

NAMING NAMES

Perspectives in Quantum Theory:

Essays in Honor of Alfred Landé
edited by Wolfgang Yourgrau and Alwyn van der Merwe
Max Born, Louis de Broglie, Eugene Wigner, Hermann Bondi, Karl Popper, and others of comparable stature here express their esteem for Alfred Landé and his lifelong dedication to his science in a particularly appropriate way: by addressing the issues of the nature of quantum reality and the consistency and completeness inherent in our descriptions of it. **\$17.50**

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Woman Ecologist, liberal arts background, Stanford Ph.D., 4 years' teaching experience, funded research. Teaching areas: ecology, evolution, quantitative biology. Box 425, SCIENCE. X

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PURPOSE: The purpose of this Fellowship Program is to give support to a limited number of promising graduate students for a period during preparation of their doctoral dissertation in fields pertinent to the expansion of knowledge in schizophrenia. These fields are: (1) psychiatry, (2) psychology, (3) sociology and anthropology, (4) behavioral genetics, (5) neurocybernetics, epidemiology, and statistical theory, (6) biochemistry, (7) anatomy, (8) physiology, and (9) pharmacology. In general, candidates will be expected to have completed all requirements for the doctorate with the exception of the dissertation by the beginning of the fellowship year. The dissertation topic should have high potential relevance to some facet of research on schizophrenia, but it is not intended that support should be limited to applied projects or that relevance be narrowly construed.

STIPEND: The stipend will be \$3500 per annum with \$500 extra allowance per dependent up to a total of \$5000, in the expectation that the institution of the applicant will either forego the cost of the tuition or will afford the candidate the means to pay the tuition. In general, it will be assumed that no stipend other than this Fellowship will be a source of income for the candidate. Grants will be made for a period of one year, with a possibility of renewal in some instances.

APPLICATION: An application must be initiated by a letter from a sponsoring scientist which includes: (a) evidence of the candidate's distinction in graduate performance, and (b) an outline of the research protocol to be pursued. If it appears that the candidate's qualifications and interests are appropriate, application forms will be sent.

Sponsoring letter should be sent as soon as possible to the Research Fellowship Program, The Supreme Council 33° A.A. Scottish Rite, Northern Masonic Jurisdiction, U.S.A., P.O. Box 519, Lexington, Mass. 02173. The awards will be announced by 1 April.

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BIOCHEMIST

Ph.D., or equivalent, in biochemistry. Experience in the isolation of complex lipids, polysaccharides or proteins from biological sources. Experience in immunology, immuno-chemistry, isolation of transplantation or tumor antigens highly desirable. Must have ability to assume responsibility for organizing a program in the area of isolating human tissue antigens and other humoral immune factors, including serum proteins.

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Postdoctoral appointment, available immediately. Organic chemist, preferably with biochemical interests, for joint chemistry-entomology study of insect metabolism and natural products. Ability to work with small quantities and to use spectral and chromatographic methods required. **Dr. T. W. Smith, Department of Chemistry, University of Kentucky, Lexington, Kentucky 40506.**

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Position open for biologist with in-depth knowledge of estuarine phytoplankton and zooplankton systematics needed for on-going East Coast environmental program. Salary negotiable according to qualifications. Send résumé, references, and date available.

Box 431, SCIENCE

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Québec 10e—CANADA

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TISSUE CULTURE TECHNOLOGIST

Institute for General and Experimental Pathology at the University of Oslo, Norway, will move into new premises this autumn. A trained tissue- and organ-culture technologist is required.

Annual salary in the range of U.S. \$5000, which is rather good in Norway according to living costs there. For further information, contact **Institute of General and Experimental Pathology, Rikshospitalet, Oslo 1, Norway.**

COURSES

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GRADUATE STUDY

POSTDOCTORAL FELLOWSHIP

Applications are invited for the C. H. Best Foundation Postdoctoral Fellowship in the Banting and Best Department of Medical Research. The position is tenable on approximately 1 July 1972 for 2 years with a basic stipend of \$8000 for the first year, plus traveling and dependent allowance. Research motivated candidates interested in furthering their training in research areas being investigated by department staff should submit their applications before 1 February 1972. Applications should include curriculum vitae, specific research interest, and the names of three references. A list of staff members and their research interests will be sent on request. Applications or enquiries should be sent to:

