lead, tin, and various other substances. The colors displayed by fusible metal possess at first extraordinary beauty, which in a short time is partially lost, owing to a change that occurs upon the surface of the metal.

A few months ago, while engaged upon some experiments in electrotyping, I was led to think that by this process the hues of the pearl might be readily transferred to those metals, which from their hardness are incapable of receiving impressions in mass, but yet, on account of their freedom from oxidation, retain for a long time a surface comparatively pure. I therefore took a Smee's battery, which I had just constructed, and after several experiments succeeded in obtaining small sheets of silver, radiant with the hues of the shell. When seen by a single light, as that of a lamp, the play of colors is surpassingly beautiful, scarcely inferior to that of the pearl; and where equal care was employed, the plate of silver, which was formed eight months ago, rivals in brilliancy that which came fresh from the battery a few hours since.

The process by which this result is obtained is as follows. The first thing required is to prepare the shell. This is effected by grinding, and polishing it upon the back, in such a manner as to cut through the numerous concentric strata that compose its substance. When this is done, by the aid of a microscope the surface will be seen covered with delicate grooves, some thousand in an inch, formed by the sections of the concentric laminæ, and this configuration gives rise to the glowing tints of the shell. The next step is to obtain an exact impression of this surface upon some good conductor of electricity. This we are enabled to do by means of fusible metal, if proper precautions are employed in taking the impression. I pursue exactly the same method as in taking the copy of a medal. After fusing the metal, I pour it upon oiled paper, and when the air bubbles cease to rise through the metal the oxide is skimmed from its surface with a card, and as soon as it presents the appearance of a perfect mirror the shell is forced down upon it by a sudden pressure. When the metal has cooled I remove it from the shell, and having ascertained the accuracy of the impression, immediately plunge it, before any change of the surface can occur, into the silver solution, thereby completing the circuit between the poles of the battery. In a few moments the surface of the metal is frosted with silver, and the configuration of the shell exactly copied. A sheet of silver, of sufficient thickness to be easily removed with a pen-knife, will be deposited in the course of five or six hours under favorable circumstances. The battery I have employed consists of two plates of amalgamated zinc and one of platinized silver, six inches by eight.

The working mixture is sulphuric acid and water, the strength varying with the temperature, and the amount of work to be performed. I have found a wine-glass of acid to three quarts of well-water, at the temperature acquired by standing a few hours in a room at 70° Fah., to answer very well, when the surface to be plated did not exceed 1½ square inches. The silver solution is made by dissolving cyanide of potassium in water, and adding thereto the oxide of silver. The ratio of the ingredients I am unable to state, as I have not hitherto directed my attention to this point, but have prepared the solution by trial until I obtained the desired result.

By the process above described, we can at pleasure transfer the tints of the pearl to those pure metals, which will best preserve their brilliancy, and while the knowledge of this fact is interesting as a matter of science, it may perhaps be well for the artist to consider if it cannot be applied to some ornamental purpose, and the beauty of the precious metals enhanced, by teaching them to glow with the richest hues of light.

26. *On the Volumes of Atoms and their Relation to the Position of the Elements in the Electro-Chemical Series;* by M. Avogadro, (Bib. Univ. Genev. June, 1845, p. 182; from Mem. Acad. Roy. Turin, Vol. viii.)—The author gives the following table, and demonstrates that the order of the elements which it presents, is in general their order in the electro-chemical scale; and such discrepancies as appear, he believes will be removed when the molecular volume is more accurately determined.

NAMES OF SUBSTANCES.	MOLECULES, oxygen = 1m.	DENSITY, water = 1d.	VOLUME, molecular $\frac{m}{d}$.	VOLUME, molecular, gold = 1.
Chlorine,	0·35	1·40	0·395	0·612
Iodine,	1·98	4·95	0·399	0·618
Bromine,	1·22	3·00	0·407	0·632
Carbon, (diamond,)	1·50	3·50	0·429	0·665
Sulphur,	1·00	2·00	0·500	0·775
Phosphorus,	0·98	1·77	0·553	0·858
Palladium,	6·66	11·70	0·569	0·882
Platinum, Iridium,	12·33	21·50	0·573	0·889
Rhodium,	6·51	11·10	0·586	0·909
Osmium,	12·44	19·50	0·638	0·989
Gold,	12·43	19·26	0·645	1·000
Silver,	6·76	10·47		
Manganese,	6·29	8·01	0·785	1·218
Mercury, (solid,)	12·66	15·50	0·817	1·266
Arsenic,	4·70	5·75	0·817	1·267
Cobalt,	7·38	8·50	0·868	1·346
Nickel,	7·40	8·40	0·881	1·366
Iron,	6·78	7·60	0·892	1·382
Copper,	7·92	8·80	0·901	1·396
Tin,	7·35	7·29	1·008	1·563
Lead,	12·94	11·40	1·135	1·760
Zinc,	8·06	7·00	1·151	1·785
Potassium,	1·22	0·86	1·424	2·209
Sodium,	1·45	0·97	1·500	2·325

M. Avogadro has fixed upon 0·650 as expressing neutrality, or a state neither basic or acid, gold being the unit. He next deduces an *affinitary* number by taking the cube roots of the molecular volumes, which he finds to express the actual relations he had elsewhere determined for the elements, as regards the strength of their affinities. Thus $\sqrt[3]{0{\cdot}65}=0{\cdot}866$, will be the affinitary number of the neutrality point in the scale; $\sqrt[3]{2{\cdot}209}=1{\cdot}303$, the affinitary number for potassium; consequently $1{\cdot}303-0{\cdot}866=0{\cdot}437$, is the distance of potassium from the point of neutrality. The following table contains his results; which however he considers as only approximations, that more accurate data will hereafter correct.

Names of substances.	Affinitary number, (gold = 1).	Affinitary number, (ox. = 1).	Names of substances.	Affinitary number, (gold = 1).	Affinitary number, (ox. = 1).
Oxygen,	0·214	1·00	Gold,	1·000	4·67
Chlorine,	0·849	3·97	Silver,		
Iodine,	0·852	3·98	Manganese,	1·068	4·99
Bromine,	0·859	4·01	Mercury,	1·082	5·06
Point of neutrality,	0·866	4·05	Arsenic,		
Carbon,	0·873	4·07	Cobalt,	1·104	5·16
Sulphur,	0·919	4·29	Nickel,	1·109	5·18
Phosphorus,	0·950	4·44	Iron,	1·114	5·21
Palladium,	0·959	4·48	Copper,	1·118	5·22
Platinum, Iridium,	0·962	4·50	Tin,	1·161	5·43
Rhodium,	0·969	4·53	Lead,	1·207	5·64
Osmium,	0·996	4·65	Zinc,	1·213	5·67
			Potassium,	1·303	6·09
			Sodium,	1·325	6·19

27. *Connection between the constitution and boiling point of organic substances;* by M. S. Schröder, (Ann. de Chim. et de Phys. xiii, 1845, p. 145, from Ann. Pogg. lxii, p. 184.)—M. Schröder has deduced the following general laws:—

1. The molecular volumes of the equivalents of organic bodies are equal in the liquid state at equal distances from their point of ebullition; the volume of the compound is equal to the sum of the volumes of the constituent elements; these volumes are represented by entire numbers and have a simple relation.

Thus from the elementary composition and the point of ebullition, the density in the state of vapor may be determined; and reciprocally, knowing the elementary composition and the density of the vapor, the equivalent of a substance may be deduced.

2. The equivalents of volatile organic substances, generally adopted, and the equivalents of their elements, are too large compared with those of the metals and ought to be divided by 2.

The atomic weights of most metals are consequently double what they should be compared with those of oxygen, hydrogen, carbon, nitrogen, sulphur, chlorine, bromine, iodine, as Gerhardt endeavored to demonstrate.

3. The density of the vapor of a substance or its equivalent being given, as also the elementary composition and point of ebullition, the nature of its constituent parts may be determined, provided the compound does not include components which have not been isolated, and whose influence upon the point of ebullition has not been ascertained.

4. Reciprocally, from the composition, we may deduce—1, the equivalent; 2, the density of its vapor; 3, the density in the liquid state; 4, its point of ebullition.

These several laws are illustrated by numerous examples, and the influence of different radicals on the boiling point given. Thus water of "hydratation" ($H^4 O^2$) raises the point of ebullition of a substance 113·5° C. The oxyd of carbon ($C^2 O^2$), 57°; carbonic acid ($C^2 O^4$), 90°; formyle ($C^4 H^4$), 52°; methylene $(C^2 H^4)^m$, 21°; $(C^2 H^4)^e$, 17°; and hydrogen (H^4) diminishes the temperature of ebullition 3°.

Benzine ($C^{12} H^{12}$) boils at 86°, MITSCHERLICH.

Retinaphtha ($C^{14} H^{16}$) boils at 108°, WATER.

Retinaphtha consists of methylene and benzine; the point of ebullition should therefore be 21°; and observation gives 22°.

Ether ($C^8 H^{20} O^2$) boils at 35·7°, GAY LUSSAC.

Carbonic ether boils at 125° to 126°, ETTLING.

The point of ebullition, as above given, ought to be 90° greater for carbonic ether than for ether, and so it is.

Oxalic ether ($C^{12} H^{20} O^8$) boils at 183° to 184° C., DUMAS and BOULLAY. And as it differs from carbonic ether in the addition of oxyd of carbon ($C^2 O^2$), the point of ebullition should be raised 57° and observation gives 57° to 58°.

To determine the point of ebullition of Tetramethylene $(C^2 H^4)^m_4$ *from that of Benzine, that is, from triformyle* $(C^4 H^4)^3$.—Formyle raises the boiling point 52°; consequently triformyle will raise it $52 \times 3 = 156°$; methylene raises it 21°; and tetramethylene consequently $21 \times 4 = 84°$.

The boiling point of benzine is 86°; now if benzine, which raises the temperature 156°, has for its boiling point 86°, which is 70° less than 156°, then tetramethylene, which raises the temperature 84°, will have for its boiling point 14°, which is 70 less than 84°. M. BOUCHARDAT has obtained a carburet of hydrogen ($C^8 H^{16}$) which boils at 14·5°, and he has called it *Caoutchène*. This carburet is no other than tetramethylene.

Alcohol $= (C^4 H^{12} O^2)$, or is a hydrate of bielayle $(C^2 H^4)^2_2 (H^4 O^2)$; it boils at 78·4°. The number representing the influence of its component parts is $2 \times 17 = 34°$ for bielayle; and 113·5° for water; the sum equals 147·5°. Subtracting 78·4°, the boiling point of alcohol, we obtain 69·1°. We find now the boiling point of benzine or triformyle by subtracting 69°·1 from $3 \times 52 = 156°$, which represents the influence of triformyle. We thus obtain 87°; observation gives 86°.

The author goes on to give the calculated and observed boiling points for a great variety of substances, and with those whose composition is fully understood, the results corroborate throughout his most remarkable deductions.

28. *Contraction of Ice in Cooling*, (Ann. de Chim. et de Phys., 3d series, xiv, 1845, p. 369.)—M. BRUNNER, by a series of experiments, has shown that, contrary to the observations of M. PETZHOLDT, ice contracts by cold. He obtained the following as the amount of linear contraction for 1 degree of Centigrade, by three methods—·0000416, ·0000315, ·0000395; from which is deduced the mean ·0000375 or $\frac{1}{26666}$. This is equivalent to ·00002083 for a degree of FAHRENHEIT. The contraction of ice consequent upon a diminution of temperature, is greater than that of any other solid body hitherto examined. The following table gives the density at different Centigrade temperatures.

Temperature.	Density of Ice.	Temperature.	Density of Ice.	Temperature.	Density of Ice.
0° C.	0·91800	— 7° C.	0·91879	—14° C.	0·91957
—1	0·91812	— 8	0·91890	—15	0·91968
—2	0·91823	— 9	0·91901	—16	0·91980
—3	0·91834	—10	0·91912	—17	0·91991
—4	0·91845	—11	0·91924	—18	0·92002
—5	0·91856	—12	0·91935	—19	0·92013
—6	0·91868	—13	0·91946	—20	0·92025

Just the reverse is the case with water, which continues to *dilate* by increase of cold, as shown by M. DESPRETZ, whose experiments were carried to —20° C., (—4° F.)

