absorption on a milk diet is therefore to be expected. On the other hand, Holt *et al.* (1919a, 1919b) found that normal infants fed on cows' milk passed more than twice as much fat as infants who were breast-fed, and that the average utilization of dietary fat was 88.6% for cows' milk and 95.8% for breast milk. They also found that the percentage of the total fat excreted as soap was much higher in infants taking cows' milk. We therefore believe that our results are worth recording.

Methods.—The collection of faeces was carried out between carmine markers over a period of three days. The diet consisted of nothing but pasteurized cows' milk, and the intake was kept constant before and during the period of collection of faeces. Five millilitre samples of milk from all bottles drunk were collected, and the fat content of the mixed samples was estimated. The faeces were collected in screw-capped glass jars containing a small amount of formalin, and were dried over a water-bath, ground, and mixed carefully. The estimations of soap, neutral fat, and free fatty acids were carried out in duplicate, using Soxhlet apparatus by the method described by Harrison (1947).

The results are shown in Table I.

TABLE I

	W.H.H.A.	R.H.
Daily milk intake	12 pints	10 pints
Fat content of milk	3.3 g.% (w/v)	3.3 g.% (w/v)
Daily fat intake	225 g.	187.5 g.
Weight of dried faeces (3 days) ..	147 g.	131 g.
Total fat in dried faeces	28.6%	26.4%
Percentage fat as (1) Soaps	74.5%	72%
(2) Free fatty acids	13.5%	14%
(3) Neutral fat	12%	14%
Total daily weight of excreted fat ..	14 g.	11.5 g.
Fat intake absorbed	93.8%	93.9%
Total body weight. Gain or loss over one month period on milk in brackets ..	195 lb. (+5)	155 lb. (nil)
Daily calorie intake approximately ..	4,450	3,700

Discussion

Although a diet of cows' milk becomes monotonous no difficulty was experienced in continuing it for a period of one month. At times we observed minor degrees of flatulence, but general health was apparently unaffected. One of us, in fact, played competitive tennis throughout the whole period and even travelled to London for the Coronation, having to sit all day in Hyde Park drinking milk. The motions seemed to be increased in bulk, rather constipated, and of uniform consistency and colour (pale) throughout. The calorie intake was obviously adequate, and one of us (W.H.H.A.) gained 5 lb. in weight over a total period of one month on milk.

The most striking feature of the results is that fat utilization is 94% (Table II), a figure well within the usually accepted, roughly defined normal range for adults, in which the amount of fat in the stool should not exceed 10% of the ingested fat. The other feature of interest is the high percentage of the total fat excreted which appears as soap. This bears a close relation to the figures which Holt *et al.* obtained for infants fed on cows' milk. The percentage of

TABLE II

	Total Fat in Dried Faeces	Percentage as Soap	Percentage as Free Fatty Acid	Percentage as Neutral Fat	Utilization of Fat Intake
W.H.H.A.	28.6%	74.5%	13.5%	12%	94%
R.H.	26.4%	72%	14%	14%	94%
Average for normal breast-fed infants (Holt <i>et al.</i>) ..	34.5%	43.1%	36.7%	20.2%	95.8%
Average for infants fed on cows' milk (Holt <i>et al.</i>) ..	34.1%	60.5%	18.6%	12.1%	88.6%
Average for children on milk with bread and cereal (Holt <i>et al.</i>) ..	30.7%	60.9%	25.1%	14.0%	90.6%
Average for normal adults on a mixed diet containing 208 g. fat (Wollaeger <i>et al.</i>) ..	33.7%	—	—	—	96%

total fat in the dried faeces is just above that which is usually regarded as being within normal limits for a mixed diet of average fat content, but below the figure obtained by Wollaeger *et al.* on a mixed diet containing 208 g. of fat.

Conclusions

An investigation was made into the fat absorption and excretion in adults on a milk diet.

It was found that adults living on a high fat diet consisting of cows' milk absorb a normal proportion of their fat intake.

As in infants on cows' milk and normal children on a milk diet, a considerable proportion of the excreted fat is in the form of soap.

A milk diet for one month has no adverse influence on health.

The work of one of us (R.H.) was carried out during the tenure of a John Holt Research Fellowship and with the aid of a grant from the Royal Australasian College of Physicians. The milk fat estimations were kindly carried out by Mr. N. Heron, of the City Analyst's Department, Liverpool, and the faecal fat estimations by Mrs. E. Smith, of the Department of Tropical Medicine, Liverpool School of Tropical Medicine.

