Could senna be obtained from any of our cassias? Could we dispense with chirata by using our own erythraea here? Could the very potent acrid principle of the palm-like cycas and zamia species be chemically defined, having hitherto, like the active ingredient of croton-oil and of many delicate fragrances, eluded separation as distinct substances? Were the alkaloids and the aromatic oils of the four Australian monimieaceous sassafras trees from as many colonies closely akin? What was the precise position of cassia absus, used for ophthalmic complaints already by the ancient Egyptians, in the therapeutic system, this plant extending naturally to Queensland? Did any of the Australian species of croton yield an oil comparable to that of the Indian *C. tiglium*? In what way did the blue-flowering grass-lily of Western Australia (*agrostis crinum*) affect the visual apparatus of sheep feeding on this plant, so as to cause blindness, and what conclusions could be drawn therefrom? What was the nature of the intensely bitter principle in some of our pittosporums? How far could Australian lobelias replace *L. inflata*? Could cocaine be obtained from two species of erythroxyllon peculiar to tropical Australia? Had the powerful properties of zygophyllum and didiscus, manifested by their action on pasture animals, any counteracting value in some of the morbid affections with which the therapist had to cope? Such were some of the questions, the solution of which devolved especially on Australians, who should strive by united efforts all over this great land to put together an Australian *Materia Medica*—not a mere collection from vague traditions or crude empiricism, but supported by all auxiliaries of recent medicine, biology, and chemistry, so as to render such a work worthy of our time and of our country.

From Dr. William M'Gregor, the recently-appointed Governor of British New Guinea, he expected a closer study of the particular form of paludal fever and the beri-beri, which raged so severely in some of the lowlands of his territory, and on the treatment of which His Excellency, as an experienced physician, could bring professional knowledge to bear. From the ranks of the medical profession had sprung leaders of thought in all fields of human knowledge, and the training gained by medical students through membership of field naturalists' clubs had called forth the careers of some of the greatest zoologists and phytologists of this and past ages.

The most famous achievements for Australian therapeutics through pharmaceutical aid had been with the eucalyptus. The value of its oil was recognised as a medicament by wide-reaching testimony, and a study of the hygienic effect of eucalypts had assigned to the eucalyptus one of the foremost places in therapeutics. To Mr. Bosisto belonged the credit of rendering the eucalyptus oil accessible in every pharmaceutical establishment of the globe, for ample benefit of medicine and surgery. Other active principles of the eucalyptus had been brought under notice—for instance, kino of *E. rostrata* had been used with success in chronic diarrhoea, such as was apt to occur in tropical countries. The products of the eucalyptus had been used as an antiseptic for gauze-dressing, for inhalation from vapour-atomisers; also as an antispasmodic, as an antipyretic, and as a local disinfectant, while the oil had proved efficacious in paralytic affections.

As Australians we should reflect what our clime might be if, instead of the salubrious eucalyptus forests, we had trees through vast regions, from the mouldering foliage of which various forms of malarial fever arose, dreaded in so many other tracts of the warm zone; and it might fairly come within our notice that young growing eucalypts, to us so handy here, were placed in the wards of hospitals in various places of the European continent, to ameliorate the air and subdue contagion, quite irrespective of the cheerfulness which the foliage imparted. How easily could something similar be done anywhere here. Need he draw attention to the vastness of the myrtaceous vegetation throughout all Australia, and in forms strongly antiseptic. Even Cook's surgeons foreshadowed ingeniously our comparatively recent clearer discernments by using foliage from *leptospermum* for an antiscorbutic tea, given to the sick of the crew while the great navigator stayed in New Zealand—hence the popular name of tea-tree; also for so many Australian shrubs, even if not arborescent. It would be an incalculable boon if an international pharmacopoeia could authoritatively be established, with weights and measures of a uniform standard, according to the decimal system. To avoid more readily the occurrence of numeric errors in the writing and interpretation of figures, it might be best in prescribing to use distinct letter-designations for the decimal proportions of

grammes and litres, should these standards ever be adopted as universal.

In the United States the reissue of the *Pharmacopoeia* was decennial, which acted as an incentive to bring timely together all additional data, meanwhile gained, for systematic and conformous insertion.