29. *Transparency of Quicksilver*, (L'Institut, No. 605, p. 279.)—M. MELSENS has found that quicksilver in minute globules is transparent and transmits a blue light, slightly tinged with violet. These globules are formed when a fine stream of water is dropped on a mercury bath; the drops of water, in consequence of falling with some force, become covered with a thin pellicle of mercury, which present the fact here stated. The result has been verified by ARAGO.

30. *On Wax*; by M. B. LEWY, (extracted from M. LEWY's memoir, Ann. de Chim. et de Phys. xiii, 1845, p. 438.)—Beeswax is changed completely into a soluble soap when treated with a very concentrated solution of potash.

Treating wax with boiling alcohol, dissolves out the *cerine*, which on cooling is deposited in fine needles. On evaporating the alcohol after filtration, another compound is obtained, called *ceroleine*. Ceroleine is very soft, melts at 83·5° F., is very soluble in cold alcohol and ether; it constitutes 4 to 5 per cent. of the wax.

From the soap obtained with potash, muriatic acid separates an acid named *cerinic acid*; it is white and crystallizable.

A vegetable wax is obtained in China from a Rhus (*R. succedaneum*,) which requires a temperature of 180° F. for fusion. It is but slightly soluble in boiling alcohol or ether, but completely so in naphtha. With a lye of potash it forms a soluble soap; it also combines with baryta.

The *Palm wax* from New Grenada is obtained from the *Cerozylon andicola*. The scrapings from the exterior of the tree are boiled by the Indians, and the wax swims on the surface of the water. After being purified, it has a yellowish white color and fuses at 161½° F.; it is but slightly soluble in boiling alcohol.

Other kinds of wax of vegetable origin are, the wax of the *Myrica cerifera*; of *Carnauba*, derived from a palm in northern Brazil; of *Ocuba*, from a tree in the provinces of Para and Guyana, and afforded by a species of *Myristica* (either the *M. ocoba*, *officinalis*, or *sebifera*;) of *Bicuiba*, derived from the *Myristica bicuhyba*, according to Brongniart; of *Sugar-cane*; and of *Andaquies* from the upper regions of the Oronoco and Amazon east of the Cordilleras. Of each of these varieties, analyses are given by M. B. Lewy. He concludes by expressing his doubts with regard to the experiments of Milne Edwards and Dumas upon the animal origin of beeswax, and sustains the view that it is collected by the bees.

31. *Organic Compounds*, (L'Institut, 1845, xiii, p. 333.)—M. Laurent has arrived at the conclusion, after numerous analyses and comparisons, that in all the organic compounds, the sum of the atoms of nitrogen and hydrogen (or of the bodies which may replace hydrogen, such as the halogen bodies and the metals) is always divisible by *four*.

32. *Analysis of a Chinese Metallic Mirror*, (L'Institut, 1845, p. 332, from Erdmann's Jour. 1845, No. 8.)—M. Elsner obtained by his analysis the following results:—

	I.	II.
Copper,	80·823	80·850
Lead,	9·389	10·038
Antimony,	8·431=98·643	8·430=99·318

The mirror was a very perfect one, and was scarcely at all tarnished. It afforded a trace of iron but no arsenic. He suggests as probable, that in preparing the alloy equal parts of lead and antimony were employed, but that a part of the antimony was volatilized during the fusion.

33. *Air of Mines*, (L'Institut, No. 603, 1845, p. 255.)—M. Leblanc, on analyzing the air of Poullavuen mine, finds that when most altered by respiration and combustion of lamps, there is 3 to 4 per cent. of carbonic acid, and a diminution of 4 to 5 per cent. in the proportion of oxygen. The miners' lamps are extinguished; but by placing the meshes of two lamps in contact, combustion often goes on where one alone fails. The respiration of the miners is a little impeded, but work is possible when this limit is not exceeded, provided the temperature is low. Air collected at Huelgoet, in an unoccupied shaft, showed a diminution of 10 per cent. in the amount of oxygen, without a replacement of the same by carbonic acid, which circumstance he attributes to the influence of decomposing pyrites.

34. *Bezoardic acid.*—This acid according to Wöhler, is identical with the ellagic acid of Braconnot.

35. *Litharge*, (L'Institut, No. 605, p. 276.)—M. F. Leblanc has determined that oxygen will dissolve in litharge in fusion, in the same manner as in silver, without forming a superoxyd; also that nitrogen probably dissolves in a feeble proportion in the same manner. He concludes also that litharge and red lead differ only physically in structure, color and density, but not in composition.

II. Mineralogy and Geology.

36. *Cancrinite, Nepheline, and Zircon, from Litchfield, Maine*; by Dr. C. T. Jackson, (from the report in the Proceedings of the Geol. Assoc., for 1845.)—The Cancrinite was found by Mr. Stacy, in boulders in granite, associated with Zircon and Nepheline. The masses are an inch or more in diameter, with some indications of a rhombohedral cleavage. They are translucent, with a deep azure blue color. Hardness=6; specific gravity=2·420—2·462. The mineral gelatinizes in acids quickly. Before the blowpipe it loses its color, becoming transparent below a red heat; and at a red heat it melts to a colorless glass.

The Nepheline occurs occasionally in six-sided prisms of a lemon or sulphur yellow color, with a vitreous lustre inclining to resinous; also in masses with a somewhat oily lustre and a greenish yellow color, (variety Elæolite.) The crystals have the specific gravity 2·42, and the Elæolite variety, 2.442. The hardness is 5 to 5·5.

The following are the analyses of these minerals, by Dr. Jackson:

	Cancrinite.		Nepheline.
Silica,	35·400		34·700
Alumina,	31·750		28·000
Soda,	17.578		13·360
Sulphuric acid,	6.460		
Oxyd of Manganese,	4·397	Oxyd of manganese and of tungsten?	3·700
Magnesia,	1·800		2·800
Lime,	1·856		8·440
Water,	0·875		

In the analysis of the Cancrinite, if the sulphuric acid be regarded as sulphur, it will amount only to 2·592 per cent., and indicates a loss of 3·752 per cent. Dr. Jackson states that it is probable that a portion of the sulphur must be in a state of sulphuric acid, while another por-

tion combined with sodium and alumina probably gives the rich blue color to the mineral. The analysis differs essentially from that in Poggendorf's Annalen, xlvii, p. 179, in the occurrence of sulphur and sulphuric acid in place of carbonic acid. Dr. JACKSON consequently analyzed a specimen of the foreign mineral so far as to ascertain that no carbonic acid exists in it, and that it does contain sulphur and sulphuric acid.

The crystals of *Zircon* are short prisms, sometimes highly modified. One crystal found by Mr. STACY, was a little more than one inch in diameter.

37. *Iberite, a new mineral from Montalvan, province of Toledo, Spain;* by E. C. NORLIN, (Bib. Univ. Geneva, July, 1845, p. 375; from Compt. Rend. Acad. Stockholm.)—This mineral occurs in large hexagonal prisms and is near Gigantolite. It has both lateral and a basal cleavage; hardness 2·5; specific gravity 2·89; fracture scaly; color pale grayish-green; opaque, with a lustre between pearly and vitreous. Exposed to the blowpipe it melts at a strong heat and fuses perfectly into a glass; and in a tube it gives off water. Composition, according to M. NORLIN, silica 40·901, alumina 30·741, protoxyd of iron 15·467, potash 4·571, soda 0·043, protoxyd of manganese 1·327, lime 0·397, magnesia 0·806, water 5·567=99·820; from this he deduces the formula

$$(Fe, K)^3\ \ddot{S}i + \ddot{A}l^2\ \ddot{S}i + 3\dot{H}.$$

Amphodelite has the same formula, exclusive of the water.

38. *Damourite, a new mineral*, by M. DELESSE, (L'Institut, No. 605.)—Damourite is a hydrosilicate of alumina, having the formula, according to DELESSE, $\ddot{S}i\ K + 3\ddot{S}i\ \ddot{A}l + 2\dot{H}$. It occurs in small lamellar crystals, having a pearly lustre, and a little harder than talc. Its specific gravity is between 2·74 and 2·82. Before the blowpipe it melts with difficulty to a white enamel, not acted upon by muriatic acid or aqua regia; it is completely attacked by sulphuric acid.

39. *Diaspore*, (L'Institut, No. 605.)—DAMOUR finds that this mineral is attacked by acids after being strongly calcined, and has thus analyzed it. His results were the same with those of BERZELIUS and DUFRENOY.

40. *Native Lead.*—Native lead has been detected in the carboniferous limestone near Kenmar, County of Kerry, Ireland. It occurs in grains in crevices in the rock, and fragments weighing half an ounce are said to have been obtained. This mineral is said also to occur in the chain of Luquillo, at Porto Rico.

41. *Crystallization of Sulphuret of Cadmium and Perowskite;* by M. DESCLOISEAUX, (Ann. de Chim. et de Phys., xiii, 1845.)—The form is a hexagonal prism terminating in the faces of one or more six-sided pyramids, and with a truncate summit. DESCLOISEAUX has determined

the relation between the vertical and a lateral axis to be as 689 : 418. The inclination of P or the terminal plane, on the four faces in succession, observed between P and M, (a lateral plane of the prism,) are as follows:—P : b^2=154° 33′, (154° 32′ observed by Breithaupt;) P : b^1, 136° 25′ (136° 23′, by Breithaupt;) P : $b^{\frac{1}{2}}$=117° 43′; P : $b^{\frac{1}{4}}$=122° 9½′.

Perowskite is a titanate of lime, from the Ural, and occurs in modified cubes. DESCLOISEAUX figures a very complex crystal with 7 planes on each edge, and 10 on each angle, or 164 faces in all. The modifications are in part hemihedral.

42. *Baryto-calcite;* MM. DESCLOISEAUX and DUMAS, (Ann. de Chim. et de Phys., xiii, 1845, p. 425.)—This mineral assumes two distinct forms, one an oblique rhombic prism and the other a right rhombic; the former is from Alston Moor, and the latter from Fallowfield. Analyses by DESCLOISEAUX and DUMAS confirm the view that they are identical in composition; the formula is $\dot{C}\ Ba + \dot{C}\ Ca$.

43. *Fluids and Crystals in Topaz*, by Sir DAVID BREWSTER.—These crystals and fluids, occupying cavities in topaz crystals, have been found to be of various kinds. The crystals present the following different forms. Cube, cube with truncated edges and angles, rhombohedron, prism with plain and pyramidal summits, rhomboidal plates, hexagonal plates, and long rectangular plates; and Sir DAVID has determined that there are two distinct substances under a tesseral form, and three others among the remaining forms. They are operated upon very differently by heat, some dissolving easily and others not at all.

The fluids are of two kinds, one dense and the other light and volatile. By heat they sometimes made their way out of a cavity between the laminæ to some other resting place or to the surface, the laminæ closing together after the passage of the fluid.

44. *Phacolite observed in New York*, (communicated by Mr. ALGER.)—Mr. ALGER has detected this mineral among specimens of minerals received from Messrs. MATTHEWS and JOHNSON, of New York city. It was labelled stilbite, but proves on examination to be *phacolite*. It occurs in geodes, the crystals implanted on calc spar, and associated with silvery mica, and a few scales of specular iron. They are of a wax or honey-yellow color and a waxy lustre, translucent and brittle. It is extremely scarce.

45. *Yttro-cerite*, (ib.)—This rare mineral has been found by Mr. ALGER associated with Brucite, in masses of rolled limestone from the town of Amity, Orange County, N. Y.

46. *Dysluite identical with Automolite*, (ib.)—Mr. ALGER states that from recent observations of the New Jersey specimens, he is satisfied there is no reason for any longer considering the two minerals distinct.

The characteristic differences heretofore insisted on in color, hardness, specific gravity, &c. being well accounted for by the isomorphous replacement of alumina and peroxide of iron, and protoxide of iron and zinc. This opinion is confirmed by the following comparison of compositions, according to the analysis of automolite by ECKEBERG and ABICH.

