# Journal of Labelled Compounds

In the following part of this journal, information on methods of synthetizing labelled compounds and related problems (analysis, assaying, purifying, radiodecomposition, storage) will regularly be given. The references cover articles drawn from 40 primary periodicals and also from N.S.A. and C.A.

A point will be made of singling out each of the above mentioned aspects in the abstracts, particularly where the greater part of the article deals with applications of labelled compounds [1]. This journal will likewise contain author and subject indexes at the end of each volume.

The articles are abstracted by H. Dworschak, CID (Euratom).

# ABSTRACTS

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[1] The work on this information project was started in May 1964. The results obtained until December 1964 have been published in Euratom reports EUR 2212.e and EUR 2212.e suppl., the latter of which contains author and subject indexes.

# *ABSTRACTS — CONTENTS*

# 1 — SYNTHESIS

## 1.1 — Deuterium and Tritium Compounds

### 1.1.1 — *GENERAL*

**65-68**

SENN M., RICHTER W. J., BURLINGAME A. L.

**Convenient deuterium labeling for mass spectrometry via exchange of enolizable hydrogen on a gas-liquid chromatography column.**

J. Am. Chem. Soc. **87**, 681 (1965)

96 % average total incorporation of enolizable hydrogen atoms in over 50 compounds of various structural types through a g.l.c. column pretreated with deuterium.

**65-69**

VAN DER MERWE K. J., STEYN P. S., EGGERS S. H.

**Simple preparation of deuterium-labelled O-methyl groups for mass spectrometry.**

Tetrahedron Letters **1964** (52), 3923-5

CA **62**, 8975h (1965)

$CH_2N_2$ in dry dioxane treated with excess $D_2O$ and with a soln. of the acidic or phenolic compd. in dioxane-$D_2O$ gave a partially deuterated compd. Mass spectral detns. showed mainly the introduction of 3 D atoms per O-Me group.

**65-70**

GARLAND J. K.

**Recoil tritium reactions with cyclic $C_6$ hydrocarbons.**

Thesis, Lawrence, Kan., Univ. of Kansas, 1963. 203 p.

N. S. A. **19**, 7587 (1965)

Cyclohexane, cyclohexene, 1,4-cyclohexadiene, and benzene, in gas and liquid phases. Gas chromatography, solvent extraction, and combustion of residues was successful in recovering of all the tritium. Reaction models.

**65-71**

TANG Yi-Noo, ROWLAND F. S.

**Formation of monochlorocarbene by the gas-phase decomposition of dihalomethane molecules excited through recoil tritium substitution reactions.**

J. Am. Chem. Soc. **87**, 1625 (1965)

The carbene was trapped by ethylene. Cyclopropyl-T chloride in very small amounts.

**65-72**

JONES J. R.

**Tritium labeling of compounds : an assessment.**

Lab. Pract. **14**, 433 (1965)

As a tracer tritium is second only to carbon-14. In view of this importance the author has prepared a comprehensive assessment of the chemical and physical methods available and their current position in the light of recent advances.

**65-73**

SUNG Cheng-yu

**Measurement and synthesis of tritium-tagged compounds and their application in pharmacology.**

(JPRS-27049 (p. 61-78))

N. S. A. **19**, 2010 (1965)

Description of the methods used to synthesize T-tagged pharmaceuticals, with emphasis on the tritium gas exposure method, and of detn. by the liquid scintillation counting method.

### 1.1.2 — *ALIPHATIC COMPOUNDS*

**65-74**

FUHRER H., GUNTHARD Hs. H.

**23. Schwingungsspektrum von Cyclododecan und Cyclododecan-$d_2$ zwischen 4000 und 50 $cm^{-1}$.**

**Normalkoordinatenanalyse von zwei Cyclododecanmodellen.**

Helv. Chim. Acta **48**, 236 (1965)

Cyclododecane-$d_2$ from the cyclanone with $LiAlD_4$, tosylating and newly treating with $LiAlD_4$. The by-product cyclene was removed by bromination. 94 atom % $d_2$, 4 atom % $d_1$.

**65-75**

GRIMME W.

**Reversible thermische Umlagerung von Bicyclo(5.1.0)-octen-(2) in Cyclooctadien-(1.4).**

Chem. Ber. **98**, 756 (1965).

Dideuteriodiazomethane (exchange of H in nitromethane, reduction, N-methyl-N-nitrosourea) and cycloheptadiene-(1,3) gave 8,8-dideuterio-bicyclo(5.1.0)-octene-(2). It was isomerised to 3,3-dideuteriocyclooctadiene-(1,4).

**65-76**

KARLINER J., BUDZIKIEWICZ H., DJERASSI C.

**Mass spectrometry in structural and stereochemical problems. LXII. Fragmentation and hydrogen transfer reactions of β-hydrindanones. Synthesis of deuterated β-hydrindanones.**

J. Am. Chem. Soc. **87**, 580 (1965)

Starting from bicyclo(4.4.0)decadien-(2.8)-one-(4) (hexalone) 9 at various positions mono- and polydeuterated derivatives of β-hydrindanone have been prepared.

**65-77**

WOLOVSKY R.

**(18)-Annulene-$d_6$, its structure and the temperature dependance of its NMR spectrum.**

Israel J. Chem. **2**, 299 (1964)

Tridehydro-(18)-annulene upon partial deuteration renders (18)-annulene-$d_6$, which shows the outer-to-inner protons to be in the ratio of exactly 2 : 1 instead of 3 : 1 as expected.

**65-78**

PINCOCK R. E.

**Effects of nonpolar solvents on an ionic reaction. II. Catalyst basicity, activation parameters, salt effects and deuterium isotope effects in the ionic decomposition of *t-butylperoxy* formate.**

J. Am. Chem. Soc. **87**, 1274 (1965)

tert.-Butylperoxy formate-d from acetic formic anhydride (via formic acid-d + ketene) and tert.-butyl hydroperoxide; b.p. 43°/22 mm; free from starting material.

**65-79**

SWAIN C. G., KUHN D. A., SCHOWEN R. L.

**Effect of structural changes in reactants on the position of hydrogen-bonding hydrogens *and solvating molecules in transition states.* The mechanism of tetrahydrofuran formation from 4-chlorobutanol.**

J. Am. Chem. Soc. **87**, 1553 (1965)

4-Chlorobutanol-d via tetrahydrofuran and DCl or by addition of tri-4-chlorobutyl borate to $D_2O$.

**65-80**

SCHELLENBERG K. A.

**Evidence for the participation of tryptophan as intermediate in transfer of hydrogen between diphosphopyridine nucleotide and substrate in yeast alcohol dehydrogenase.**

J. Biol. Chem. **240**, 1165 (1965).

Stereospecifically labeled ethanol-1-$^3$H enzymatically by incubn. of ethanol-1-$^3$H, glycine, yeast alcohol dehydrogenase, DPN. The distillate containing the resulting labeled acetaldehyde + potassium phosphate, DPHN, yeast alcohol dehydrogenase gave the desired product with 15 % of the calculated activity.

**65-81**

SCHROEPFER G. J., Jr, BLOCH K.

**The stereospecific conversion of stearic acid to oleic acid.**

J. Biol. Chem. **240**, 54 (1965)

Preparation of the enantiomers of in pos. 9 or 10 with T labeled stearic acid by reduction of the tosylates of the hydroxy fatty acid methylester. Spec. act. between 0,08 and 0,21 μC/mg. Radiopurity higher than 90 %.

**65-82**

GRANSTRÖM E., INGER U., SAMUELSSON B.

**The structure of a urinary metabolite of *prostaglandin $F_{1\alpha}$ in the rat.***

**Prostaglandins and related factors 29.**

J. Biol. Chem. **240**, 457 (1965)

Tritium-labeled prostaglandin $E_1$ (see 65-10) was reduced with sodium borohydride. Separation by reversed phase partition chromatography on hydrophobic Super-Cel. Spec. act. of prostaglandin $F_{1\alpha}$ : 140 μC per mg.

## 1.1.3 — *AROMATIC COMPOUNDS*

**65-83**

BERGSON G.

**Proton-mobility in the indene ring system. VIII. Tautomerism in isotopically substituted indenes.**

Acta Chem. Scand. **18**, 2003 (1964).

CA **62**, 6364b (1965)

Indene-1-d from indenylsodium; exchange between indene and $D_2O$ in pyridine → indene-$d_3$ → indenyl-$d_2$-sodium → indene-1,3-$d_2$.

**65-84**

BERSON J. A., ASPELIN G. B.

**Mechanism of the indene-maleic anhydride reaction.**

Tetrahedron **20**, 2697 (1964)

Indene + NaOMe + MeOD, 21 hrs., → 1,1,3-trideuterio-indene contg. 2.33 atoms D/mol. with $d_0$ 1.2, $d_1$ 11.2, $d_2$ 41.2, $d_3$ 45.7, $d_4$ 0.7 percentage distribn.

**65-85**

BERGSON G., WEIDLER A. M.

**Hydrogen isotope effect on the rate of an intramolecular tautomeric rearrangement.**

Acta Chem. Scand. **18** (6), 1498 (1964).

CA **62**, 1526h (1965)

Deuterated 3-methyl-1-indanone from crotonic acid-d; reduction and dehydration of the resulting alcohol to 1-methyl-1-d-indene (35 % in the last step).

**65-86**

BROWN W. G.

**Application of fission-product sources in organic radiation chemistry.**

(TID-21443). Final Summary Report, May, 1, 1959-Jun., 30 (1964)

N. S. A. **19**, 11170 (1965)

Gamma and ultraviolet radiation on the Pt oxide-benzene-$D_2O$ system resulted in faster catalyst activation and exchange.

**65-87**

GARNETT J. L.
SOLLICH-BAUMGARTNER W. A.