It might be construed as a designed omission, were he to leave the subject of remedies against ophidian poisons untouched in a part of the world where deadly dangerous snakes were comparatively numerous, and represented by many species. We were evidently as yet on the threshold only of these inquiries anywhere in the world. But experiences were accumulating from observations on the human subject, the most valuable for our purpose. It seemed to him that the principle of the Halfordian treatment should be followed up, and that deductions, on which Dr. Aug. Mueller based his recommendation, should be considered in their *rationale*, as well as in reference to the choice of particular remedies, especially as it could not be supposed that the chemical constitution of ophidian virus was in each species of snake absolutely identical. His method of injecting strychnine subcutaneously seemed the most hopeful of all at present, and was already to some extent countenanced by the great Virchow. Alcoholism, when resorted to, needed further physiological explanation as to its operating in these cases, and we might get thus, perhaps, a key disclosing the mysterious secrets which yet enshrouded the subject.

SUBPHRENIC ABSCESS SIMULATING PNEUMOTHORAX.*

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ABDOMINAL abscess is a condition which comes under the notice of the physician quite as often as under that of the surgeon. Although such cases require surgical treatment, yet they commonly arise in connection with disease of the gastro-intestinal tract, which still remains part of the physician's province. I do not, therefore, hesitate to bring an instance of one variety of abdominal abscess before the Section of Medicine; especially as this variety—subphrenic abscess—embraces some interesting points in physical diagnosis. The chief of these points is the differentiation from a limited basic pneumothorax, since such abscesses often contain gas, from their connection with stomach or intestine. This fact led Professor Leyden to term the condition "pyopneumothorax subphrenicus," a name which is not strictly accurate, but which serves to mark the main feature of these abscesses (Fig. 1).

The case I have to record is that of A. C., aged 15, a printer, who was admitted under my care into the Middlesex Hospital, on March 14th, 1888. He was very thin and delicate looking, and gave the following history.

Exactly two months before, namely, on January 14th, he came home in the evening feeling ill, and twice vomited. The next morning he complained of great pain in the right iliac region, and in the knee. After lasting for three days, these pains left him, but were followed by pain in the right side of chest, shoulder, and arm. Always constipated and irregular in action, the bowels now became obstinately confined—he said, for three weeks—when he was given some castor-oil. This caused pain in the belly, at a higher spot than previously, and he became very ill. Altogether he was kept in bed for six weeks. He used to keep the thigh and leg flexed, to relieve the pain in the right half of belly. Sometimes he was delirious. He did not again vomit, but was feverish, had no appetite, and lost flesh. He had no cough nor sweating. It was said that his knees were swollen, and that the urine was scanty. He had been up for a week, when he had a relapse, and was brought to the hospital. It may be added that there was no tubercular taint in the family, of whom the mother and six sons are living.

The patient was a pale lad, and looked ill. There were sordes on the lips, and traces of herpes at each angle of the mouth. The

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skin was moist and desquamating; temperature 103° ; pulse 144. No joint swelling. He complained of pain in both sides of chest; no cough.

Fig. 1.—Pyo-pneumothorax subphrenic (Leyden)

On examination there was observed to be slight fullness of the lower part of the right side of chest, with impaired respiratory movement. The percussion note at right apex was of higher pitch than at left, and the breath-sounds were harsher, and accompanied by scanty crepitation. At the right posterior base, about two inches below the scapular angle, there was hyper-resonance extending round to the axilla; and here metallic tinkling was plainly audible, while the breath-sounds were weak, and at base quite abolished. Vocal fremitus was also absent over this region. Over the left side, which was normally resonant, fine metallic *râles* were audible near the sternum, whilst coarse friction could be heard in the lower axillary region. The heart's apex beat was in the fourth interspace, half an inch within the left nipple. The impulse was diffuse and wavy, slightly thrilling. The area of dulness was normal; the sounds were loud at apex, where a soft, inconstant, systolic *bruit* was audible. At the third left cartilage the first sound was very rough; and here, also, there was an occasional systolic *bruit*. The second sound was accentuated. (The *bruits* were probably functional; they afterwards disappeared.) The tongue was coated; the bowels confined. The abdominal wall was retracted, and there was tenderness in the right hypochondriac and lumbar regions. The liver could not be felt below the ribs, nor was the spleen enlarged. The urine was acid, specific gravity 1027, loaded with lithates; no albumen.