Dysluite.		Ox. Ratio.		Automolite.	Ox. Ratio.
Alumina,	30·49	14·23 } 20·51=3	Alumina,	57·09	25·37=3
Perox. Iron,	30·00	6·00 }	Oxide Zinc,	34·80 }	
Protox. Iron,	11·93	2·65 }	Magnesia,	2·22 }	7·42=1
Protox. Mang.	7·60	1·68 } 7·53=1	Protox. Iron,	4·55 }	
Oxide Zinc,	16·80	3·20 } THOMSON.			ABICH and ECKEBERG.

To confirm this probable view, a new analysis of dysluite is required, to show the iron to be protoxide, as Dr. THOMSON, (the only chemist who has analyzed this mineral,) states it to be peroxide.

47. *Acadiolite of Nova Scotia*, (*Chabasite.*)—Mr. A. A. HAYES, of Roxbury Laboratory, analyzed this mineral for Mr. ALGER's edition of PHILLIPS' Mineralogy. As the analysis has not before been published in this Journal, we annex it.

	I.	II.
Silica, -	52·02	52·20
Alumina, -	17·88	18·27
Lime, -	4·24	6·58
Potash, -	3·03 }	2·12
Soda, -	4·07 }	
Water, -	18·30=99.54 HAYES.	20·52=99·69 HAYES.

These results agree closely with those obtained by HOFFMANN, and prove the identity of this mineral with chabasite, although RAMMELSBERG has given a somewhat different formula for the two.

48. *Washingtonite of Shepard.*—This mineral was analyzed by Mr. J. L. KENDALL, under the direction of Dr. C. T. JACKSON, (also for Mr. ALGER's book,) and gave the following result:

		Ratio of Ox.
Titanic acid, - - -	25·28	1
Peroxide of iron, - - -	51·84	2
Protoxide of iron, - - -	22.86=99·98	1

The identity of this mineral with an Ilmenite from Arendal, analyzed by MOSANDER, cannot be questioned, thus:

		Ratio of Ox.
Ilmenite of Arendal by MOSANDER,—Titanic acid,	24·19	1
Perox. iron,	53·01	2
Protox. iron,	19·91 }	1
Mag. and lime,	1·01 }	

49. *Mexican Fossils*, (cited from Ann. Mag. Nat. Hist. xvi, 1845, p. 212.)—In a letter to Prof. BRONN, M. CLAUSSEN states that he has again found in Brazil a great many fossil bones, and among them the head of a large tiger related to *Felis meganthereon* (*Ursus cultridens*), but it is much larger; the upper canine teeth are nearly 10 inches long and 1½ broad. The French Institute has purchased it for 4000 francs. The remainder of the collection, except the duplicates, has been disposed of to the British Museum. He promises subsequently to communicate some remarks on the occurrence of these fossil bones, and especially on that of the human remains, which are found among the bones of various extinct animals. He has discovered two kinds of *monkeys*, which approximate to the genera *Mycetes* and *Cebus*. A short time since also, among a number of pieces of amber (not copal), he found some containing insects, in which distinct spiders' webs could be seen (thus fossil spiders' webs!!); in some, the webs and also the insects hanging in them were evident.

50. *The Oust-Urt, and shores of Lake Aral;* (L'Institut, 605, p. 256.)—This region hitherto little known, has been geologically examined by M. S. de HELMERSEN. He has ascertained, that at the period when the beds of the Oust-Urt were deposited, the Caspian and Aral seas formed a single Mediterranean sea; that at the middle of this sea stood a high island—the Oust-Urt—at whose foot commence formations of marl and sandy clays, in which marine and fresh-water fossils are mingled; that the two seas communicated with one another for a period by a channel, and had a common fauna even to the formation of the most recent deposits, which include some existing species.

51. *Infusoria.*—EHRENBERG has arrived at some remarkable results with regard to the prevalence of infusoria in volcanic rocks. They are as follows:—

Numerous and widely extended observations have proved that there is an ultimate reciprocal relation between independent infusorial life and the volcanic phenomena exhibited upon the banks of the Rhine. Volcanic crystals of sodalite, leucite, and probably of augite, consist in part of masses of infusoria.

The volcanic island of Ascension, so destitute of life, animal and vegetable, and even of streams of water, and situated in mid-ocean, presents an enormous mass of volcanic cinders which consist almost wholly of organic matters, principally of fibres of plants, along with some *fresh-water* siliceous infusoria.

Although observation shows that in all parts of the world the infusoria, prevalent in volcanic rocks, are of *fresh-water* origin, still Patagonia affords *marine* deposits, constituting masses of great thickness.

The Pyrobiolitic rocks in Patagonia constitute extensive beds 800 feet thick, containing no carbonate of lime, and only here and there a little sulphate of lime.

The cinders which have been ejected by Pompeii, are of fresh-water formation; and they are similar to those constituting the tufa of Hochsimmer, on the Rhine.

The bed containing the fossil Mastodon, on the La Plata, and that of the fossil bones at Monte Hermosa, and the hills in the plains of Bahia Blanca, are formations of fresh-water origin, mixed with some marine.

52. *Abundant occurrence of rare Infusoria in the Scallop.*—(To the Editors of the Annals of Natural History.)—Gentlemen: The discovery some time since of the siliceous shells and cases of animalcules in the stomach of recent *Lepades*, belonging to many of the genera and some of the species which constitute a large proportion of the miocene tertiary strata of Virginia, was announced in Dr. Mantell's recent work, the 'Medals of Creation.' (See vol. i, p. 586.) This fact, so highly interesting in a geological point of view, has been fully established by many; and among others by the Rev. J. B. Reade, who has communicated the result of his examination of the oyster to the Microscopic Society. Having subsequently extended my investigations to the contents of the digestive sac of other mollusks, it may interest your readers to be informed that the common scallop (*Pecten maximus*) now in season, and therefore easily obtained, contains a richer assemblage of the most beautiful siliceous carapaces of animalcules than any other of the mollusca hitherto noticed.

So abundant and diversified are these forms in the scallop, that a few grains of the undigested contents of the stomach, properly prepared and mounted on a glass slide, exhibits many of the species usually found in the Richmond earth, and indeed could not be readily distinguished from a similar preparation of the fossil forms.

Another remarkable fact, also noticed in the 'Medals,' (see p. 233,) that of the occurrence of the mineralized bodies of Polythalamia, is fully confirmed; and when the eye of the observer becomes accustomed to the appearances presented by remains of this kind, they will be found abundantly in most chalk flints. I discovered one species in an atom of flint, in which the entire body of a *Rotalia*, except that part of it which occupied the outer cell, is as beautifully preserved as that of an insect in amber.

I am, gentlemen, yours obediently, Hamlin Lee.

Chester Square, Pimlico, April 21, 1845.

53. *On the Microscopic Constituents of the Ash of Fossil Coal;* by Professor Ehrenberg, (Ann. Mag. Nat. Hist., xvi, 1845, pp. 69, 70.)—At the meeting of the Berlin Academy of the 25th of October, Prof. Ehrenberg communicated an observation of Dr. Franz Shulz of Eldena, which the latter had addressed to M. v. Humboldt in a letter, in which he describes his method of separating the silica contained in coal so chemically pure as to enable us to recognize the microscopical

siliceous organisms. "The usual method of burning the coal," Dr. Schulz states, "is attended with an unavoidable vitrification of the mineral constituents, even when conducted in the slowest and most cautious manner, owing to which their cellular structure is lost. After many fruitless experiments I succeeded in hitting upon a method of incineration, which leaves the silica contained in the coal perfectly unaltered. Very instructive preparations are readily obtained (from the already known structural relations of siliceous earth in plants) on moistening grass-halms, ears of grain, *Equisetum*, Spanish cane, &c. with nitric acid, and afterwards burning them on platinum foil. The nitric acid not only facilitates the combustion of the organic substance, but also prevents the potash combined with the vegetable acid from being converted into carbonate of potash before the silica has been heated to such a degree as to be less liable to be acted upon. The greater degree of heat required for the perfect combustion of the coal no longer destroys the cellular form of the silica after nitric acid has prevented the production of carbonate of potash on the first application of heat. An excess of nitric acid has the effect of destroying the connexion of the siliceous cells and acts too powerfully upon them, and should therefore be avoided.

"Encouraged by the success of these experiments, I turned my attention to coal, it being exceedingly desirable to be enabled to detect remains of organic structure in it. The large quantity of siliceous earth contained in all varieties of coal led me to infer that a judicious method of incineration would be attended with good results; your excellency will be enabled to judge from the preparation attached in how far I have succeeded. A piece of coal of about two square inches was broken into twelve pieces of nearly the same size, and then treated with nitric acid in a platinum vessel. The nitric acid being evaporated at a moderate heat, I ignited the residue until no further empyreumatic vapors were given off, treated the residue again with nitric acid and repeated the ignition. Thus prepared, the coal was placed in a platinum crucible with a lid perforated in the centre, and air was blown from a gasometer through the aperture in the lid, whilst the crucible was kept at a red heat over a spirit-lamp, so that the coal was necessarily slowly consumed. The ash thus obtained had not coked, but formed a brownish powder. Some white splinters occur among this, which appear on microscopical examination to be aggregated siliceous cells arranged in regular succession, of the structure of the prosenchymatous cells of wood."

Prof. Ehrenberg added, that the importance of a method for obtaining the organized siliceous parts from the lower strata of the earth with their forms preserved for microscopical observation is manifest, and

requires no recommendation, to judge from the results which have already ensued. His own efforts with respect to coal had never been attended with success, and he therefore considers this method as a most useful and important discovery. He further stated that the clearness of the specimens (which were, it was to be regretted, not numerous) communicated by M. Schulz had astonished him, and, as might have been expected, had immediately been attended with a result. Prof. Ehrenberg had during many years brought before the Academy descriptions of the parts of plants (containing silica) which are found in marshy soils of all zones and in the infusorial deposits, and had likewise alluded to their origin from recent plants. This group, called *Phytolitharia*, had been as it were classified by him into eleven genera. Of these eleven genera only one is found in several forms in the purified siliceous ash of the coal forwarded by M. Schulz, namely the genus *Lithostylidium*, which contains regular siliceous nuclei of cells of plants. *Lithodontia*, or marginal teeth of grasses, *Lithodermatia*, or epidermis of plants (*Equisetacea Arundinacea*), could not be distinctly recognized, although the presence of the latter may be presumed. Other negative results were also particularly remarkable, namely the absence of all *Lithasterisci*, *Lithosphæræ*, *Spongolites*, &c. &c., otherwise so frequent. Finally, no trace of infusoria possessing a siliceous shell was found, notwithstanding the most careful investigation.

He concluded by expressing a conviction that a rapid development of our knowledge on this subject would, now that a method had been discovered, undoubtedly take place, and a wish that this may be the commencement of its study.

54. *On some New Species of American Desmidiaceæ, from the Catskill Mountains;* by J. W. Bailey.—During the month of August, 1845, I collected from the ponds near the Catskill Mountain House, a portion of the sediment adhering to various submerged bodies, and on submitting it to microscopic examination, I found it unusually rich in interesting organisms. Among these were some which appeared to me to be so novel and interesting, as to merit being placed on record by at least the following brief notice.

1. *Euastrum muricatum*, (figs. 1 and 2.) Body binary, each half divided by deep indentations into three transverse portions, of which the one nearest the middle has six projecting arms, (three on a side,) and the other two have each four arms, (two on a side.)

Fig. 1. Fig. 2.

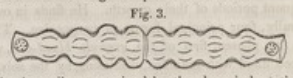
This is one of the most remarkable species of *Euastrum* which I have yet

seen, and is at once distinguished from all known species by its numerous arms or projections, of which those belonging to each principal subdivision are not arranged as usual in the general plane of the body, but one above another in the plane perpendicular to the broadest surface to the individual. These arms much resemble those of *Xanthidium Arctiscon*, Ehr., and terminate in a similar manner in three or four diverging points. Its size is equal to the largest of the genus. It is rather rare in the Catskill Ponds.

Fig. 1 gives the front view, and fig. 2 an oblique view of the body thrown up on edge.

2. *Closterium nodosum*, (fig. 3.) Body binary, straight, somewhat cylindrical, each half having four prominent nodes.

Fig. 3.



This species is easily recognized by the deep indentations in its outline, corresponding to the constrictions which separate the transverse rows of knot-like projections. The clusters of moving corpuscles are near the extremities. When highly magnified, the outline shows something resembling minute pubescence. It is one of the largest species of the genus. I found vast numbers of this species in the Catskill Ponds, all agreeing with the above description.

