us as the final authority on every possible point, begin to question our wisdom and belittle our judgement, and frequently push their information to a point beyond that reached by us. In like manner the growing nations were approaching a time when they would no longer take things for granted, nor blindly follow authority. Two events in the fifteenth century—the fall of Byzantium or Constantinople and the invention of printing—are credited with great influence on the progress of medicine and the sciences. So far as printing is concerned, its effects are so incalculable and evident that we need not say more about them. The fall of Constantinople brought to Italy much of the old Greek treasures which had been stored in that city, and thus opened to Western scholars a direct avenue to the learning of Greece and the ebullitions of the Greek genius. It became quite “the thing” for scholars to journey to Italy to study and translate these manuscripts, and it is interesting to note that our own Linacre was among the most famous of these travellers. It is generally held that the advent of the supply of the pure undefiled Greek writings had much to do with increasing the vital energy of medicine and its sciences, leading to advances and new discoveries, and no doubt there is truth in the belief. But I confess that I find myself a little sceptical; at any rate in anatomy the Arabian influence seems to have persisted for a century after the fall of Constantinople, nor is there much reason to suppose that the Greek resurrection would set doubting a world of men who had accepted the Arabian statements without question. It seems to me a natural and inevitable result of the growth of the proper mentality of the Western nations: they were reaching the adolescent stage and wanted to inquire into things for themselves, and under those conditions advances were bound to come, the truth was bound to be slowly sifted from the false, and our special subject, vascular physiology, was as certain to be put on a proper foundation as anything could be in this world of uncertainty.

Thus we find in the sixteenth century tentative efforts being made toward the solution. At first, at the beginning of the century, we have the old belief. This copy of Magnus Hund's book, one of the rarest anatomical books, was published in 1501: it was once supposed to be the first anatomical work with cuts, but that is not the truth. Woodcuts as illustrations were introduced about 1461, but they only found their way into anatomical or medical books toward the end of the century. Not considering de Ketham's “fasciculus,” we have Jacques Peylig's work which appeared in 1499. I have compared the cuts in this with those in Hund, and they are undoubtedly copied from the same originals, but what these were I cannot say. In a couple of the drawings from Hund, the heart, in the pericardium, shows the outer form of the two ventricles; it is placed obliquely, has two structures above the ventricles which may be meant to represent appendices, and possesses certain vessels leaving or going to it which I have not yet been able to place with any satisfaction. Like the other early writers on the subject, Magnus Hund seemed to look on his illustrations as in themselves sufficient, and did not take the least notice of them in his text. Such a picture of the heart is, of course, merely formal, almost like that on a playing card, and the description of the organ shows the usual conception of structure and function which had been current for so many centuries.

As the sixteenth century goes on, however, we begin to find evident signs of the growth of the spirit of inquiry. We can pass over the obscure crudity of Berengarius's description, and the evident influence of Mundinus on Massa: Massa talks of three ventricles, and his account of the heart, fuller than that of Mundinus, is not much of an improvement on it. In this century, however, we find an outburst of anatomical activity, and greater freedom in expression of individual views. The actual investigation of anatomical structure was not confined to professional anatomists, but was largely undertaken by artists, who might, indeed, be looked on as leaders in the revival, particularly in the study of skeletal and muscular anatomy, since the great names of Leonardo, Michelangelo, and Raffaello are found at the end of the fifteenth and early

part of the sixteenth centuries. These men were not concerned with physiological ideas, but in this century, however, we find Servetus, Columbus, Cesalpinus, and the greatest of all, Vesalius. In one of Vesalius's early illustrations of a heart, from one of his “fugitive sheets,” there is no appearance of auricles as we know them, though the appendages are well shown. I have found this to be a common deficiency, probably due to the teaching that the heart only has ventricles, and that those parts which we term the atria of the auricles are parts of the vena cava and pulmonary vein (*arteria venalis*) respectively; in the case of Vesalius the explanation might hold, for this great anatomist and accurate describer failed altogether to get any true conception of the circulatory process. Others, however, pushed the matter further. Michael Servetus was the first to describe clearly the pulmonary circulation; he was followed on the same lines, and almost in the same words, by Realdus Columbus, then by Arantius and Cesalpinus. All these anatomists have been credited, at one time or another, with knowledge of the circulation, but if we turn to their accounts of the veins and liver—a very good test of their views—it is found that they were all quite innocent of any conception of the circulation. The same test disposes at once of Nemesius, Bishop of Emesa in the fourth century, who has also been said to have known it. In all these cases the passage through the lungs, which had been postulated by Galen, was simply adopted to supply the left heart with the material for its manufacture of “vital spirits,” the perforations in the septum having lost caste with most writers.