Next day he was again carefully examined. Temperature 103.4° , pulse 100. It was now found that the percussion note at the right base was quite tympanitic, and that it extended right round the axilla to the front, where it wholly replaced the normal hepatic dulness, except for a small area bounded by the costal arch above, between the end of the seventh rib and the left arch; in front the tympanitic area was surmounted by a strip of dulness from the fifth to the seventh ribs, and over this part vocal fremitus was diminished: fine crepitation was audible here. A like, but nar-

rower strip of dulness, continuous with the former, surmounted the area of tympanitic resonance in the back. This tympanitic area was strictly limited in front by the costal margin, where the note became altered, but there was no dulness indicating downward displacement of the liver. Posteriorly, the area in question slightly passed beyond the limit of the ribs. There was some undoubted fullness of the right flank; no redness nor oedema.

Fig. 2.—Case of subphrenic abscess: physical signs (back).

Most of the signs commonly present in pneumothorax were met with over this area, absence of breath-sounds, of vocal fremitus, and resonance. Even metallic tinkling could occasionally be heard, whilst the bell sound was clearly elicited on striking coins at any spot, back or front of the tympanitic area. (Figs. 2 and 3.)

Fig. 3.—Case of subphrenic abscess: physical signs (front).

Fig. 4.—Case of Subphrenic Abscess: Temperature Chart.

An exploratory puncture was made over this area behind with a hypodermic syringe; no fluid, but a little foetid gas, was withdrawn.

During the next few days we observed that the area of tympanic (or rather of amphoric) resonance had extended in the back towards the crest of the ilium. There was some pain in this region. The belly became rather distended, and on the right half more resistant. Constipation continued until an enema was given on the 20th, after which the bowels were moved regularly once or twice daily. There was marked hectic. Meanwhile the *râles* cleared away, except a few at the left base, and there was neither cough nor expectoration.

The diagnosis of subphrenic abscess was now fairly clear, the presence of pus being inferred from the type of pyrexia; whilst the history of the case, as well as the indications of abdominal disease, suggested the origin of the abscess in intestinal perforation, most probably of the appendix cæci. Such an origin would moreover explain the foetid gas that so largely filled the abscess, and caused the presence of signs of pneumothorax. As to the alternative diagnosis of basic pneumothorax, the comparative absence of lung signs, and the disappearance of most of those which were at first noticed, aided in negating it. I think that the strip of comparative dulness between the normal lung resonance above and the amphoric area below was an important sign of the condition not being true pneumothorax; otherwise, the physical signs strikingly resembled those of a case of right basic pneumothorax of phthisical origin that had, by a curious coincidence, occupied the same bed in the ward just before this patient was admitted. Although there could be no doubt of the existence of suppuration, a few days were allowed to elapse before invoking surgical aid, in the hope that the abscess would point externally.

On the 22nd a tender spot was detected between the last rib and the iliac crest, and a trace of œdema in the lower axilla.

On the 24th it was noted that the tympanic area did not extend so far forward. There was now dulness over the sixth to the eighth rib-cartilages continuous with the dulness in the epigastrium. Posteriorly there was no change in the physical signs.

Chloroform being administered, my colleague, Mr. Gould, inserted a trocar in the back about the centre of the tympanic area. Some three or four ounces of highly foetid pus and gas were withdrawn by the aspirator. This gave temporary relief, but next day the tympanic area had its previous limits, and signs of left iliac thrombosis appeared in pain in the left thigh, followed on the 26th by slight œdema of the leg, and fullness with resistance in the groin. Belladonna was freely applied. Otherwise there was slight improvement. The tongue was cleaner, the bowels well open, the anterior part of the chest free from *râles*; but the hectic type of pyrexia continued.

On the 27th, although evidence of thrombosis was plain from the detection of the plugged vein in the left groin, it was felt that a free incision should no longer be delayed. Chloroform was given, and Mr. Gould made an incision for three inches just below and parallel to the last rib. Much foetid pus escaped, and the cavity, which was formed of two pouches, was thoroughly irri-

gated with mercurial solution, and two large drainage-tubes inserted.

Mr. Gould says one pouch appeared to be above and behind the liver, separating it from the diaphragm; and the other ran down to the iliac fossa as far as Poupart's ligament. The incision opened the area of constriction between the pouches, the upper one being quite behind the kidney. The liver was felt in front of incision, probably through the fascia. From this it is clear that the abscess was seated deeply in the abdominal wall, and that its gaseous contents had made their way upwards between the muscular and fascial planes, so as to eventually come between the liver and the parietes.

