Contents

1: CONVERGENT RESEARCHES THE VITAMIN B ₁₈ STORY	page 1
Anti-pernicious anaemia factor – Extrinsic and intrinsic factors – Animal protein factor – L.L.D. factor – Pine in ruminants – Coenzyme B ₁₂	
THE FOLIC ACID STORY	
Tropical macrocytic anaemia and monkey anaemia — Chick growth factors — Bacterial growth factors — Isolation and synthesis of folic acid SYMPOSIA AND REVIEWS	
2: ORIGIN AND DISTRIBUTION OF VITAMIN Biz AND COENZYME B ₁₂ Microbial origin - Natural forms of vitamin Bia - Vitamin B ₁₂ in soil and water - Vitamin B ₁₂ in plants - Vitamin B ₁₂ in animals - Vitamin B ₁₂ in sewage sludge	14
3: ISOLATION OF VITAMIN B ₁₂ AND	
$COENZYME$ $\mathbf{B_{12}}$ Isolation from liver – Industrial production of vitamin $\mathbf{B_{12}}$ – Isolation of $\mathbf{B_{12}}$ coenzymes	22
4: CHEMISTRY OF VITAMIN Biz Physical properties - Structure - The cobalamins - Acid hydrolysis of vitamin B ₁₂ - The nucleotide products from mild acid hydrolysis - Factor B - Alkaline hydrolysis - Oxidation products - Reduction of vitamin B ₁₂ - Reaction with halogens - Methylation - Rebuilding the bridge - X-ray crystallography - Total synthesis - Stability	30
5: CHEMISTRY OF COENZYME B ₁₂ Structure and degradation – Chemical synthesis – Reactions of the coenzyme analogues	54

vi	VITAMIN B ₁₈	
6 : <i>N</i>	NOMENCLATURE Tentative rules – Definitive rules – Subsequent re- commendations	page 62
7 : <i>V</i>	TITAMIN B ₁₂ DERIVATIVES The cobalamins and cobalichromes – Carboxylic acids related to vitamin B ₁₂ – The lactam, lactone, and related derivatives – Halogenated derivatives – Substituted amides – Methylated vitamin B ₁₂ – Derivatives lacking all or part of the nucleotide – Coenzyme and analogues	68
8: 1	BIOGENESIS: ISOTOPIC LABELLING Precursors of the nucleotide – Precursors of the planar group – Assemblage of the complete molecule – Pre- cursors of coenzyme B ₁₂ – Radioactive vitamin B ₁₂ – Radioactive coenzyme and analogues – Bacterial degradation	72
9 : A	ANALOGUES Naturally-occurring analogues – Biosynthesis of vitamin B12 analogues – Chemical modification of analogues – Biological activities of analogues – Coenzyme analogues	
10: <i>A</i>	ANTIMETABOLITES RELATED TO VITAMIN Biz Benziminazolesandphenylene diamines – Interference with vitamin B12 uptake – Antimetabolites derived from vitamin Biz – Alkanolamine antagonists – Coenzyme antagonists – Activity in malignant condiditions	
11: A	ASSAY OF VITAMIN Biz, ANALOGUES, AND COENZYME Biz Colorimetric assays – Chemical methods of assay –	103

Isotope dilution assays - Microbiological assays -Lactobacilli - Escherichia Coli mutant - Euglena gracilis - Ochrornonas rnalhamensis and other organisms - Assays with higher animals - Clinical assays - Assay of coenzyme B_{12}

175

CONTENTS	V11
12: VITAMIN B ₁₂ BINDING FACTORS Intrinsic factor – Assay – Purification of intrinsic factor – Mode of action of intrinsic factor – Releasing factor – Other binding factors – Separation and assay of free and bound B ₁₂ – Site of binding	page 115
13: ABSORPTION, EXCRETION, AND DISTRIBUTION IN THE BODY Tracer studies in rats – Tracer studies in other animals – Vitamin B ₁₂ in ruminants – Human studies with injected vitamin B ₁₂ – Human studies with oral vitamin B ₁₂ – Distribution and turnover in man – Absorption of coenzyme Biz	
14: DIAGNOSIS AND TREATMENT OF MEGALOBLASTIC ANAEMIA Methods of diagnosis - Diagnostic methods with radioactive vitamin B ₁₂ - Treatment of megaloblastic anaemias - Depot preparations - Oral treatment	
15 : VITAMIN B ₁₂ IN ANIMAL AND HUMAN NUTRITION Deficiencysigns – Vitamins B ₁₂ requirements – Human dietary deficiencies – Vitamin Biz for diseases other than anaemias	
16: MECHANISMS OF ACTION Vitamin B ₁₂ in biochemical reductions – Synthesis of nucleic acids – Metabolism ofprotein and amino acids – One-carbon transfers – Biosynthesis of nethionine – Methane synthesis – Isomerase reactions – Metabolism of ochromonas – Dehydrase reactions – Other possible roles – Unsolved problems	·

INDEX