treatment in this case contributed largely to the satisfactory recovery. The administration of polyvalent anti-streptococcal serum was apparently beneficial.

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REFERENCES

¹ Meleney: *Arch. of Surg.*, 1924, ix, 317.

² Idem: *Ann. of Surg.*, 1930, xci, 289.

³ Campbell: *Surg., Gynecol. and Obstet.*, 1922, xxxiv, 780.

Delayed Rash in Measles

The two cases I report below were diagnosed tentatively as measles from the beginning of the symptoms, but it was somewhat difficult to convince oneself, and the parents, that measles would develop, especially after the passing of six or seven days with no rash.

Case I.—Female, aged 8 years, developed catarrh, rise of temperature, and a cough on the evening of October 30th, 1935. The temperature, ranging from 101° to 103.5° F., the catarrh, cough, restlessness, and delirium on each night continued till the evening of November 10th, when measles developed, the rash then showing on the head and neck. Koplik's spots appeared on November 8th, and injection of the mucous membrane of the palate and mouth the day before. On the 9th a rash appeared behind the ears, but by the morning of the 10th this had disappeared. A very heavy rash was fully developed by the 11th, and did not fade till the 16th.

Case II.—Male, aged 9 years, first ill on October 31st, 1935, with temperature, catarrh, and some enlargement of the glands of the left anterior triangle. There was marked catarrh, suffusion of the eyes, and the temperature ranged from 100.5° to 104°, till on November 9th the measles rash developed on the face and behind the ears. The rash was fully developed by the 11th. Koplik's spots had appeared on the 8th. The rash was again very profuse, and did not die down till the 15th.

In both these cases the period of invasion lasted much longer than usual. The limits are said by Rundle, in *Ker's Infectious Diseases*, to be four to seven days. The boy's rash appeared nine days after the beginning of the symptoms, and the girl's eleven days after.

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Presence of Copper in Gall-stones

While the occurrence of traces of copper in the human organism has long been known—and, in fact, its presence has been regarded by some as essential to the efficient action of iron in the production of the elements of the blood—yet its presence in any appreciable quantity does not seem to have been recorded. It was therefore thought that the following case was worthy of being put on record.

The patient was a man of middle age, suffering from gastric ulcer and cholelithiasis. A partial gastrectomy was performed and the gall-bladder was removed; it was found to contain eight faceted gall-stones, weighing in all 1,038 mg. The stones were found to be composed almost entirely of inspissated bile pigments (mainly bilirubin and biliverdin) and to contain no cholesterol. After the usual extractions with ether, chloroform, and hot alcohol there remained an appreciable quantity of a compound which was found to consist of copper in organic combination with bilirubin.

The copper was separated by incineration and identified by the usual reactions—blue colour with ammonia and brown precipitate with potassium ferrocyanide. The quantitative estimation was done by dissolving the ash from a weighed quantity of stone in dilute HCl, adding KI and titrating the liberated iodine with N/400 sodium thiosulphate. This showed copper to be present to the extent of 0.3 per cent., which gave the total amount of metallic copper in the gall-stones as 3.1 mg.

I am indebted to the Director-General of Medical Services, Ministry of Pensions, for permission to publish this note.

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Reviews

HAEMOCHROMATOSIS

Dr. J. H. SHELDON's monograph on *Haemochromatosis*¹ contains more pages than the total number of reported cases of the disease. His justification, if any is needed, is found in the light thrown by this rare malady on fundamental questions of metabolism and constitutional pathology. Knowledge of facts in medicine grows continually, but wisdom often lingers for need of the synthesis of data into a coherent structure. The research worker may be unable from preoccupation or literary inability to describe the broad outlines of his subject, while the reviewer who has not personally handled the material may fail to distinguish the false from the true, the important from the trivial. Dr. Sheldon fortunately possesses the two talents. His research work on the mineral constitution of the organism is well known, and the present monograph shows his skill in marshalling facts. We hope that many of our readers will read this volume, for it is so printed and arranged that the gist of the book can be quickly read, and it is of interest not only to the pathologist but to all who are curious about the vagaries of the human constitution.

Haemochromatosis is characterized by deposits of pigments in the tissues and a tendency to cirrhosis of the liver and pancreas. The pigment is of two types: haemosiderin, an iron-containing pigment which is found especially in glandular tissues; and haemofuscin, a melanin pigment which is found especially in smooth muscle. There are reasons for believing that cirrhosis of the organs is not due merely to irritation by the deposits of pigment, but is an integral part of the disease. The important symptoms are pigmentation of the skin; diabetes, hepatomegaly, and a tendency to terminal jaundice, ascites, or cancer of the liver; and impotence and loss of hair, which are probably associated with the pigmentation of the testes and the pituitary gland. Now that the diabetes can be controlled by insulin, the hepatic complications will probably become the most frequent cause of death. It is a disease of the male sex, only about one in twenty cases occurring in females, and it rarely becomes manifest before the age of 35. In view of the occasional discovery of latent cases at an early age, and calculating also from the rate of accumulation of pigment in the tissues, it appears likely that the actual disease process begins in the first years of life. The disease has occasionally been familial and more rarely hereditary. Since the appearance of Dr. Sheldon's book Dr. R. D. Lawrence has published a pedigree which suggests that haemochromatosis may be a sex-linked hereditary disease transmitted by females and affecting mostly males (*Lancet*, 1935, ii, 1055).

Reviewing all the evidence Dr. Sheldon concludes that the disease is an inborn error of metabolism, comparable with alkaptonuria. The haemosiderin is not derived from the iron of the blood but from the tissues, and is the result of a congenital disturbance in the metabolism of the iron-containing respiratory ferments. The cirrhosis is the result of an associated tissue defect and is comparable with the hepato-lenticular degeneration of Wilson's disease. Dr. Sheldon's purpose in writing his monograph has been to provide for future students a complete summary of the records of haemochromatosis up to 1934, and one of the few judgements of his with which the reader will disagree is that in which he ascribes no permanent value to his hypotheses about the disease.

¹ *Haemochromatosis*. By J. H. Sheldon, M.D., F.R.C.P. London: H. Milford, Oxford University Press. 1935. (Pp. 382; 40 figures. 25s. net.)