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CERTAIN APPEARANCES OBSERVED IN THE EYEGROUND OF THE TUBERCULOUS.

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The writer has observed a special fullness and tortuosity of the retinal vessels in patients suffering from tuberculosis, and those whose family history included cases of this disease. No heart lesions were present in these patients. Attention is called to these changes in the hope that they will be looked for by other ophthalmologists.

The condition to be described does not refer to the tubercles of the choroid usually seen in the last stages of tuberculosis, nor to the perivascular types with hemorrhages, so well described by Finoff,¹ nor to the exudative or conglomerate types; but to an anomalous distribution, multiplication and tortuosity of the retinal vessels, principally venous, but frequently arterial as well.

I have been watching these anomalies for twenty years, being astounded at the condition found in a fellow prac-

titioner of this city when refracting him. As he coughed frequently, expectorated moderately, and was noticeably dyspneic, I assumed the condition was due to undue fullness of his pulmonary venous system, thus producing the fullness and tortuosity of his retinal vessels. This patient is living, and in active practice, over fifty years of age, his lung condition having become stayed. He is, however, dyspneic. In sequence, I observed cases with similarly appearing eye grounds who were tuberculous, or

with stayed lesions, but who never had marked shortness of breath, which disproved the belief that the appearances of the retina, in the case mentioned, are due to undue fullness of the pulmonary circulation.

Other similar cases were observed year after year, until certain characteristics seemed to form an entity. At times I was impressed with these characteristics in apparently healthy young adults, and in children whose history showed them to be of tuberculous ancestry.

Yesterday, a patient consulted me whose retina showed great increase in the number of the retinal vessels with extreme tortuosity. In addition, there were seen knotty kinks of the small veins, convincing me that I should find high blood pressure and other evidences of such condition. Altho there are believed to be beginning changes of the vessel coats, I can find no distinct indentations where veins and arteries cross. This man is fifty years of age, in active business pursuits. He has been under the care of excellent internists for two years, whose investigations show that he has an abnormally low blood pressure, now 110; but before treatment it registered systolic 90, diastolic 65. Wassermann negative. Blood count normal. Low hemoglobin and normal conditions of the urine, excepting low specific gravity. The X-ray findings of his chest showed that, in the hiluses of the lungs, there is dense infiltration from a tuberculosis of former years, of which he had never been conscious.

This patient claims to have never had cough, hemoptysis, dyspnea or any other symptoms arousing any suspicion of tuberculosis. He has never had any severe or prolonged illness. He is an overworked, too strenuous business man, irritable and sleepless; symptoms accompanying arterial sclerosis.

During the seven years that I have recorded these retinal peculiarities, I find, sometimes, somewhat similar appearances in the constipated and those whose elimination is faulty.

Two cases of my earlier tabulation had these retinal peculiarities; both had been fast runners in their college days. One had paced; the other running two miles daily. One patient had hypertrophy of the heart. He claims he never had tuberculosis. The other patient's mother had, and was cured of tuberculosis by residing in Colorado. Both are physicians. Unfortunately I have no X-ray findings of these cases, which might be enlightening.

It has been very difficult in my active work to go back over this long period to search my files; yet this has been done, and I can cite several cases in confirmation. Only comparatively recently (seven years) have I inquired into patients' past histories when I find such conditions in the eyeground. Many times when negative replies are given, further inquiry discloses the fact that one or the other of the patient's parents have been tuberculous.

The causes of these conditions seemed unfathomable until I occasionally found similar conditions in patients lacking normal eliminative functions. Then Jackson's article on "Tuberculosis as a Focal Disease," awakened me to the belief that he had opened the nut and disclosed the rich kernel within. We have many instances of these so-called focal features in the tuberculous; headaches particularly, and the usual train of bad tongue, breath and indigestion. One of the great drawbacks to health in these patients is intestinal disfunction, and frequently these annoyances are relieved by an appendectomy. Is it possible that the toxins of tuberculosis and the deficiency in eliminating them, both in the predisposed and in those whose lesions are active or stayed, may explain the anomalous appearances described? We have alterations in the course and in the appearances and in the number of retinal vessels in polycythemia. Acquired tortuosity of the retinal vessels occurs also in leukemia. The appearances I describe are similar to the congenital tortuosity which Levin⁸ attributes to "an insufficiency of elastic vascular fibers." The bending of the ves-

sels is chiefly in the lateral plane and not so much in the anteropendicular, coming under the description of inordinate physiologic or congenital tortuosity, as described by Beard.⁴ No heart lesions have been present in the cases I describe as tuberculosis. There is yet to be considered the influence of the endocrin glands, of which much is still to be learned.

There is no difference noted in the eyeground appearance between those cases in the active or stayed stage of the disease, nor in those assumed to be due to hereditary influence. I have tabulated 325 cases from private practice. Of these:

13.23% are classed as possibly due to heredity.

36.31% are in cases of tuberculosis, active or stayed.

50.15% in cases showing the vascular condition, on which appearance this article is based, but of which no history is noted in case records and no cause can be obtained.

There are sure to be some of these latter cases who have had tuberculosis, known or unsuspected, but this cannot be proven without X-rays of their chests, which are obviously impossible to obtain; therefore the proportion of the real tubercular cases, under no circumstances, can be lessened. Better knowledge of many is more liable to increase the percentage of the tuberculous.

The fact that about one-half of the cases observed with this vascular retinal condition are in the individual whose lesions are active or stayed, or in who heredity is a vulnerable factor, certainly gives cause for thought. The writer practices in a section where he meets probably a larger proportion of these unfortunates than other regions might show, and he makes no claim other than for originality of observation. His effort is largely to bring these facts before his fellows so that they may aid him in making further observations.

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DISCIFORM KERATITIS FOLLOWING SMALLPOX.

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Four cases are here reported. In three of them the corneal disease followed smallpox, and in two the eyes had to be removed. Read before the Colorado Congress, July, 1921.

"This is a keratitis that is allied to *ulcus serpens*, and consists in the development in the middle layers of the cornea of a gray disc-shaped opacity. In the center of the disc a small, more deeply clouded speck is commonly observed. The periphery of the disc is sharply delineated by a border of deeper gray, which in many cases, is made up of concentric lines." (Fuchs.) In these few words we have the essential visible characteristics that identify this form of keratitis. It runs a rather protracted course and the indications

for treatment may be complicated. Fuchs says, "only exceptionally a small loss of substance develops over a circumscribed area." In two of the following cases there was large loss of corneal substance, with loss of the eyes. Fox in his treatise on Ophthalmology says, "Treatment is of no avail in effecting a cure."

I wish to recount four cases I have seen; three of the cases following a few weeks after recovery from attacks of smallpox. The fourth followed a mild trauma to the cornea. In three