Fig. 5.—Case of subphrenic abscess. Diagram showing its position in abdominal wall.

From this date the record is one of uninterrupted progress towards recovery. The hectic entirely disappeared, and the lad rapidly put on flesh. In a few days the pain and swelling in the left groin disappeared.

On March 29th examination showed that the normal area of hepatic dulness was no longer masked by tympanic resonance either in front or behind.

There was never much discharge, and the tubes were gradually shortened. One was removed on April 13th, and the other replaced by a smaller one on the 27th, when the upper cavity was

found to be wholly closed, and the other reduced to a narrow sinus passing downwards and forwards. The tube was finally removed on May 17th, and the sinus healed.

The precise condition illustrated by this case is not very common, and it has, in consequence, received but little, if any, notice in textbooks, or even in works, which deal more especially with thoracic or abdominal disease. Moreover, most authors who do refer to it seldom speak from personal knowledge of such cases. Thus Dr. Gee² says:

"An abscess below the diaphragm may become partly filled with air, and may so raise the diaphragm, the pleura remaining uninjured, as to give a tympanitic percussion note over the lower part of the chest, but not the amphoric signs of pneumothorax."

This latter statement is confuted, not only by the case I have narrated, but by many quoted by Leyden, to which I shall presently refer.

Dr. Hilton Fagge³ refers to a case of Wintrich's, where one such abscess, due to a perforating ulcer of the stomach, was mistaken for pneumothorax.

Dr. Austin Flint enters into more detail, reproducing Leyden's conclusions⁴, and also states that the diagnostic features of these abscesses were first recognised by Barlow and Wilks in 1845.

Eichorst⁵ summarises the facts recorded by Cossy and Leyden, and reproduces the illustration given by the latter in his paper on pyo-pneumothorax subphrenicus.⁶ Indeed, this paper practically comprises all that can be said upon the subject; and I will briefly mention its salient points.

A peritoneal abscess containing air as well as pus, may develop on the right or left side. When on the right side it may push upwards the diaphragm to the level of the third space, depressing the liver and compressing the lung, whilst it is limited on the left by the falciform ligament (*vide* Fig. 1). Its presence is indicated by the full resonance over the retracted lung, the tympanitic note extending downwards from the third rib, and replacing the normal hepatic area, the palpation of the displaced liver, the absence of breath sound and presence of metallic clang or amphoric hum below the third rib, together with metallic phenomena on combined percussion and auscultation, absence of vocal fremitus, and lastly the presence of succussion and of dullness, shifting with position, when the cavity contains sufficient fluid. The points in differential diagnosis between a gaseo-purulent collection above or one below the diaphragm are stated to be: 1. The development of the disease pointing to abdominal inflammation. 2. Absence of cough and expectoration at least during a long period of the illness. 3. But little displacement of the heart, and no bulging of interspaces. 4. Normal respiratory murmur below the clavicle, and the abrupt transition lower down to an amphoric echo.

Leyden then goes on to say that the condition has been frequently described, but in most cases the true nature of the case has only been revealed by the *post-mortem* examination. Considered during life to be pneumothorax, the case has often had withheld from it that surgical intervention which, if resorted to early, might have saved life.

In addition to the cases he has quoted from various writers, Professor Leyden relates three cases in which he diagnosed the subphrenic character of the condition, which in each case had the signs of pyo-pneumothorax. The cases are all referable to perforation of stomach or intestine setting up a localised purulent peritonitis, instead of the more common general peritonitis with meteorism, a condition in which disappearance of liver dullness forms so valuable a sign.

In only one case, and that doubtful, was the subphrenic abscess attributable to perforation of the appendix. I believe, although it could not be proved, that such was the source of the abscess in my case, which was also singular in being wholly extra-peritoneal. I presume that in consequence of previous inflammation the appendix had become adherent to the parietes, and that its ulceration took place into the subperitoneal tissue and transversalis fascia, by which, and by the iliac fascia, the escaped gas was directed beneath the diaphragm, and accumulated to such an extent as almost entirely to cover the liver, and mask its percussion area. This fact lends additional interest to the case, and

illustrates a difficulty one often experiences in diagnosing between the peritoneal and extra-peritoneal varieties of abdominal abscess. Perhaps the extension of the tympanitic area towards the iliac crest behind was significant of the parietal position of the abscess, as indicating that the gaseous contents lay behind the kidney as well as the liver; although I must frankly confess that I did not consider this at the time, but thought we had to deal with a peritoneal abscess.