Dr. I. B. Fritz, Chairman
Banting & Best Department of Medical Research
University of Toronto
112 College Street
Toronto 101, Ontario, Canada

POSTDOCTORAL FELLOW

BIOCHEMIST—One- or two-year appointment for Ph.D. with research experience and interest in enzymology related to carbohydrate and nucleotide biochemistry. Excellent research opportunities. Location—Philadelphia. Application with curriculum vitae and names of two references. Available December 1971. Send to **Box 414, SCIENCE.**

PRE- AND POSTDOCTORAL FELLOWSHIPS IN CLINICAL BIOCHEMISTRY: Fellowships are available for American Board of Clinical Chemists approved Clinical Biochemistry Program beginning July 1972. Degree in chemistry or biology required for predoctoral and M.D. or Ph.D. for 2-year postdoctoral program. For information, write **Dr. T. M. Devlin, Program Director, Department of Biological Chemistry, Hahnemann Medical College, Philadelphia, Pennsylvania 19102.**

The **FERTILIZATION AND GAMETE PHYSIOLOGY RESEARCH TRAINING PROGRAM** will be held at the Marine Biological Laboratory, Woods Hole, Mass., 12 June to 25 August 1972. Emphasis will be on immunological, cytological, biochemical, and physiological research on marine organisms, both plant and animal, available at Woods Hole. The program is open to pre- and postdoctorals. Applications must be filed by 1 March 1972 with **Dr. Charles B. Metz, Institute of Molecular Evolution, University of Miami, 521 Anastasia Avenue, Coral Gables, Florida 33134.**

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Cellular DNA Polymerase	Low to Moderate Activity	High Activity

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5 mg free with purchase of Poly(dA) and Oligo(T)

Reverse Transcriptase References*

¹N.C. Goodman and S. Spiegelman, *Proc. Nat. Acad. Sci. USA*, **68**, 2203 (1971).

²R.D. Wells, et al, *Biochemistry*, In Press.

*Literature references are cited for the sole purposes of documenting statements of fact and do not constitute endorsement of products.

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Recent Advances in the Preparation of L.S.C. Samples

Radioactive Proteins

A paper on the "Rapid and Simplified Method for Liquid Scintillation Counting of Radioactive Proteins"¹ clearly indicates the advantages of Aquasol for determining radioactivity of proteins. Observed counts from replicate samples prepared in Aquasol are highly reproducible; in addition, the observed radioactivity with Aquasol is higher than with a toluene/Triton X-100 (2:1) scintillation solution. Liver samples prepared in Aquasol accurately indicate actual protein activity, as shown by a linear response to protein concentration, and by a decrease in radioactivity of protein following cycloheximide and dimethylnitrosamine. Aquasol has the unique property of forming gels when mixed with water. This gel will hold the protein in suspension. On the other hand, samples prepared in toluene/Triton X-100 (2:1) scintillation solution settle on the bottom of the vial where self-absorption becomes an important factor. A procedure using Aquasol with acid-precipitated proteins follows:

1. Apply hot acid-precipitated proteins to Millipore filter under vacuum
2. Wash filter cake
3. Place filter cake and filter into liquid scintillation vial with 3.5 ml water
4. Add 11.5 ml Aquasol, shake well and count

Lipid Extraction From TLC

Data from the article, "Recovery of Lipids from Thin-Layer Chromatography for Radioassay"² demonstrates that the combination of a multipurpose scintillator, Aquasol, and a suitable elution system can give complete recovery of all classes of lipids from TLC plates. Both neutral and phospho-lipids give quantitative recoveries in the indicated systems. It was ascertained that up to 300mg of silica gel could be added to Aquasol without impairment of ¹⁴C counting efficiency. Specific applications follow:

Neutral Lipids

1. Develop plate in hexane:ether:acetic acid (90:10:1)
Unsaturated Lipids — expose to iodine vapor and allow for sublimation of iodine.
Saturated Lipids — develop in duplicate and spray one spot with sulfuric acid.
2. Suspend silica gel in 15 ml Aquasol
3. Shake well and count

Phospholipids (except phosphatidylcholine)

