far between. Those affected were not subject to diarrhoea; they had a mottled eruption upon all parts of the body, at times simulating that peculiar to scarlatina, at others being merely mulberry coloured spots. They presented a considerable degree of severity from the first; but the danger subsided early, the convalescence was rapid, and the case was not liable to relapse. If fatal, this event occurred at an early day.

There was also a third form of fever, one which was very much more prevalent than the typhus, and fully equal in numbers to the remittent variety. It was always attended with diarrhoea, sometimes preceded by it. This symptom was occasionally excessively obstinate, and often attended by hæmorrhage from the bowels. It frequently continued long after the fever had subsided, and rendered the convalescent stage very tedious. The cases generally presented an eruption of pink spots upon the body, especially the abdomen, some time during the second week; they disappeared upon pressure, but immediately returned when the pressure was removed, and were easily overlooked by a superficial observer. These attacks were tedious, and were especially liable to relapse; lasting, in several instances, ten or twelve weeks. They occurred more generally among water drinkers, especially those who would continue to drink the water from wells contaminated with foul animal matter, instead of the pure water of the Local Board of Health. Many persons continued to do so from prejudice, and others because the town water was frequently stained with iron rust from the conveying pipes. They occurred in houses connected with the sewers, as well as those which were unconnected; but those in unconnected houses were possibly milder than the others.

There were also many cases of choleraic diarrhoea. I had two under my care with temporary suppression of urine, and I believe several passed on into typhoid fever. I cannot call to recollection the situations in which these occurred, as at that time I had not learned to look upon choleraic diarrhoea as allied to the fever, and therefore did not note the separate cases.

These, then, were the main causes of the Croydon epidemic, viz.—

1. Excessive moisture;
2. Warmth;
3. The presence of decaying vegetable and animal matter;
4. Impure water from wells and other sources;
5. Want of ventilation in the sewers.

Tending, by themselves or in combination, to produce the several varieties of fever which presented themselves, viz.—

1. Remittent fever;
2. Typhus;
3. Typhoid fever;
4. Choleraic diarrhoea.

The fifth cause was fortunately rendered apparent at an early period by the innumerable stoppages which occurred by reason of the dislocation of the pipes, or by their fracture, as well as by the many substances which were obligingly introduced by persons gratifying their resentment at the proceedings of the Board by making the works of the Board useless. A frequent argument against the ill effect of the first three causes is, that such were common to all England, yet that no great epidemic of fever prevailed. In answer to that, I would beg to remark, that very few places existed under similar circumstances, viz., a dry bed of gravel, in some parts recently drained, becoming rapidly infiltrated with water, even to the filling of the cellars and basement stories of numbers of houses, and thus exposing the inhabitants to marshy exhalations, to which they were totally unaccustomed. In corroboration of this view, I may mention that, at the end of 1853, after the last fever had subsided, a large number of cases of ague came under my notice (large, I mean, for one individual in private practice); and, curiously enough, most of these had formerly inhabited marshy districts of the country.

Such are the main points upon which our illness depended, without going into many particulars deemed highly important by partisans, but which, I am convinced, had

very little to do with the origin or extensive spread of the disease. It will be best to look upon that illness as the result of a state of transition from filth to cleanliness, at an unfortunate period as far as Croydon is concerned, but perhaps fortunate for other towns. And, notwithstanding all Croydon has suffered in reality, as well as from exaggeration, notwithstanding all the expense the inhabitants have been put to, the town has cheaply obtained a state of salubrity which is daily more and more evidenced by the increased value of property, by the great increase in the number of new houses built for the residence of the city merchant, as well as by the demand from every part of the outskirts of the town, to become connected with our present system of drainage and water supply. The success of sanitary measures at Croydon is as great as the most ardent lover of cleanliness can wish for, or the most enthusiastic supporter of science dream of; and, if it be not spoilt by parish parsimony and half measures, will be of incalculable benefit to our town. The errors which were made in carrying out the works, were not greater than were certain to happen in the working of any new scheme. They will serve as beacons for other Boards to avoid; and, if viewed in the proper light, will be of great benefit to the inhabitants of the metropolis itself. The mistakes which have been made are remedied, and, as time passes over, the works will be rendered more and more perfect. Notwithstanding the predictions which have been made, and the outcry which has been raised against the Board of Health, I do not believe there is one man of positive intelligence in the town, who would raise his hand in favour of a return to the old system.

