

like Gold and Silver preserve their lustre practically untarnished; but other metals, such as Iron, on being exposed to the air at ordinary temperatures become crusted over with a brown earthy substance which from its reddish colour you call 'rust.' If you go on removing this crust, more will form until all of the iron is converted into this rust, which is the 'calx' of iron.

Lead exposed to the air undergoes little change; but if we heat it to fusion, you see that its bright surface is soon covered over with a scum or dross. This is popularly believed to be impurity, but it is not really so. For when it is removed fresh scum is formed, and this can be continued until all the lead is converted into this 'scum.' This scum on lead bears the same relation to the lead that rust does to iron—it is the 'calx' or 'rust' of lead.

This piece of lustrous Copper when burned in the air has its surface coated with a black powder which is the 'rust' or 'calx' of copper.

Here, then, we have metals undergoing change in the air with the formation of an earthy substance called a 'calx' which is altogether unlike the metal itself.

Even the Ancients, from their acquaintance with metallurgy, were aware of the fact that the metal could be recovered again from many of these earthy substances. Thus I take a small quantity of this lead dross and heat it with red-hot charcoal, and it becomes metal again. Yet in the process of conversion of the metal into dross and back again into metallic lead, nothing can be seen to have been added to the metal or taken away from the dross.

To account for this phenomenon STAHL (1660-1734) formulated a theory which was, that all bodies capable of burning contained an inflammable and *invisible* substance which he called *phlogiston* (from the Greek *phlogistos*—burnt, combustible) which was given off when the metal was burned. To get back the metal then, you only require to add *phlogiston* to the powder and the metal is 'revived.' This theory of STAHL'S soon prevailed all over Europe, and it was of great use in assisting in the classification of elements; but it was at length found that although *qualitatively*, this theory answered the case well enough, when taken *quantitatively* it gave a contradictory result. For it was found that when metals were burned in the air, instead of weighing less they weighed more, as you see in this experiment where we burn Magnesium; thus *loss* of Phlogiston, led to *gain* in weight, which was impossible! This false theory, therefore, had to be given up, though it lingered on till near the end of the eighteenth century. And here also we have an instance of the value of the balance in chemistry in upsetting false theories by the logic of precisely observed facts.

The next great step towards the true theory of Combustion was made by JOSEPH BLACK of

Glasgow. When limestone (or shells or marble, which are essentially the same) is burned in a kiln it becomes caustic; and it was at first believed to have absorbed this caustic principle from the fire. Black was the first to show what actually occurred. He found in 1754 that lime on being burnt in a kiln instead of weighing more, it weighed less; and he showed that the non-causticity of the lime was due to an invisible *gas* which differed from ordinary air in that it was caught and *fixed* by certain solid substances, hence he called this new gas "Fixed air." Further he showed that the '*mild-alkalies*,' differed from the '*caustic-alkalies*' by the presence of this so-called '*fixed-air*,' which we now call Carbon-dioxide. Here we have some of this invisible gas, and you see that it is heavier than atmospheric air; for when I pour it into this equiposed bell-jar, that arm of the balance at once goes down; it does not support combustion as you see this light candle is extinguished when I introduce it into the gas; and this gas has the property of forming insoluble compounds with the earthy alkalies, as you see when it is passed into lime-water.

This discovery then of this new gas called 'Fixed air' explaining why limestone became caustic when roasted in the fire, cleared the way for the discovery of the true explanation of combustion which was the real starting point of modern chemistry.

(To be continued.)

A Mirror of Hospital Practice.

A CASE OF ULCERATION OF THE CÆCUM FOLLOWED BY MULTIPLE ABSCESSSES OF THE LIVER.

UNDER THE CARE OF
LT.-COL. J. MAITLAND, & CAPT. A. E. GRANT,
I.M.S., I.M.S.,

General Hospital, Madras.

MAJOR J. —, an officer of the Royal Artillery, reported sick on the 7th March 1899, complaining of pain in the left side and fever.

History.—Had served in India for the past ten years during which time he had been ill on one occasion only, namely, two years previously when he suffered from an attack of malarial fever that lasted four days. About six weeks previous to his present illness he suffered from slight looseness of the bowels, but thought nothing of it and did not consult a medical man. With this exception he appears to have enjoyed very good health as instanced by the fact that he frequently went out snipe-shooting the whole day. He was temperate in his habits.