Fig. 4.

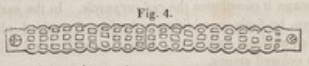


Fig. 5.

3. *Closterium verrucosum*, (fig. 4.) Body binary, straight, cylindrical, with numerous transverse rows of small prominences. Moving corpuscles near the extremities. This is a pretty species, with a waved outline caused by the slight projections, which are arranged in numerous transverse rings. It is quite abundant with the preceding in the Catskill Ponds.

The detection of the above forms gives reason to hope, that other species equally curious may be found when the productions of other sub-alpine ponds are examined.

N. B. The figures which accompany this notice are drawn to the scale which is represented by fig. 5. This shows $\frac{1}{100}$ of a millimetre magnified equally with the drawings, which are much less amplified than those given in the plates of the American *Bacillaria*.

III. Zoology.

55. *The Blood-Corpuscle considered in its different phases of development in the Animal Series;* by Thos. Wharton Jones, Esq., F. R. S., lecturer on Anatomy, Physiology and Pathology, at the Charing Cross Hospital, (Roy. Soc. June, 1845.—Ann. Mag. Nat. Hist. xvi, 1845, 131.) —This paper is divided into three parts; the first relating to the blood-corpuscles of the Vertebrata; the second to those of the Invertebrata; and the last to a comparison between the two. He first describes the microscopic appearances of these corpuscles in different classes of vertebrate animals, beginning with the skate and the frog, and proceeding to birds and mammifera; first in their early embryonic state, and next in the subsequent periods of their growth. He finds in oviparous vertebrata generally, four principal forms of corpuscles. These he distinguishes as the phases, first of the *granule blood-cell*, which he describes as a cell filled with granules, disclosing by the solvent action of dilute acetic acid on these granules a vesicular, or as the author terms it, a "*cellæform*" nucleus. These granule cells appear under two stages of development, namely, the coarsely granulous stage and the finely granulous stage. The second phase is that of the *nucleolated blood-cell*, oval in shape, containing a vesicular (or "cellæform") nucleus, and red-colored matter. These cells likewise appear under two stages of development; colorless in the first and colored in the second, in which last stage it constitutes the *red corpuscle*. In the early mammiferous embryo, he finds, in addition to the former, a third phase, that of *free vesicular nucleus*, exhibiting, like the nucleolated cell, the colorless and the colored stages.

On examining the corpuscles of the lymph of vertebrate animals, the author finds them in all the classes to be identical in structure with their blood-corpuscles, and differing only in the inferior degree of coloration, attending their last stage. In the oviparous classes, he observes that the nucleolated are more numerous than the granule cells, while in the mammifera the latter are predominant, which is the reverse of the proportion in which they exist in the blood of these animals. He finds that some of the nucleolated cells of the contents of the thoracic duct exhibit a marked degree of coloration, and have an oval shape; thus offering a resemblance with the blood of the early embryonic state.

The blood-corpuscles of all the invertebrate animals in which the author examined them, present the same phases of granule and nucleolated cells as in the higher classes, excepting that in the last stage of the latter phase the coloration is very slight, but the vesicular nucleus is frequently distinctly colored. As in the higher classes, corpuscles exist in different states of transition from the granular to the nucleolated form of cell. In some of the invertebrata, corpuscles are found which appear to be the nuclei of some of the nucleolated cells become free; and these the author considers to be abortions, rather than examples, of cells having attained their third phase of free cells. Corpuscles are also met with in these animals, in greater or less abundance, belonging to the lowest forms of organic elements, namely, elementary granules.

The comparison which the author institutes between the blood-corpuscles of the vertebrate and invertebrate divisions of the animal kingdom, tends to show that they in all cases pass through similar phases of development, except with respect to the last, or colored stage of the nucleolated cell, which they do not attain in the lower classes of animals. He finds that the blood-corpuscles of the crab, according to an analysis made by Professor Graham, contain a sensible quantity of iron, perhaps as much as red corpuscles. He considers the corpuscles of the blood of the invertebrata, in as far as relates to the absence of nucleolated cells, as resembling those of the lymph of vertebrate animals.

56. *On the Extinct Mammals of Australia, with Additional Observations on the genus Dinornis of New Zealand;* by Professor Owen, (Mag. Nat. Hist. xvi, 1845, p. 142.)—In a previous report Professor Owen had demonstrated the former existence in Australia of two genera of Marsupial animals, rivalling in size the rhinoceros and hippopotamus of the old continent. Since the reading of his first report, Prof. Owen had received three molar teeth belonging to the upper jaw of the *Diprotodon;* the crown of each tooth was divided into two principal transverse ridges, like those of the lower jaw, and the enamel presented the wrinkled and punctate surface peculiar to the genus. With these was found a large scalpriform incisor, whose bevelled cutting edge showed that it worked upon a similar tooth in the lower jaw. The *Diprotodon*, therefore, had molars like the kangaroo; but, instead of the two large incisors in the lower jaw being opposed to six smaller in the upper, as in the kangaroo, it had two large incisors above as well as below, agreeing in form and structure, and relative size, with those of the Wombat. Prof. Owen considered himself justified in concluding that the *Diprotodon* combined the characters of *Phascolomys* with those of *Macropus*, exhibiting both upon a gigantic scale, and constituting one of those links in the chain of being which the course of time has broken and destroyed. Prof. Owen also stated that a large collection of bones of the Dinornis had been obtained from a new locality by Mr. Percy Earle. This collection contains four of the species of Dinornis already described, including the three most remarkable for gigantic stature. One of these, with a stature nearly equalling the ostrich, presents in all the bones of its leg double the thickness in pro-

portion to their length, and must have been the strongest and most robust bird in proportion to its size that ever existed. Of the gigantic species, vertebræ, ribs, and an almost entire sternum, most resembling that of the Apteryx, have been obtained. The Rev. Mr. WILLIAMS has also transmitted the cranial portion of a skull related in size to the *Dinornis struthoides*, manifesting many peculiarities and a striking resemblance to the same part in the Dodo and Apteryx.

57. *On the Boring Apparatus of the Carnivorous Gasteropods, and of the Stone and Wood-burrowing Bivalves;* by ALBANY HANCOCK, Esq., (Mag. Nat. Hist., xv, 1845, p. 113.)—During the investigation of the anatomy of the *Eolidæ* by Dr. EMBLETON and myself, we ascertained, as appears in the last Number of the 'Annals,' that the teeth of these animals are composed of silex. Directed by this interesting fact, I was induced to examine the nature of the instrument by which the carnivorous Gasteropods pierce the testaceous covering of bivalve and other shells. I found this apparatus in *Buccinum undatum* to be composed of rows of stout, much-curved spines or teeth, of great brilliancy, and as glossy and transparent as glass, and certainly to have no appearance whatever of horny tissue. They are so similar to those of *Eolis*, that there could be little doubt that they are formed of the same material; and accordingly, after subjecting them to the action of acid, such was found to be the case. Their capacity to drill holes in calcareous matter is therefore easily understood, without the necessity of supposing the aid of a solvent requisite, as surmised by CUVIER.

This result was to be expected after the discovery of the siliceous nature of the teeth of *Eolis;* but that the wood and stone-burrowing bivalves should work out their excavations by an instrument provided with the same material, may, perhaps appear somewhat startling. Such however I believe is the fact; a fact which if established will at once explain all the phenomena attending this much-controverted problem. It is not my intention at present to enter into details; all that I now wish to communicate is the result at which I have arrived; and in a short time I hope to have the pleasure of publishing, at length, my observations in connexion with this interesting subject.

The excavating instrument of *Pholas* and *Teredo* is formed of the anterior portion of the animal, in the surface of which are imbedded siliceous particles. The particles penetrating the skin give to it much the character of rasping-paper. The whole forms a rubbing surface, which being applied closely to the bottom of the cavity by the adhesion of the foot, enables the animal to rub down, and so penetrate shale, chalk, wood, or even the hardest limestones and marble.

Saxicava rugosa is also furnished with a rasping surface covered with siliceous particles. This surface, however, in this species is formed entirely of the anterior portion of the mantle, the margins of which being united are much thickened, forming a sort of cushion capable of considerable protrusion at the will of the animal. The foot is small, and passing through a much-constricted orifice, gives origin to a byssus, which anchors the shell close to the base of the excavation, and thus holds the rubbing apparatus in immediate contact with the part to be excavated.

58. *The Animal of the Spirula;* by J. E. GRAY, (Mag. Nat. Hist., xv, 1845, p. 257.)—Mr. GRAY states that the animal of the Spirula has hitherto been known only from a figure in the atlas of PERON and LESUEUR. He concludes from his examinations of a specimen in alcohol, (of which he gives figures,) that they resemble closely the cuttle-fish in external form, and will constitute a group of the Decapodous Cephalopods, forming a passage to the Octapodous; for like the latter, they are without a dorsal fin, and have a regularly chambered shell. The shell is enclosed with but a small part exposed, and is placed on the dorsal surface of the body with the spine bent towards the ventral sides.

"The examination of this animal confirms me in the opinion, which I expressed in the Synopsis of the British Museum, (1840, p. 149,) that the Ammonites, from their texture and the small size of the last chamber, are internal shells, and should be arranged with the Decapodous Cephalopods, being chiefly distinguished from the Spirulæ by the siphon, always on the dorsal margin of the whorls, and the septa being foliated on the edges."

59. *Adaptation of the Eye to Distinct Vision at Different Distances;* by Prof. FORBES, (Trans. Roy. Soc. Ed., xvi, 1.)—The crystalline lens,—for example, that of the ox,—is composed of a nearly spherical nucleus of compact, comparatively dense matter, of a hard pasty consistence; this nucleus gradually, yet rapidly passes into the gelatinous envelope, of a lenticular form, which has far less consistence and less resistance to external pressure, than the central spherule. Prof. FORBES thence suggests that any uniform pressure applied to the lens, such as might be communicated by the external muscles of the eye to the entire eye-ball, and propagated by hydrostatic pressure through the humors, would tend to make the exceedingly flattened ellipsoid of the eye approach in figure to the dense spheroidal nucleus; the obvious effect of this would be, to increase the curvature of the lens without changing its position, and thus render the rays from a near object more convergent. The effect probably proceeds from a simultaneous effort of the four *recti* muscles drawing the eye back in its socket.

IV. Botany.

60. *Number of Known Plants as given by Different Authors since Theophrastus, together with the supposed Total;* by R. B. Hind, (in Geographic Botany, Ann. Mag. Nat. Hist., xv, Jan. 1845, p. 12.)

	Known.	Supposed Total.
A. C. 300, Theophrastus, History of Plants, .	500	
A. D. 70, Pliny, History of the World, . .	1,000	
1580, Dodonæus, Stirpium Historia, . .	1,330	
1623, Banhin, Pinax, ...	6,000	
1690, Ray, ...		18,000
Tournefort, ...	6,000	
1753, Linnæus, Species Plantarum, 1st ed.,	7,300	
1762, 2d ed.,	8,800	
1796, Gmelin, Systema Vegetabilium, .	16,635	
1806, Persoon, Enchiridium, ...	27,000	
Humboldt, ...		44,000
1814, Brown, Flinders' Voyage, . .	37,000	
1820, De Candolle, Théorie Elémentaire, .	50,000	100,000
1824, Prodromus, . .	50,000	
1827, Sprengel, ...	37,000	
1830, Balbi, Geographic, ...		80,000
1835, Lindley, Introduction to Botany, .		86,000
1845, R. B. Hind, (supposing, for reasons which he states, that one third yet remains to be discovered,		134,000

Mr. Hind gives the following as their probable distribution:

		Square Miles.
Europe, ...	11,200	2,793,000
Asia, ...	36,000	12,118,000
Africa, ...	25,200	8,500,000
North America, ...	14,400	11,146,000
South America, ...	40,000	
Australasia, ...	7,200	3,100,000
	134,000	37,657,000

61. *Potato disease*, (L'Institut, xiii, ann. 1845, pp. 325, 328, 343.)—The origin of this disease is traced by M. Payen, as has been done by others, to a cryptogamic vegetation propagating within the tubes. The fungus, whose spirules have followed the liquids infiltrated about the cortical parts especially, and sometimes the axis, develops in the cellules minute anastomosing filaments, which are nourished by the oily ingredients and enclosed fecula. Passing from one cellule to another, they bind the whole together so that the texture is not destroyed at the boiling point. The fibres growing outward towards the exterior surface, attack all the azotized, oily and amylaceous substances which they can assimilate; the fecula or starch is gradually disaggregated, dissolved and absorbed, presenting a novel series of changes in the history of this substance. A humid state of the weather is believed to hasten the development of the potato fungus.