In conclusion, I feel assured that, considering me as a resident in Croydon, Dr. Routh will look upon my corrections of his paper in the proper light; and I would at the same time thank him for the many interesting and convincing particulars which he has brought together.

ILLUSTRATIONS OF THE PATHOLOGY OF CANCER.

By J. ZACHARIAH LAURENCE, Esq., F.R.C.S.

PART IV.

ON THE RELATION OF THE SECONDARY TO THE PRIMARY DEPOSITS OF CANCER.

THE words "primary" and "secondary" are, in the doctrine of cancer, used in the same sense as in the science of geology, to indicate merely a question of *time*—that one tumour was deposited before the other—without reference to any further relationship they may bear to each other. This is necessary to observe, inasmuch as the predominating idea in the words "primary" and "secondary" would, in the language of the day, appear to be one rather of rank and importance than of simple ordinality. Perhaps the least objectionable designations would be "original" and "consecutive" deposits—terms in which the relations of time overbalance those of comparative rank.

Given an original deposit of cancerous material, the *loci* of the consecutive deposits may be, either singly or conjoined—

- (1) The lymphatic glands;
- (2) The vital organs (the viscera);
- (3) The organs of external relation (organs of locomotion and special sense).

No set of organs is so constantly the seat of consecutive infiltrations as the *lymphatic glands*. Most authors, whilst admitting the great practical significance of this fact, have underrated its pathological distinctiveness by referring to other specific diseases (as syphilis) and non-specific inflammations, of which engorgement of the adjacent lymphatic glands is a concomitant. We are, however, of the opinion that this symptom is in a degree quite peculiar to cancerous disease.* Upon what other supposition can the well known

* The tuberculous deposits of lymphatic glands cannot be regarded as "consecutive" deposits.

fact be explained, that, after the removal of a cancerous tumour, *with an often prolonged interval of apparent cure*, the adjacent lymphatic glands may become affected without any local recurrence of the original tumour? Why, in those cases in which it is more reasonable to refer the glandular swelling to infection from the original tumour, the lymphatic rather than the vascular system should be the channel of infection, is a question as difficult of solution as the fact is easy of observation. The analogies of poisons, in their preference to vascular or lymphatic absorption, is the nearest approach to explanation we can offer. But, that the cancerous virus may also be conveyed by the circulating blood to remote organs, two excellent examples will at once demonstrate. The one is a case of Professor Wernher's of Giessen, to whose politeness I am indebted for some excellent original drawings of the preparations. A man had his thigh amputated for fungus hæmatodes of the upper third of the left tibia. He died seventeen days after the operation, with symptoms of gangrene of the lungs. After death, gangrenous abscesses were seen in the lungs. These were found to depend on occlusion of the pulmonary arteries by cords of cancer; whilst in the blood of the vena cava ascendens, Professor Vogel detected the microscopic elements of cancer.* The next case alluded to is that of Professor Paget. (*Vide p. 786.*)

But our statistics on the consecutive infection of the vascular system in cases of malignant disease remain to be made; for in how many *post mortems* (conducted as they generally are after a fixed routine) are the blood and its channels, notwithstanding their exalted physiological and pathological position, ever examined? Proceeding, however, from the scanty materials we possess, one's attention is arrested by the following facts.

For the lungs to be consecutively infected in cancer of the testis, is comparatively rare; but, out of 8 cases which I have collected, in no less than 5 cases (upwards of one-half) the vascular system is stated to have been simultaneously infected. In 5 instances of vascular infection in 14 cases of osteoid cancer, in all the lungs were so also.† In a single instance out of 16 cases of cancer of the liver in which the lungs were affected, in that very case was the vascular system. It must be remembered, too, that it is most probable that in many cases the affection of the vascular system was overlooked; but that deposits in the lungs were so, is improbable.

