third in 1907-8, with previous hot summers. The gap between 1908 and 1935 is simply a gap in records, for several seasons undoubtedly occurred in this interval.

The behaviour of *N. menziesii* needs to be examined further, for it does not appear to fall into line with that of the remaining species. In other characters, morphological, physical properties of the wood, etc., it is also distinct from its New Zealand relatives, and along with certain Australian and South American species should probably be placed in a separate section of *Nothofagus*.

It is of interest to note that specimens of *Fagus sylvatica* grown ornamentally also flowered heavily in the spring of 1948. Specimens of two South American *Nothofagus*, *N. obliqua* and *N. procera*, grown from seed brought to New Zealand some fifteen years ago, also flowered for the first time.

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¹ Bourne, Ray, *Quart. J. For.*, **36**, 2, 42 (1942). *Forestry*, **19**, 33 (1945).

² Büsgen, M., "The Structure and Life of Forest Trees". English trans. by Thomas Thomson (Chapman and Hall, London, 1929).

³ Klebs, *Biol. Zentralbl.*, **24** (1904).

Tubular Factors in the Development of Extra-renal Azotæmia

IN *Nature* of March 5, Gomori, Balint and Harsing¹ presented the results of an investigation into urea excretion under conditions of dehydration in the rabbit and demonstrated the significant fall in the ratio urea clearance to glomerular filtration-rate.

Glomerular filtration-rate (ml./min.)	Renal plasma flow (ml./min.)	Filtration fraction	Blood urea (mgm./100 ml.)	Urea clearance (ml./min.)	Urea clearance Glom. fil.-rate
<i>Normal</i>					
108	520	20.7	31	50	0.463
142	640	22.0	28	62	0.437
122	580	16.0	12	54	0.443
Mean		19.5			0.448
<i>After dehydration</i>					
80	308	26.0	70	16	0.200
90	400	22.5	58	24	0.267
87	390	22.3	42	15	0.172
Mean		23.6			0.213

In a series of experiments, to be reported in full elsewhere, on man, similar findings have been obtained. The subjects were dehydrated by the simple process of water deprivation for a period of four days. The results presented in the accompanying table show clearly that (1) glomerular filtration-rate falls, (2) the renal plasma flow falls to an even greater extent, and consequently (3) the filtration fraction rises. That the fall in the ratio urea clearance to glomerular filtration-rate should be associated with an increase in the filtration fraction is of interest in view of the demonstration of Barclay, Cooke and Kenney² that with a fall in the filtration fraction the ratio urea clearance to filtration-rate rises to a value which in some cases may exceed unity. These two findings

would suggest that there is available, in addition to the filtrative and reabsorptive mechanisms, an active tubular secretory process for urea, and that the balance of the two tubular components is related to the haemodynamic state of the organ. It is then possible that the change observed in urea excretion in dehydration may have its origin in the haemodynamic disturbance which occurs under these conditions.

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¹ Gomori, P., Balint, P., and Harsing, L., *Nature*, **163**, 364 (1949).

² Barclay, J. A., Cooke, W. T., and Kenney, R. A., Communication to International Physiological Congress, 1947.

Phosphorus Compounds and Metabolic Rate in Insect Pupæ

THE level of inorganic phosphorus varies in the blood of hibernating pupæ of the hawk-moth (*Celerio euphorbiae*) inversely with the rate of consumption of oxygen^{1,2}. The curve representing inorganic phosphorus values in the blood during the whole pupal stage is the reverse of the well-known U-shaped curve of oxygen consumption.

The 7-min. labile phosphorus (in adenosine triphosphate) in the pupal muscle diminishes during the winter diapause, when the metabolic-rate is at its minimum³. In 1941 we found⁴ in the 'brei' of overwintering *C. euphorbiae* pupæ a reduced cozymase-level, when compared with that of fresh pupa. Cozymase proved to be a limiting factor for the oxygen consumption in the brei. Added cozymase raised the respiratory rate of the preparation, but it was soon inactivated.

X-Ray photograph of *C. euphorbiae* during pupal diapause showing the solidified phosphate-rod

We have now made a further observation concerning the phosphorus metabolism during the diapause. In this period the intestine is quite shrunken, representing only 1-2 per cent by weight of the whole body. Its content is converted into a solid rod consisting of inorganic phosphate, probably potassium phosphate. A very important proportion of free phosphate is thus immobilized (see table).

The intestine contains 50-70 per cent of all inorganic phosphorus of the pupa. When calculated (as is usual) in mgm. per cent, it reaches values of

Exp. No.	Inorganic phosphorus (mgm.)		Per cent in intestine
	in the whole body	in the intestine	
1	1.53	1.10	72
2	2.60	1.50	58
3	2.06	1.33	65
4	1.95	1.00	51
5	2.71	1.38	51
6	2.00	1.14	57