at all periods of life, especially at the period of greater liability, and more amongst males than females, involves serious considerations. The disease is now said to prevail more in England than in Ireland; but, on the other hand, it has been pointed out that in the United States it is more prevalent amongst those of Irish and of German descent than amongst the rest of the population. Still, further researches on all these points are required.

The influences due to *social status*, and of the many conditions which accompany wealth or poverty, appear to me, in relation to the actual proportions of the rich and the needy, to be adverse to the well-to-do classes. Excess of diet, especially of animal food, used to be said to conduce to cancer; and carnivorous mammalia and birds, especially in a state of domestication, are known to suffer more than the herbivora. The latter, however, are killed earlier, not only for the necessities of the human race, but also for those of animals of prey. Tame and wild vegetable-feeders, as a rule, fall early victims to their predatory fellow creatures. Long-lived domesticated animals, even if herbivorous, suffer from some forms of cancerous disease; and I well remember dissecting and examining a wild hare, sent to my old master, Robert Liston, which had a well-marked soft adenoid tumour of the mammary glands on the left side of the body, which weighed more than two pounds. The genuine effects of habit and irritation were especially seen in regard to the former use of the clay pipe, and are now shown in reference to the action of tobacco vapours on the tongue and palate. Many instances of both these facts are engraved upon my memory. But I would now add that I have never met with a due inquiry into the effects of chewing tobacco. Is there any peculiarity in the mode of preparing tobacco for mastication and for smoking? Is there any mischievous empyreumatic evolution in the distilling action of the pipe or the cigar? Why did not or does not the use or the abuse of snuff give rise to the development of cancer in the nose—of which I may say that I do not know of a single instance?

Finally, I have to note that the influence of *occupation*, and of its concomitant exposure to the effects of external agencies in relation to the provocation or prevention of cancer, has not been sufficiently investigated, more especially in regard to the continued inhalation or swallowing of vapours, or of minute particles of mineral substances contained in the air which workmen breathe, or the water they drink, or in the dust which lights upon their skin. Especially would I direct attention to the advisability of making an inquiry into the apparently bad or good effects of particular vapours or dust, which might contain zinc, lead, copper, silver, mercury, antimony, or arsenic. This investigation should also extend to the influence of organic vapours or of dust, consisting of living or of dead organic matter.

Lastly, to revert to the real object of all such inquiry—viz., the discovery of the causative agent in the production of cancer from what appears to be healthy tissue,—I would urge upon our modern investigators the great desirability of comparing not merely the histological details of cancerous and normal structures, but to attempt the chemical analysis of the same. By a combination of all such methods of research we may ultimately remove the reproach of ignorance on this most common and most fatal disease.

A CASE OF

HEPATIC ABSCESS IMPLICATING THE PLEURA, LUNG, KIDNEY, AND COLON; RECOVERY.

By E. W. ROUGHTON, B.S., M.D. LOND., F.R.C.S.,
ASSISTANT SURGEON TO THE ROYAL FREE HOSPITAL; SENIOR DEMON-
STRATOR OF ANATOMY AND WARDEN OF THE COLLEGE
AT ST. MARY'S HOSPITAL.

DURING the past few years the surgery of the thorax and abdomen has advanced with rapid strides, and perhaps of all the viscera contained within these cavities few of them have reaped more benefit therefrom than the liver. The following case will no doubt prove of interest to those who have worked in this field.

The patient, who was a strong athletic gentleman aged twenty-three years, was taken ill with febrile symptoms on Jan. 11th, 1889, at Kandy, in Ceylon. In a few days pain over the liver and a bulging under the costal margin indi-

