



A STUDY

of the

SALIVA

with special reference

to its

AMMONIA

and

INORGANIC PHOSPHORUS

CONCENTRATIONS.

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## INTRODUCTION.

Although modern literature on dental caries often contains surveys of the many and varied attempts at explaining the cause of the disease, in commencing the present observations, it is felt that it is impossible to avoid a repetition of such opinions, in order that certain aspects of the various hypotheses expounded may be stressed in relation to the need, and the carrying out of the particular investigations here recorded.

So much literature has appeared on the subject of dental caries and its origin, that the scientist finds himself completely bewildered: he reads of local and nutritional theories, of the endocrines, of hereditary influences, of pure mechanics, and of many other plausible explanations for this process of caries. But from this mass of observation, experiment and speculation emerges the realization that there are two main schools of thought, the local environmental group, subscribing to all the essential details of the chemico-parasitic theory originally propounded by Miller, and the group who believe that caries is the result of some nutritional disturbance.

There is ample evidence to support the doctrines of both schools, but the many objections levelled against both are sufficiently tangible to show that, at least, the problem is one of a decidedly complex nature. Some observers believe that the chemico-parasitic theory breaks down when it attempts to explain the following clinical and experimental phenomena :--

- (1) teeth in dirty and uncared-for mouths are often immune from caries,
- (ii) teeth scrupulously cleaned often succumb to caries -- the converse of clause (1),
- (iii) cases of arrested caries, where the destructive process has commenced, and has been halted,
- (iv) test tube experiments in which acids and enamel are allowed to interact, do not reproduce lesions similar to those of caries,
- (v) experimental caries cannot be produced by the action of the bacillus acidophilus and the symbiotic yeast on concentrated carbohydrate pabulum,
- (vi) if caries increases during certain systemic diseases and pregnancy, the chemico-parasitic theory would experience difficulty in providing an adequate explanation.

Others consider that the metabolic theory falls short in as many aspects :--

- (i) The theory is based on the incorrect conception of tooth structure itself.
- (ii) To satisfy the hypothesis, a circulation in the enamel is an essential condition: evidence on this point is conflicting.
- (iii) No agreement exists on the particular food deficiency responsible for the lesion.
- (iv) The influence that diet might exert on tooth environment per medium of the saliva and mucous secretions is not taken into account.
- (v) Attempts to control possible lesions by the addition of 'x' or 'y' to diets is lacking in scientific precision.
- (vi) The nutritional formula seeks to find a satisfactory explanation of caries in the secondary condition of 'resistance' rather than in the primary focus of infection.

In addition to the negative points enumerated above, there are also many positive arguments offering substantiation to each hypothesis. Numerous research workers have produced results from

carefully controlled dietary studies that call for the deepest consideration. On the other hand, such men as Miller (112, 113,) Leon Williams (149), and more recently Bunting (30, 31) and the Hatton-carries investigation group (74) have all produced evidence, the import of which literally demands the acceptance of the chemico-parasitic theory. In summing up the combined and conflicting testimonies, an impartial judge would call attention to the wisdom existing in the beliefs of both schools, and to the missing evidence, the absence of which, at present, makes final clarification of the problem impossible.

Formerly it has been customary for dental scientists to arraign themselves as definite proteges of the one school or the other, and it is regrettable that little evidence is to be found in past or contemporaneous literature to show equal resolve in correlating the proven and generally accepted portions of each theory. Accordingly, in this work it is proposed to examine caries, not with the bias of a nutritionalist nor that of a supporter of the chemico-school, but rather with the logical mind of a scientific diagnostician.