REFERENCES

- Annekers, J. H., Boutwell, J. H., and Ivy, A. C. (1948). *Gastroenterology*, 10, 486.
 Harrison, G. A. (1947). *Chemical Methods in Clinical Medicine*, 3rd ed., p. 494. Churchill, London.
 Holt, L. E., Courtney, A. M., and Fales, H. L. (1919a). *Amer. J. Dis. Child.*, 17, 241.
 ——— (1919b). *Ibid.*, 17, 423.
 ——— (1919c). *Ibid.*, 18, 107.
 Wollaeger, E. E., Comfort, M. W., Weir, J. F., and Osterberg, A. E. (1946). *Gastroenterology*, 6, 83.

Medical Memoranda

Intestinal Polyposis associated with Pigmentation of the Oral Mucosa

This syndrome was described by Peutz (1921) and again by Jeghers (1944), who later collected a further 22 cases from the world's literature. Of the 30 patients so far reported few proved cases have been described in the British Isles.

In view of the apparent rarity of the condition, which may yet prove to be more common than is at present supposed, two further cases are considered worth recording. The first patient, in whom the polyposis is confined to the small intestine, is exceptional in that he has been admitted to hospital on eight occasions with an intussusception and has undergone five operations for this complication. In the second patient the polyposis occurred predominantly in the large intestine, and radical surgery was possible.

CASE 1

A man aged 28 attended in March, 1948, with symptoms of recurrent partial intestinal obstruction. In 1943, when in the Forces, he had been operated on for intussusception. His son, aged 8, has pigmented lips but as yet no symptoms.

He was a dark sallow man with typical pigmentation of the lips and buccal mucosa. Barium enema revealed a chronic ileo-colic intussusception.

At laparotomy on March 15 chronic jejuno-jejunal, ileo-ileal, and ileo-colic intussusceptions were found. All three were reduced. Nine large polyps were present at intervals throughout the small intestine. No resection was carried out. He was subsequently readmitted in six attacks of acute intestinal obstruction.

At laparotomy on May 5 an ileo-colic intussusception was partially reduced. A few inches of ileum and the contained polyp required resection. Pathological examination showed a benign adenomatous polyp.

At laparotomy on May 30, 1949, an ileo-ileal intussusception was reduced; no resection. On April 20, 1950, laparotomy revealed an irreducible ileo-ileal intussusception; 12 in. (30 cm.) of ileum was resected.

In November, 1950, and January and July, 1951, he was admitted with intestinal obstruction and intussusceptions were palpated, but spontaneous reduction occurred shortly after admission. He often suffers from both mild and severe attacks of colic, but so far has required no further admission to hospital.

CASE 2

A boy aged 12 attended in February, 1951, with a rectal polyp. He had had an operation for intussusception in 1939. There was no relevant family history. He was a sallow child with typical pigmentation of the lips and oral mucosa. A polyp was removed from the rectum. Barium enema and sigmoidoscopy revealed no further polyps at that time. A second polyp was removed in July 1951, and in May, 1952, examination revealed a third rectal polyp and mass in the ascending colon.

An exploratory laparotomy on July 9, 1952, revealed a polyp in the jejunum, 12 in. (30 cm.) from the duodeno-jejunal flexure, a polypoid mass in the caecum, a polyp in the appendix, a polypoid mass in the descending colon, where a chronic intussusception was present, and a polyp in the sigmoid colon; the mucosa of the terminal ileum was nodular, but no true polyps were present. Resection of 6 in. (15 cm.) of upper jejunum and total colectomy, anastomosing the lower ileum to the rectum, were carried out. The pathological report stated "benign adenomatous polyps."

Post-operative progress was complicated in October, 1952, by intestinal obstruction due to adhesions, which were divided. No further polyps have developed in the 4 in. (10 cm.) of rectum remaining.

I wish to thank Mr. Ridley Thomas and Mr. Norman Townsley for permission to publish the histories of these patients, who are under their care, and for their help and advice.

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BIBLIOGRAPHY

- Foster, D. B. E. (1944). *British Medical Journal*, 2, 78.
 Jeghers, H. (1944). *New Engl. J. Med.*, 231, 88.
 —, McKusick, V. A., and Katz, K. H. (1949). *Ibid.*, 241, 993, 1031.
 Kaplan, I., and Feuchtwanger, M. (1953). *British Medical Journal*, 1, 659.
 Kitchen, A. P. (1953). *Ibid.*, 1, 658.
 Peitz, J. L. A. (1921). *Ned. Maandschr. Geneesk.*, 10, 134.
 Tanner, N. C. (1951). *Proc. roy. Soc. Med.*, 44, 405.
 Wolff, H. H. (1952). *Lancet*, 1, 446.