As to the diagnosis from a localised basic pneumothorax, there was never much difficulty in this case. The history of the illness clearly indicated an abdominal origin; the pulmonary and pleural signs were justifiably regarded as being due to secondary complications, whilst the physical signs common to pneumothorax and subphrenic abscess were only those producible over any air-containing cavity.

I ought not to conclude this paper without referring to the fact mentioned in Flint's *Medicine*—that, so long ago as 1845, the simulation of pneumothorax by an abscess beneath the diaphragm was described by Drs. Barlow and Wilks, and I am indebted to Dr. Wilks for informing me where to find the record of this case. It is in the *London Medical Gazette*, 1845, vol. i, p. 18, under the title of "Perforation of Stomach with Obscure Thoracic Symptoms." The case was that of a woman who had suffered from gastric symptoms for eighteen months, when she was suddenly seized with intense pain in the left side and shoulder, and great dyspnoea. When the chest was examined there was found to be dullness below the left scapula, and amphoric respiration was heard there and as far as the loins. Metallic tinkling was also occasionally audible; sometimes there was a splashing sound on succussion. The report (by Dr. Wilks) states that:—"The stethoscopic signs, particularly the amphoric respiration, coupled with the severe symptoms, satisfactorily proved to many that the case was one of pneumothorax. Dr. Barlow was opposed to this opinion, and persisted in referring the amphoric and metallic sounds to the stomach, and mentioned a case in which a perforation of the stomach had communicated with a large peritoneal abscess." The patient died, and the condition proved to be such an abscess, which communicated with the stomach by two perforations. The diaphragm was forced up to the fourth rib, and there was much sero-purulent fluid in the pleural cavity. Dr. Wilks attributed the amphoric sound to the passage of air from the stomach to the abscess, influenced by the movement of the diaphragm. Dr. Barlow thought that it was rather due to the bronchial sounds modified by the stomach and abscess cavity.

In his letter to me Dr. Wilks says, with reference to this case:—"..... I should not have thought such cases so excessively uncommon. It was the first I had met with, but I was then only a student, and was then, as now, quite innocent of bringing anything original before the profession..... The interest of the case to me and why I have often alluded to it, was to try and make the students distinguish between the physical conclusions drawn from physical signs and the inference. Air and water in a circumscribed cavity produce certain signs, and, because heard in lower part of chest, pneumothorax is diagnosed."

It need hardly be said that many abscesses occur beneath the diaphragm which neither contain gas nor have any connection with the gastro-intestinal tract. The diaphragm may be so displaced upwards as to give rise to the mistaken diagnosis of empyema just as the gas-containing variety may simulate pneumothorax. Drs. Fagge and Taylor have recorded such cases in *Guy's Hospital Reports*, third series, vol. 19, cases mostly where the abscess has been primarily hepatic, and where also eventually the diaphragm has been perforated and empyema been produced. Quite recently there have been two cases of this class in the Middlesex Hospital under the care of my colleague, Dr. Finlay. In the one, a large perinephric abscess on the right side had burrowed upwards and displaced the diaphragm considerably. The abscess was diagnosed and treated as a basic empyema, being twice incised and drained; but it was wholly below the diaphragm, which was, in consequence, pierced by the incision. The other was a case of hepatic abscess which had perforated the diaphragm and given rise to empyema. The occurrence of such cases may be usefully borne in mind when dealing with a supposed localised empyema at the right base; but the scope of my paper does not allow me to do more than simply refer to them.

DURING a football match at Bradford on March 5th, one of the players sustained intracranial injuries, from which he died on March 8th.

² *Auscultation and Percussion*, third edition, p. 280.

³ *Principles and Pract. of Med.*, vol. i, p. 145.

⁴ *Princ. and Pract. of Med.*, 6th ed., 1886, p. 145.

⁵ *Handb. d. Sp. Path. und Therap.*, 1st ed., vol. i, p. 458.

⁶ *Zeitschr. f. Klin. Med.*, vol. i, 1879.