cated the presence of an hepatic abscess. On Feb. 1st the abscess was opened and ten or twelve ounces of pus evacuated. The drainage does not seem to have been efficient, inasmuch as the temperature rose to between 101° and 102° in the evening. However, by March 1st the abscess had healed up, but still the temperature kept above normal. This led to an examination of the chest, resulting in physical signs of pleurisy with effusion being detected on the right side. Up to this time there had been no cough, dyspnoea, or other chest symptom. On March 16th twenty-seven ounces of clear serum were drawn from the right side of the chest by an aspirator inserted near the angle of the scapula. On March 26th the same operation was repeated, and with similar result. It appears that the physical signs of effusion continued, as he was aspirated again on April 4th, 8th, and 12th, close to the original place, but on these occasions nothing was withdrawn. These aspirations had been performed on board ship during his journey to England, where he arrived on April 13th. On the next day he came under my care, and I then made the following note: "Strongly built man, but decidedly emaciated; appetite good. Scar over liver in nipple line, just under costal margin. Liver dullness extends one inch below costal margin. On the right side of the chest there is dullness below the nipple and behind the anterior fold of the axilla; posteriorly, the dullness extends as high as the spine of the scapula. Over the dull area there is almost complete absence of respiratory murmur, vocal resonance, and vocal vibration. Heart not displaced; left lung normal; slight hacking cough, with greenish expectoration." The opinion that I formed at that time was that the physical signs indicated a pleurisy with effusion due to extension of inflammation from the liver through the diaphragm. As he had been greatly shaken during his journey to London, I thought it wisest to adopt no active treatment at once, but to allow him a few days' rest in bed. On the evening of April 18th the temperature rose to 101.2°, and was followed by profuse perspiration. The perspirations were repeated nightly, and on the evening of the 21st the temperature reached 102.2°. The following day it was considered advisable to explore the chest with a needle, and (after consultation with Dr. Gee) pus was tapped in the right axilla, a puncture near the angle of the scapula having been made without result. Under chloroform an incision was made near the posterior fold of the axilla, and an inch of the sixth rib excised subperiosteally. About twenty-five ounces of pus were evacuated. The finger inserted into the opening discovered two cavities, one extending forwards towards the nipple, and the other downwards towards the costal margin, partially separated from one another by a septum. As the incision seemed to have struck the most dependent part of the cavity, no counter-opening was made. A large drainage-tube was inserted. The immediate result of the operation was very satisfactory, the temperature falling to normal and remaining so until April 28th, when, without discoverable cause, it ran up to 101.2°. Thinking there might be some retention or decomposition of discharge, I explored the cavity under chloroform and washed it out with a weak solution of carbolic acid on the 29th. This was not attended by any good result, as next day the temperature had reached 103°. The fever, however, gradually subsided without other treatment and without obvious reason, so that on May 7th the temperature was normal, and remained so for more than a week. On May 16th, whilst the cavity was being washed out, he suddenly coughed very violently and said he tasted the carbolic acid which was being used. On the evening of the 18th the temperature rose to 101.2° and increased every evening, till on the 21st it was 103°. On the 25th he had a severe attack of coughing, and said he had a "rotten taste" in his mouth. When he coughed a distinctly fetid odour could be detected, although his expectoration was almost free from smell. The discharge from the wound remained quite sweet. Judging that some portion of the cavity had become shut off from the external opening and had established a communication with the lung, and so become fetid, I had the patient put under the influence of chloroform again and inserted my finger into the external opening. The cavity seemed to have contracted to little more than the track occupied by the drainage-tube, but at the end of the track a small hole about large enough to admit a good-sized probe was found. When this was enlarged with dressing forceps, it was found to lead into a cavity about an inch in diameter, presumably partly in the lung and partly in thickened