1. Develop plate in chloroform:methanol:7M ammonia (230:90:15)
2. Visualize spots by exposure to iodine vapor or H₂SO₄ spray
3. Suspend silica gel in 15 ml Aquasol
4. Shake well and count

Labeled Inulin

Inulin labeled with tritium or carbon-14 is widely used for assessment of glomerular filtration rate and determination of extracellular spaces. Significant decreases in observed radioactivity with time have, in many instances, precluded the use of liquid scintillation counting as an analytical technique. The "Evaluation of Liquid Scintillation Systems for the Assay of Tritiated Inulin"³ conclude that an Aquasol/water system affords ease of sample preparation, high counting efficiency and long-term sample stability. Samples prepared by this technique remained stable over the ninety-day experimental period, maintaining a satisfactory counting efficiency of approximately 27 percent. A brief description of the sample preparation technique is as follows:

1. Place tritiated inulin aliquod in liquid scintillation counting vial
2. Adjust sample volume to 3.5 ml with water
3. Add 11.5 ml Aquasol, shake well to form stiff gel, count

Acrylamide Gels

Data from "Acrylamide Gel Electrophoresis of Radioactive Compounds With Accompanying Low Background"⁴ describes a method for the detection of radioactive components in polyacrylamide gel disc electropherograms by automated mechanical fractionation with the use of Aquasol. Aquasol also can be successfully utilized in the conventional, non-automated acrylamide gel counting procedures with minimal background interference. Unpublished data provided by Harris-McEvoy follows:

N, N'-methylenebisacrylamide cross-linked

1. Place 20 mg wet sample into glass liquid scintillation vial
2. Cover gel with 0.1 ml 30% H₂O₂ and cap tightly
3. Incubate at 50° until digested
4. Allow to cool
5. Add 10 ml Aquasol, shake well and count

Ethylene diacrylate cross-linked

1. Place 20 mg gel samples into liquid scintillation vials
2. Add 1.5 ml 10% NH₄OH and cap tightly
3. Incubate at 50° until digested
4. Allow to cool
5. Add 10 ml Aquasol, shake well and count

Reduction of Adsorption by Phosphates and Sulfates in Glass L.S.C. Vials

Data on the "Incorporation of High Concentrations of Phosphates and Sulfates in Samples for Liquid Scintillation Counting"⁵ reports of problems associated with solubility and adsorption on the walls of glass vials by solutions of phosphates and sulfates. For instance, the loss of counts and reduction of apparent radioactivity over a period of time can be minimized by using Aquasol as follows:

1. Add up to 2 ml sample to 15 ml Aquasol
2. If precipitation or turbidity occurs, add water in increments of 0.2 ml, with shaking, until sample clears
3. Count

30% (W/V) Sucrose Density Gradients

Thirty percent (w/v) Sucrose gradient cuts were measured by liquid scintillation counting utilizing Aquasol. The results for tritium labeled samples follow:⁶

Sample Volume	Aquasol Volume	% of Sample	³ H Efficiency	Figure of Merit†
0.5 ml	14.5 ml	3.3	29.9 ± 0.1%*	14.9
1.5 ml	13.5 ml	10.0	29.3 ± 0.4%	44.0
2.5 ml	12.5 ml	16.7	27.0 ± 0.6%	67.5
3.5 ml	11.5 ml	23.3	26.7 ± 0.1%	93.3

†Figure of Merit = (volume added sample) (efficiency)

- Counting performed on Packard TriCarb Model 3320
- Absolute efficiency of TriCarb is 60% with sealed ³H standard in toluene
- Settings: Gain — 50%, Discriminators 50-1000
- 3 samples at each point. Internal standard = 125190 DPM
- All samples clear at room temp.

*S.D. of the mean

References and Notes

1. Marvin A. Friedman, Gail Miller, Arthur McEvoy and Samuel S. Epstein, *Anal. Chem.*, Vol. 43, No. 6 (1971).
2. David Kritchinsky and Saroj Malhotra, *J. Chromatog.*, 52, 498-499 (1970).
3. Arthur McEvoy and Wayne G. Harris, *Anal. Biochem.* (in press) (1971).
4. Bohdan Bakay, *Anal. Biochem.*, 40, 429-439 (1971).
5. Unpublished data, Assay Laboratory, NEN Corp.
6. Unpublished data, Assay Laboratory, NEN Corp.

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