Intestinal Polyposis associated with Pigmentation and Intussusception in Triplets

Hunter and Wilson (1953) define two types of true adenomatous polyps of the small intestine: (1) those associated with pigmentation of the lips and buccal mucosa and with familial tendencies; and (2) those not associated with pigmentation and no obvious hereditary factor.

In view of the rarity of this condition the following cases of type 1 occurring in triplets are considered worthy of note. All three presented initially with abdominal colic and all showed marked pigmentation of the lips and buccal mucosa, including the gums; all were of sallow complexion and had dark hair.

CASE 1

The patient was first seen on November 17, 1944, when aged 8. For three years, on and off, she had complained of colicky abdominal pain associated with diarrhoea and vomiting. Marked circumoral and buccal pigmentation was noted along with a patchy brown pigmentation of the abdominal wall. A tentative diagnosis of Addison's disease was made, and she was admitted for further investigation. Full blood examination showed only very slight anisocytosis; blood sodium 307 mg. per 100 ml.; and blood potassium 24 mg. per 100 ml. X-ray examination showed no supracalcification and the Kepler water test was normal.

A diagnosis of mild Addison's disease was made, and she was discharged on January 15, 1945.

She was readmitted on February 10 with symptoms of acute intestinal obstruction. At laparotomy (A. L. L.) 4 feet (122 cm.) of gangrenous ileum was seen and was thought to be due to volvulus. Resection with end-to-end anastomosis was performed. Some calcified tuberculous glands in the mesentery were included in the resection. She was seen again on April 9, complaining of intermittent abdominal pain, but full x-ray examination showed no abnormality.

On March 10, 1953, she was readmitted with very severe abdominal pain and symptoms of intestinal obstruction. Examination revealed a large sausage-shaped swelling in the lower and right abdomen. A diagnosis of small-bowel obstruction was made and laparotomy was performed (W. P. C.). An ileo-ileal intussusception extending through the ileo-caecal valve was found. Reduction was impossible, and a right hemicolectomy was performed. A large, simple adenomatous polyp was found to have initiated the intussusception. Convalescence was uneventful, and since discharge she has been seen several times and has remained perfectly well.

CASE 2

This sister was first seen on April 22, 1948, when aged 12, with symptoms of acute small-bowel obstruction. Circumoral and buccal pigmentation was noted. Laparotomy (A. L. L.) revealed an ileo-ileal intussusception 4 in. (10 cm.) in length. This was reduced and an intestinal polyp $\frac{1}{2}$ in. (1.9 cm.) in diameter was palpated through the bowel wall. The polyp was excised and the bowel sutured transversely. Histological examination showed inflammation of an adenomatous polyp. She was readmitted on May 26, complaining of left lower abdominal pain, but sigmoidoscopy and barium examination revealed no abnormality.

On March 28, 1949, she was again admitted with severe lower left abdominal pain associated with vomiting. At laparotomy a colo-colic intussusception of the sigmoid loop was demonstrated. This was easily reduced, and was found to be initiated by a polyp palpable through the bowel wall. Several other polyps were palpable further up the large bowel as far as the transverse colon. A Paul-Mikulicz resection of the sigmoid colon containing the intussuscepting polyp was performed. The double-barrel colostomy was later successfully closed.

CASE 3

This girl is the only one of the triplets who has not required laparotomy. Nevertheless she was seen on April 9, 1951, aged 15, complaining of colicky abdominal pain. At examination she, too, had marked circumoral and buccal pigmentation. In view of her sisters' history full barium x-ray examination and sigmoidoscopy were performed, but no evidence of polyposis could be demonstrated.

COMMENT

The association of circumoral and buccal pigmentation with polyposis of the small intestine and intussusception, though rare, is by now a well-recognized syndrome. The familial tendency of the condition is well demonstrated in these triplets, but no history of similar pigmentation or intussusception could be elicited from the parents or other members of the family.

Hutchinson (1896) first described pigmentation of the lips and buccal cavity in twins, and Parkes Weber (1919) recorded that one had died of intussusception. Jeghers (1944) and Jeghers *et al.* (1949) described the syndrome more fully and recorded 10 further cases. Tanner (1951) added a further case, and Wolff (1952) reviewed the literature and recorded a case of his own. Kaplan and Feuchtwanger (1953) and Kitchen (1953) added three further cases. Hunter and Wilson (1953) recorded yet another case of adenomatous polyp of the small intestine associated with pigmentation and intussusception, and suggested a classification of intestinal polyps. So far as can be ascertained 31 cases have been recorded.