This, then, was the state of knowledge of the heart and vascular physiology when Harvey made his onslaught on the belief. Riolan still taught a way through the septum, but with many, if not most, the pulmonary route was accepted: on this subject Harvey credits Columbus with the description, being apparently ignorant of Servetus. The vital spirits were still elaborated in the left ventricle and discharged in small quantities by the aorta, and some thought they ebbed back again at times, especially during sleep. The natural spirits were elaborated in the liver and transmitted by the veins. The structure of the heart was quite well known, but did not seem incompatible with the theories, and it was really these theories of the double flow of blood, with its double origin, that had to be destroyed by Harvey, for it was the fundamental idea on which the whole superstructure rested.

THE LARVA OF THE WARBLE-FLY AS A HUMAN PARASITE.

BY

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OWING to its rare occurrence, the following account of a case of myiasis due to a warble-fly may be of interest.

On February 19th last I was called to an outlying farm to see a boy, aged 4 years. His mother told me that he had not suffered from any previous illness. In November and December last he lost flesh, colour, and appetite, but did not complain of any pain. During the whole of January, 1924, he had recurrent attacks of urticaria on the front and sides of the neck.

Early in February he complained of severe pain in the left ear which lasted a few hours. Next day the left cheek was red and swollen. This swelling subsided in an hour or two, and was immediately followed by extreme swelling of the left eyelids so that the eye could not be opened. The swelling was not red or painful, and it entirely disappeared in about three days. The day following its disappearance the boy was suddenly seized with severe vertical headache, and vomited. The pain lasted several hours, but in twenty-four hours he appeared to be quite well and continued so for about four days, when the swelling in the left eye returned, with vomiting, and pain in the left side of the forehead. The eyelids were red and there was some thin purulent discharge.

When I saw him the next day I found the left eyelids slightly swollen and red, the conjunctiva somewhat injected, and the tongue dirty. Temperature and pulse were normal. The boy was well nourished and did not appear to be ill.

In a day or two all swelling and redness had disappeared, and nothing further occurred until February 29th, when he vomited, and the left eye became swollen. Next day I found him in bed, and was told that he had passed a sleepless night, owing to very severe pain in the left side of the head.

The left eyelids and conjunctiva were very oedematous. The left cheek, over the parotid region, was red and swollen. All the affected parts were somewhat tender. Temperature and pulse were normal; the tongue was very coated; the pupils were equal and active. All other reflexes were normal. On the chest and abdomen there was a rash, which had been present about twenty-four hours. The clinical features of this rash, throughout its duration, were those of varicella, but, in the light of subsequent events, the question arises whether the rash was due to varicella or to larval infection. Within forty-eight hours the swelling of eye and cheek had completely subsided, the tongue was clean, and the child was asking for food.

He remained quite well until March 14th, when the right eyelids and cheek became swollen and red. There were also several circumscribed swellings—one the size of a chestnut on the right side of the forehead just above the outer canthus, one the size of a hazel-nut behind the left ear, one the size of a walnut over the right parietal region of the scalp, and two small ones over the left parietal region. The swelling on the right side of the scalp was semifluctuating, the others were moderately firm. None of the swellings was red or painful. In a few days, with the exception of the scalp swellings, the parts returned to their normal condition and the child again seemed to be quite well.

On March 24th, after severe pain in the head, the oedema and redness returned, this time in both eyes and cheeks. Next day, from the right parietal swelling, which was now discharging pus, came a maggot about half an inch long. Within a few hours the swelling of eyes and cheeks had completely disappeared.

On March 27th a maggot was discharged from one of the two swellings on the left side of the scalp, and from the other swelling a maggot was removed on April 1st; both of these maggots were about a quarter of an inch long. There have been no further developments.

Curious features of the case are:

(a) The regular intervals between the appearance of the swellings. There were five distinct attacks with about ten days between each.

(b) Their symmetrical situation. The first swelling was in the left eye; the second in the left eye; the third in the right eye and cheek; the fourth in the left eye; the fifth in both eyes and cheeks. One maggot came from the right side of the scalp and two from the left side of the scalp.

(c) The rapidity with which the oedema subsided.

The swellings noticed on March 14th, one above the outer canthus of the right eye and the other behind the left ear, are suggestive of halts in the progress of the maggots either to or from the scalp.

Can the periodic swellings be accounted for by assuming that eggs were deposited and hatched in the scalp and that the larvae migrated, at intervals, to the orbital tissues, remaining there a few days only? The remarkably rapid onset and subsidence of the oedema seem to point to some such transient exciting cause.

I have ascertained that warble-flies are prevalent on the farm where the child lives, so that the source of infection is obvious.

Report by Major Austen.

The first maggot was sent to Major E. E. Austen, Natural History Section of the British Museum, who very kindly furnishes the attached report, which he permits me to use.