M. Pouchet points out four stages in the process of changes. In the *first* period, the tissues of the potato are hardly discolored; small clear brownish granules are distinguished at the surface of the membrane constituting the cellular tissue, especially in the intercellular spaces; the fecula of the cellules is untouched. In the *second*, the tissues are brownish; the brown granules upon the surface of the cellules have multiplied, and become deeper colored; the fecula is still in a healthy state. In the *third*, the granules have become of a deeper brown color, and the cellules gradually become broken into shreds, the starch or fecula being not yet at all altered. In the *fourth*, the tissues are soft and grayish; the cellular membranes are reduced to brown granulations resulting from the walls of the cellules and the granules on their surface. The starch grains remain "*dans leur integrité.*" M. Pouchet does not believe that this disease results from the growth of a fungus (*Botrytis infestans,*) which M. Moren has detected upon the leaves of the potato, and regards as its origin. The affection is considered analogous to that which destroys cellulous fruits, such as apples, pears, &c.; and a direct microscopic comparison is stated to favor the view.

The prevailing opinion and most observations are opposed to the views of M. Pouchet. M. Payen has compared by analyses the healthy and diseased potato, and found that the fecula has actually been diminished 20 per cent.

V. General Physics.

62. *Temperature of the Mediterranean;* (extracted from a Memoir on the Temp. of the Medit., by M. Aime, Ann. de Chim. et de Phys., 3d ser., xv, 1845, p. 6.)—M. Aime arrives at the following conclusions from numerous observations on the temperature of the Mediterranean.

1. Near the coast the temperature during the day is higher than in the open sea, and at night lower.

2. The mean surface temperature for the year is nearly that of the air; in spring and summer it is less than that of the air, and in autumn and winter, greater. The surface temperature is never below 50° Fah.; and sometimes reaches to 79°.

3. The diurnal variation ceases to be appreciable at 20 yards, and the annual variation at 350 to 430 yards.

4. On a morning after a clear and calm night, the temperature of the surface is colder than that of the water several yards below.

5. The minimum temperature of the depths of the Mediterranean is equal to the mean temperature of the winter.

In the southern part the temperature decreases through the year, to a depth of 35 to 440 yards. In the northern part it increases during the winter to that depth. It seems consequently that the cold temperature below depends on the descent of the upper cold strata during winter, and not on the entrance of the waters of the ocean.

63. *Boiling point of Water at different heights*; by M. V. Regnault, (extracted from Ann. de Chim. et de Phys., xiv, 1845, 196.)—The following table has been made out by M. V. Regnault to aid in determining heights by the boiling point of water, a method recommended alike by its simplicity and the portable character of the instrument, and now very commonly adopted in preference to the barometer. The calculated results are shown to vary less than half a line in the height of the barometric column from those by observations.

M. Regnault states that the thermometer should be made of the best crystal glass, as others dilate irregularly. They are graduated from 75° to 100° C., (equivalent to 167° to 212° Fah.,) and the following is the method adopted for this purpose. As much mercury is introduced in the usual way as will stand one third up the stem when placed in melting ice; this point (designated n) is accurately marked. The tube is then placed alongside of another graduated thermometer in a large vessel full of water, kept agitated, and exactly at 20° C. (68° Fah.); and the height of the mercury (n') corresponding to the degree of temperature (t) indicated on the graduated scale is noted. $\frac{n'-n}{t}$ will then give the value of a degree. A portion of the mercury is next expelled, so that it will reach towards the top of the tube when in boiling water, and the tube is closed as usual. It is then placed in the vapor of boiling water under a pressure of about 760 millimetres, and the point at which the mercury stands (n'') is noted, and also the exact temperature (T). The value of a corrected degree may then be obtained by the following formula:—

$$\frac{\frac{n'-n}{t}+\frac{1}{6480}(n''-n)}{1+\frac{T}{6480}}$$

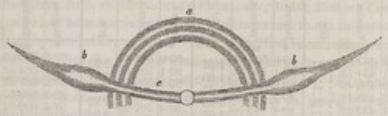
The instrument is made of brass tubes that slide into one another like a spy-glass, and is but six inches long when closed up, but may be drawn out to a length of fifteen inches. The lower part, which contains the water to be heated, is one and one-eighth inches in diameter. This is inserted in a large cylindrical vessel, which has a lamp at bottom. The thermometer is dropped down into the vapor just above the surface of the boiling water.

The table gives for each tenth of a degree Centigrade, between 85° and 101°, the amount of barometric pressure reduced to 0°, corresponding to the temperatures observed, of boiling water. The calculations are in French measures. A millimetre = .03937 English inches. The Centigrade scale is used in the table.

Table of the tension of the vapor of water in millimetres, from 85 *to* 101 *degrees* C.

Degree.	Tension.	Diff.	Degree.	Tension.	Diff.	Degree.	Tension.	Diff.	Degree.	Tension.	Diff.
°	mm		°	mm		°	mm		°	mm	
85·0	433·04	1·71	89·0	505·76	1·94	93·0	588·41	2·20	97·0	682·03	2·49
85·1	434·75	1·71	89·1	507·70	1·95	93·1	590·61	2·21	97·1	684·52	2·50
85·2	436·46	1·71	89·2	509·65	1·95	93·2	592·82	2·22	97·2	687·02	2·51
85·3	438·17	1·72	89·3	511·60	1·96	93·3	595·04	2·22	97·3	689·53	2·51
85·4	439·89	1·73	89·4	513·56	1·97	93·4	597·26	2·23	97·4	692·04	2·52
85·5	441·62	1·73	89·5	515·53	1·97	93·5	599·49	2·23	97·5	694·56	2·52
85·6	443·35	1·74	89·6	517·50	1·98	93·6	601·72	2·25	97·6	697·08	2·53
85·7	445·09	1·75	89·7	519·48	1·98	93·7	603·97	2·25	97·7	699·61	2·54
85·8	446·84	1·75	89·8	521·46	1·99	93·8	606·22	2·26	97·8	702·15	2·55
85·9	448·59	1·75	89·9	523·45	2·00	93·9	608·48	2·26	97·9	704·70	2·56
86·0	450·34	1·76	90·0	525·45	2·00	94·0	610·74	2·26	98·0	707·26	2·56
86·1	452·10	1·77	90·1	527·45	2·01	94·1	613·01	2·27	98·1	709·82	2·57
86·2	453·87	1·77	90·2	529·46	2·02	94·2	615·29	2·28	98·2	712·39	2·58
86·3	455·64	1·78	90·3	531·48	2·02	94·3	617·58	2·29	98·3	714·97	2·59
86·4	457·42	1·79	90·4	533·50	2·03	94·4	619·87	2·29	98·4	717·56	2·59
86·5	459·21	1·79	90·5	535·53	2·04	94·5	622·17	2·30	98·5	720·15	2·60
86·6	461·00	1·80	90·6	537·57	2·04	94·6	624·48	2·31	98·6	722·75	2·60
86·7	462·80	1·80	90·7	539·61	2·04	94·7	626·79	2·31	98·7	725·35	2·61
86·8	464·60	1·81	90·8	541·66	2·05	94·8	629·11	2·32	98·8	727·96	2·62
86·9	466·41	1·81	90·9	543·72	2·06	94·9	631·44	2·33	98·9	730·58	2·62
87·0	468·22	1·82	91·0	545·78	2·06	95·0	633·78	2·34	99·0	733·21	2·63
87·1	470·04	1·83	91·1	547·85	2·07	95·1	636·12	2·34	99·1	735·85	2·64
87·2	471·87	1·83	91·2	549·92	2·07	95·2	638·47	2·35	99·2	738·50	2·65
87·3	473·70	1·84	91·3	552·00	2·08	95·3	640·83	2·36	99·3	741·16	2·66
87·4	475·54	1·84	91·4	554·09	2·09	95·4	643·19	2·36	99·4	743·83	2·67
87·5	477·38	1·85	91·5	556·19	2·10	95·5	645·57	2·38	99·5	746·50	2·67
87·6	479·23	1·85	91·6	558·29	2·10	95·6	647·95	2·38	99·6	749·18	2·68
87·7	481·08	1·86	91·7	560·39	2·10	95·7	650·34	2·39	99·7	751·87	2·69
87·8	482·94	1·87	91·8	562·51	2·12	95·8	652·73	2·39	99·8	754·57	2·70
87·9	484·81	1·88	91·9	564·63	2·12	95·9	655·13	2·40	99·9	757·28	2·71
88·0	486·67	1·88	92·0	566·76	2·13	96·0	657·54	2·41	100·0	760·00	2·72
88·1	488·57	1·88	92·1	568·89	2·14	96·1	659·95	2·42	100·1	762·73	2·73
88·2	490·45	1·89	92·2	571·03	2·15	96·2	662·37	2·43	100·2	765·46	2·74
88·3	492·34	1·90	92·3	573·18	2·16	96·3	664·80	2·44	100·3	768·20	2·75
88·4	494·24	1·91	92·4	575·34	2·16	96·4	667·24	2·45	100·4	771·95	2·76
88·5	496·15	1·91	92·5	577·50	2·17	96·5	669·69	2·46	100·5	773·71	2·77
88·6	498·06	1·92	92·6	579·67	2·17	96·6	672·14	2·46	100·6	776·48	2·78
88·7	499·98	1·92	92·7	581·84	2·18	96·7	674·60	2·47	100·7	779·26	2·78
88·8	501·90	1·92	92·8	584·02	2·19	96·8	677·07	2·48	100·8	782·04	2·79
88·9	503·82	1·94	92·9	586·21	2·20	96·9	679·55	2·48	100·9	784·83	2·80
89·0	505·76		93·0	588·41		97·0	682·03		101·0	787·63	

64. *Remarkable Paraselene witnessed on the night of the 19th April, 1845*; by Prof. Chas. G. Page, M. D., (in a letter to Prof. Silliman.)—Parhelia of varied forms are often seen in this region, and more particularly late in the autumn; but it has never been my good fortune to witness a distinct paraselene, until the above period. Being merely a casual observer of the heavens, I bear record of such phenomena with diffidence, and hoped to have seen ere this time, some faithful notices of this rare appearance by those who explore the heavens with



more than the unassisted eye. The above sketch agrees in several particulars with one given by Mr. R. W. Birt in the Philosophical Magazine, No. 121, of a paraselene witnessed by him on the 6th May, 1841. The halos and luminous portions were formed upon a light cloud of the class cirro-stratus, first making their appearance about half past 9 P. M., and lasting one hour. The moon was nearly full, and high in the heavens. There were three distinct concentric halos, of the general prismatic character of the large halo or circle so often seen around the moon, the outermost of which presented a diameter of about one half that of the large halos. The halos during the whole time extended only a very little beyond a semicircle. At their uppermost point (*a*) there appeared a diffused luminosity, too faint to define by representation, but at the points *b*, *b*, (and what seemed to be extraordinary)—*without* the circle of the halos, there were two brilliant oval spots, not appearing as defined images of the moon, but bearing about the same relation to the moon in intensity of light, as parhelia do to the sun. From these, there extended for some distance a nebulous pencil, as seen in the figure. A belt of light curved somewhat as represented in the figure, extending from the moon on either side, seemed to form the base of the arch made by the halos, but on close observation it was found that the halos appeared faintly for a short distance below the belt. In the paraselene described by Mr. Birt, the images of the moon were directly upon or coincident with the halos, but were represented as of a lozenge shape. The circle of halos in the same case was also incomplete, and the belt of light subtending the semicircle of halos, was similar to that I have represented.

Washington, D. C., Sept. 18, 1845.

65. *Recent Progress of Magnetical and Meteorological Science,—being notices of several new publications both American and Foreign on these subjects.*

(1.) *Observations made at the Magnetical and Meteorological Observatory at Toronto in Canada, 1840, 1841, and 1842.* 4to.