**Catalytic deuterium exchange reactions with organics. XIV. Distinction between associative and dissociative π-complex substitution mechanisms.**

J. Phys. Chem. **68**, 3177 (1964)

N. S. A. **19**, 4186 (1965)

The relative importance of the associative and dissociative π-complex substitution mechanisms in group VIII transition metal catalyzed exchange reactions was investigated by comparing the rate of $D_2O$-benzene exchange reactions to the randomization rate of a mixture of normal and 98.3 % deuterated benzene.

**65-88**

HORNER L., MAYER D.

**Der H-D-Austausch zwischen Deuterium-Gas und Alkylbenzolen in Gegenwart von Raney-Nickel.**

Ann. Chemie **680**, 1 (1964)

Study on the influence of humidity of Raney-Nickel in the exchange reaction of D gas with toluene in the different positions (see 65-16).

**65-89**

HORNER L., MAYER D.

**Isomerisierung definiert deuterierter Alkylbenzole an Raney-Nickel.**

Ann. Chemie **680**, 11 (1964)

Toluene, definitely labeled in either the α-, o-, m-, or p-position with D was subjected to the action of dry Raney-Nickel and the rate of isomerization was determined.

**65-90**

MACDONALD C. G., SHANNON J. S.

**Selective nickel-catalyzed hydrogen exchange of phenol, aniline, and pyridine derivatives.**

Tetrahedron Letters **1964** (45-46), 3351.

CA **62**, 3906b (1965)

Ni on kieselguhr, prepn. of D-labeled pyridine and aniline derivs. α- or ortho to the N. Same pattern of selectivity with phenols and with isoquinoline. Quinoline : C-2, C-7 and C-8.

**65-91**

SCHOELLKOPF U., SCHAEFER H.

**Umlagerungen organischer Anionen. IV. Stereochemischer Ablauf der Isomerisation von Dimethyl-benzyl-(α-D)-aminoxyd (I) zu O-Benzyl-(α-D)-N,N-dimethyl-hydroxylamin. Ein Beitrag zur Frage der $S_{Ni}$-Substitution.**

Ann. Chemie **683**, 42 (1965)

Optically active benzyl-α-d-alcohol → the amine (via tosyl ester, $NaH_3$ and $LiAlH_4$) → dimethylamine → I (15 % racemisation).

**65-92**

SETKINA V. N., BARANETSKAYA N. K., ANISIMOV K. N., KURSANOV D. N.

**Hydrogen isotope exchange of tricarbonylbenzene-chromium.**

Izv. Akad. Nauk. SSSR, Ser. Khim. **10**, 1873 (1964)

N. S. A. **19**, 7373 (1965)

The title compound was found to enter into a hydrogen isotope exchange reaction with deuterium-labeled alcohols and amines.

**65-93**

LIJINSKY W., GARCIA H.

**The purification of polynuclear hydrocarbons tritiated by the Wilzbach procedure.**

Biologica (Santiago) **35**, 135 (1963)

N. S. A. **19**, 11245 (1965)

Benzo(a)pyrene, 20-methylcholanthrene, and 7,12-dimethylbenz(a)anthracene were exposed to 15 C of T gas for 2 weeks. The purified polynuclear hydrocarbons were studied chemically to ascertain the distribution of T. The yields were 81 %, 92 %, and again 92 % resp.

**65-94**

MARRIAN D. H., EVANS E. A.

**Tritiated-2-methyl-naphthaquinol-(1,4)-diphosphoric acids (I).**

U. S. Patent 3,157,684. Nov. 17, 1964.

N. S. A. **19**, 4191 (1965)

2-Methylnaphthalene-6-sulfonyl chloride was reduced to the sulfinate which was converted to 2-methyl-6-iodonaphthalene, 2-methyl-6-iodonaphthaquinone-(1,4), → I, tritiated at position 5, 6, 7, or 8.

**65-95**

SIMON H., PALM D.

**Kinetic und Mechanismus der Hydrolyse von N-Glykosiden.**

Chem. Ber. **98**, 433 (1965)

p-Toluidine-$^3H$ from p-nitro-toluene by proton exchange and reduction on Pd/Charcoal. More than 95 % of the activity in the methyl group.

## 1.1.4 — *HETEROCYCLIC COMPOUNDS*

**65-96**

ADEMBRI G., FRANCHINI P. F.

**Fulminic synthesis of α, α'-diisoxazole-$d_4$.**

Ric. Sci. Rend. Sez. A **4**, 567 (1964)

CA **62**, 6468d (1965)

To $(DC \equiv C)_2$ a soln. of Na fulminate in 40 cc. $D_2O$ is introduced.

**65-97**

PAQUETTE L. A., WISE L. D.

**The Hofmann elimination of 9-methyl-3,9-diazabicyclo(4.2.1)nonan-4-one methiodide. Nature of the product and mechanism.**

J. Org. Chem. **30**, 228 (1965)

2,2,4,4-$d_4$-Tropinone → 2,2,5,5-$d_4$-9-methyl-3,9-diazabicyclo(3.2.1)nonan-4-one (by the Schmidt reaction), iodomethane and Hofmann elimination → 8,8-$d_2$-7-dimethylamino-5,6,7,8-tetrahydro-2(1H)-azocinone (100 atom % D).

**65-98**

SELTZER S.

**The mechanism of the Diels-Alder reaction of 2-methylfuran with maleic anhydride.**

J. Am. Chem. Soc. **87**, 1534 (1965)

Five different deuterated isomers of the exo adduct formed from 2-methylfuran (and 2-methyl-furan-5d(I) and maleic anhydride and maleic anhydride-$d_1$(II) and -$d_2$) were synthesized.
I from 2-chloromercuri-5-methylfuran.
II via bromomaleic anhydride, deuterolysis and electrolytical dehalogenation.

**65-99**

SHVACHKIN Yu P., SHPRUNKA I K., KAZAKOVA G. V.

**Synthesis of deuterated 2-thiouracils.**

Zh. Obschch. Khim. **34**, 3846 (1964)

CA **62**, 9128d (1965)

Thiourea + RCO$_2$Et (R = H, Me, CD$_2$, D, DC (ONa) : CD, HC-(ONa). CD, and DC(ONa) : CH) → 4-d-, 5-d-, and 4,5-d$_2$-2-thiouracil + hot D$_2$O → 1,3,4-d$_2$-, 1,3,5-d$_3$- and perdeuterio-2-thiouracil.

See also : **65-90**, pyridine-α-d
isoquinoline-d
quinoline-2,7,8-d$_3$
**65-127**, DPN

### 1.1.5 — *ALKALOIDS*

### 1.1.6 — *CARBOHYDRATES*

**65-100**

HEYNS K., MÜLLER D.

**Mass spectrometric investigations. VI. Mass spectrometric investigation of deuterium-labeled and methyl 2,3,4-tri-O-methyl-β-D-arabinopyranoside (I).**

Tetrahedron **21** (*I*), 55 (*1965*)

CA **62**, 9216h (1965)

I labeled in one or more MeO groups with CD$_3$O and in ring H atoms with D in all pos. except C-3 (for difficulties in prepn).

**65-101**

ANGYAL S. J., FERNANDEZ C. M., GARNETT J. L.

**The stereochemistry of tritium substitution by the Wilzbach method. II. The distribution of tritium.**

Aust. J. Chem. **18**, 39-45 (1965)

In the Wilzbach labeling procedure of (-)-inositol T-labeled myoinositol is formed as a by-product. (-)-Inositol is labeled nearly at random, whereas all T in the myoinositol is attached to the carbon atom on which the configurational inversion has occurred.

**65-102**

ROGNSTAD R., KEMP R. G., KATZ J.

**Enzymic synthesis of glucose-4-tritium and glucose-3-tritium.**

Arch. Biochem. Biophys. **109**, 372 (1965)

Dihydroxyacetone phosphate and D-glyceraldehyde phosphate were labeled with T in pos. 1 by enzymic exchange and isomerization in tritiated water. Condensation by means of aldolase to fructose-1,6-diphosphate labeled either in position 3 or 4. Glucoses from the phosphate esters. Yield : 25 %; spec. act. : 5μC/μmole.

**65-103**

KATZ J., ROGNSTAD R., KEMP R. G.

**Isotope discrimination effects in the metabolism of tritiated glucose.**

J. Biol. Chem. **240**, 1484 (1965)

The difficulties involved in the administration of glucose-1-T or -6-T in metabolic studies by the isotope discrimination effect are eliminated with the T-label in pos. 3.

### 1.1.7 — *PEPTIDES, MIANO ACIDS, PROTEINS*

**65-104**

AGISHI Y., DINGMAN J. F.

**Specific tritiation of oxytocin by catalytic deiodination.**

Biochem. Biophys. Res. Commun. **18**, 92 (1965)

The above mentioned method is described. The radiochromatographically homogeneous $^3$H-oxytocin had a very high bioactivity after 1000 tube countercurrent distribution.

### 1.1.8 — *STEROIDS*

**65-105**

LEZNOFF C. C., JUST G.

**Photochemical transformations of dienes. IV. The stereochemistry of the photo-induced ethanol addition to 3-methoxycholesta-3,5-diene.**

Can. J. Chem. **42**, 2801 (1964)

Cholest-4-en-3β-yl acetate + monoperphthalic acid → 4α, 5α-epoxycholestan-3β-yl acetate + LiAlD$_4$ → 4β-deuteriocholestan-3β, 5α-diol. Monoacetylation and dehydration with thionyl chloride → 4β-deuteriocholesteryl acetate → 4β-deuteriocholesteryl tosylate. Solvolysis of the latter yielded 4β-deuterio-3α, 5-cyclo-5α-cholestan-6β-ol.

**65-106**

KALLNER A.

**Metabolism of 3α, 12α-dihydroxy-5α-cholanoic acid (I) in the bile fistula rat. Bile acids and steroids 151.**

Acta Chem. Scand. **18**, 1502 (1964)

CA **62**, 2077b (1965)

I was exposed to 2 C. tritium for 3 weeks at room temp., then dissolved in M methanolic NaOH, acidified, and extd. with ether. The ether ext. was washed with water until neutral, then evapd. The residue was chromatographed on Hyflo Super-Cel. Tritium activity was 12 μC/mg.

