

**ON THE FORMATION OF  
URIC ACID IN  
ANIMALS: ITS RELATION  
TO GOUT AND GRAVEL**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649301713

On the Formation of Uric Acid in Animals: Its Relation to Gout and Gravel by P. W. Latham

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**P. W. LATHAM**

**ON THE FORMATION OF  
URIC ACID IN  
ANIMALS: ITS RELATION  
TO GOUT AND GRAVEL**



Cambridge:

PRINTED BY C. J. CLAY, M.A. AND SON,  
AT THE UNIVERSITY PRESS.

ON THE  
FORMATION OF URIC ACID  
IN ANIMALS:

ITS RELATION TO GOUT AND GRAVEL.

TOGETHER WITH

AN EXPLANATION OF THE THERAPEUTIC EFFECTS  
OF SOME OF THE REMEDIES USED IN THE  
TREATMENT OF THOSE DISORDERS.

BY

P. W. LATHAM, M.A., M.D.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, LONDON;  
DOWNING PROFESSOR OF MEDICINE, CAMBRIDGE;  
PHYSICIAN TO ADDENBROOK'S HOSPITAL, AND FORMERLY ASSISTANT  
PHYSICIAN TO THE WESTMINSTER HOSPITAL.

CAMBRIDGE:  
DEIGHTON, BELL AND CO.  
LONDON: GEORGE BELL AND SONS.  
1884.

*a*  
*157.e.5*



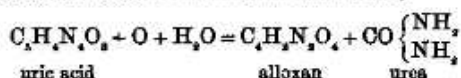
READ BEFORE THE CAMBRIDGE MEDICAL SOCIETY,  
MARCH 7, 1884.

THE generally received notion with regard to the production of uric acid is that it is due to an incomplete oxidation of the nitrogenous principles in the animal system<sup>1</sup>, in other words, to a less perfect oxidation of the tissues than occurs when urea is formed. This view I believe to be only partially true; and I shall endeavour to shew in the first place that the formation of uric acid is in the human subject to a large extent due to defective assimilation or metabolism, and secondly that it is a "condensation product" much in the same way that cyanuric acid  $C_3N_3H_3O_3$  and biuret  $C_2H_5N_2O_2$  are condensation products of urea, or that cyanuric acid and in some degree allophanic ether  $CO \begin{cases} NH_2 \\ NH \cdot CO \cdot OC_2H_5 \end{cases}$  are condensation products of cyanic acid.

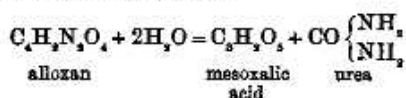
<sup>1</sup> Watts, *Dict. of Chem.* Vol. v. p. 955.



The main ground for the hypothesis that uric acid is due to defective oxidation is that by means of oxidising agents it can be split up into urea and other substances. For instance oxidised by nitric acid it is converted into alloxan and urea<sup>1</sup>,



and alloxan heated with baryta water is converted into mesoxalic acid and urea,



Or, if uric acid is oxidised by lead dioxide it is converted into allantoin, oxalic acid and urea<sup>2</sup>,



The view that the acid is due to defective oxidation has some support also from the fact, that in certain reptiles, as the Ophidians and Saurians, whose respiration is languid and whose temperature is low, the effete nitrogen of the system is eliminated in the

<sup>1</sup> Fownes' *Organic Chem.* 12th Ed. p. 402.

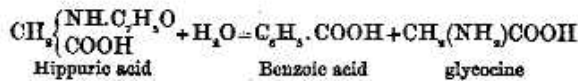
<sup>2</sup> *Ibid.*, p. 412.

form of uric acid. But that this is not the true explanation or anywhere approaching to it is shewn by another fact that in birds whose temperature is higher than that of mammals and whose respiration is rapid, the urinary secretion contains very little urea and consists largely of uric acid, amounting in some cases to as much as 90 per cent. of the secretion. Further, in nearly all the invertebrata, whose temperature is high, the urinary secretion consists of uric acid or ammonium urate and contains no urea.

The diet has by some been thought to influence the secretion of uric acid; but in the urine of the carnivorous lion and tiger there is little uric acid and abundance of urea. In the carnivorous python and boa there is no urea but abundance of uric acid, and this is the case too in graminivorous birds, whilst in the herbivorous mammal the urine is rich in urea and in the adult contains no uric acid, though in the young of this class it is found in notable quantities. The diet then which in one class of animals produces uric acid, in another class produces urea, and *vice versa*; it by no means follows however that the amount of uric acid formed or excreted by the *same* animal should not be greatly

influenced by the diet; there is in fact no doubt that it is so influenced.

But whilst the urine of adult herbivorous mammals contains no uric acid this substance is replaced by hippuric acid,  $C_9H_9NO_3$ , varying in quantity both according to the food of the animal and according to the amount of work or exercise it has taken. Hippuric acid is also found though in much smaller quantity under normal circumstances in human urine. Now hippuric acid may be decomposed by boiling it with strong hydrochloric acid into benzoic acid and glycocine<sup>1</sup>



This action may be reversed and by heating benzoic acid and glycocine in a sealed tube to  $160^\circ\text{C}$ . hippuric acid is formed<sup>2</sup>. It may also be formed by injecting benzoic acid and glycocine, or bile into the blood of a living animal.

According to Kühne and Hallwachs<sup>1</sup> benzoic acid injected alone into the jugular vein, is not con-

<sup>1</sup> Watts, *Dict. of Chem.* Vol. III. 1865, p. 158.

<sup>2</sup> *Ibid.* p. 166.