"The specimen is a penultimate stage larva of *Hypoderma lineatum*, Vill., which is one of the two British cattle warble-flies, the other being *Hypoderma bovis*, De G.

"This is the first British case of myiasis in man due to a warble-fly larva that has come to my personal knowledge, but a number of instances which have occurred on the continent of Europe and in the United States of America, where *Hypoderma lineatum* is also found, are on record.

"The preponderance of cases in which the victims of the fly's attack have been young children is noteworthy, but is perhaps to be correlated with the fact that in cattle young animals are usually most severely warbled.

"Another interesting point in your case arises in connexion with the way in which the patient became infected. The egg from which the larva developed must have been laid last summer, probably between July and September, and, if not actually deposited on a hair of the child's head or body, was in all probability laid in the ordinary way on a cow's hair, and then swallowed in milk.

"Under normal conditions, the eggs of both *Hypoderma lineatum* and *H. bovis* are attached by the parent flies to hairs on the legs and flanks of cattle, and the minute larvae, which hatch out a few days later, crawl down the hairs and enter the body, burrowing through the skin by way of the hair follicles. A period of many months of wandering follows, during which the larvae travel about the body through the connective tissue, and, before taking up their final position in 'warbles' beneath the skin of the back, are met with in situations so diverse as the wall of the oesophagus and the spinal canal.

"The full-grown larva is a grub of considerable size, and is many times larger than the specimen forwarded."

The following references to other published cases of this condition have been provided by Major Austen.

Riley, C. V.: "A grub supposed to have travelled in the human body." *Insect Life*, Washington, U.S.A., vol. ii, p. 238 (1890).

Condorelli, Mario: "Caso di 'myiasis' nell'uomo per larva cuticolare di *Hypoderma bovis* (De Geer)." *Boll. Soc. Zool. Ital.*, Anno xiii, pp. 171-181 (1904).

Topsent, E.: "Sur un cas de myase hypodermique chez l'homme." *Archives de Parasitologie*, T. iv, p. 609 (1901). Larva of *H. lineatum* beneath skin of upper part of thorax of girl of 8 years.

Topsent, E.: "Second cas de myase hypodermique dans le Morbihan." *Op. cit.*, T. xiii, pp. 438-489 (August 25th, 1903). Larva of *Hypoderma* beneath skin of face of girl of 6½ years.

Miller: "Larvae of *Hypoderma lineatum* in the human subject in U.S.A." *Journal of the American Medical Association*, December 3rd, 1910 (abstract in the *Journal of Tropical Medicine and Hygiene*, January 2nd, 1911, p. 13).

ETIOLOGY AND TREATMENT OF RHEUMATOID ARTHRITIS AND ALLIED DISEASES.

BY

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WITH ELECTRO-THERAPEUTIC NOTES

BY

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THE term "rheumatism" is very casually applied to the signs and symptoms of inflammation of joint, nerve, muscle, or fibrous tissue. The first essential step is to determine the cause of the inflammation.

The causes of the so-called rheumatic conditions fall into line with the usual causes of inflammation—physical (mechanical or traumatic), chemical (metabolic, gouty, diabetic, alcohol, etc.), thermal (heat or cold), specific (syphilitic, neuropathic, haemophilic, and the specific bacterial such as typhoid, gonococcal, etc.) and non-specific bacterial.

The remarks here made will be confined to the non-specific bacterial group, though the others must be mentioned from the point of view of differential diagnosis.

Articular rheumatism, which is probably the most common variety, and certainly the most important from the point of view of disability caused, can be divided into two great groups:

1. *Rheumatic Arthritis*.—Usually polyarticular and associated with pyrexia, often accompanied by an endocardial lesion and generally controlled by salicylates. The joint lesions are characterized by painful and tender synovial and periarticular swelling which may appear and disappear comparatively rapidly.

2. *The Rheumatoid Group* (and in this I include the various types of rheumatoid arthritis and osteo-arthritis).—This variety may be polyarticular or monarticular, and acute, subacute, or chronic. The acute arthritis may develop as a primary disease or follow an acute febrile condition such as influenza, or result from a sudden exacerbation of the chronic. The chronic form may develop as such or supervene upon the acute.

The rheumatic affections of nerves, muscles, and fibrous tissue closely correspond, except that the acute varieties are less common if we exclude the nerves. In our experience the underlying causes are the same: which tissue is involved depends largely upon personal or regional susceptibility and various contributory causes.

A very high percentage of rheumatic affections may, for practical purposes, be regarded as metastatic manifestations of focal bacterial absorption. In a small proportion of cases exciting causes, such as nervous shock, worry, trauma, etc., appear to play an important part. In another small proportion the disease supervenes upon a febrile attack, though frequently in these cases a local septic focus has been lighted up.

The pathological varieties cannot be considered in this communication; but the fact may be emphasized that the