**65-107**

LEVITZ M., KATZ J.

**Synthesis and some properties of estriol-15-$^3$H.**

Steroids **5**, 11 (1965).

CA **62**, 9190a (1965)

3-Benzyl ether of dimethyl marrianolate-$^3$H (I), in a 68 % isotopic yield by reaction with $Ph_3CNa + {}^3H_2O$. Acyloin condensation of I-$^3$H → 16-oxoestradiol-15-$^3$H in a 67 % isotopic yield, redn. to 16-epiestrol-15-$^3$H and estriol-15-$^3$H (V); column. chrom. sepn. of V; isotopic yield of 30 %. Purity : 97 %, sp. act. 11-13m C/mg. Destruction of V following refluxing in either 1,5 N HCl or N NaOH at 100°, but min. at room temp.

**65-108**

THOMAS P. J., HSIA S. L.
MATSCHINER J. T., THAYER S. A.,
ELLIOTT W. H., DOISY E. A., Jr.,
DOISY E. A.

**Bile acids. XXI. Metabolism of 3α, 6β-dihydroxy-5β-cholanoic acid-24-$^{14}$C-6α-$^3$H in the rat.**

J. Biol. Chem. **240**, 1059 (1965)

3α, 6β-Dihydroxy-5β-cholanoic acid-24-$^{14}$C from hyodeoxycholic acid-24-$^{14}$C (10 mg containing $1.07 \times 10^8$ dpm) by oxidn. with $CrO_3$ and redn. with $NaBH_4$. (sp. act. $1.06 \times 10^7$ dpm per mg). 3α-Acetoxy-6-keto-5β-cholanoic acid, redn. with $NaBT_4$ → 5α, 6β-dihydroxy-5β-cholanoic acid-6α-$^3$H (sp. act. $1.05 \times 10^8$ dpm per mg). Proof of the T distribution and contamination by 6α-hydroxy isomers.

## 1.2 — Carbon-13 and -14 Compounds

### 1.2.1 — *GENERAL*

**65-109**

ACHE H., WOLF A. P.

**Reactions and mechanisms involving hot carbon atoms and $N_2$-$H_2$, $N_2$-alkane and $N_2$-alkane-moderator systems including their relationship to other simple systems.**

(BNL-8537) (1964). 20 p.

(From Symposium on Chemical Effects Associated with Nuclear Reactions and Radioactive Transformation, Vienna, Dec. 1964.)

N. S. A. **19**, 2370 (1965)

**65-110**

BARAKAT M. F., FIRSOVA L. P.,
NESMEYANOV A.N.

**The interaction of $^{14}$C recoil atoms with pyrrole (I), 2-methyl-pyrrole (II) and piperidine (III).**

Radiokhimiya **6**, 626 (1964)

CA **62**, 8469c (1965)

In I, methylpyrroles, $C_5H_5N$, I, and products of the hydrogenation of the pyrrole ring; in **II**, volatile compds. (b. < 80°), products of the hydrogenation of the pyrrole ring, **I**, pyridine, α-picoline, **II**, dimethylpyrroles; and from **III**, cyclohexane, $C_6H_6$, aminopentanes, **III**, pyridine, α-, β-, and γ-pipecolines, and 2 unidentified substances were found by a chromatographic method.

**65-111**

CONSTANT R., FALLAIS C.
PROVOOST F.

**Preparation of labeled molecules by gamma irradiation.**

EUR 2203.f (1964), 16 p.

The influence of various parameters on the formation of labeled compound in the irradiation of mixtures of methane or n-butane and $^{14}CO_2$ has been investigated.

**65-112**

DE VRIES D. B., VOIGT A. F.

**The effect of oxygen on the recoil reactions of carbon-11 in hydrocarbons.**

(IS-866)

N. S. A. **19**, 7522 (1965)

**65-113**

DUBRIN J., MacKAY C., WOLFANG R.

**Reactions of carbon atoms with ethylene. II. Production of acetylene and $C_5$ compounds.**

J. Am. Chem. Soc. **86**, 4747 (1964)

N. S. A. **19**, 4181 (1965)

Reaction mechanisms of recoil $^{11}C$ with ethylene were studied. Sixteen products were identified, most of them minor.

**65-114**

FIRSOVA L. P., FORYS M.

**Mechanisms of the reactions of $^{14}C$ recoil atoms in systems containing indole.**

Radiokhimiya **6**, 610 (1964)

CA **62**, 8969a (1965)

**65-115**

LUK'YANOV V. B.,
NESMEYANOV, A. N. EREMEEV A. P.

**Products of reaction of labeled carbon oxides with a mixture of acetylene and hydrogen in an electric discharge.**

Vestn. Mosk. Univ. Ser. II, Khim. **19**, 11 (1964)

CA **62**, 8987c (1965)

$CH_2O$ is formed predominantly. In tubes with a metal deposit, in addn. to $CH_2O$, AcOH, propionaldehyde (or acetone) and butyraldehyde (or MeCOEt), are formed.

**65-116**

MARSHALL M., MacKAY C.,
WOLFGANG R.

**The reactions of atomic carbon with ethylene. I. Production of allene and methylacetylene.**

J. Am. Chem. Soc. **86**, 4741 (1964)

N. S. A. **19**, 4180 (1965)

Insertion reactions of $^{11}C$ atoms into ethylene were studied on $^{11}C$-allene and $^{11}C$-methylacetylene. Degradative studies showed that most of the allene is center labeled. End labeling was more important in methylacetylene.

**65-117**

STOECKLIN G., WOLF A. P.

**Competitive gas phase reactions of $^{11}C$ in binary oxygen-alkane systems.**

(BNL-8621) (1964)

N. S. A. **19**, 4173 (1965)

Study of reaction of carbon-11 from $^{12}C(n, 2n)$ and $^{12}C(p, pn)$, with alkanes in the presence of $O_2$. Yields of CO, $C_2H_2$, and $C_2H_4$ were determined for methane ethane, propane, and other alkanes. The results are interpreted as confirming the insertion reaction mechanism.

## 1.2.2 — *ALIPHATIC COMPOUNDS*

**65-118**

BACHUR N. R., MASEK K.,
MELMON K. L., UDENFRIEND S.

**Fatty acid amides of ethanolamine in mammalian tissues.**

J. Biol. Chem. **240**, 1019 (1965)

1-$^{14}C$-Palmitic ethanolamine ester hydrochloride from 1-$^{14}C$-palmitoylethanolamide by mixing 100 mg of the amide with 50 ml of anhydrous ether, and dry HCl. Yield of 60-70 %.

**65-119**

BENTOV M., LEVI A.,
BERGMANN E. D.

**Synthesis of nitrilotriacetic acid-2-$^{14}C$.**

Israel J. Chem. **2**, 298 (1964)

Interaction of glycine-2-$^{14}C$ with chloracetic acid leads directly to pure nitrilotriacetic acid-2-$^{14}C$ in 90-95 % chemical and radiochemical yield. The radioactive purity was tested by radiochromatogram scanning in thin layer.

**65-120**

HUNG P. P., MARKS C. L.,
TARDREW P. L.

**The biosynthesis and metabolism of erythromycine by Streptomyces erythreus.**

J. Biol. Chem. **240**, 1322 (1965)

Erythronolide B-$^{14}C$ by adding propionate-1-$^{14}C$ (200 $\mu$C) to a culture of S. erythreus. Yield e.g. 293 mg of sp. act. of 47,000 to 48,000 c.p.m. per mg. By the same way : erythromycin A, B and C.

**65-121**

JONES J. A., BLECHER M.

**On the mechanism of β-oxidation of long chain fatty acids by liver mitochondria from normal and alloxan-diabetic rats.**

J. Biol. Chem. **240**, 68 (1965)

Methyl β-ketopalminate-1-$^{14}C$ : condensation of myristoyl chloride with ethyl acetoacetate-1-$^{14}C$ followed by hydrolysis *with methanolic hydrochloric acid.* DL-β-Hydroxypalmitic acid-1-$^{14}$C from myristaldehyde with ethyl bromoacetate-1-$^{14}$C trans-α,β-hexadecenoic acid-1-$^{14}$C by pyrolysis of DL-β-hydroxypalmitic acid-1-$^{14}$C in the presence of boric anhydride.

**65-122**

OAK RIDGE NATIONAL LAB., TENN.

**Organic chemistry.**

(ORNL-3679 (p. 49-59)

N. S. A. **19**, 417 (1965)

Decarboxylation of mixed Fe salts of fatty acids and benzoic acid affords a convenient route for the synthesis of labeled alkyl phenyl ketones. The 2.4-dinitrobenzenesulfenate esters of erythro- and threo-3-phenyl-2-butanol-1-$^{14}$C were subjected to chlorinolysis. The products were identified and in certain cases the distributions of the $^{14}$C labels were determined.

**61-123**

PLIENINGER H., IMMEL H.

**Die Darstellung von reinem γ,γ-Dimethylallylpyrophosphat nach dem Verfahren von F. Cramer.**

Chem. Ber. **98**, 414 (1965)

Phosphonoacetic acid triethylester and 1,3-$^{14}$C-acetone give β,β-di-($^{14}$C-methyl)-acrylic acid ethylester, → γ,γ-di-($^{14}$C-methyl)-allylic alcohol, + triethylammonium phosphate and trichloroacetonitrile → dimethylallylpyrophosphate (1.81 μC/ mmole). *Chromatography on silicagel.*

**65-124**

POTTER J. C., BURTON W. B.

**Isotope-labeled insecticides synthesis of alpha-methylbenzyl 3-(dimethoxyphosphinyloxy)-crotonate labeled with phosphorus-32 and carbon-14.**

J. Agr. Food Chem. **12**, 439 (1964)

N. S. A. **19**, 7528 (1965)

Exchange of methanol-$^{14}$C with the methoxy groups in trimethyl phosphite, or reaction of $^{32}$P-trichloride and methanol, then reacted with α-methylbenzyl-2-chloroacetoacetate. Separation of cis and trans isomers on Silogel C-22. Cis isomer : 32 % in the $^{14}$C and 41 % in the $^{32}$P preparation, *purity* : 98 %.