We are beginning to reap the fruits of the grand system of magnetical and meteorological observations which was commenced in 1840. Several volumes of observations have already appeared, and we shall look for others in due time. Above we have given the title of a thick quarto volume, containing at large the observations of three years at Toronto. It is a splendid volume, and will prove a lasting monument of the liberality of the British government.

The Toronto Observatory is situated in latitude 43° 39′ 35″ N., longitude 79° 21′ 30″ W., and is 108 feet above the surface of Lake Ontario. The main observatory has two apartments—one 50 feet by 20 for the instruments, the other 18 feet 12 for a computing room. The observatory was provided with instruments for measuring the declination and inclination of the magnetic needle, the horizontal and vertical force, and also with a complete set of meteorological instruments. We regret that we can only find room for a few of the results of these observations.

The mean declination of the needle for 1841, was 1° 14′·35 west.
" " " 1842, " 1° 18′·95

Annual increase of west declination, 4′·6.

The mean inclination of the needle for 1841, was 75° 17′·0
" " " 1842, " 75° 16′·4

The results for the two years are so nearly identical, as to prove that the annual change of inclination must be exceedingly small, and even to leave it uncertain in what direction this change is taking place.

The magnetic observations on the term days are all projected in curves; and side by side are placed for comparison the curves at Boston and Philadelphia. The correspondence in the motions of the needle at these three places was generally quite remarkable; all the larger movements at either station, and frequently also the most minute ones, being exactly copied at each of the other stations.

The mean temperature of 1841, was . .	43°·9	
" " 1842, " . .	44°·8	
The greatest heat of the two years, was	91°·7	
The greatest cold " " "	—5°·2	
Range of the thermometer, . .	96°·9	
The maximum of the barometer, was .		30·417
The minimum " " "		28·672
Range in two years, ...		1·745

The least degree of humidity was 22, the point of saturation being represented by 100.

The following is the mean result of the barometric observations for two years.

	6 A. M.	8.	10.	noon.	2 P. M.	4.	6.	8.	10.	midnight	2 A. M.	4.
Gaseous atmosphere,	29·379	·375	·364	·333	·310	·311	·326	·348	·357	·361	·364	·370
Aqueous vapor,	·241	·259	·271	·281	·285	·279	·269	·256	·250	·243	·238	·234
Total pressure,	29·620	·634	·635	·614	·595	·590	·595	·604	·607	·604	·602	·604

The diurnal pressure of the gaseous atmosphere has one maximum which occurs about the coldest hour of the day, and one minimum which occurs about the warmest hour of the day. The elastic force of the vapor has also one maximum which occurs at 2 P. M. and one minimum at 4 A. M. The sum of these two pressures however exhibits two daily maxima, viz. at 10 A. M. and P. M.; and two daily minima, viz. about 3 or 4 A. M. and P. M. Thus this knotty question respecting the diurnal oscillations of the barometer has been beautifully resolved by simply *interrogating nature*.

The pressure of the wind resolved in the direction of the four cardinal points, was as follows:

Date.	N.	E.	S.	W.
1841,	1832·6 lbs.	957·2	747·4	1741·4
1842,	2544·4	1386·2	1293·3	2697·4

The mean direction of the wind is accordingly N. 41° 53′ W. The greatest pressure observed during the two years was 15 pounds per square foot, Feb. 3, 1841.

The amount of rain in 1841, was . . 36·58 inches.
" " " 1842, " . . 42·80 "

(2.) *Observations in Magnetism and Meteorology, made at Makerstoun, Scotland, in the Observatory of Sir* T. M. BRISBANE, 1841 *and* 1842.

These are the fruits of a private observatory established by General BRISBANE in concert with those which were endowed by the governments of Europe. The observatory is situated in latitude 55° 34′ 45″ N., longitude 0h 10m 3″·5 W.

According to these observations, the mean declination in 1842 was 25° 28′·56 W. Yearly decrease of west declination, 4′·07.

Greatest declination observed, . . 27° 1′·56
Least " " " . . 24° 54′·28

Range in 17 months, ... 2° 7′·28

Mean magnetic dip for 1842, 71° 11′·95. Yearly decrease of dip, 4′·83.

Greatest height of the barometer, . . 30·304
Least " " " . . 28·262

Range in 17 months, ... 2·042

The amount of cloudiness appears to be very high; but as the observations only embrace a period of eight months, perhaps they are not a fair representation of the climate.

The average amount of rain in a period of 11 years, was 24·565 inches, as determined by a gauge placed six feet above the soil.

(3.) *Annuaire Magnetique et Meteorologique de Russie, par* A. T. KUPFFER, 1842. 4to. [The 7th of the Series.]

In this imperial Annuaire, worthy of the Cesars, we find meteorological observations made *every hour of the day*, at St. Petersburg, Barnaoul, Nertchinsk, Catherinenburg, and Sitka; and observations made *eight hours* of the day at Zlatouste, Bogoslowsk, Lougan, and Peking; observations which are more valuable, as several of these places are situated in a quarter of the globe hitherto but little known. Most of these stations have also furnished magnetic observations. The following is a summary of some of the results for 1842.

Places.	Latitude.	Longitude.	Dip.	Declination.	Annual variation.
St. Petersburg,	59° 56′ N.	30° 19′ E.	71° 0′·3	6° 21′·1 W.	— 4′·9
Catherinenburg,	56 51	60 34	69 53′·56	38′·9 E.	
Barnaoul,	53 20	83 56	70 7′·28	24′·8 E.	
Nerichinsk,	51 56	116 31	67 7′·93	46′·9 W.	
Peking,	39 54	116 26	55 42′·0		
Kazan,	55 48	49 7	68 23′·0		

The following is a summary of the observations on the pressure of the air.

ST. PETERSBURG.	Noon.	1 P.M.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Dry air, . .	29·870	·867	·864	·863	·865	·866	·870	·872	·873	·874	·875	·875
Vapor, . .	·117	·117	·118	·118	·116	·115	·113	·113	·111	·110	·109	·108
Total, . .	29·987	·984	·982	·981	·981	·981	·983	·985	·984	·984	·984	·983
BARNAOUL.												
Dry air, . .	29·432	·433	·434	·437	·429	·438	·428	·438	·438	·436	·437	·439
Vapor, . .	·106	·105	·104	·101	·099	·097	·095	·093	·091	·090	·089	·087
Total, . .	29·538	·538	·538	·538	·538	·535	·533	·531	·529	·526	·526	·526
CATHERINENBURG.												
Dry air, . .	28·883	·884	·886	·890	·892	·895	·898	·900	·900	·900	·898	·898
Vapor, . .	·090	·090	·090	·089	·089	·089	·089	·088	·087	·086	·086	·085
Total, . .	28·973	·974	·976	·979	·981	·984	·987	·988	·987	·986	·984	·983
SITKA.												
Dry air, . .	29·804	·801	·802	·802	·801	·802	·804	·809	·812	·813	·815	·814
Vapor, . .	·132	·131	·129	·128	·126	·125	·123	·121	·120	·120	·119	·118
Total, . .	29·936	·932	·931	·930	·927	·927	·927	·930	·932	·933	·934	·932

St. Petersburg.	Midn't.	1 A.M.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Dry air, . .	29·874	·873	·871	·869	·868	·866	·866	·867	·870	·871	·869	·868
Vapor, . .	·107	·106	·105	·105	·106	·107	·109	·112	·112	·114	·116	·116
Total, . .	·981	·979	·976	·974	·974	·973	·975	·979	·982	·985	·985	·984
Barnaoul.												
Dry air, . .	29·438	·438	·438	·436	·435	·435	·432	·428	·425	·421	·416	·416
Vapor, . .	·089	·091	·095	·100	·104	·106	·109	·111	·112	·113	·114	·112
Total, . .	29·527	·529	·533	·536	·539	·541	·541	·539	·537	·534	·530	·528
Catherinenburg.												
Dry air, . .	28·808	·807	·806	·803	·802	·802	·800	·800	·807	·804	·802	·800
Vapor, . .	·084	·084	·084	·087	·089	·090	·091	·091	·092	·092	·092	·092
Total, . .	28·082	·981	·980	·980	·981	·982	·981	·980	·979	·976	·974	·972
Sitka.												
Dry air, . .	29·810	·808	·806	·804	·802	·803	·805	·807	·807	·807	·807	·806
Vapor, . .	·117	·117	·117	·119	·121	·125	·127	·129	·131	·133	·133	·133
Total, . .	29·927	·925	·923	·923	·923	·928	·932	·936	·938	·940	·940	·939

According to all of these observations, the elastic force of the vapor of the air has one daily maximum and one daily minimum.

According to the St. Petersburg obs. the max. occurs 2½ P. M., the min. 2½ A. M.
" " Barnaoul, " " " 10 A. M., " 11 P. M.
" " Catherinenburg, " " " 9½ " " 1 A. M.
" " Sitka, " " " 10 " " 1 "

At St. Petersburg, the greatest heat occurs at 2 P. M., greatest cold at 3 A. M.
At Barnaoul, " " " 9½ A. M., " " 11 P. M.
At Catherinenburg, " " " 10 " " " 1 A. M.
At Sitka, " " " 10½ " " " 1 "

The minimum pressure of the vapor occurs at almost the precise instant of minimum temperature, and so also with the maxima.

The pressure of the gaseous atmosphere has one daily maximum at Catherinenburg about 8 P. M. and one daily minimum at 10 A. M., and the motion is throughout extremely regular. At the other three stations there is a maximum about the time of greatest cold, and a minimum about the time of greatest heat; but there are also subordinate maxima and minima. Possibly the direction of the wind may have some influence in producing these irregularities.

The following is the amount of rain and snow during the year.

St. Petersburg,	18·5 inches.	Zlatouste,	14·67 inches.
Barnaoul,	19·13 "	Bogoslowsk,	15·98 "
Nertchinsk,	13·81 "	Lougan,	15·47 "
Catherinenburg,	11·78 "	Peking,	27·98 "

(4.) *Observations Meteorologiques faites à Arkangel.* Lat. 64° 32′, long. 40° 34′ E.; *et communiquées par* M. Kupffer.

This volume contains observations of eighteen and a half years, from June, 1813, to December, 1831; and they are of very great importance as coming from so high a latitude.

The greatest height of the barometer for the entire period was 30·97 inches. Least height, 27·97 inches. Range in 18½ years, 3·00 inches.

The mean temperature of the entire period, was +0°·68 Reaumur, =33°·53 Fahrenheit.

	Reaumur.	Fahrenheit.	
The highest temp. was	32°·5 =	105°·12,	July 2, 1818.
The lowest " "	−35°·0 =	−46°·75,	Jan. 1, 1814. Jan. 18, 1828.
Range of 18 years,	67°·5 =	151°·87	

In two instances the thermometer is said to have sunk to −35°·0, once to −33°·8, twice to −31°·5, and twice to −31°·0. The observations were all made with a mercurial thermometer, and mercury freezes at −31° Reaumur; that is, according to these observations the temperature fell repeatedly below the point of congelation of mercury.

The following table shows the influence of wind upon temperature.

With a north wind,	the mean temp. was	−1°·1	Reaum.
" northwest wind,	" " "	+1°·0	"
" west	" " " "	+1°·8	"
" southwest	" " " "	+2°·8	"
" south	" " " "	+2°·6	"
" southeast	" " " "	+0°·8	"
" east	" " " "	−1°·4	"
" northeast	" " " "	−2°·2	"

The coldest wind is from the northeast, and the warmest from the southwest.

The following table shows the number of times the wind was observed to blow from each of the cardinal points.

North, . . .	2350	Southeast, . .	2760
Northwest, . .	2023	East, . . .	2239
West, . . .	3007	Northeast, . .	1426
Southwest, . .	2757	Calm, . . .	1784
South, . . .	1969		

The mean direction deduced from these numbers, is S. 47° 42′ W.; but the mean progress in that direction is *less than one twelfth* of the entire velocity of the wind—so that at Arkangel the wind has *no prevalent direction.* The atmosphere oscillates to and fro, and the inhabitants inhale the same particles of air from generation to generation.