History of present illness.—He attended parade on the 7th March apparently in perfect

health. From this he returned to his quarters, perspiring heavily and changed his clothes opposite an open window through which a strong breeze was blowing. He then went to stables and whilst on this duty was seized with a severe pain about the upper part of the epigastrium. He reported sick, and was seen by Major R. T. Macleod, R.A.M.C., who has very kindly furnished the following notes of his case taken up to the 14th March, when he was admitted into the General Hospital in Madras.

7th March.—Complained of pain under the lower ribs on the left side, aggravated by movement. No cough. Temperature 100.5. Tongue dirty. Bowels constipated. Liver not enlarged. Tenderness on left side under the lower ribs. Ordered ammonium chloride mixture and calomel and colocynth pill. Milk diet.

8th March.—Pain increased. Poultices ordered.

9th March.—Pain persistent and severe. Tenderness on pressure under lower ribs left side. Tongue furred white. No pleuritic friction sounds. No increase of dullness.

10th March.—Pain much less. Temperature in the morning fell to 99°. Same treatment. Also 10 grains of quinine.

11th March.—Slight increase of dullness in epigastric and left hypochondriac region, and slight bulging in same locality, apparent on inspection and palpation. Bowels not opened. Calomel repeated.

12th March.—Fever continues accompanied by copious sweatings. No rigors, no pain. Slight tenderness in epigastrium. Temperature rose in the evening nearly to 104°. Quinine repeated, and 20 grains of ipecacuanha given.

13th March.—Slightly better. Temperature 99.4. Bowels opened twice; loose bilious motions. Evening temperature 102.2.

14th March.—Morning temperature 100.4. Bowels opened several times in the night. Stools loose, bilious. Slight tinge of jaundice evident, principally in the face and conjunctiva. Otherwise no evident change. On this date he was transferred to the General Hospital, Madras.

On admission he seemed rather exhausted and was perspiring heavily, otherwise he did not appear to be very ill, save as regards the physical signs. General hepatic enlargement and a swelling partly in the epigastrium and partly in the left hypochondrium. No pain even on palpation. Perspired profusely during the night.

15th March.—Right lobe of liver enlarged upwards posteriorly and in the mid-axillary line. Friction sounds heard all over the right lobe. Symptoms otherwise unchanged.

16th March.—No important change. It was observed that the patient was somewhat delirious

and talked at random, but he could always collect his senses and answer questions properly.

17th March.—Does not complain of any pain even on palpation of the epigastric swelling. Sweats rather profusely. The emanations from the body have a peculiar odour suggestive of pyæmia. Slight further increase in dullness over the right lobe of the liver. It was decided that an operation should be performed the following morning. During the night the patient became comatose, the temperature rose to 107°, and death took place at 3 o'clock in the morning.

Post-mortem examination.—On opening the abdomen the descending colon is seen to be greatly distended and pushing inwards towards the middle of the lower part of the peritoneal cavity—the latter contains yellowish serous fluid. The upper part of the abdominal cavity is shut off by recent soft adhesions forming a space containing pus and communicating with an abscess on the under surface of the left lobe of the liver. The lower margin of the latter is adherent to the transverse colon. A considerable number of adhesions much firmer and older than those seen in the upper part of the abdomen are found in the right iliac region binding down the lower part of the ileum as well as the cæcum, as if there had been previous perityphlitis. The hepatic flexure of the colon is adherent to the under-surface of the right lobe of the liver, and the transverse colon forms part of the inferior wall of the above-mentioned abscess cavity.

The liver is adherent over all its surface, the adhesions being soft and recent. Weight 116 ounces. Deeply congested. On the posterior surface of the right lobe as well as the under surface of the left lobe an abscess, situated close to the surface of the organ, has burst. On section, six abscesses are found in the right lobe and one in the left. These abscesses vary in size from that of a walnut to that of a small mango. The walls are ragged and of a dirty brown colour. The contents consist of thick brownish yellow substance. The liver tissue between the abscesses in the right lobe is dark, brownish purple in colour. That of the left lobe is much less congested.

The large intestine is distended. The cæcum and adjacent part of the ascending colon contains several large ulcers and numerous smaller ones. The larger ulcers lie transverse to the axis of the bowel. The intestinal coats at the seat of the ulcers are much thickened. The surface of the larger ulcers are rough and gray in colour, the smaller ones blackish. The edges are thick and raised above the floor of the ulcer as well as the contiguous mucous membrane. Patches of congestion are seen in other parts of the large intestine, especially in that part which is adjacent to the abscess.

(To be continued.)