## 1.2.3 — *AROMATIC COMPOUNDS*

**65-125**

DUFFY J. R. H.

**The syntheses of ethane-labeled DDT and o-Cl-DDT and their metabolism in larval** *Aedes Aegypti.*

Thesis, New York, Fordham Univ., 1964. 98 p.

N. S. A. **19**, 10778 (1965)

DDT-1-$^{14}$C, DDT-2-$^{14}$C, o-Cl-DDT-1-$^{14}$C, and o-Cl-DDT-2-$^{14}$C were synthesized.

**65-126**

STONE E. W., MAKI A. H.

**Solvent effects on the electron spin resonance spectrum of p-benzosemiquinone-1-$^{13}$C.**

J. Am. Chem. Soc. **87**, 454 (1965)

Barium acetate-1-$^{13}$C → acetone-2-$^{13}$C → condensation with sodium nitromalonaldehyde monohydrate → p-nitro-phenol-1-$^{13}$C → p-aminophenol-1-$^{13}$C → oxidation to p-benzoquinone-1-$^{13}$C; over-all yield : 16 %; isotopic abundance : 54 %.

## 1.2.4 — *HETEROCYCLIC COMPOUNDS*

**65-127**

CHAYKIN S.

**Carbon-14 and tritium-labeled DPN and TPN.**

Atomlight, No. 43, 1-8 (1965)

N. S. A. **19**, 11143 (1965)

DPN-$^{14}$C and TPN-$^{14}$C simultaneously from nicotinamide-7-$^{14}$C (I) with the assistance of S. fragilis C$_{351}$ in yields up to 16 and 42 %, resp. DPN-$^{14}$C has a sp. act. essentially equal to that of I. DPN-$^{3}$H, labeled in the 2, 4, and 6 pos. of the nicotinamide ring by the reduction with tritium-labeled sodium borohydride, up to sp. act. as high as 0,25 C/mmole.

**65-128**

CUSTER L. E., ABEI T.,
CHIPMAN B. K., IBER F. L.

**Preparation of bilirubin-$^{14}$C.**

J. Lab. Clin. Med. **64**, 820-7 (1964)

N. S. A. **19**, 2365 (1965)

Erythrocytes taken from ducks treated with acetylphenylhydrazine are incubated with glycine-2-$^{14}$C, glucose and ferrous ion to prepare $^{14}$C-labeled hemoglobin. They are injected intravenously into a dog prepared with a biliary fistula. Approx. 45 mg of cryst. bilirubin from a dog in 24 hours; spec. act. 2,000 dpm/μg.

**65-129**

DELVIGS P., McISAAC M.,
TABORSKY R. G.

**The metabolism of 5-methoxytryptophol.**

J. Biol. Chem. **240**, 348 (1965)

5-Methoxytryptophol-α-$^{14}$C picrate (I) (spec. act. of 256 μC per g) was synthesized as follows : 5-methoxyindole + 37 % aq. formaldehyde + 25 % aq. dimethylamine → 5-methoxygramine, + dimethyl sulfate → 5-methoxygramine quaternary methosulfate, + sodium cyanide-$^{14}$C → 5-methoxyindole-3-acetonitrile-α-$^{14}$C- → 5-methoxyindole-3-acetic acid-α-$^{14}$C, + lithium aluminium hydride → 5-methoxytryptophol-α-$^{14}$C, + picric acid → I.

**65-130**

HANKES L. V.

**Carbonyl-$^{14}$C-labeled DL-kynurenine.**

(BNL-7750)

N. S. A. **19**, 8698 (1965)

The synthesis begins with 2-nitroiodobenzene and Cu$^{14}$CN, and the product is purified by chromatography and crystallization.

**65-131**

NISHIZUKA Y., ICHIYAMA A.,
GHOLSON R. K., HAYAISHI O.

**Studies on the metabolism of the benzene ring of tryptophan in mammalian tissues. I. Enzymic formation of glutaric acid from 3-hydroxy-anthranilic acid.**

J. Biol. Chem. **240**, 733 (1965)

DL-Tryptophan benzene ring-U-$^{14}$C was enzymically transformed to L-kynurenine-$^{14}$C by Pseudomonas tryptophan oxygenase and formidase. Isolation by paper chromatography, yield : 70 % of theory; 1,37 × $10^6$ cpm per μmole.

Hydroxylation by rat liver mitochondrial kynurenine hydroxylase gave 3-hydroxykynurenine-$^{14}$C. Yield : 70 %, spec. act. : 2,27 × $10^5$ c.p.m. per μmole.

**65-132**

PETROVIC S., PETROVIC J.

**A method for the biosynthetic labeling and the isolation of pyrimidine nucleotides.**

(AEC-tr-6227/2 (p. 131-7))

N. S. A. **19**, 4176 (1965)

Pyrimidine nucleotides, $^{14}$C exclusively in position 6 of the pyrimidine nucleus with high sp. act. from the acid-soluble fraction of rat liver, following injection of an adequate amount of orotic acid-(6-$^{14}$C). Utilization of the precursor is 40-50 percent. Methods for the quantitative hydrolysis of the pyrimidine nucleotides to monophosphates, quantitative absorption on and desorption from activated charcoal, and quantitative resolution which gives 96-100 percent pure products.

**65-133**

SCHUETTE H. R., SCHAAF R.,
LIEBISCH H. W., BENES J., KOZEL J.,
VERES K.

**Synthesis of radioactively labeled compounds. XI. Synthesis of kinetin-8-$^{14}$C.**

Z. Chem. **4** (II), 430 (1964)

CA **62**, 7758a (1965)

Hypoxanthine-8-$^{14}$C (from 4,5-diamino-6-hydroxypyrimidine and Na formate-$^{14}$C) + $POCl_3$ → 47 % 6-chloropurine-8-$^{14}$C, + furfurylamine → 70 % 6-furfurylaminopurine-8-$^{14}$C.

**65-134**

SMITH D. A., VISSER D. W.

**Studies on 5-hydroxyuridine (I).**

J. Biol. Chem. **240**, 446 (1965)

I-2-$^{14}$C was synthesized by a modification of the method of Ueda (only 4-hour period of heating, bromination at a uridine concentration of not less than 100 mg per 3 to 4 ml, pyridine was added periodically during the heating period).

### 1.2.5 — *ALKALOIDS*

### 1.2.6 — *AMINO ACIDS, PEPTIDES*

**65-135**

COLLIPP P. J., KAPLAN S. A.,
BOYLE D. C., SHIMIZU C. S. N.

**$^{14}$C-Acetyl bovine growth hormone. Physiological and antigenic properties.**

J. Biol. Chem. **240**, 143 (1965)

Bovine growth hormone was treated with acetic anhydride-1-$^{14}$C (13.3 mC per mmole). The entire 4-ml volume was passed through a Sephadex G-25 column. Eight different $^{14}$C-growth hormone preparations have been calculated to have from 2 to 12 acetyl residues per molecule of growth hormone. In the same way $^{14}$C (acetylated)-human albumin was prepd. It was calculated to contain four acetyl groups per molecule and 97 % of the radioactivity was precipitated with 5 % trichloroacetic acid.

**65-136**

LINDSTEDT G., LINDSTEDT S.

**Studies on the biosynthesis of carnitine.**

J. Biol. Chem. **240**, 316 (1965)

4-Dimethylaminobutyric acid-1-$^{14}$C by reduction of the N,N-dihydroxymethyl derivative of 4-aminobutyric acid-1-$^{14}$C, yield : 92 %; 4-dimethylamino-3-hydroxy-butyric acid-1-$^{14}$C by catalytic reduction of the formol derivative of 4-amino-3-hydroxy-butyric acid-1-$^{14}$C, isotopic yield : 97 %. 5-Trimethylaminovaleric acid-methyl-$^{14}$C and 6-trimethylaminocaproic acid-methyl-$^{14}$C (spec. act. 0.4 mC per mmole) from the parent amino acids by methylation with $^{14}$CH$_3$I; isotopic yield in both cases : 40 %; 4-Trimethylaminobutan-1-ol-methyl-$^{14}$C (0.4 mC per mmole) from 4-aminobutan-1-ol by methylation; isotopic yield, 20 % (see 64-63).

**65-137**

MONTANINI I., SIMONCINI I.,
PORCELLATI G.

**Preliminary data on the synthesis of phosphodiesters of $^{14}$C-labeled ethanolamino-L-serine and L-threonine**

Boll. Soc. Ital. Biol. Sper. **40**, 1211 (1964)

CA **62**, 6551h (1965)

2-Aminoethyl-L-2-amino-2-carboxyethyl hydrogen phosphate and 2-aminoethyl-L-2-amino-2-carboxy-1-methyl-ethyl hydrogen phosphate, contg. $^{14}$C in either the serine or the threonine were prepd. Yields, referred to the initial radioactivity were 21 % and 23 %, resp.

## 1.2.7 — *CARBOHYDRATES*

**65-138**

DAGLEY S., TRUDGILL P. W.

**The metabolism of galactarate, D-glucarate and various pentoses by species of Pseudodomonas.**

Biochem. J. **95**, 48 (1965)

$^{14}$C-Galactaric and $^{14}$C-glucaric acids by oxidn. of the sugars with nitric acid. Yields : 50-60 % and 40-50 % resp.

**65-139**

KANFER J.

**Observations on cerebroside metabolism in vivo.**

J. Biol. Chem. **240**, 609 (1965)

Acetobromoglucose-1-$^{14}$C + 3-O-benzyl-N-stearoyl-sphingosine (from 3-O-benzyl-sphingosine and stearoyl chloride) (see *ibid.* p. 39) gave in the presence of HgCN 1'-O-glucosyl-1-$^{14}$C-N-stearoylsphingosine. By deacetylation glucose-1-$^{14}$C cerebroside (609.000 cpm per mg) was build. Column chromatography on silicic acid. Starting with stearoyl chloride-1-$^{14}$C stearic acid-1-$^{14}$C cerebroside was obtained. (974.000 cpm per mg.)