(5.) *Ueber das Magnetische Observatorium der Sternwarte bei München.—Bestimmung der Horisontal Intensitat der Erdmagnetismus.—Resultate der Magnetischen Beobachtungen in München,* 1840, 1841, 1842; von Dr. J. Lamont.

The first of the above named pamphlets contains a particular description of the Magnetic Observatory at Munich; the second contains a treatise on the absolute determination of the horizontal intensity of the earth's magnetism; and the third contains the results of three years magnetic observations.

The mean declination of the magnetic needle at Munich—

For 1841, was	16° 54′·4
1842, "	16° 48′·0
Annual decrease of west declination, .	6′·4

(6.) *Proceedings connected with the Magnetical and Meteorological Conference held at Cambridge, (Eng.) in June*, 1845.

From this pamphlet we learn that the British government have resolved to equip a new Arctic expedition under the command of Sir JOHN FRANKLIN, with a view to the completion of the discovery of a northwest passage. The expedition, consisting of the *Erebus* and the *Terror*, furnished with steam-power, and provided with all the instruments necessary for the prosecution of magnetic and meteorological observations, sailed during the summer of 1845.

A new magnetic observatory has recently been established in British Guiana; and an observatory is in contemplation at Colombo, in Ceylon.

Lieut. LEFROY has completed his magnetic survey of an important part of North America. He has determined the three magnetic elements at above 100 stations within the isodynamic oval of 1·7.

Lieuts. MOORE and CLERK sailed in the *Pagoda*, Jan. 9th, 1845, from Simon's Bay, on the magnetic survey of that part of the Atlantic Ocean left unexplored by Sir JAMES ROSS. She crossed the Antarctic circle on the 5th of February, in long. 30° 45′ E., and her furthermost point south was 67° 50′. She returned to the Cape, via St. George's Sound, Australia, on the 20th of June last, having sailed over more degrees of longitude within the sixtieth parallel than any other single vessel. As the second term of three years, during which the magnetic and meteorological establishments of the British and other governments were to be continued, would expire with the year 1845, the magnetic committee of the British Association, about a year since, entered into an extensive correspondence with foreign meteorologists on the subject of a continuance of the observations. Several distinct questions were proposed, upon which opinions were requested. Replies were received from a large number of individuals, generally expressing the desire that the observations might be continued, with some modifications. The most eminent persons in these sciences from all parts of the world, were invited to a conference on the subject, which was held at Cambridge in June last. Among others, there were present at the conference, Messrs. KUPFFER, KREIL, ERMAN, DOVE, BOGUSLAWSKI and LEUFTENBERG. The result of this conference was the adoption of resolutions recommending the continuance of observations upon substantially the present system, for another period of three years. It is to be hoped that this recommendation will be generally concurred in, and that the coöperation during the coming three years will be more general and enthusiastic than ever.

(7.) *First Report on Meteorology*; by JAMES P. ESPY.

This report consists chiefly of maps of the United States, exhibiting the direction of the wind, state of the barometer, thermometer, &c., on various days in January, February and March, 1843. There are twenty nine of these maps, which contain a vast amount of valuable information. They clearly indicate the proper course to be pursued if we would arrive at a complete knowledge of the laws of storms. Several important generalizations deduced from these observations, accompany the report. The following are some of them.

Storms in the United States travel from west to east; they are accompanied with a depression of the barometer near the centre of the storm; they travel about 36 miles per hour; in great storms, the wind for several hundred miles on both sides of the line of minimum pressure, blows towards that line, directly or obliquely. The force of the wind is in proportion to the suddenness and greatness of the barometric depression. In all great and sudden depressions of the barometer, there is much rain or snow; and in all sudden and great rains or snows, there is a great fluctuation of the barometer.* Many storms are of great and unknown length from north to south, while their east and west diameter is comparatively small. There is generally a lull of wind at the line of minimum pressure, and sometimes a calm. When the wind changes to the west, the barometer generally begins to rise. There is generally but little wind near the line of maximum pressure, and on each side of that line the winds are irregular, but tend outwards from that line. The fluctuations of the barometer are generally greater in the northern than in the southern parts of the United States, and greater in the eastern than in the western parts.†

(8.) *Magnetical and Meteorological Observations made at Washington*; by Lieut. J. M. GILLISS. 8vo., pp. 648.

The instruments used in these observations were a declinometer and dip circle by SIMMS, a barometer, several thermometers, hygrometer, rain gauge, &c. The magnetic observations embrace two years, from July, 1840, to June, 1842.

The mean declination for 1840–1, was 1° 20′ 12″·7 W.

" "	1841–2, "	1° 23′ 56″·9	
Annual variation, . . .		3′ 44″·2	
The minimum declination for each day occurs at		8h. 6m.	A. M.
Maximum " " "		1 33	P. M.
A secondary minimum occurs . . .		9 46	"
" maximum " . . .		2 10	A. M.

* There are some remarkable cases of great rains with little motion of the barometer.

† We should like to see the evidence of the second part of this statement.

The mean diurnal variation for summer, is	.	10′ 4″·1
" " autumn,	. .	6′ 21″·9
" " winter,	. .	4′ 36″·3
" " spring,	. .	8′ 10″·7
The mean dip for 1840–1, was	. . .	71° 20′·2
" 1841–2,	. . . .	71° 18′·0

The meteorological journal embraces four years, from July, 1838, to June, 1842.

The maximum of the barometer for two years, was	30·810
Minimum " "	29·074
Range, ...	1·736
The maximum temperature was . . .	103°·0
Minimum "	—4°·5
Range for four years, ...	107°·5

Mean temperature of Washington from four years, 53°·97.

The following is the result of four years observations of the winds:

No. of observations from the	South, . .	32·7
" "	Southwest, .	56·2
" "	West, . .	38·4
" "	Northwest, .	70·3
" "	North, . .	26·3
" "	Northeast, .	43.2
" "	East, . .	18·9
" "	Southeast, .	20·3
" "	Calm, . .	52·8

Mean direction of the wind, N. 71° 51′ W.

Mean annual amount of rain, 41·21 inches.

The subject of meteorology is every year attracting increased attention both in this country and in Europe, and the perseverance of its cultivators has been rewarded with considerable success. We have advanced so far that we can see very clearly what is wanted to ensure further progress. A vast number of meteorological journals are kept in the United States, and a great amount of industry expended upon them. We need however more uniformity of system—in many cases better instruments, and in some quarters a great increase of observers. In order to be able to investigate satisfactorily the phenomena of a great storm, we need observations throughout its entire extent, from stations not more than fifty miles from each other,—observations with good instruments and upon a uniform plan. Is this idea too gigantic to be realized? Let us see what materials we have to depend upon.

I. The general government has manifested a very commendable zeal on this subject. Observations of the thermometer have long been made at some of the military posts, but recently their number has been much increased, and the observations made much more valuable by the addition of barometers, &c. This system might very profitably be extended still further, so as to include forts, light-houses, navy yards, arsenals, &c.; and those stations are the more important, as many of them are upon the very outskirts of civilization, where it would be difficult to obtain observations from any other source.

II. Two of the state governments, viz. New York and Pennsylvania, have set a most praiseworthy example in their encouragement of meteorological observations. For twenty years the state of New York has required a register to be kept at each of the academies subject to the Board of Regents. These observations have furnished results of the greatest value. Nevertheless it is time that the system in that state was revised. The observations are incomplete without a barometer, and it is desirable that the stations be distributed more uniformly over the state. We sincerely hope that other states will emulate the noble examples of New York and Pennsylvania. Many of them might do it without the least inconvenience, and the results of the observations would be interesting to every member of the community.

III. Our main reliance in every scientific enterprise must be on private zeal. This zeal in some parts of the country is still to be awakened, and where zeal is already awakened, it needs to be directed. We want more observers from the north of New England, and every where throughout the South and West. Here is a great work which naturally devolves upon the philosophical societies. Let every philosophical society in the United States, within the sphere of its influence, strive to organize a company of observers occupying the whole country at intervals of fifty miles; and after deciding upon the best plan of observations, endeavor to persuade every observer to adopt the same system.

IV. The British government have established a noble observatory at Toronto. Subordinate stations might be established at every military post in Canada, at a trifling expense, which would powerfully contribute to the promotion of meteorology. It is important to determine the *limits* of our great storms, but they very frequently extend northward to an unknown distance beyond the limits of the United States. Hence we need the coöperation of the British government, and we flatter ourselves that when the importance of the subject is fully presented to their consideration, they will respond to the call with that discriminating liberality which has ever characterized their patronage of science.

[Our magnetical and meteorological summary having extended to an unexpected length, has excluded some *astronomical* and other scientific notices which were intended for this number. They shall however appear in our next.—*Eds.*]

MISCELLANEOUS ITEMS.

66. At the Italian Scientific Association for 1844, VON BUCH exhibited a geological map of Sicily made by M. HOFFMANN, and observing that the granites of Calabria have a relation to those of Sicily, deduced that the Straits of Messina must have been produced at the period of the granitic eruptions; and consequently that Sicily and Calabria were never united.—*L'Institut, No.* 603, 1845, *p.* 260.

67. The *Geological Society of France* commenced their extraordinary session for the past year on the 14th of September at Avallon. The place was selected on account of the great geological interest of the country around.

68. *Expedition to Siberia*, (L'Institut, No. 606, 1845, p. 257.)—M. MIDDENDORFF is engaged on an expedition into Siberia, and has already made extensive observations and collections towards elucidating the natural history of that country.

69. *Rail Road Excavations in England.*—The sections made through the country are not only bringing to light interesting geological facts, but curious historical monuments. The line of railway from Brighton to Lewes cuts directly through the ancient Priory destroyed by Henry VIII, and across the site of the high altar and the leaden coffins of *William of Warren and his countess Gundreda*, daughter of William the Conqueror, and the skeletons when disinterred were found in very tolerable preservation. They are to be placed in Southover church under the sepulchral tablet of Gundred, which had been thrown by when the Priory was destroyed, and was made use of (the smooth side upward) in the tomb of a country gentleman, EDWARD SHIRLEY, in a village church-yard seven miles from Lewes; now the bones will be again covered by the Latin laudatory hexameters.*

70. Professor BALFOUR, late of the University of Glasgow, has been elected to the botanical chair in the University of Edinburgh, vacated by the death of the excellent Dr. GRAHAM. We learn that the professorship at Glasgow, relinquished by Dr. BALFOUR, has been offered to that very able botanist, G. A. WALKER ARNOTT, Esq. of Arlary, Kinrosshire.

71. *Identity of Light, Heat and Electricity*, (Athenæum, No. 941.)—Mr. FARADAY, on the 2d of Nov. last, announced, at a meeting of the Council of the Royal Institution, a very remarkable discovery; which appears to connect the imponderable agencies yet closer together, if it does not indeed prove that light, heat and electricity are merely

* In the history of the antiquities of Lewes by HORSFIELD, we find a drawing of Gundreda's tomb; the slab referred to above was beautifully and deeply sculptured both for the inscription and the ornaments.—EDS.

modifications of one great universal principle. This discovery is, that a beam of polarized light is deflected by the electric current, so that it may be made to rotate between the poles of a magnet; and, as we understand, the converse of this, that electro-magnetic rotations may be produced by the agency of light. Thus the problem which has disturbed science for a long period as to the power of magnetizing iron by the sun's rays, as stated by Mrs. SOMERVILLE, MORICHINI and others, receives satisfactory elucidation from the indefatigable industry of Mr. FARADAY. Already has he proved the identity of machine, chemical, magnetic and animal electricity; and now, advancing a step higher in the inquiry, he finds the most ethereal principle with which we are acquainted capable of producing phenomena which have hitherto been regarded as the exclusive property of ponderable bodies only. Light, the subtile agent of vision, the source of all the beauty of color, is now shown to have some close relation with electricity, to which has long been referred many of the vital functions. As life and organization exist only where there is light, this discovery of Mr. FARADAY's would appear to advance us towards some knowledge of those physiological phenomena which are the most recondite subjects of science.