pleura. No fetid pus was evacuated at the time of the operation, but two days afterwards the discharge became distinctly fetid. It therefore appeared that this cavity was not the one containing the fetid pus and communicating with the bronchus, but was somewhere adjacent to it, and soon established a connexion with it. I do not think that the pus could have become infected through the operation wound, partly because great care was taken to do the dressing antiseptically, but chiefly because the fetor showed itself in the expectoration first. The cough and fetor continued, in spite of the wound being irrigated with various antiseptic fluids. It soon, however, became evident why the antiseptics failed to produce any effect, for after washing thoroughly in both the sitting and recumbent postures till the fluid returned unstained, if the patient gave a slight cough a few drops of most fetid pus were expelled from the wound. It was then apparent that the pus-containing cavity had a very imperfect (perhaps valvular) communication with the exterior. Mr. Godlee saw him in consultation with me, and it was resolved to make an attempt to establish better drainage. Accordingly, on June 12th I proceeded to do this, Mr. Godlee very kindly assisting me during the operation. The original wound was enlarged and about an inch and a quarter of the seventh rib excised. The sinus was then explored by the finger and probe, but no cavity could be found. The finger introduced between the ribs came at once upon a membrane running almost horizontally, and, after breaking down a few recent adhesions, could be passed either above or below it. This septum was observed to move downwards every time the patient inspired, and was suspected to be the diaphragm. After further search a narrow sinus running in the direction of the nipple was discovered and dilated with dressing forceps, but no pus was observed to escape. The whole space was thoroughly washed out with perchloride solution (1 in 2000) and a large drainage-tube inserted. The patient was much collapsed after the operation, apparently owing mainly to free oozing of blood from the many vascular adhesions which were broken down. On the next day he seemed too weak to cough, but on June 14th (second day of operation) he spat up some blood-stained muco-pus. On the next day some of the same material flowed out through the tube, thus showing that we had in reality struck the offending spot. On the 18th there was a very copious flow of a thin olive-green fluid, looking suspiciously like bile. When subjected carefully to examination, however, it failed to give any bile reactions. This curious discharge ceased in a few days, and I am still at a loss to know what it was.

From this time his condition gradually improved, the discharge lessened, the cough became much better, and he gained so much in general health and strength that he was able to drive out for a short time every day when the weather permitted; but the temperature remained raised, being about 98° 8' in the morning and 100° 4' in the evening. Nothing of note occurred until July 1st, when he complained of pain over the liver, and his temperature rose nearly two degrees higher. On examining the abdomen I noticed ill-defined fulness and tenderness in the region of the liver. This condition continued with but little change until July 14th, when the discharge from the wound greatly increased, and the temperature fell nearly to the normal. On the 22nd there was another copious discharge of pus, and the temperature fell to normal and remained so for the following four weeks, during which time all his symptoms disappeared, and the discharge diminished so much that there was only a stain the size of a sixpence on the dressing after being on for twenty-four hours. He gained greatly in flesh and strength, and was able to walk about his room and to drive out for three or four hours every day. Unfortunately, on Sept. 18th he caught cold whilst out of doors. The cold seemed to "settle" in the crippled lung and produced the ordinary symptoms of acute pneumonia. The temperature ran up to 103°, the cough returned, and the expectoration became rust-coloured. It seems that under the stress of the inflammation the new tissue in the lung broke down; for a few days later there was a flow of pus from the old sinus. About this time the urine was noticed to be very dark, and on examining it I found it loaded with albumen and containing blood casts. These complications, of course, pulled him down considerably, and he lost a good deal in strength and weight. The old sinus had contracted to such an extent that the newly formed abscess in the chest was very imperfectly drained.

An attempt was made to expand the opening with dressing forceps, but without much success. In a few days the abscess cavity had established a communication with one of the bronchi, and the patient spat up about five or six ounces of pus in the twenty-four hours. In this condition he went on for several weeks, sometimes the discharge from the wound being fairly free and the expectoration scanty, and at other times the converse taking place. It then became a serious question whether an attempt should be made to open up the cavity and drain it, or whether it should be left alone in the hopes that it might be emptied by expectoration, and so granulate up. Taking into consideration the albuminuria, the feeble general condition, and the difficulty of getting at the cavity without performing a formidable operation, I determined to leave the drainage to nature. The event proved that this was the best course, for the temperature gradually fell, the cough and expectoration lessened, and the albumen diminished.