**65-140**

O'BRIEN P. J., NEUFELD E. F.

**A rapid procedure for the preparation of small quantities of uridine diphosphate-N-acetylhexosamine-$^{14}$C.**

Biochem. Biophys. Acta **83**, 352 (1964)

CA **62**, 3057b (1965)

After injection of D-glucosamine-1-$^{14}$C to rats the title compound was isolated from the livers. 15 min. after injection a max. of incorporation (15-20 %) was reached.

**65-141**

SILBERT J. E., HUGHES E. F. X.

**Enzymic synthesis of uridine diphosphate-glucosaminuronic acid.**

Biochem. Biophys. Acta **83**, 355 (1964)

CA **62**, 4267b (1965)

UDP-glucosamine-1-$^{14}$C + UPGD dehydrogenase and NAD → 10-30 % yield of UPD-glucosaminuronic-1-$^{14}$C acid.

### 1.2.8 — *STEROIDS*

**65-142**

BELL R. G., HSIA S. L.
MATSCHINER J. T., DOISY E. A., Jr.,
ELLIOTT W. H., THAYER S. A.,
DOISY E. A.

**Bile acids. XX. Metabolism of coprostanol-4-$^{14}$C (I) in the rat.**

J. Biol. Chem. **240**, 1054 (1965)

To a rat maintained on a cholesterol-free diet for 1 week, fasted overnight, and fed 3.8 g of a diet containing 377 mg of a cerebroside fraction 23.5 mg of cholesterol-4-$^{14}$C (sp. act. $3.7 \times 10^7$ dpm per mg) were administered. 12 % of the activity was isolated from feces of 3 days as **I** (sp. act. $6.80 \times 10^6$ dpm per mg).

**65-143**

RAO P. N., AXELROD L. R.

**Synthesis of (19-$^{14}$C) testosterone.**

J. Chem. Soc. **1965**, 1356

Ozonolysis of 17-β-acetoxy-19-nortestosterone; blocking of the carbonyl function in pos. 6 with the N-methylanilinomethylene group; alkylation with ($^{14}$C)methyl iodide (27 mC); hydrolysis and transformation to the enol lactone and finally to (19-$^{14}$C)-testosterone (4 % from methyl iodide, 3,97 μC/mg).

**65-144**

WEISZ I., KOVACS O.

**Preparation of pregnadienolone-20-$^{14}$C (I).**

Acta Univ. Szeged., Acta Phys. Chem. **10**, 107 (1964)

CA **62**, 6535h (1965)

3β-Acetoxy-5-androsten-17-one was treated with K$^{14}$CN in AcH and EtOH to give **I**.

See also : **65-108**, 3α, 6β-dihydroxy-5β-cholanoic acid-24-$^{14}$C.

## 1.3 — Halogen Labeled Compounds

**65-145**

VASAROS L., FILATOV E. S. ,
NESMEYANOV An. N.

**The chemical action of the recoils of $^{38}$Cl atoms in chloromethanes. The peculiarities of the yields of the reaction $^{37}$Cl(n, γ)$^{38}$Cl by comparison with $^{81}$Br(n, γ)$^{82}$Br.**

Radiokhimiya **6**, 484-90 (1964)

N. S. A. **19**, 459 (1965)

Chemical effects of the recoil of $^{38}$Cl from $^{37}$Cl-(n, γ)$^{38}$Cl were studied by irradiating various chloromethanes in low neutron fluxes.

**65-146**

BORN H. J.

**The mechanism of molecule formation by nuclear fission and subsequent processes in solid mixtures.**

EUR-2209, 1964, 18 p.

Exchange of $^{131}$I formed by U-fission, with iodobenzene. Exchange of carrier free $^{131}$I, with halobenzenes under the influence of the high dose rate of a functioning reactor.

**65-147**

CHEN Teng-yueh, YEH Si-jung

**Synthesis of iodine-131 labeled compound by fission recoil method.**

Ho Tsu K'o Hsueh, **4**, 65 (1964)

N. S. A. **19**, 11144 (1965)

CH$_3$$^{131}$I by neutron irradiation of mixtures of $U_3O_8$ and ammonium acetate. Increasing yields with increasing weight ratios of $NH_4OOCCH_3/U_3O_8$. The average yield was about 40 %.

**65-148**

KLASSEN N. V., BAERG A. P.

**The chemical fate of recoil iodine atoms in iodine-methyl iodide solutions.**

Can. J. Chem. **42**, 2684 (1964)

The organic yield of recoil $^{131}$I, produced by the 14 MeV neutron irradiation of iodide-methyl iodide solutions, was examined. At very low concentrations it was found to be 57 %. At all iodine concentrations the organic products consisted mainly of $CH_3I$ and $CH_2I_2$. The formation is discussed in terms of thermal reactions, diffusion-controlled reactions in the spurs, and hot reactions.

**65-149**

OPPERMANN W., AMMON J.

**Über Verunreinigung in Jod-131-Lösungen (Verteilung nach intravenöser Injektion in der Ratte).**

Naturwissenschaften **52**, 137 (1965)

**65-150**

ANGHILERI L. J.

**Absorption and excretion of 131-iodine-labeled atabrine.**

J. Nucl. Med. **5**, 936-41 (1964)

N. S. A. **19**, 10759 (1965)

The preparation of $^{131}$I-labeled atabrine is described.

**65-151**

ANGHILERI L. J.

**A new method for the preparation of labeled $^{131}$I oleic acid-1 and triolein-1.**

Int. J. Appl. Radiation Isotopes **16**, 53 (1965)

The new method proposed, is based on an isotopic exchange between radioiodide and ICl and also avoids most of the handling.

**65-152**

REITH W. S., BROWN B. L.

**A method for reacting submicrogram quantities of radioactive substances; observations on the preparation of ($^{131}$I)-iodotyrosines of very high specific activities.**

Nature **205**, 513 (1965)

Apparatus for handling very small quantities in order to obtain reproducable reaction conditions (~0,1 μg L-tyrosine, ~25 μl volume).

**65-153**

TOI K., SALVATORE G., CAHNMANN H. J.

**Non-enzymic formation of thyroxine and 3,3', 5'-triiodothyronine residues in thyroglobulin.**

Biochim. Biophys. Acta **97**, 523-531 (1965).

The $^{125}$ICl solution was added to a stirred solution of thyroglobulin (TG) in 0.1 M glycine buffer pH 9. After the iodination, reaction mixture was dialyzed at 4° against 0.02 M phosphate-0.05 M KCl buffer (pH 7.4). When solutions were kept at 4° without freezing for several weeks, the TG released small amounts of radioactive-free 3-iodotyrosine and 3,5-diiodotyrosine.

**65-154**

VAN ZYL A., WILSON B., ARBUCKLE D.

**The labeling of tyrosine derivatives with $^{131}$I directly on chromatography paper.**

p. 106-17 of « National Conference on Nuclear Energy; Application of Isotopes and Radiation », 1963

N. S. A. **19**, 11257 (1965)

The optimum oxidizing conditions for the most effective labeling appear to be a mixture of dilute hydrogen peroxide and elemental stable iodine in an acetate buffer of pH 5.

With 50 μC $^{131}$I per 25 mg of tyrosine, radiosp. act. of about 6 μC/μg of monoiodotyrosine and about 0.9 μC/μg of diiodotyrosine were obtaineg.

## 1.4 — Phosphorus-32 Compounds

**65-155**

IVES D. H.

**Evidence for thymidine diphosphate as the precursor of thymidine triphosphate in tumor. Transfer of the terminal phosphate of adenosine triphosphate to thymidylate.**

J. Biol. Chem. **240**, 819 (1965)

Combination of glyceraldehyde phosphate dehydrogenase and phosphoglycerate kinase systems gave ATP-γ-$^{32}$P from ADP and orthophosphate-$^{32}$P (2 mC) (less than 0.1 % of the label in β-pos.).

This ATP (50 μC) and excess of adenylic acid + rabbit muscle adenylate kinase produced terminally labeled ADP, which was transformed to ATP-β-$^{32}$P.

See also : **65-124**, Insecticides.

## 1.5 — Sulfur-35 Compounds

## 1.6 — Oxygen-18 Compounds

**65-156**

WYNBERG H., KOOREMAN H. J.

**The mechanism of the Hinsberg thiophene ring synthesis.**

J. Am. Chem. Soc. **87**, 1739 (1965)

Benzil-$^{18}$O and the ethyl ester of thiodiacetic acid are reacted, yielding 3,4-diphenyl-2-carbothoxy-thiophene-5-carboxylic acid-$^{18}$O, demonstrating a Stobbe-type condensation proceeding via a δ-lactone intermediate.

**65-157**

HOWARD F. B., MILES H. T.

**6-$^{18}$O-Purine nucleotides. Synthesis and infrared band assignment.**

J. Biol. Chem. **240**, 801 (1965)

Enzymic synthesis of inosine-6-$^{18}$O, inosine 5'-phosphate-6-$^{18}$O and guanosine-6-$^{18}$O. Chemical transformation of the latter to guanosine 5'-phosphate-6-$^{18}$O (adenosine and adenylic acid deaminases, $D_2{}^{18}O$).

See also : **65-218**, Bibliography.

## 1.7 — Nitrogen-15 Compounds

**65-158**

WEMPEN I., BROWN G. B., UEDA T., FOX J. J.

**Pyrimidines. V. Rearrangement of cytosine amino-$^{15}$N (I) and a preparation of uracil-$^{15}N_3$.**

Biochemistry **4**, 54 (1965)

CA **62**, 6481e (1965)

**I** undergoes a reversible rearrangement involving an exchange between the exocyclic amine N and the N in position 3 (**II**). Transformation to uracil-3-$^{15}$N. Cat. reductive elimination of the exocyclic amine function provides a method for the detn. of the isotope content of the amino N in labeled cytosines **I** and **II**.