72. *Note on Prof. Twining's Article.*—We have, on account of its ingenuity and plausibility, inserted (at p. 89) Prof. TWINING's solution of the much vexed problem concerning parallel lines. We ought, however, to state that a scientific friend to whom we referred the paper, does not consider the course of reasoning satisfactory, and we have thought best to insert here the remarks which he has furnished.—*Eds.*

The reasoning in question is certainly of a novel and ingenious character, but is not free from steps that are objectionable. That there must be *some* fallacy in it, might be shown by pointing out cases where false conclusions would result from applying it with proper modifications, though without essential change. It will, however, be more satisfactory to learn, if possible, in what particulars the reasoning is faulty.

On page 95, the angle BAD is determined by the condition that it be such as to contain all the lines which can be drawn through A, to meet FG or FG produced beyond G. Then it is said that CAD cannot be so conditioned as simply to contain all the lines that will *not* meet FG produced as before; for in that case AD must meet and not meet FG at the same time. Now this conclusion appears inadmissible. It is founded plainly on the assumption that in determining the angle BAD to be such as to contain all of a certain class of lines, every other line is excluded from it; in other words, that the line AD, which is the limit of a certain class of lines, must itself be comprehended in that class. This surely would not be an authorized assumption, even if it were not erroneous.

There are many cases in which difficulty may be occasioned by inattention to the kind of consideration we here advert to. In the case before us, a clear distinction is observable between AD considered as a limit of the lines which meet FG produced, and AD considered as the limit of those lines which do *not* meet FG produced. In the former case, the line AD belongs not to the class of lines limited by it, while in the latter, it is one of that class of lines which it limits. At the bottom of page 95, this important distinction is disregarded, when it is said that if AD is contained by BAD, it must meet FG or FG produced.

Further objections to the demonstration under notice, similar to those here suggested, might be advanced; but if the consideration which has been referred to be kept in view, they will readily occur to the reader.

A. D. S.

Bibliography.

1. *Notice of* Mr. Alger's Phillips' *Mineralogy.*—Prof. Gustav Leonhard of Heidelberg, Germany, has given a very favorable notice of Mr. Alger's book, (already reviewed in this Journal.) It appears in the Annals of the University of Heidelberg, and we abstract from it the following:—

"The fifth edition of a work is the best encomium upon its character, especially of one of a scientific nature. The first four editions of Phillips's work appeared in London; the fifth has now been published in Boston, edited by Mr. Alger, whose name was previously advantageously known by his beautiful investigations in Nova Scotia, and by the Essay which he published thereupon in common with Dr. Jackson. It was but very recently that we had occasion to allude in these pages to the scientific activity that reigns in the United States; and this work of Mr. Alger furnishes us with additional proof thereof. The Mineralogy of Phillips appears in a new dress, much improved and augmented. The minerals are arranged according to a chemical system. The most satisfactory and accurate analyses are given for each species, and there are additional analyses by Dr. Jackson and others, of American minerals, as Danaite, Cavanite, Hudsonite, Masonite, and Ledererite. The figures of the crystals, amounting to 600, are admirable, and there is much interesting information touching the occurrence of minerals, those of Nova Scotia and South America in particular. There is no doubt in our mind that Mr. Alger's Mineralogy, splendid as it is in its getting up, will find many readers. It is peculiarly adapted as a compendium for students."

2. *Die Meteoriten, or Meteorites in the Imperial Mineral Cabinet at Vienna;* by Paul Partsch. pp. 162, 8vo, with a plate. Vienna, 1843. —The Vienna cabinet of meteorites contains two hundred and fifty eight specimens; they are from ninety four distinct meteorites, twenty five of which are of meteoric iron. Their physical characters are quite fully described by M. Partsch, and much information is added with regard to their geographical history. A table exhibiting their commerical value appended to the work, increases much its interest. The value of the Elbogen meteorite (iron) weighing 141 Vienna pounds* is stated at . . . . . 10,000 florins.

The Agram meteorite, weighing	70 pounds, at	.	10,000	"
An Atacama specimen,	" 5 "	5½ loth,	506	"
Weston (Connecticut) meteoric stone, weighing	3 loth,		15	"
Nashville (Tennessee)	" " "	1$\frac{27}{32}$ "	20	"
Richmond (Virginia)	" " "	3½ "	36	"

3. *Works of the Exploring Expedition.*—Two of the scientific volumes of the Exploring Expedition under Capt. Wilkes are just leaving the press, one by Horatio Hall on *Ethnography* and *Philology*, the other by James D. Dana on *Zoophytes*, including descriptions of species of corals. The latter is to be accompanied by an atlas of sixty one folio plates, containing several hundred figures, with colored drawings of the animals of many species.

4. *Die Rizopodi Caratteristeci dei Terreni Sopracretacei*, or *On the Characteristic Rhizopodi of the Supracretaceous deposits;* by G. Michelotti. Modena, 1841.—This valuable memoir contains descriptions of these minute shells from different parts of Europe, and is accompanied by three plates, containing figures of twenty four species.

5. Dr. Mantell will soon publish "Thoughts on Animalcules, or a glimpse of the invisible world, revealed by the microscope, with twelve plates, containing many colored figures of living Infusoria, and occupying about sixteen sheets."

Also by the same author, the seventh edition, with additions, of "Thoughts on a Pebble."

The author's "Wonders of Geology" are ready for a new edition, and he is preparing also, "A Geological Ramble round the Isle of Wight," and "Popular Lectures on the Nervous System."

Dr. Mantell read, May 14, 1845, before the Geological Society, "Notes on the Microscopical Examination of the Chalk and Flint of the S. E. of England."—*See Mag. Nat. Hist., Aug.* 1845.

6. Mr. Murchison's long expected work on Russia, in two quarto volumes, is published.

7. *Report of the Exploring Expedition to the Rocky Mountains in the year* 1842, *and to Oregon and California in* 1843–44; by Brevet

* The Vienna pound is about one fifth greater than the English, i. e. 100 pounds English=81 pounds Austrian. The loth=one sixteenth of a Vienna pound. The florin=forty eight and a half cents.

Capt. J. C. Fremont, of the U. S. Topographical Engineers. Printed by order of the U. S. Senate. Washington, 1845. pp. 694, 8vo. With maps and plates.—This truly valuable report has reached us at the last moment. The first part we read with equal profit and pleasure two years since, and shall give a more extended notice of both in our next number.

8. *The American Electro-Magnetic Telegraph, with the Reports of Congress, and description of all Telegraphs known employing Electricity or Galvanism, illustrated by eighty one engravings;* by Alfred Vail. Philadelphia, Lea & Blanchard. This is a useful descriptive pamphlet of 208 pages, which is well timed, and will be read with interest by all who watch the progress of human affairs.

9. *Papers on Practical Engineering,* (*No.* 3,)—*On Sustaining Walls: Geometrical Construction to determine their thickness under various circumstances*; derived chiefly from a memoir of Mr. Poncelet, with modifications and extensions, by Lt. D. P. Woodbury, U. S. Corps of Engineers.—This is one of a valuable series of scientific papers now publishing under the enlightened superintendence of Col. Totten, Chief Engineer. The labors of the gentlemen of our army in the various departments of science are fast gaining them a well earned reputation.

10. *A History of Fossil Insects in the Secondary Rocks of England, &c.;* by the Rev. Peter Brodie, M. A., F. G. S. London, J. Van Voorst, 1845. pp. 130, 8vo, and 11 plates.—Such books as this are the reward of minute and patient investigation, and mark a mature state in the progress of science.

Obituary.

1. It is our painful duty to record the tragical death of Dr. Douglass Houghton, State Geologist of Michigan, which occurred on the night of October 13th, by drowning in Lake Superior. Dr. Jackson has sent us the following letter of particulars, which will be read with melancholy interest by all.

Boston, Nov. 9th, 1845.

Prof. Silliman: *My Dear Sir*—You have doubtless heard of the death of our estimable friend Dr. Douglass Houghton, state geologist to Michigan, and United States surveyor of the public lands in that state. I now communicate to you all that I have been able to learn respecting that melancholy event, which has deprived science of one of her most untiring votaries, the state of her geologist, and his friends of one of the most amiable and true-hearted of men.

Dr. Houghton, in addition to his duties as state geologist to Michigan, had made a contract with the United States government to run the township lines on the public lands of that state, and had employed a number of distinguished surveyors, with their assistants, in performing the difficult and laborious task of the linear surveys, while he explored, so far as his other duties would allow, the geological features of the country over which the survey extended.

He had just been engaged in the important duty of conveying supplies by appointment to his surveying parties, and was returning to Eagle River, when the sad accident befel him which it becomes my painful duty to relate. On the 13th of October, with a party of four trusty French *voyageurs*, in a beautiful sail-boat which had been presented to him by his friends, he was on his way from the portage on the north side of Keweenaw Point to Eagle River, and had just passed a point of land, and was running along the shore to the mouth of the river, when a sudden northeast gale sprang up, accompanied by a heavy fall of snow, and a tremendous cross sea, driving on to a steep and rocky lee shore, obstructed his progress and jeopardized the lives of all who were in the boat. To land on that coast was impossible, for the sea ran as high as his boat's masts, and dashed upon the inhospitable rocks with great fury. The coast at that place consists of conglomerate ledges, dipping boldly into the lake at an angle of nearly 45°, and from ten to twenty feet high. Every exertion was made to keep the boat from being swamped by the sea, which blew directly over its sides. Once when the boat was half full of water, the men bailed it out, and then handed Dr. Houghton his life preserver, entreating him to put it on; but he laid it down at his feet, and said that "there was no danger." This was evidently for the purpose of encouraging his boatmen.

The next moment the boat was filled and overturned. This took place at 8 P. M., three miles from Eagle River, and not more than twenty rods from the shore.

One of the men who had secured a hold on the rudder of the overturned boat, saw a hand rise out of the water, and seizing upon it drew up Dr. Houghton, who after getting hold of the rudder also, pulled off his gloves and said to the man who offered him assistance, "Save yourself—I can get ashore easily."* Soon after a heavy sea struck the boat under her bows, and completely ended her over, and it is supposed that Dr. H. must have been stunned by the blow, for he sank immediately, and was not seen again. Two of his men were drowned with him, and two succeeded in reaching the shore, but were much bruised against the rocks, the sea often carrying them back into the lake after they had gained the shore, and dashing them on the rocks again with violence. At last they succeeded in laying hold of some bushes which grew in the

* Dr. Houghton was a good swimmer.

crevices of the rocks, and saved themselves. Only one of the drowned men has been found, and his body was mangled and his brains were dashed out against the rocks. Every exertion was made by Col. GRATIOT, of the Lake Superior Copper Company, to recover the body of Dr. HOUGHTON from the lake, but thus far without success.

Thus has perished one of the most energetic and active of our state geologists, who lost his life near the scene of his labors, before he had been able to complete the monument of his scientific achievements, and benefit the world by the publication of his volumes of field notes, which must have been filled with important and valuable information.

Dr. HOUGHTON, I understand, was born in Bolton, (Mass.) and emigrated in early life to Michigan. His age was about 45 years. He married young, and has left a wife and several children to deplore his loss. We offer our heartfelt sympathy, and lament with them the loss of a friend, whom we highly esteemed for his many virtues, and uniform courtesy and kindness. C. T. J.

2. Dr. WILLIAM HORTON.—This gentleman, who was well known to all cultivators of mineralogy in the United States, died at his residence at Craigville, in Orange County, New York, some time during the last spring. His inquiries were early directed to the exploration of his own district of country, so rich in rare and curious minerals. He was also for a time one of the geologists who conducted the survey of the State of New York. His latter years were clouded by a chronic melancholy which impaired his previous usefulness. He was a very modest and retiring man; and he has unfortunately left but few written evidences of his scientific acumen. We are unable to give the exact time of his death or his age.

3. WILLIAM C. WOODBRIDGE, long known for his philanthropic labors in the cause of education, died at Boston, Nov. 9, 1845, in the 51st year of his age. He was graduated at Yale College in 1811, and early devoted his efforts to the advance of the educational interests of his country. Being impressed with the opinion that the study of geography might be pursued in a more philosophical manner, he expended much time and labor in the preparation of a treatise on this subject, aided by Mrs. WILLARD. His services in this department were recognized by various Geographical Societies abroad by admission to membership. The "American Annals of Education," established and conducted by Mr. WOODBRIDGE at Boston, enjoyed a high reputation, and contributed very much to incite the measures now every where in progress for the elevation of general education.

PAMPHLETS

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