NEW OXOID electrophoresis strips are now so good, we just had to put a brand-new container round them.

New purer cellulose acetate permits—

* more clearly defined separations
* improved and permanent clearance of strips

New Oxoid electrophoresis strips are now—

* interleaved for easier handling in a more practical container
* available in a wider range of sizes

For further information, write to Oxoid Limited, Southwark Bridge Road, London SE1 9HF. Telephone 01-928 4615.

OXOID for progressive laboratories
120 Molecular Biologicals
including 11 Deoxynucleotides
10 Nucleotide sugars
10 Polynucleotides
and B.D. cellulose
for you!

Supplied by return of First Class post
Quality controlled at every stage of production

All at competitive prices
Guaranteed to a stated specification

Please write for further details and prices to
The Boehringer Corporation (London) Ltd.
Bilton House, Uxbridge Road,
Ealing, London, W5 2TZ
**Modern Trends in Endocrinology—4**

F. T. G. Prunt and H. Gardiner-Hill

In the five years since the third volume, there has been a rapid expansion in the field of endocrinology. Series four is a critical survey of certain areas rather than a general review of the field, and each contributor has picked out salient points of current research as well as looking toward future developments.

1972 374 pp illustrated 0 407 29103 2 £9.75

---

**Transport and Accumulation in Biological Systems—3rd Ed**

Edited by E. J. Harris

A completely rewritten version of this classic text, still unique in its field, which draws together the main themes of this broad subject. The editor, whose eminence in the subject is widely acknowledged, has contributed several chapters, and in this edition the kinetic description of transport physiology is supplemented with an attempt, based on recent research, at an understanding of the molecular processes involved.

1972 448 pp illustrated 0 408 37901 4 £8.50

Available from leading booksellers or

**The Butterworth Group**
88 Kingsway, London WC2B 6AB
Showrooms and Trade Counter: 4–5 Bell Yard, London WC2

---

**Modern Trends in Physiology—1**

C. B. B. Downman

During the last decade, some of the most elemental concepts of physiology have been revised due to major breakthroughs in the research. Each chapter of this book, written by a specialist distinguished in his field, draws together the many strands of development which the reader may not yet have had time to assimilate. Together they represent an authoritative cross-section of international medical opinion.

1972 328 pp illustrated 0 407 31150 5 £6.50

---

**Pesticide Terminal Residues**

An IUPAC Symposium, Tel Aviv 1971

Edited by A. S. Tahori

With far-reaching implications over many disciplines, and the recent concern with pollution and ecology, these papers will have much that is of interest for ecologists, plant pathologists, entomologists, as well as scientists in the pesticide industry all over the world.

1972 374 pp illustrated 0 408 70290 7 £12.00
($36.00)

---

**THE BIOCHEMICAL JOURNAL**

---

**Index of Authors and Subjects**

1964–1969 VOLUMES 91–115

**EDITED BY**

E. N. MALTBY

**PRICE** £5.25 (U.S.A. $13.00)

($3.25 (U.S.A. $9.00) to members of the Biochemical Society)

**Orders to:**

BIOCHEMICAL SOCIETY
(PUBLICATIONS)
7 WARWICK COURT,
LONDON, WC1R 5DP
EXPERTISE FROM AROUND THE WORLD!

Miles-Seravac

PRESENT THE RANGE OF

RESEARCH PRODUCTS

SYTHETIC POLYNUCLEOTIDES
BOVINE ALBUMIN & OTHER BLOOD PROTEINS
IMMUNOCHEMICALS
NATURAL PRODUCTS
TISSUE CULTURE PRODUCTS
ISOTOPIC PRODUCTS
REAGENTS FOR PROTEIN CHEMISTRY
COMPANION BIOCHEMICALS

and of course!
ENZYMES & INSOLUBILIZED BIOCHEMICALS

from
Miles-Seravac and
Miles-Yeda

Miles-Seravac (Pty) Limited
(A SUBSIDIARY OF MILES LABORATORIES INC.)

IN THE U.K.
Miles-Seravac (Pty) Ltd.
Holyport.
Berkshire
England

Telephone Maidenhead 21343
Telex 84672

IN SWITZERLAND
Miles-Seravac.
5 Chemin de Messidor,
CH-1006, Lausanne,
Switzerland.

Telephone Lausanne 232201
Telex 24426

IN THE U.S.A.
Research and Products,
Research Division.
Miles Laboratories Inc.
P.O.Box 272
Kankakee, Illinois 60901
Telephone: 815/939-4417
TWX: 910-632-1474

Send for literature
A spectrum of spectrophotometers
The range for UV, visible, IR and atomic absorption! From Pye Unicam. Precision spectrophotometers for high performance analysis. From manual operation to sophisticated automatic systems. An absorbing short form catalogue tells all. Ask for it now.

And don’t forget, leasing or extended credit terms are normally available on all instruments.