## 1.8 — Miscellaneous

**65-159**

KAVAI M., KESZTYUS L.

**Modified process for labeling ovalbumin with chromium.**

Acta Microbiol. Acad. Sci. Hung. **9**, 349 (1962/63)

CA **62**, 6706g (1965)

Pure ovalbumin and $^{51}$Cr as Cr(III) hexammine in the mol. ratio 1 : 25, at 37°. After 2 hrs. 67 % of the Cr was bound. No changes in viscosity and electrophoretic motility.

**65-160**

YANG Mo-hsiung, CHANG Chau-ting

**Synthesis of mercury-203 labeled organomercuric compounds.**

Ho Tsu K'o Hsueh **4**, 69-70 (1964)

N. S. A. **19**, 13409 (1965)

Mercuric acetate, neutron flux, benzene addn., reflux. Phenylmercuric acetate, above 80 %, phenylmercuric iodide and chloride.

**65-161**

MARINA M. A.

**Colloidal chromium phosphates with phosphorus-32.**

Anales Real Soc. Espan. Fis. Quim. (Madrid), Ser. B, **60**, 381 (1964)

N. S. A. **19**, 7598 (1965)

The procedure consists of simple precipitation and allows preparation of a colloid with higher stability that may be sterilized by heating in an autoclave (size : 350 to 222 Å).

**65-162**

MARINA M. A.

**Colloidal zirconyl phosphates with phosphorus-32.**

Anales Real Soc. Espan. Fis. Quim. (Madrid), Ser. B, **60**, 391 (1964)

N. S. A. **19**, 7599 (1965)

Direct preparation of colloidal zirconyl phosphate labeled with $^{32}$P is described; the size was 300 Å.

**65-163**

MORROW P. E., DELLA ROSA R. J., CASARETT L. J., MILLER G. J.

**Investigations of the colloidal properties of polonium-210 solutions by using molecular filters.**

Radiation Res., Suppl. **5**, 1-15 (1964)

N. S. A. **19**, 2338 (1965)

A nonfilterable form of polonium characteristic of colloid was observed over a wide range of hydrogen ion concentration and found to be at a maximum any neutrality and in the absence of complexing electrolytes.

**65-164**

THOMAS R. G., STANNARD J. N.

**Some characteristics of polonium solutions of importance in biological experiments.**

Radiation Res., Suppl. **5**, 23-8 (1964)

N. S. A. **19**, 2339 (1965)

The presence and formation of aggregates of polonium-containing particles in neutral solutions of polonium-210 were clearly demonstrated. The phenomenon was not seen with the acidified solutions. Aggregates are shown to form, in part at least, about foreign material. The rate of aggregation, for a given solution, bears a relationship to time after neutralization.

## 2. — RADIODECOMPOSITION, STABILITY, STORAGE

**65-165**

DUNN A., STRAHS S.

**A comparison of $^3$H- and $^{14}$C-glucose metabolism in the intact rat.**

Nature **205**, 705 (1965)

After administration of D-glucose-6-$^{14}$C and D-glucose-6-$^3$H, the $^3$H : carbon-14 isotope ratio decreased with time. This strongly suggests that loss of T is due to cleavage of the (6)-C-H bound.

**65-166**

NOUVERTNE W., HEMPEL K.

**Untersuchungen über die Lagerfaehigkeit H-3-markierter Aminosaeuren hoher spezifischer Aktivitaet.**

EUR-1828.d

Phenylalanine-(2,4-$T_2$), lysine (4,5-$T_2$), and 3,4-dihydroxyphenylalanine-(2,5,6-$T^3$) of high sp. act. (8000 mC/mmole were stored in 80 % ethanol or water and in solid form under ten different conditions. The radiochemical purity was investigated by paper chromatography after varying storage time. Maximum stability was shown by tritiated amino acids in ethanol solution at low temperature.

**65-167**

SCHLEGEL D. E.

**The loss of antibody titer following labeling by tritium gas exposure.**

J. Immunol. **93**, 566 (1964)

N. S. A. **19**, 6967 (1965)

1. Globulin was exposed to T gas at 0° C for 10 days.
2. It was exposed to 1.0 C of T under silent electrical discharge.

Comparisons between the antibody titers of tritiated and control globulin against normal rabbit serum on agar diffusion plates. A total loss of antibody titer even after the shortest period of exposure to T. It appears then that antibodies are denatured during exposure to T under these conditions.

See also : **65-107**, estriol-15-$^3$H
**65-149**, iodine-131 solutions
**65-153**, thyroglobulin-$^{125}$I

## 3. — PURIFICATION, SEPARATION

**65-168**

KENNEDY J. A., KINLOCH, J. D.

**The impurity of radioiodinated triolein.**

J. Clin. Pathol. **17**, 160 (1964)

CA **62**, 9449a (1965)

Thin-layer chromatography (silica gel and silicic acid) showed approx. 30 % of the total radioactivity to be present in a diglyceride impurity and 7 % in the free fatty acids.

**65-169**

ANGHILERI L. J.

**Separation of ortho- (I), pyro- (II), and polymetaphosphate (III) by ion exchange.**

Agr. Rep. Com. Nacl. Energia At. Inform. **117**, 7 (1964)

CA **62**, 2227d (1965)

The phosphates, tagged with $^{32}$P, were sorbed on a Dowex-3 anion exchanger (20-50 mesh). Elution of **I** with 0.8 M $NH_4Cl$, **II** with 2 M $NH_4Cl$, and **III** with 2 M $NH_4Cl$ plus concd. $NH_4OH$. Elution peaks were sharp with either 1 mg or 45 mg of each phosphate in the initial soln.

**65-170**

CEJKA V., VENNEMAN E. M.

**Difference in chromatographic behaviour of aldosterone and (1,2-$^3$H)-aldosterone.**

Clin. Chim. Acta **11**, 188-190 (1965).

(1,2-$^3$H)-Aldosterone (sp. act. 31.3 C/mmole) and unlabeled aldosterone showed in partition chromatography on celite 545 different rates of displacement.

**65-171**

LARAGH J. H., SEALEY J. E.,
DLEIN P. D.

**The presence and effect of isotope fractionation in isotope dilution analysis : a factor in the measurement of aldosterone secretory rates in man.**

IAEA 1964, Preprint SM-55/44, 29 p.

N. S. A. **19**, 7344 (1965)

The effect of various amounts of unlabeled aldosterone diacetate in the absence of constant isotope ratio and the relative contributions of the $^3$H and $^{14}$C label to the isotopic fractionation effect were investigated.

**65-172**

SGOUTAS D. S., KUMMEROW F. A.

**Exposure of an isotope effect by $^3$H-labeled fatty acids on silica-silver nitrate chromatography.**

J. Chromatog. **16**, 448-53 (1964)

N. S. A. **19**, 13242 (1965)

A tritium isotope effect was observed during the chromatography of tritiated unsaturated fatty acids as their methyl esters on silica-silver nitrate columns. The results are interpreted in terms of the coordination complexes formed between olefinic bonds and silver ions.

**65-173**

VISWANATHAN K. V.

**Enrichissement isotopique de $^{14}$C par chromatographie en couche mince.**

Intern. J. Appl. Radiation Isotopes **16**, 60 (1965)

On thin-layer chromatograms the R$_f$ values of high radioactive Na-formate (16 mC/mmole), differed clearly from these of the inactive substance.

See also : **65-93**, polynuclear hydrocarbons-$^3$H
**65-104**, oxytocin--$^3$H
**65-132**, pyrimidine-6-$^{14}$C nucleotides
**65-207**, electrophoresis

## 4. — ANALYSIS

### 4.1 — Substances

#### 4.1.1 — *DETERMINATION OF ACTIVITY*

**65-174**

NAGASE Y., BABA S., IDO T.

**Determination of colored $^{14}$C-nitro-compounds using liquid scintillation counter.**

Yakugaku Zasshi **84**, 202-5 (1964)

N. S. A. **19**, 9088 (1965)

The sample is electrolytically reduced directly in the vessel used for the measurement. A hydrophilic scintillator is added and measured at an applied voltage of 1300 v and a discriminator voltage of 10 v to $\infty$ (2.4-dinitrophenylhydrazine derivatives) $\sim$90 % efficiency. Reproductibility within statistical error.

**65-175**

GABRIEL O.

**Specific activity determination of radioactive formic acid.**

Anal. Biochem. **10**, 143 (1965

N. S. A. **19**, 11242 (1965)

Tritiated formic acid and dibromoacetophenone → p-bromophenacylformate → derivatives. Thin-layer chromatography.

**65-176**

KANDEL M., GORNALL A. G.

**Effect of glass surfaces on the liquid scintillation counting of aldosterone.**

Can. J. Biochem. **42**, 1833 (1964)

N. S. A. **19**, 7527 (1965)

Pure tritiated aldosterone gave lower cpm in glass than in plastic vials. As a routine practice the addition of hydrocortisone is recommended to prevent adsorption of radioactive aldosterone.

**65-177**

SPRATT J. L.

**Colorimetric identification following tritium recovery from paper.**

J. Chromatog. **16**, 253 (1964)

N. S. A. **19**, 7310 (1965)

Glycoside color reagents used to assure quantitative recovery of T-labeled compounds quench counts and/or decrease extraction. Therefore, the chromatogram was cut into thin strips and each section quantitatively extracted and counted. The color reagent was then added to verify location of carrier compounds.

**65-178**

HOUTMAN A. C.

**Liquid scintillation counting of blood.**

Intern. J. Appl. Radiation Isotopes **16**, 65 (1965)

The radioactive products are extracted from the blood either directly with the scintillation solvent system « Polyether 611 » or with solvents such as dioxane or ethanol. The last-mentioned extracts are counted in a hyamine-Cl-toluene system. Conditions for counting at normal background values are determined. Contents from 0.01 nC $^3H$ or 0.003 nC $^{14}C$ per ml blood are thus detectable.

**65-179**

NAKSHBANDI M. M.