In November he was sufficiently recovered to allow of his going to the south of France. There he continued his convalescence, and was soon able to walk about and enjoy himself. All his symptoms disappeared, with the exception of an occasional trace of albumen in the urine. Unfortunately, on Dec. 16th, when everything promised well, he fell sick again, with symptoms of pneumonia and nephritis. I saw him at Cannes on Dec. 21st, and found him very ill in bed with a temperature of 103°, much cough with rusty expectoration, profuse diarrhoea, and a large quantity of albumen and some blood in the urine. The next day pus was present both in the urine and in the faeces, showing that a collection of pus had burst probably into the pelvis of the kidney and into the colon simultaneously. The flow of pus relieved the general symptoms, and the temperature fell slowly. The diarrhoea soon ceased, but the flow of pus in the urine continued and occasioned an attack of cystitis, which was only relieved by washing out the bladder. At this time the urine was very scanty, and certain symptoms suggested uræmic poisoning; these were a dimness of vision and a marked divergent squint, present only on awaking, and passing off in about half a minute. Operative interference was clearly out of the question, so I contented myself with treating the symptoms and supporting his strength as much as possible. He gradually improved, and his symptoms slowly disappeared, without anything noteworthy occurring. He travelled about the Continent until May, 1890, when he returned to London, I saw him then, and found him in excellent general health. The upper part of the right lung had expanded well, but the lower part was still collapsed. In the situation of the original operation wound there was a sinus about an inch long, admitting an ordinary-sized probe. I suspected necrosis of the end of one of the ribs which had been divided, but was unable to detect any dead bone with the probe. When I examined the urine I found it natural, but Dr. Alfred Fisher (who kindly took charge of him whilst abroad) told me that occasionally a trace of albumen and a few blood-cells were to be discovered on careful examination. On June 4th he returned to his home in Philadelphia, and came under the care of Dr. William White. That gentleman enlarged the sinus, and discovered the anterior end of the posterior portion of the sixth rib necrosed; he removed the portion of dead bone and curetted the sinus, which has since granulated up and healed soundly. I heard from my patient in January last, when he informed me that he was in excellent condition.

There are many points of interest in this case, but I will content myself with stating my views with regard to its pathology. The starting-point of the disease was an abscess in the liver, the cause of which I have been unable to discover. The abscess was opened, and it granulated up. During this process the inflammation extended to the convex surface of the liver, and there produced an encysted serous peritonitis, pushing the diaphragm upwards, and producing signs mistaken for those of pleurisy with effusion. This collection became purulent and perforated the diaphragm, thus forming a large abscess partly in the abdomen and partly in the thorax. This collection was evacuated by resection of a rib, after which the surrounding parts collapsed, and shut off a portion of the abscess cavity, which soon established a communication with the lung. This portion of the cavity was then drained by operation. Next, the aperture in the diaphragm became closed, and dammed up a portion of the discharge between the liver and diaphragm until the tension

produced was sufficient to break down the barrier and re-establish the drainage. With regard to the attack of pneumonia which followed next, I cannot be sure whether it was really due to cold or to blocking up of some sinus or suppurating track in the lung which had been for a time quiescent. At the time I attributed it to cold (he certainly had a bad cold in the head at the time); but when a somewhat similar attack occurred at Cannes, and was followed by discharge of pus both through kidney and colon, I inclined to the view that some portion of the abscess cavity, which had dwindled down to insignificant dimensions, and which had been discharging a minute quantity of pus, had become closed, and so obliged to burrow in a new direction in order to find vent. (See diagram.)

References to similar cases in medical literature are scarce. In the nineteenth volume of Guy's Hospital Reports the late Dr. Hilton Fagge recorded a series of cases of abscess between the liver and diaphragm. He remarks that they are generally the result of direct external injury, or extension of disease from one of the neighbouring organs. I will give a brief epitome of those of Dr. Fagge's cases which throw light upon the pathology of my own case.

W. T—, aged thirty-eight, was under the care of Dr. Wilks in Guy's Hospital in June, 1868. He died after a month's illness, the chief features of which were abdominal pain, chiefly over the hepatic flexure of the colon, signs of effusion into the right pleural cavity, with pushing down of the liver and the constitutional symptoms of suppuration. No surgical treatment was adopted. The post-mortem examination in this case corresponds in a remarkable degree with the view which I have given of the pathology of my case. Here is the account of it:—"Below the diaphragm was a very large abscess, which had pressed down the right lobe of the liver and caused it to be concave upwards. The diaphragm was penetrated at two places. One of the apertures was large, and from it there ran a fistula obliquely upwards into a sloughy cavity in the pulmonary substance. This cavity was large enough to contain a hazel nut; its wall shreddy, with sloughed lung, and this shreddy part bounded externally by an opaque abscess wall or line of demarcation. There also ran a straight passage into the pleura. Thus the pulmonary slough communicated with the pleural cavity by the abscess below the diaphragm, which opened into either. Another perforation of the diaphragm ran to the space between the lung and the diaphragm, which was shut off from the rest of the pleural cavity by adhesion of the edge of the lung to the diaphragm." In this case Dr. Fagge was unable to discover any more probable cause than a strain of the abdomen, attributed to twisting suddenly in bed.

