THE NUTRITIVE VALUE OF FLOURS.

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As a control of our former experiments,¹ we obtained a new supply of flours straight from the mill of guaranteed quality, supplied by the Hovis Company.

The following tables again show the striking deficiency of white flour. Standard flour has proved better than wholemeal. This is contrary to our results reported on June 3rd. On inquiring into this matter, we find that, while the Hovis Company's wholemeal really contains all

TABLE A.—White Flour.

	I.	II.	III.	IV.	V.	VI.	Increase or Decrease in Six Weeks.	VII. After Extract of Offal.
231	243+12	243+0	243+0	233-10	242+9	209-33	-22	215+6
99	105+6	99-6	90-9	84-6	91+7	86-5	-13	91+5
61	58-3	60+2	70+10	67-3	69+2	66-3	+5	86+20
59	58-1	60+2	68+8	66-2	66+0	59-7	+0	83+24
59	55-4	62+7	61-1	55-6	57-2	55-2	-4	61+6
57	54-3	59+5	57-2	54-3	56+2	49-6	-8	61+12
56	55-1	59+4	56-3	50-6	55+5	47-8	-9	48+
56	55-1	58+3	51-7	48-3	47-1	Dead		
56	53-3	53+0	Dead					
55	53-2	51-2	Dead					
48	52+4	50-2	Dead					
46	49+3	47-2	Dead					
45	46+1	42-4	Dead					
38	Dead							
25	23-2	Dead						
622							-51	

Survivors decreased 8 per cent.; 8 deaths.

TABLE B.—Wholemeal.

	I.	II.	III.	IV.	V.	VI.	Increase in Six Weeks.
164	166+2	186+20	183-3	188+5	201+13	205+4	41
105	113+8	124+11	137+13	144+7	133-11	137+4	32
58	60+2	63+3	75+12	87+12	76-11	Dead	
55	58+3	62+4	70+8	77+7	73-4	Dead; partly eaten 60-3	8
52	53+1	54+1	69+15	62-7	63+1		11
41	41+0	43+2	49+6	50+1	52+2	52+0	15
32	32+0	31-1	37+6	43+6	50+7	47-3	14
28	28+0	27-1	33+6	36+3	40+4	42+2	13
28	28+0	27-1	32+5	34+2	39+5	41+2	11
28	29+1	31+2	32+1	34+2	38+4	39+1	9
27	28+1	28+0	31+3	33+2	34+1	36+2	9
27	28+1	27-1	29+2	32+3	34+2	36+2	10
26	28+2	28+0	30+2	31+1	33+2	35+2	11
25	25+0	26+1	29+3	29+0	33+4	35+2	
23	24+1	24+0	27+3	28+1	32+4	34+2	
606							193

Survivors increased 32 per cent.; 2 deaths.

TABLE C.—Standard Flour.

	I.	II.	III.	IV.	V.	VI.	Increase in Six Weeks.
103	121+18	134+13	141+7	135-6	121-14	126+5	23
84	117+33*						
65	77+12	82+5	81-1	85+4	84-1	84+0	19
53	64+11	69+5	76+7	72-4	80+8	84+4	31
50	60+10	66+6	71+5	72+1	75+3	80+5	30
49	55+6	65+10	63-2	65+2	68+3	75+7	26
46	48+2	59+11	57-2	61+4	65+4	73+8	27
46	49+3	56+7	52-4	50-2	52+2	57+5	11
40	36-4	36+0	40+4	41+1	46+5	49+3	9
31	34+3	33-1	40+7	40+0	46+6	48+2	17
29	32+3	32+0	39+7	39+0	45+6	47+2	18
26	28+2	31+3	39+8	39+0	42+3	47+5	21
25	27+2	31+4	35+4	36+1	41+5	44+3	19
21	25+4	25+0	35+10	31-4	34+3	36+2	15
21	22+1	24+2	31+7	31+0	33+2	Escaped	
584							266

* Mother of six, all growing up on Hovis.

Survivors increased 45 per cent.; 1 mother, 1 missing, 2 escaped.

TABLE D.—Hovis Flour.

	I.	II.	III.	IV.	V.	VI.	Increase in Six Weeks.
100	128+28	144+16	162+18	*			
100	126+26	144+18	161+17	158-3	164+6	163-1	63
86	107+21	120+13	127+7	127+0	133+6	133+0	47
63	77+14	78+1	102+24	109+7	108-1	122+14	59
49	65+16	73+8	86+13	107+21	106-1	111+5	62
49	65+15	72+8	86+14	99+13	105+6	92-13	43
45	61+16	69+8	79+10	88+9	97+9	88-9	43
45	59+14	69+10	81+12	75-6	86+11	87+1	42
44	58+14	66+8	70+4	71+1	85+14	81-4	37
44	56+12	65+9	65+0	70+5	79+9	75-4	31
42	52+10	62+10	Dead				
30	35+5	53+18	54+1	58+4	74+16	74+0	44
27	34+7	40+6	51+11	54+3	62+8	67+5	40
23	32+9	39+7	51+12	52+1	55+3	56+1	33
605							544

* Mother of 10 young.

