The figures given in Tables 2 and 3 show that the antibacterial activity is not destroyed by heating for 15 min. to a temperature of 120° C., the growth-inhibiting properties of the autoclaved extracts (type III), on the contrary, being stronger than those of the corresponding extracts before autoclaving. Furthermore, the substances preventing cell division of *Staphylococcus* are not held back by the Seitz filter, the antibiotic capacity of a filtered extract of *Acer platanoides* (type IV) being even greater than that of the untreated extract serving as a control.

TABLE 3. ANTIBIOTIC ACTION EXERTED ON *Staphylococcus aureus* BY UNDILUTED AND DILUTED LITTER EXTRACTS OF *Acer platanoides*

Type of extract	Dilution				
	Undil.	1:1	1:2	1:3	1:4
I	20.6 ^a	18.5 ^a	0 ^a	0 ^a	0 ^a
III	21.8 ^a	21.5 ^a	18.9 ^a	17.0 ^a	12.3 ^a
IV	21.5 ^a	18.9 ^a	16.7 ^a	15.8 ^a	13.3 ^a

In dilution the extracts were mixed with distilled water in the proportions 1:1, 1:2, etc. The figures placed at the top of the mean assay values (mm.) indicate the number of parallel cylinders used in testing.

The results given in Table 3 may be interpreted as indicating that untreated cold water extracts from litter of *Acer platanoides* contain one or more factors acting as destroying agents upon the antibacterial substances effective against *Staphylococcus*. This being the case, the inactivator or inactivators involved are susceptible to heat and do not pass through a Seitz filter, the extracts III and IV, as noticed above, showing a higher capacity to inhibit bacterial growth than does the corresponding extract I.

The antibacterial substances present in litter extracts of *Acer platanoides* and found to inhibit the growth of *Staphylococcus* diffuse through 'Cellophane' membranes on dialysing against distilled water.

Finally, it may be worth noting that Osborn⁴ does not range *Acer platanoides* and *Quercus robur* with the species of green plants found to be active against *Staphylococcus aureus* when tested as extracts from freshly picked material.

ELIAS MELIN
TORSTEN WIKÉN

Institute of Physiological Botany,
University of Uppsala.
June 16.

¹ Melin, E., *Symb. Bot. Upsal.*, **8**, 3 (1946).

² Abraham, E. P., Chain, E., Fletcher, C. M., Florey, H. W., Gardner, A. D., Heatley, N. G., and Jennings, M. A., *Lancet*, **241**, 177 (1941).

³ Wikén, T., *Ark. Bot.*, **33**, A, 3 (1946).

⁴ Osborn, E. M., *Brit. J. Exp. Pathol.*, **24**, 227 (1943).

Isolation of the Growth-promoting Factor Present in the Fatty Acids of Summer-Butter

In 1941 Boer and Jansen showed¹ that summer-butter contains a growth-promoting factor that was neither vitamin A nor one of the other known fat-soluble vitamins. Later, Boer and Jansen demonstrated that the growth-promoting action was due to the saponifiable fraction of the summer-butter. We have now divided the saponifiable fraction by fractional distillation. The different fatty acids obtained in this way were administered to rats, and the growth of the rats on the different fractions was compared. Details of the technique of this test are given in our earlier publications. In a fuller publication, that will appear elsewhere, the method of distillation also will be described.

It appeared that none of the fractions below C₁₄ had a growth-promoting action. However, a fraction near C₁₆, containing only vaccenic acid (it seemed to us very improbable that other substances were present in this fraction), had the same growth-promoting action as summer-butter itself.

Vaccenic acid is an isomer of oleic acid (C₁₇H₃₃COOH). The double bond, however, is here between C₁₁ and C₁₂ (in oleic acid between C₉ and C₁₀). The vaccenic acid was identified by its melting point (35° C.), and its iodine-value (81).

