

AUSTRALIAN JOURNAL
OF
BIOLOGICAL SCIENCES

VOLUME 13

MELBOURNE
1960

AUSTRALIAN JOURNAL OF BIOLOGICAL SCIENCES

A medium for the publication of results of original scientific research in the biological sciences with special emphasis on the experimental phases. Volumes 1 to 5 issued as the Australian Journal of Scientific Research, Series B: Biological Sciences.

Published by the Commonwealth Scientific and Industrial Research Organization.
Issued quarterly, £2 per annum.

BOARD OF STANDARDS

The Board of Standards for this Journal is appointed by the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science and consists of Professor Sir Macfarlane Burnet (Chairman), Dr. N. S. Noble (Editor), Professor N. S. Bayliss, Dr. J. L. Pawsey, Professor W. P. Rogers, and Professor J. S. Turner.

ADVISORY COMMITTEE

Acceptance of papers for this Journal is in the hands of an Advisory Committee appointed by the Board of Standards and consisting of Dr. N. S. Noble (Chairman and Editor), Professor Sir Macfarlane Burnet, Professor W. P. Rogers, and Professor J. S. Turner.

All enquiries and manuscripts should be forwarded to:

The Editor,
Australian Journal of Biological Sciences,
Commonwealth Scientific and Industrial Research Organization,
314 Albert Street, East Melbourne, C.2, Victoria

MELBOURNE

CONTENTS

NUMBER 1, FEBRUARY 1960

	PAGE
Uptake of Mannitol in the Shoots of Intact Barley Plants. By H. Groenewegen and J. A. Mills	1
Membrane Stability in <i>Micrococcus lysodeikticus</i> and its Protoplasts. By A. R. Gilby and the Late A. V. Few	5
The Onset and Duration of Diapause in Eggs of <i>Acheta commodus</i> (Walk.) (Orthoptera). By T. W. Hogan	14
Natural Selection for an Intermediate Optimum. By B. D. H. Latter ..	30
Selection for Canalization of the Scute Phenotype in <i>Drosophila melanogaster</i> . By J. M. Rendel and B. L. Sheldon	36
Selection for an Invariant Character, Vibrissa Number, in the House Mouse. II. Limits to Variability. By A. S. Fraser and B. M. Kindred	48
Cystine and Glutathione Reductases in the Clothes Moth <i>Tineola bisselliella</i> . By R. F. Powning and H. Irzykiewicz	59
The Effect of Temperature on the Chromatography of Insulin on DEAE-cellulose. By I. J. O'Donnell and E. O. P. Thompson	69
The Isolation and Properties of some Soluble Proteins from Wool. I. The Isolation of a Low-sulphur Protein. By J. M. Gillespie	81

Short Communications

Nitrate Accumulation in Relation to Molybdenum Deficiency Leaf Scorch Symptoms. By L. F. Notley and G. L. Wilson	104
Selective Degradation by Bromine Water of the Polypeptide Chains of Oxidized Insulin. By E. O. P. Thompson	106

NUMBER 2, MAY 1960

	PAGE
The Respiratory Chain of Beetroot Mitochondria. By J. T. Wiskich, R. K. Morton, and R. N. Robertson	109
Inflorescence Initiation in <i>Lolium temulentum</i> L. I. Effect of Plant Age and Leaf Area on Sensitivity to Photoperiodic Induction. By L. T. Evans	123
On the Utilization of γ -Aminobutyric Acid by Wheat Seedlings. By A. H. G. C. Rijven	132
The Sensitivities of Mixed Populations of Bacteria to Inhibitors. By E. O. Bennett and R. H. Bauerle	142
Simulation of Genetic Systems by Automatic Digital Computers. VI. Epistasis. By A. S. Fraser	150
Pathology of Infestation of the Rat with <i>Nippostrongylus muris</i> (Yokogawa). II. Chemical Constituents of the Jejunum and Dry Weight of the Mucosa. By L. E. A. Symons	163
Pathology of Infestation of the Rat with <i>Nippostrongylus muris</i> (Yokogawa). III. Jejunal Fluxes <i>in vivo</i> of Water, Sodium, and Chloride. By L. E. A. Symons	171
Pathology of Infestation of the Rat with <i>Nippostrongylus muris</i> (Yokogawa). IV. The Absorption of Glucose and Histidine. By L. E. A. Symons ..	180
Some Factors Influencing the Breakdown of Cellulose by Bacteria. By G. Youatt	188

Short Communications

The Effects of Injected Biotin and Dethiobiotin on Butter Yellow Carcinogenesis in Rats fed a Protective Diet. By M. H. Briggs	196
The Experimental Production of Epithelium-lined Cysts. By G. S. Molyneux	198