These facts, coupled with those of direct observation (as in Professor Wernher and Paget's cases), would seem to indicate that, *wherever the lungs become the nidus of consecutive cancerous deposits, they do so through the medium of the vascular system.* This view is in a degree supported by the facts observed in another disease—pyæmia. The purulent deposits of pyæmia may not inaptly be compared to those of cancer and tubercle, the differences in the three diseases depending on the different times the different processes expend in their consummation. I do not stand alone in seeking to establish these analogies. The same idea has struck many other authors. Of these, I may cite Cruveilhier. He calls attention to the fact that the lungs and liver are the organs prone to secondary abscesses and secondary cancers; that, the same as multiple abscesses of the liver are the consequence of phlebitis, so does cancer affect a sort of predilection for the surface of the organs.‡

The connexion between phlebitis and pyæmia is admitted: a similar connexion between cancer of the blood and cancer of the lungs is rendered probable by the foregoing considerations, but still remains to be proved.

The frequency with which the *viscera* are consecutively affected in cases of malignant disease may be compared

with that of affections of the lymphatic system, and will be found to hold the second numerical rank. The general statement is, that the lungs and liver are the organs most often consecutively affected. This crude statement is true, but affords little information either to the pathologist or to the surgeon. In discussing this point, I have been obliged to glean my materials from the most various sources, and regret to say that I have been compelled to dismiss from consideration two most important organs—the breast and uterus. The records of complete cases of cancer of these organs are rare, because the cases are common. Let us, however, see what results emanate from the consideration of some other classes of cases. Repetition will be avoided, and the subject made the clearer, by exhibiting these results in a tabular form.

PRIMARY DEPOSIT.	SECONDARY DEPOSITS IN THE—						
	Cases.	Lymphatic glands.	Lungs.	Liver.	Vascular system.	Brain.	Stomach.
I. Malignant disease of the testis	36	30	8	9	10	—	—
II. Encephaloid of the femur or tibia	9	1	3	3	1	—	—
III. Malignant disease of the soft parts of lower extremities	10	6	7	2	1	—	—
IV. Osteoid cancer of the lower extremities (one of the upper extremity)	14	7	9	0	5	—	—
V. Encephaloid of the eyeball or orbit	14	8	—	—	—	11	—
VI. Cancer of the liver....	16	5	1	4	1	—	8

From the above numerical data, we may deduce the following conclusion—that *special original deposits are succeeded by special consecutive deposits.* For example, in 13 cases of osteoid cancer of the lower extremity, in no less than 9 were the lungs affected; while, on the contrary, in 16 cases of cancer of the liver, in only 1 were the lungs affected. In 32 cases of malignant disease of the lower extremities, in 14 were the lymphatic glands affected; whilst, in 36 cases of the affection of the testicle, in no less than 30 were the glands contaminated. There is reason to suppose that, with our advancing knowledge of the pathology of cancer, we may be able to deduce further conclusions on this interesting point. As yet, the one announced appears to be the only one fairly deducible from the data referred to.

PECULIAR URINARY DEPOSIT IN SCARLATINA.

By C. E. PRIOR, M.D., Bedford.

THERE is occasionally observed in different stages of scarlatina, though more frequently from about the tenth to the fifteenth or sixteenth day (and frequently persisting much longer), a peculiar character of urinary deposit, which, notwithstanding the attention that this subject has received from various authors, has never been described—at least, not so far as I know—by English authors, and certainly not with the fullness and care which its importance as a pathological sign requires. The nature of this deposit has been to me, on many occasions, a subject of investigation, both chemically and microscopically; but I cannot say that the results I have thereby attained have been such as to render me perfectly clear on the subject.

I should premise that what I may say on this matter is with a cognizance of the ordinary results of the "acute desquamative nephritis" of Dr. G. Johnson, following on scarlatina, and of the forms of albuminuria incidental to the disease; but that I cannot reconcile any of the descriptions enumerated by Prout and others with the form of deposit which has passed under my observation, unless it

* *Vide* "Ein Fall von Krebs der Lungenarterie, von Dr. A. Wernher", in Henle u. Pfeufer's Zeitschrift, N. F. Bd. v. 2. Heft. pag. 109.

† The cases of osteoid cancer possess a value in discussing the relation of the lung to the vascular infection—1, because, being a rare disease, the *post mortems* have been made carefully; 2, because any infection of the vascular system is rendered the more obvious by the nature of the deposit.

‡ Cruveilhier's "Anatomie Pathologique du Corps Humain". Paris: 1829-35.