**A plastic scintillator method for the radioassay of $^3H$- and $^{14}C$-labeled compounds on filter paper.**

Intern. J. Appl. Radiation Isotopes **16**, 157 (1965)

A paper tissue soaked in a solution of plastic scintillator in benzene at a concentration of $\sim$200 g/l is placed onto each side of the filter paper supporting the activity and dried at a temperature of about 60° C. The sample is then counted in a conventional Tri-Carb liquid scintillation spectrometer. Efficiencies of about 20 per cent for tritiated non-polar compounds, about 10 per cent for tritiated polar compounds.

**65-180**

WENZEL M.

**Einfache Aktivitätsmessung doppeltmarkierter Substanzen auf Chromatogrammen.**

Naturwiss. **52**, 129 (1965)

A chromatogram with double labeled samples (e.g. $^3H/^{14}C$ or $^{14}C/^{32}P$) is scanned with a two channel counting tube for the first time without, for the second time with a window. From the two curves and by comparision with standards the activities of the two isotopes can be calculated.

**65-181**

FLIEDER D. E.

**A method of determining $^{14}C$ and $^{35}S$ in biological specimens utilizing the cryostat.**

J. Oral Therap. Pharmacol. **1**, 331 (1964)

N. S. A. **19**, 13244 (1965)

Tissues are removed from the animal, frozen in liquid nitrogen, and cut at —15° C. The sections are counted with a Geiger-Müller system. The specimen may be used further in histo-chemistry, cytochemistry and autoradiography.

**65-182**

VAN ZYL A., WILSON B.

**A micro-method for specific activity analysis of $^{131}I$-labeled tyrosine derivatives and its use in thyroid hormone biosynthesis.**

p. 226-41 of « National Conference on Nuclear Energy; Application of Isotopes and Radiation. » 1963.

N. S. A. **19**, 10779 (1965)

Method for measurement of sp. act. of $^{131}I$ labeled monoiodotyrosine, diiodotyrosine, thyroxine, and triiodothyronine and free iodine, simultaneously on one rat thyroid gland.

**65-183**

THUNNEL S.

**Determination of incorporation of $^{59}Fe$ in hemin of peripheral red blood cells and of red cells in bone narrow cultures.**

Clin. Chim. Acta **11**, 321 (1965)

The hemin of a blood or a bone marrow sample is isolated in solution, the radioactivity is recorded and the concentration of hemin is determined spectrophotometrically.

See also: **65-73**, T-labeled pharmaceuticals

## 4.1.2 — *DETERMINATION OF RADIOCHEMICAL PATTERN*

**65-184**

CIRANNI E., CIRANNI G.
GUARINO A.

**Distribution of tritium in molecules of aromatic hydrocarbons labeled with tritium by the reaction $^6$Li(n, α)$^3$H.**

Gazz. Chim. Ital. **95**, 52 (1965)

Determination for toluene, ethylbenzene and cumene. The tritium atoms in the side chain increase from toluene to cumene, and the activity at the meta position of the ring decreases with the lenghtening of the side chain.

**65-185**

BENTLEY R., RAMSEY V. G.,
SPRINGER C. M., DIALAMEH G. H.,
OLSON R. E.

**Application of a chemical degradation of coenzyme Q to problems of biosynthesis.**

Biochemistry **4**, 166 (1965)

CA **62**, 6717d (1965)

Treating the diacetate of CoQ hydroquinone in EtOAc with damp $O_3$ at low temp., sepn. of levulinaldehyde as the 2,4-DNPH, oxid. the aromatic aldehyde with neutral $MnO_4^-$ to 3'6'-diacetoxy-4', 5'-dimethoxy-2'-methylphenylacetic acid with a 25-40 % yield.

**65-186**

GATENBECK S., BENTLEY R.

**Naphthaquinone biosynthesis in moulds : the mechanism for formation of javanicin.**

Biochem. J. **94**, 478 (1965)

$^{14}$C-labeled samples of javanicin were degraded by Zeisel reaction, Kuhn-Roth oxidation and reaction with sodium hypoiodite; acetic acid obtained from the Kuhn-Roth reaction was further degraded by the Schmidt reaction.

**65-187**

GUPTA R. N., SPENSER I. D.

**Biosynthetic incorporation of one-carbon units into berberine and hydrastine.**

Can. J. Chem. **43**, 133 (1965)

Degradation of hydrastine (hydrastinine, the corresp. N-methyl methiodide, 6-vinylpiperonylic acid; opianic acid) and berberine.

**65-188**

JOHNSON C. K., GABE E. J.,
TAYLOR M. R., ROSE I. A.

**Determination by neutron and X-ray diffraction of the absolute configuration of an enzymatically formed α-monodeuterioglycolate (I).**

J. Am. Chem. Soc. **87**, 1802 (1965)

I is produced by the action of muscle lactic dehydrogenase on deuterioglyoxylate ion in stereochemical specificity.

**65-189**

KINDL H., BIEDL-NEUBACHER J.,
HOFFMANN-OSTENHOF O.

**Untersuchungen über die Biosynthese der Cyclite. IX. Überführung von D-Glucose und D-Glucose-6-phosphat in meso-Inosit durch einen zellfreien Extrakt aus Candida utilis.**

Biochem. Z. **341**, 157 (1965)

D-Glucose-$^{14}$C precursors were transformed into meso-inositol by an enzyme extract from the yeast Candida utilis. The meso-inositol was selectively degraded and the distribution of the radioactivity determined.

**65-190**

SCHUETTE H. R., HINDORF H.,
MOTHES K., HUEBNER G.

**Biosynthese von Spartein in Lupinus luteus und Sarothamnus scoparius.**

Ann. Chemie **680**, 93 (1964)

Clear degradative routes were applied in the detn. of $^{14}$C-labeling pattern of sparteine, built biosynthetically from cadaverine-(1,5-$^{14}$C) and lysine-(2-$^{14}$C) resp. ($CrO_3$-oxidation, Schmidt reaction).

**65-191**

SMITH G. N., BU'LOCK J. D.

**Biogenesis of cyclopropene acids.**

Biochem. Biophys. Res. Commun. **17**, 433 (1964)

CA **62**, 4332d (1965)

Precursor : acetate-1-$^{14}$C. Crude labeled lipid oxidn. with permanganate-periodate, the β-diketone fraction corresponding to sterculic acid, and malvalic acid were sepd. and further oxidized to yield $CO_2$ from the central C atom, together with nonylic acid, and azelaic or suberic acids. These acids were subjected to Schmidt degradn.

See also : **65-108**, 3α, 6β-dihydroxy-5β-cholanoic acid-6α-$^{3}$H
**65-122**, 2-butanol-1 $^{14}$C, chlorinolysis
**65-158**, cytosines-$^{15}$N
**65-211**, fatty acids-$^{14}$C

## 4.2 — Apparatus

**65-192**

ROTH E., RAVOIRE J.

**Analytical methods for hydrogen-deuterium used at Saclay.**

At. Energy Rev. **2** (2), 55 (1964)

CA **62**, 7093h (1965)

Mass spectrometry for isotope concns. of 0-1 %, IR spectrometry from 1-100 %. Gas chromatography is used for mixt. of H and D and can sep. ortho-$H_2$, para-$H_2$ HD, ortho-$D_2$, para-$D_2$.

**65-193**

BROWN B. L., REITH W. S.

**Determination of $^{3}$H in substances containing a large amount of $^{131}$I-activity.**

Biochim. Biophys. Acta **97**, 378-379 (1965)

The material is burned in $O_2$, $CO_2$, tritiated water and $^{131}$I-containing oxidation products are dissolved in methanol and the solution shaken with $Ag_2O$. An aliquot of the supernatant is counted. The overall counting efficiency for $^{3}$H is 9 %.

**65-194**

KIMMEL H.

**Flow counter for the measurement of tritium.**

German Patent 1,180,856. Nov. 5, 1964

N. S. A. **19**, 11044 (1965)

Heating of the counter walls and the electrodes, which are in contact with the counter gas, to a higher temperature than the tritium and the filling gas, prevents condensation and therefore contamination is avoided.

**65-195**

LÜTHI U., WASER P. G.

**Low-temperature fluorography induced by tritium-labeled compounds on thin-layer.**

Nature **205**, 1190 (1965)

Contact autoradiography by mixing thin layer material silicagel G with anthracene. 0,005 μC of a tritiated compd. produces an autoradiograph on X-ray film after 1 day, at —70° C (without anthracene : after 100 days).

**65-196**

GENUNCHE A.

**Bibliography of carbon-14 measurements.**

I. F. A./C. O./21/Institute of Atomic Physics, Bucharest, Rumania, 1962.

A classified collection of literature references which appeared between 1940 and 1961 and were quoted in C. A., N. S. A., C. T., C. C. P., B. C. R. (bibliography of chemical reviews) and R. Z. (referationyi Zhurnal).

**65-197**

GENUNCHE A.

**Bibliography of carbon-14 measurements. Part 2 (1961-1963).**

I. F. A./C. O./28/Institute of Atomic Physics, Bucharest, Rumania 1964

(see abstract no. 65-196).

**65-198**

KACHANOV V. A.

**A cell for studying variations in β emission activity in volatile media.**

Zavodsk. Lab. **30**, 1147-8 (1964)

N. S. A. **19**, 525 (1965)

Design of a cell for measuring liquid and gaseous β emitters using a teflon window.

**65-199**

BARBATO L., BARBATO I. M.

**A micromethod for the simultaneous determination of carbon dioxide and its radioactivity applied to nervous tissues.**

J. Neurochem. **11** (10),.745-55 (1964)

CA **62**, 1959a (1965)

Measuring the resistance of a $Ba(OH)_2$ soln. when it absorbs $CO_2$. In a straight-line calibration curve increased resistance is plotted against radioactive counts/min. The sp. radioact. of $CO_2$ is measured against a sample of $Na_2{}^{14}CO_3$ of known sp. act.

**65-200**

BERGMAN E. N.