NUMBER 3, AUGUST 1960

	PAGE
The Physiology of Sugar-cane. III. Characteristics of Sugar Uptake in Slices of Mature and Immature Storage Tissue. By R. L. Bielecki	203
The Physiology of Sugar-cane. IV. Effects of Inhibitors on Sugar Accumulation in Storage Tissue Slices. By R. L. Bielecki	221
Some Effects of Boron on Root Growth. By T. F. Neales	232
Effect of NaCl on the Ion Uptake and Growth of <i>Atriplex vesicaria</i> Heward. By R. F. Black	249
Ionic Relations of Cells of <i>Chara australis</i> . II. The Indiffusible Anions of the Cell Wall. By J. Dainty, A. B. Hope, and Christine Denby	267
Ionic Relations of Cells of <i>Chara australis</i> . III. Vacuolar Fluxes of Sodium. By A. B. Hope and N. A. Walker	277
The Metabolism of Phloem isolated from Grapevine. By M. J. Canny and Katalin Markus	292
An Investigation of the Polysaccharides present in Sugar Mill Syrups. By G. K. Sutherland	300
Theoretical Consequences of Truncation Selection based on the Individual Phenotype. By B. Griffing	307
Simulation of Genetic Systems by Automatic Digital Computers. VII. Effects of Reproductive Rate, and Intensity of Selection, on Genetic Structure. By A. S. Fraser	344
Growth of the Mouse Coat. VII. Hair Cycles and Sebaceous Glands in Homozygous and Heterozygous Naked Mice. By T. Nay	351
Urinary Excretion of Creatine in the Sheep. By E. Blanch and B. P. Setchell	356
The Toxicity of some Antibacterials to Fowl Spermatozoa. By R. G. Wales and I. G. White.. .. .	361
The Glycolysis and Reducing Activity of Ram Spermatozoa in Phosphate-containing Media. By A. W. Blackshaw	371
A Study of the Reproductive Tract of <i>Helix aspersa</i> Müller after Partial Gonadectomy. By C. K. Goddard	378
The Oxidation of Cysteine to Sulphate in Soil. By J. R. Freney	387
The Chromatography of Insulin on DEAE-cellulose in Buffers containing 8M Urea. By E. O. P. Thompson and I. J. O'Donnell	393

NUMBER 4, NOVEMBER 1960

	PAGE
The Physiology of Growth in the Wheat Plant. I. Seedling Growth and the Pattern of Growth at the Shoot Apex. By R. F. Williams	401
Inflorescence Initiation in <i>Lolium temulentum</i> L. II. Evidence for Inhibitory and Promotive Photoperiodic Processes Involving Transmissible Products. By L. T. Evans	429
The Effect of Nutrient Deficiencies on the Hill Reaction of Isolated Chloroplasts from Tomato. By D. Spencer and J. V. Possingham	441
The Symbiotic Synthesis of Auxin by Legumes and Nodule Bacteria and its Role in Nodule Development. By N. P. Kefford, J. Brockwell, and J. A. Zwar	456
The Electric Resistance of the Cell Membranes in a <i>Chara</i> and a <i>Nitella</i> Species. By N. A. Walker	468
The Transport of Carbohydrates in Australian Bracken. By Susan Hamilton and M. J. Canny	479
The Breakdown of 2,4-Dichlorophenoxyacetic Acid in Shoots and Roots. By M. J. Canny and Katalin Markus	486
Accommodation of Linkage in Mass Selection Theory. By B. Griffing ..	501
The Effects of Sub-zero Temperatures on the Embryonic Diapause of <i>Acheta commodus</i> (Walk.) (Orthoptera). By T. W. Hogan	527
Experimental Studies on Pole Cells and Midgut Differentiation in Diptera. By D. F. Poulson and D. F. Waterhouse	541
Studies on Chitin. IV. The Occurrence of Complexes in which Chitin and Protein are Covalently Linked. By R. H. Hackman	568
Pathology of Infestation of the Rat with <i>Nippostrongylus muris</i> (Yokogawa). V. Protein Digestion. By L. E. A. Symons	578
The Pre-natal Development of Skin and Hair in Cattle. II. <i>Bos indicus</i> L. × <i>B. taurus</i> L. By A. G. Lyne and Margaret J. Heideman	584

Short Communication

Complexes of Copper with some Pyrrolizidine Alkaloids and with some of their Esterifying Acids. By K. J. Farrington and C. H. Gallagher ..	600
Index to Volume 13	605