S. T—, aged thirty-nine, was admitted into Guy's Hospital under Dr. Habershon in 1865, and died shortly after admission, so that no clinical history could be obtained. At the necropsy the right pleura was found to contain about three pints of turbid fluid. The left pleural cavity contained pus and the lung was adherent to the apex of the thorax above and to the diaphragm below, thus holding the latter up and preventing it from being pushed down by the effusion. Near the middle of the diaphragm, close to the

pericardium, there was a perforation the size of a sixpence, which was bevelled so as to be wider towards the chest than towards the abdomen. In the thick pleura near this hole there were many crooked-looking excavations; some of these passed through the pleura itself and came upon the connective tissue between the two serous sacs about the front of the diaphragm. The pericardium was closed by adhesions. A large abscess was found between the left lobe of the liver and the diaphragm, and communicating with the empyema, and at one place eroding the convex surface of the liver. In this case it appears from the account of the post-mortem examination that the empyema was the primary lesion, and the hepatic suppuration the remote effect—in fact, just the reverse of what I suppose took place in my case.

In the same paper Dr. Fagge records several other cases of abscess in the upper part of the abdomen, perforating the diaphragm and involving the pleural cavity. Some of them were due apparently to injury and others to disease of the stomach, spleen, or peritoneum. These cases, however, do not bear so directly on the case I am at present endeavouring to elucidate.

In the same volume of Guy's Hospital Reports, Dr. Fred. Taylor records a case of abscess between the liver and diaphragm, which resulted from a kick over the hepatic region and exposure to cold by immersion. At the post-mortem examination the right lung was found compressed against the spine by a serous pleuritic effusion, and adherent by its lower surface to the diaphragm. Between the diaphragm and the upper surface of the liver was an abscess containing about sixteen ounces of pus, and communicating with the lung through an opening in the diaphragm and the superimposed adherent pleura. There was no communication with the pleural cavity.

I have thought my case worthy of being recorded, since, as far as I can ascertain, there is no similar case on record in which recovery took place. I attribute the favourable result partly to the surgical treatment adopted, partly to the devoted attention of the patient's friends and nurses, but I think chiefly to the fact that he possessed a robust constitution untouched by alcohol or intemperance of any kind.

Westbourne-terrace, W

THE PRINCIPAL AND MOST EFFICACIOUS MEANS OF PREVENTING THE SPREAD OF ENTOZOAL AFFECTIONS IN MAN.¹

By Dr. PROSPERO SONSINO (OF PISA).

MR. PRESIDENT AND GENTLEMEN,—I wish to call the attention of this meeting to the prevention of a group of diseases which play an important part in the causation of the morbidity and mortality of mankind, especially in hot climates. I have undertaken to treat this subject with all the more pleasure, seeing that I am in this country and among you, gentlemen, to many of whom is still present the memory of a man whose busy, scientific life, though unfortunately too short, was so much occupied with the prevention of entozoal affections. I may rightly say that no man has shown so much earnestness in solving the questions regarding this subject as the late Dr. Spencer Cobbold.

There are no diseases more preventable than the entozoal, provided we know sufficiently well in each case the manner of introduction of the entozoon which produces a given specific disease. Yet it seems to me that as much attention as it deserves is not generally given by hygienists to the subject. The number of internal zooparasites as yet observed in man, excluding some doubtful species, amounts to nearly fifty. But in this reckoning are comprised some small zooparasites of protozoal character, which I will not refer to in this communication, as their manner of introduction to the human subject and their morbid action on their host are less known. Such are some amœbæ and cercomonas, a balantidium, some coccidia, and the more important hæmocytozoon, which, owing to the importance and wide distribution of the fevers originated by it, cannot be taken together with the ordinary entozoa. I shall limit, then, my consideration to the prevention of the diseases of man caused only by the entozoa which belong to the zoological class of vermes, with the exception of two species of pen-

¹ Paper read in Section I. of the International Congress of Hygiene.