PYE UNICAM
Pye Unicam Ltd
York Street, Cambridge CB1 2PX, England
Telephone (0223) 58866 Telex 81215
Probes for Thiol Groups: DTNB and related CHROMOGENIC DITHIO-COMPOUNDS

The use of DTNB for the location of thiol groups with differing reactivities at various levels of denaturants has been widely reported (1). Similar investigations were described for spinach leaf glyoxallic acid reductase (2), rat liver alanine aminotransferase (3), D-serine dehydratase from Escherichia coli (4) and rabbit muscle aldolase (5). Chemical modification of either of the 2 sulfhydryl groups of myosin had the same effect on the enzymic activity (6). However different sulfhydryl groups are involved in the activation and transfer reactions of isoacyl tRNA synthetase (7). Some enzymes are stimulated by limited reaction with DTNB—e.g. fructose 1,6-diphosphatase (8) and sphingomyelin synthetase (9). DTNB splits off a light chain fraction from myosin prepared from rabbit's skeletal muscle (10). DTNB and ALD-RITHIOL-4 were used to study the thiol groups of mercaptoalbinums and whole plasma (11). DTNB affects the metabolism of rat liver mitochondria (12). This may become an important lead for further research. DTNB and ALD-RITHIOL-4 were used as reagents for the spectrophotometric assay of sulfite (13), while the same reagents as well as ALD-RITHIOL-2 are suitable for the spectrophotometric assay of sulfides (14). ALD-RITHIOL-4 proved more suitable than DTNB for the determination of thiol groups of the colored heme proteins (15, 16). A fascinating variation in reactivity of thiol groups was observed in the case of the calf brain enzyme of ATP-creating transphosphorylase: of 10 thiol groups/mole demonstrated as cysteic acid only 8 can be titrated with DTNB or p-CHLOROMERCURIBENZOATE in the presence of denaturants, but at pH 3.2 and 30°, 2 more thiols react with ALD-RITHIOL-4 (17). ALD-RITHIOL-2 was found to penetrate and oxidize the thiols of Ehrlich ascites tumor cells with inhibition of respiration and glycolysis (18, 19), but these could be partly restored by treatment with DITHIOHETHITOL (DTT), 20. In contrast 6,6'-DITHIODINICOTINIC ACID (DTDNA) reacts only with the surface thiols of Ehrlich ascites cells and modifies the electrophoretic mobility of the cells (21, 22). A preliminary report suggests that such modification may affect the ability of such cells to metastasize (23).

2,2'-DITHIOBIS(NITROPYRIDINE) (DTNB) was developed as a selective reagent for thiol groups particularly suitable for paper and thin-layer chromatograms (24), but DTNB may be used similarly in ethanol-pH 8,2 buffer (25). ALD-RITHIOL-2 has been used to oxidize thiol groups in the Menke-field-synthesis of symmetrical cysteine peptides (26) and a study of the copper (II) complexes has been reported (27). A modified method for assay of cholinesterase with DTNB recommends BUTYRYLTHIOCHOLINE as substrate (28). A new method of determining cystine and cysteine in proteins relies on reaction with 4-VINYLPYRIDINE to form S,S'-4-(pyridylethyl)cysteine which is stable to acid hydrolysis and can be analysed by ion-exchange chromatography (29).

REFERENCES

(1) Copies of our earlier advertisements are available on request.

D21,820-0 DTNB, Ellman's Reagent $17/10 g.
$9.50/5 g.

14,304-9 Aldithiol(2-2,2'-dithiodipropylidene) $33/25 g.
43.45/25 g.

14,305-7 Aldithiol(2-2,2'-dithiodipropylidene) $13/5/5 g.

C4960-7 4-Chloromercurobenzonic acid $19/50/10 g.

C4962-3 4-Chloromercurobenzonic acid, sodium salt $19.50/10 g.

15,046-0 DTT (Dithiothreitol, Cienland's Reagent) $14/1 g.
$39.50/5 g.

16,176-4 DTE (Dithioerythritol) $14/1 g.
$39.50/5 g.

15,820-8 DTDNA (6,6'-Dithiodinitroacetic acid) $12.5/25 g.
$4.5/25 g.

15,819-4 DTNB (2,2-Dithiobis-(S-nitropryidine) $10.5/10 g.

We have been advised that U.S. Patent 3,597,160 (Aug. 3, 1971 to Dr. D. R. Grassetti) covers the use of DTNB as a thiol reagent, and Aldrich is not licensed under that patent.

B10,425-6 S-Butyrylthiocholine iodide $10/1 g.

V320-4 4-Vinylpyridine $5.55/100 g.

Write for our latest catalog

IN THE U.S.A.

Aldrich Chemical Company, Inc.
940 West St. Paul Avenue
Milwaukee, Wisconsin 53233

IN GREAT BRITAIN

Ralph N. Emanuel Ltd.
264 Water Road
Wembley, Middlesex HA0 1PY
Tel: 01-908 4414

Printed in Great Britain by
William Clowes & Sons Limited, London, Colchester and Bexecles