**A simple apparatus for long-term respiratory carbon-14 studies in ruminants.**

Am. J. Vet. Res., **25**, 848 (1964)

N. S. A. **19**, 4435 (1965)

A respiratory hood was made from a plastic tank. A pump is used to aspirate $CO_2$-free air through the hood and to a gas-sampling meter.

**65-201**

VON SCHUCHING S. L., ABT A. F.

**Carbon-14 fat oxidation test : a new method of measuring fat utilization in the human.**

Atomlight No. **41**, 8-15 (1964)

CA **62**, 1962g (1965)

The exhaled air is collected in a modified Douglas bag for 3 min. at intervals, $CO_2$ is absorbed in Hyamine hydroxide and counted in a liquid scint. counter.

**65-202**

SHREEVE W. W.

**Computer applications in metabolic studies of $^{14}CO_2$ excretion.**

(BNL-8641)

N. S. A. **19**, 5603 (1965)

Continuous analyzer of $^{14}C$ and $CO_2$ in the breath; apparatus for digitizing information from the electronic devices; digital computer analyses for calc. patient's output of $^{14}CO_2$ as cumulative per cent of $^{14}C$ dose expired with time after administration.

**65-203**

FEATES F. S.

**The rapid routine-separation and analysis of $^{14}CO$ and $^{14}CO_2$ in mixtures of low activity.**

J. Sci. Instr. **41**, 641-2 (1964)

N. S. A. **19**, 538 (1965)

Apparatus for sepn. and detn. of spec. act. of $^{14}CO$ and $^{14}CO_2$. Application to 1 $\mu$M of gas or low activities (50 dpm) with 1 % reproducibility.

**65-204**

YARDLEY H. J.

**A simplified scintillation-counting technique for assaying $^{14}CO_2$ in a Warburg flask.**

Nature **204**, 281 (1964)

N. S. A. **19**, 4084 (1965)

The $^{14}CO_2$ in a Warburg flask is assayed by trapping with filter paper moistened with KOH. The KOH is then placed in a solvent that will accomodate up to 3 % of a 25 % KOH solution with only 3 % quenching.

**65-205**

BARNABY C. F.

**Low-background Beta counters for iodine-131 sources.**

Nature **204**, 68 (1964)

N. S. A. **19**, 4504 (1965)

Two G-M counters are used in anticoincidence to determine the $^{131}I$ activity on chromatography paper. A typical counting time for determining 2 picocurie with 10 % accuracy is 204 min.

**65-206**

AGGETT J., BUNTON C. A.,
LEWIS T. A., LLEWELLYN D. R.,
O'CONNOR Ch., ODELL A. L.

**The isotopic analysis of oxygen in organic compounds and in co-ordination compounds containing organic ligands.**

Intern. J. Appl. Radiation Isotopes **16**, 165 (1965)

By pyrolysis of the compounds the oxygen is obtained as carbon monoxide or carbon dioxide for mass spectrometric analysis. Carbon monoxide can be converted to carbon dioxide by an electric discharge.

**65-207**

LAMBIOTTE M.

**Un nouveau procédé de séparation et de détection des substances tritiées : l'électrophorèse autoradiographique en couche mince de gélatine photographique.**

Comp. Rend. **260**, 1799 (1965)

Compounds of low T activity are separated electrophoretically on a photographic gelatine layer treated with a buffer. Thus separation and localisation by autoradiography in a single step is possible.

**65-208**

ROTH L. J., HANNGREN A., NORRIS W. P.

**Dry-emulsion autoradiography.**

(ANL-6906 (p. 61-4))

N. S. A. **19**, 6912 (1965)

Preparation of autoradiograms by mechanically superimposing a nuclear emulsion upon an unwetted tissue section.

**65-209**

SCHWANE R. A., NAKON R. S.

**Radioautography and scanning of thin layer chromatograms of radioactive water-soluble substances.**

Anal. Chem. **37**, 315 (1965)

The removal of thin layer chromatograms of radioactive water-soluble substances for purposes of radioautography and scanning is performed by pouring a solution of polystyrene over the developed plates and heating them to 70° C. The film can be stripped off.

**65-210**

GUILLAUME M., WARIN R.

**Demonstration of a radiometric analysis apparatus of high sensibility for gas chromatography eluants.**

Bull. Soc. Chim. Belges **72**, 686-98 (1963)

N. S. A. **19**, 320 (1965)

The radiochemical detection app. for chromatographic gaseous eluates of minute volumes is an electrolytic copper ionization chamber. Measurement of the current is made by means of a vibrating-reed electrometer. The sensibility of the whole reaches 1000 dpm + 500 with $^{14}C(C^*H_3OH)$ and 15,000 dpm with $^{3}H(C_2H_5CH_3^*)$.

**65-211**

JAMES A. T., HITCHCOCK C.

**An improved gas-liquid radiochemical chromatogram for C-14 and tritium.**

Kerntechnik **7**, 5 (1965)

In an improved gas-liquid radiochemical chromatograph the effluent from the column is converted to carbon dioxide and hydrogen. Less than 1 μg of fatty acid ester are easily detected. A method for the localisation of radioactivity in the fatty acid molecule depends on controlled oxidation to a mixture of homologuous fatty acids followed by radiochromatography.

**65-212**

CONWAY W. D., GRACE A. J.

**Liquid scintillation counting errors due to oxygen-quenching of samples prepared by the oxygen-flask combustion procedure.**

Anal. Biochem. **9**, 487-9 (1964)

N. S. A. **19**, 7597 (1965)

Two methods found for equilibrating the counting samples with air are described.

**65-213**

GOMM P. J., EAKINS J. D.

**A low background liquid counter and its application to bioassay determinations.**

AERE-R-4645, 8 pp. (1964)

CA **62**, 3043c (1965)

Development and performance, for detg. β-emitting radionuclides in soln., for routine analysis of urine samples containing $^{32}P$ or other single β-emitters. No chem. sepn. or prepn. is required.

## 4.3 — Radiochem. Methods for Analysis of Complex Compounds

**65-214**

CHATTOPADHYAY D. P., MOSBACH E. H.

**Determination of dihydrocholesterol in serum.**

Anal. Biochem **10**, 435 (1965)

CA **62**, 9448e (1965)

Serum sterols, predominantly cholesterol and dihydrocholesterol, react quant. with acetic-1-$^{14}C$ anhydride. Sepn. by thin-layer chromatography on $AgNO_3$-silicic acid plates.

**65-215**

ALIPRANDI B., CACACE F., CIRANNI G.

**Gas chromatographic and isotope dilution analysis of isomers formed on mononitration of benzoic acid.**

Anal. Chem. **36**, 445 (1964)

N. S. A. **19**, 4066 (1965)

Combination of the isotope dilution method with preparative-scale gas chromatography for analysis of complex reaction mixtures, e.g. in the analysis of the isomers formed on mononitration of benzoic acid. Comparison with a conventional gas chromatographic analysis.

**65-216**

COPINSCHI G., CORNIL A.,
FRANCKSON J. R. M.

**L'oxydation bismuthique des corticostéroïdes urinaires : application à la mesure de la sécrétion de cortisol par dilution isotopique.**

Clin. Chim. Acta **11**, 346-353 (1965)

The main steps are a bismuthate oxidation of the urinary metabolites of cortisol, an alumina column chromatography and the detn. of the spec. act.

**65-217**

BAXTER B. H., HORSLER A. F. C.

**Isotope effects in the infra-red spectra of some carbon-14-labeled acids— an ester and sodium salt.**

Nature **204**, 675 (1964)

N. S. A. **19**, 5938 (1965)

Attention is directed to possible errors due to isotope shifts that might arise in purity determination of $^{14}$C-labeled compounds by infrared spectrometry.

## 5 — MISCELLANEOUS

**65-218**

BOROWITZ J. L., SAMUEL D,
STECKEL F.

**Research with the isotopes of oxygen ($^{15}$O, $^{17}$O and $^{18}$O) during 1961-1963)**

Intern. J. Appl. Radiation Isotopes **16**, 97 (1965)

This is the second supplement to the Bibliography of the Stable Isotopes of Oxygen. Owing to the increasing use of radioactive oxygen-15 as a tracer in physiological and medical studies, work with this isotope has also been included. Research on nuclear reactions of $^{17}$O and $^{18}$O has been listed whenever this appears to have analytical applications. The supplement consist of a Subject Index and an Author Index.

**65-219**

FREIE UNIVERSITAET BERLIN

**Nuclear medicine bibliographies.**

Radionuclides in Clinical and Experimental Oncology (1964) (AED-C-10-02)

N. S. A. **19**, 4018 (1965)

The references are arranged into sections dealing with tumor therapy and diagnosis, metabolism of tumors, experimental tumors, carcinogens in animals and humans, labeled cartinogens, labeled chemical therapeutics, etc. An author index is included.

**65-220**

MORF R.

**Synthesis and labeling of carotenes and carotenoids.**

Finaka Kemistsamfundets Medd. **73** (1964), 68. A lecture

CA **62**, 4066d (1955)

**65-221**

PERLMAN D., BAYAN A. P.,
GIUFFRE N. A.

**Microbial processes for preparation of radioactive compounds.**

Advan. Appl. Microbiol. **6**, 27 (1964)

CA **62**, 8351e (1965)

**65-222**

WAGNER H. N., Jr.

**Pharmacological principles in the development of radiopharmaceuticals for radioisotope scanning.**

p. 16-29 of « Scintillation Scanning in Clinical Medicine. »

N. S. A. **19**, 5741 (1965)

Advantages and disadvantages of specific radiopharmaceuticals are presented for radioisotope scanning of thyroid, kidneys, liver, spleen, and brain.

**65-223**

CHEVALLIER A.

**Preliminary remarks on the study of radioactive colloids.**

Translated from Minerva Nucl. **7**, 439-41 (1963) (NP-tr-1197)

N. S. A. **19**, 8997 (1965)

Description of the basic characteristics of radiocolloids on which their utility for diagnostic and therapeutic purposes depends.