TABLE 1. FIRST SERIES. GROWTH DURING 18 DAYS (IN 9TH AND 10TH WEEKS)

Litter	Butter	Rape oil	Rape oil plus vaccenic acid
I	50	20	41
II	36	33	—
III	39	37	53
IV	50	34	46
V	63	35	—
VI	45	32	43
VII	45	32	—
VIII	46	34	40
IX	33	33	—
X	—	46	44
XII	—	34	41
XI	—	28	38
Mean :	46	32	43

TABLE 2. SECOND SERIES. GROWTH DURING 6TH AND 7TH WEEKS

Litter	Butter	Rape oil	Rape oil plus vaccenic acid
IV	62	13	50
VI	39	35	32
VII	51	39	48
IX	47	29	48
X	54	27	37/36
XII	33	48	44
XIV	54	34	35
III	33	32	34
XI	—	23	—
	—	44	53
Mean :	47	32	41

In two series of experiments, growth of rats on rape oil appeared to be significantly less than the growth on summer-butter. When the fraction of vaccenic acid was added to the rape oil, the difference in growth between rape oil and summer-butter disappeared completely (Tables 1 and 2). Statistical calculation showed that the difference between rape oil and rape oil plus the vaccenic acid fraction is highly significant.

In our opinion, these experiments show that the growth-promoting action of summer-butter is due to the vaccenic acid. A more detailed description of our experiments will be published elsewhere.

J. BOER
B. C. F. JANSEN
A. KENTIE

Netherlands Institute of Nutrition, and
Laboratory for Physiological Chemistry,
University of Amsterdam.

¹ *Arch. Néerl. Physiol.*, **26** (1942).

Liver Glycogen of Alloxan-Diabetic Rats under Different Conditions

It is generally agreed that a low glycogen level in liver and muscle is a characteristic of pancreatic diabetes. Considerable importance is attached to this phenomenon in the pathology of diabetes. A similar condition has been observed in alloxan-diabetic rats by Lackey, Bunde, Gill and Harris¹.

The present communication reports analyses of the liver and muscle glycogen content of alloxan-diabetic rats under different conditions: in paired feeding experiments, after a 24-hr. fast period, and after fast combined with additional demands on the carbohydrate metabolism (muscular work, phloridzin administration). As diabetic animals have a small appetite, liver and muscle glycogen were also determined in another experimental series following a fast of 24 hr. after prior chronic under-nutrition. The results of these experiments are set forth in the accompanying table.

Treatment	Animals	No. of expts.	Glycogen gm./100 gm. in		Blood sugar mgm. per cent
			Liver	Muscle	
Paired feeding	Diabetic	20	1.58 ± 0.21	0.35 ± 0.02	392
	Controls	20	1.50 ± 0.23	0.39 ± 0.02	—
24 hr. fast	Diabetic	34	0.70 ± 0.10	0.23 ± 0.02	299
	Controls	59	0.15 ± 0.04	0.25 ± 0.02	—
48 hr. fast	Diabetic	16	0.18 ± 0.04	0.22 ± 0.03	261
	Controls	13	0.21 ± 0.07	0.24 ± 0.03	—
24-30 hr. fast after under-nutrition	Diabetic	18	1.42 ± 0.20	0.35 ± 0.04	440
	Controls	13	0.69 ± 0.20	0.34 ± 0.03	—
Work expts. Swimming for 1 hr. after 16 hr. fast. Killed	Diabetic	5	0.08 ± 0.02	0.08 ± 0.02	193
(a) before recovery	Controls	4	0.05 ± 0.02	0.11 ± 0.03	—
(b) after 6 hr. recovery period	Diabetic	11	0.59 ± 0.19	0.14 ± 0.02	246
	Controls	11	0.05 ± 0.01	0.14 ± 0.02	—
Administration of phloridzin (2 × 15 mgm.) during an 8-26 hr. fast period	Diabetic	20	0.46 ± 0.09	0.20 ± 0.02	257
	Controls	13	0.06 ± 0.02	0.24 ± 0.03	—

Comatose rats exhibiting marked ketonuria, high blood sugar, high liver fat, deepened breathing, and in general low body temperature were not included in these experiments, as they show an essentially different behaviour. In ten comatose rats the liver glycogen level averaged 0.17 per cent, the average blood sugar being 686 mgm. per cent. After fasting for 24 hr. these rats, in contrast to non-comatose diabetic animals, showed a lower level of liver glycogen than the controls.

The most striking finding is the existence in alloxan-diabetic rats after a 24-hr. fast—alone or accompanied by additional demands on the carbohydrate reserves—of an increase in level of liver glycogen,