Survivors increased 90 per cent.; 1 dead, 1 mother.

the germ, sharps, and bran of the wheat, the so-called wholemeal which we bought for our experiments reported June 3rd contains only a portion of the sharps and bran. The removal of a part of the sharps and bran gave it a nutritive value higher than the true wholemeal, probably because this contains too much cellulose. Hovis flour contains about 20 per cent. of germ. This is separated in the milling by being rolled flat. After screening off, it is sterilized and added to white flour.

Wholemeal contains about 1 to 2 per cent. of germ, 13 per cent. of sharps (the inner husk), and 15 per cent. of bran. The addition of 20 per cent. of germ notably increases the percentage of protein, and ensures the presence of those organic phosphorus compounds which, according to Schaumann, are essential for growth. Thus, Hovis flour has a very high nutritive value. We have had five mothers among our rats. None of those fed on white flour have become mothers. The newborn

TABLE E.

	After Six Weeks on White Flour.	Sixth to Seventh Week put on Hovis.	After Seven Weeks on Hovis.
91	125+34	125	152+27
86	96+10	96	143+47
84	92+8	92	138+46
81	92+11	92	124+32
76	88+12	88	123+35
75	82+7	82	121+39
74	76+2	76	111+35
69	66-3	66	108+42
63	61-4	61	108+44
63	61+1	61	95+31
58	62+4	62	89+27
57	61+4	61	90+29
57	Dead		
52	52+0	52	76+24
50	50+0	50	72+22
48	Dead		
46	Dead		
42	Dead		
40	Dead		
40	Dead		
36	32-4	32	Dead.
34	Dead		
32	Dead		
1,020	+83*	1,070	480†

* Survivors increased 8 per cent. in six weeks; 8 deaths.

† Survivors increased 45 per cent. in seven weeks; 1 death.

rats have done well while the mothers (giving milk) were fed on Hovis flour and water, and have grown up strong and healthy on this diet after weaning. Wholemeal did not suffice for them. Thus Hovis flour and water has proved an adequate food for the milking mothers and for the young rats. These results show the great importance of the germ of which white flour is robbed.

Tables E and F show the effects on rats fed with white flour of a change to Hovis flour.

TABLE G.

	Twelve Weeks on Standard Flour.		Twelve Weeks on Standard Flour.
108	178+70	48	85+37
100	152+52	47	82+35
91	147+56	46	74+28
95	137+42	45	72+27
84	Dead	44	67+23
74	128+54	44	65+21
72	118+46	42	68+21
72	96+24	41	63+22
63	96+33	39	63+27
60	94+34	35	Dead
57	89+32	33	Dead
51	86+35		
49	85+36	1,385	755

Survivors increased 55 per cent. in twelve weeks; 3 deaths.

Table G shows the effect of twelve weeks on nothing but Standard flour and water.

External temperature plays a considerable part in these experiments. Flour-fed rats do comparatively badly in cold weather and well in hot weather, and this is particularly the case with those fed on white flour.

TABLE F.

	At End of Five Weeks of White Flour.	Fifth to Sixth Week put on Hovis.	At End of Six Weeks of Hovis Flour.
106	104-2	104	170+66
104	103-1	103	148+45
103	92-9	92	143+51
96	Dead		
87	Dead		
82	63-14	68	118+50
75	67-8	67	118+51
71	67-4	67	98+31
65	61-4	61	Dead
59	59+0	59	85+26
54	52-2	52	74+22
53	Dead		
49	Dead		
49	47-2	47	Dead
48	42-7	42	70+28
48	45-3	45	64+19
46	43-3	43	57+14
46	38-8	Dead	
44	37-7	Dead	
44	Dead		
43	Dead		
42	33-9	Dead	
42	32-10	Dead	
40	33-7	Dead	
38	Dead		
27	Dead		
1,220	-99	782	+403

On white flour 13 dead. Survivors decreased 8 per cent. in five weeks. On Hovis flour 2 dead. Survivors increased 51 per cent. in six weeks.

We have found we can make an extract from the offal of wheat which, added to white flour, makes it more adequate as a food. We hope to communicate particulars of this series of feeding experiments shortly.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, May 6th and June 3rd, 1911.

A CASE OF SEPTIC PNEUMONIA CAUSED BY A HATPIN.

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THE case here described is interesting medico-legally and because it illustrates how a sharp-pointed foreign object of considerable length may remain in the body and travel through various organs for several weeks before causing grave symptoms.

A. C., a male, aged 26 years, who had had no previous illness, was admitted on August 27th, 1908, and seen by me immediately. He said that he had had acute pain between his shoulders for three weeks and jaundice for three days. He looked ill, was jaundiced and drowsy, and complained of sharp pain at the inferior angle of the right scapula. There was nothing abnormal in the heart, lungs, or abdominal organs except some liver tenderness. After a good tea and sleeping for five hours he developed symptoms and signs of acute pneumonia in the lower lobe on the right. No rigors, sweats, vomiting, sputum, or epigastric pain were observed.

Later the patient became very weak and quietly delirious, the pulse bad, and the temperature oscillated. On August 30th signs of pneumonia appeared in the remainder of the right lung and the lower lobe of the left. Death occurred on September 2nd.

Jaundice preceding pneumonia is very rare; liver abscess is sure to have given increased dullness and the hepatic tenderness would have been more marked. The diagnosis of jaundice and pneumonia following influenza was favoured by the absence of an appreciable leuco-