or machines for man. In this area fall the problems of food, hygiene and sanitation, clothing, transportation, and community planning.

The *engineer-physiologist problems* regarding food (exclusive of the production of food that would be the province of the agricultural engineer) are related to food storage, processing for Arctic use, preparation, packaging, messing facilities, and special rations (pemmican and others) for emergency use. Problems in hygiene and sanitation include water supply, sewage disposal, housing (heating, ventilating, humidity control), laundry requirements, and the like. Humidity control in the dry, cold climates is an important problem, for in the usual condition which exists in northern houses the heated dry air causes the upper respiratory passages to become dehydrated. Not only is this very annoying, but it also makes one more sensitive to invasion of infectious agents when these agents happen.

The engineer-physiologist team must also attack problems of devising and improving transportation vehicles from the standpoints of operation design, maintenance convenience, and human factors in the vehicle design—heating, vibration control (for riding over rough tundra, sastrugi, and ice), noise elimination, removal of noxious gases, comfort, and safety aspects. The design and development of the best clothing for over-all use also demand the cooperation of the engineer and the physiologist.

Finally, for community planning, whether the community be a mining camp, an aerodrome, or a sizable village, the problems demand a combined attack by the human ecologist, the engineer, and the geographer.

To the writer, the essential and demanding requirement that the various disciplines of science and technology work together is one of the most exciting aspects of research in polar regions.

A System of Nomenclature for Isotopic Compounds

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THE RAPIDLY INCREASING AVAILABILITY of isotopes of the common elements, both iradioactive and stable, makes it a certainty that research studies will soon involve the synthesis and utilization of many compounds containing abnormal concentrations of isotopes, usually in definite positions in the molecules. At the present time there is no general system of nomenclature for such compounds (with the exception of those containing deuterium), and therefore they are identified by structural formulas and by textual description.

Deuterium compounds are named in this country by the modified Boughton system, this convention having been established by the American Chemical Society in cooperation with representatives of the American Physical Society (E. J. Crane. *Science*, July 27, 1934, pp. 86–89). Under this system of nomenclature the position and number of deuterium atoms in the molecule are indicated in the name itself by the suffix -m,n, . . .-d_r, where m and n are the positional numbers of deuterium atoms in the molecule or portion of the molecule and r is the number of deuterium atoms per molecule.

Several considerations seem pertinent concerning the establishment of a general system of nomenclature for isotopic compounds:

(1) The system of nomenclature should be applicable to all isotopes.

(2) For indexing purposes, as well as for clarity and convenience, the name of the isotopic compound should be very similar to that of the normal one.

(3) The position or positions in the molecule of the isotopes present in abnormal concentration should be indicated.

(4) Compounds containing isotopes in any abnormal concentration should be named by this system, rather than only those containing isotopes in essentially 100 per cent concentration, since for tracer purposes radioactive isotopes or stable isotopes in relatively small concentrations may be used.

The importance of point 4 is considerable. It is unlikely that isotopes other then deuterium will soon be available in high purity. Moreover, the ratios of isotopic masses of other elements are much smaller than the ratio of those of hydrogen. Any differences in physical properties or chemical reactivity between normal compounds and those containing pure isotopes of other elements would therefore be much less marked than the differences obtainable with hydrogen isotopes. As a consequence, interest in pure isotopes other than deuterium should be small. Yet the synthesis and use of isotopic compounds involve very specialized problems whether the compounds contain an isotope in 100 per cent purity or not, and convenient reference and indexing in all such cases will be important.

These ideas were probably considered by the American Chemical Society Committee on Nomenclature, Spelling, and Pronunciation, for in its report on nomenclature of deuterium compounds (E. J. Crane. *Ind. eng. Chem.* (News ed.) 1935, **13**, 200) this statement is made: "If compounds of tritium are eventually made, they can readily be named in like manner, 't' being used as is 'd'

in the Boughton names for deuterium compounds." Obviously, it is not inferred that such compounds would contain 100 per cent tritium atoms at a particular position in the molecule. It would seem entirely practical to name a compound to indicate abnormal isotopic concentrations and to specify the isotopic purity in the text in the same way that purities of ordinary chemical compounds are given.

As a beginning for consideration of the establishment of a general system of nomenclature for isotopic compounds, it is suggested that the system for deuterium compounds now in use in the United States be extended by using the suffix -m,n, . . . -i_r^p, where m and n are the positional numbers or Greek letters commonly used for indicating the locations of substituents (in this case used to indicate the positions of an isotope in the molecular skeleton), i is the element symbol in lower case letters[1] of the isotope in abnormal concentration, p is the mass number, and r is the number of atoms in the molecule containing abnormal concentrations of the isotope i^p. As with deuterium compounds, it may be necessary for clarity to follow names of atomic groupings (methyl, ethoxy, etc.) with the proposed suffix. A few examples of this system of nomenclature are shown in Table 1.

It will be seen that, in general, when the Geneva system of nomenclature applies, this system is applicable also. There are a few exceptions, such as the following:

$$C_6H_5N{=}N^{15}{-}C_6H_4Br$$

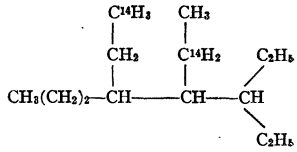
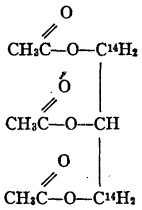
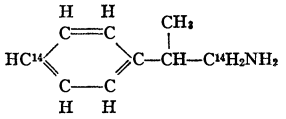
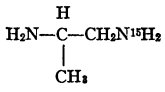
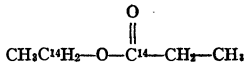
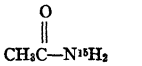
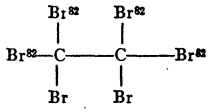
$$CH_3C(=O)-O^{18}-C_2H_5$$

where one of two atoms of an element in a functional group is isotopic and the functional group is ordinarily expressed as a whole. These situations could perhaps be solved by extending the accepted system of nomenclature in some degree. For instance, the azo compound might be referred to as p-(phenylazo-α-n^{15})-bromobenzene and the ester as a ketone, methyl ethoxy-o^{18} ketone, hence

$$CH_3C(=O^{18})-OC_2H_5$$

would be methyl ethoxy ketone-o^{18}. However both of these instances, and particularly the second, involve fundamental departures from, or extensions of, the present nomenclature and are presented here only to demonstrate that solutions to such problems can doubtless be found.

TABLE 1
EXAMPLES OF NAMES OF ISOTOPIC COMPOUNDS

2-butene-1-c^{14}	$CH_3{-}CH{=}CH{-}C^{14}H_3$
2-propen-1-c^{13}-1-ol	$CH_2{=}CH{-}C^{13}H_2OH$
3-ethyl-4-(ethyl-α-c^{14})-5-(ethyl-β-c^{14})-octane	
1,2,3-triacetoxypropane-1,3-c^{14}	
β-phenyl-4-c^{14}-propyl-α-c^{14}-amine	
hexadecanoic-6-c^{14} acid	$CH_3(CH_2)_9C^{14}H_2(CH_2)_4COOH$
ethanoic-2-c^{13} acid (acetic-α-c^{13} acid)	$C^{13}H_3COOH$
1,2-propanediamine-1-n^{15}	
ethyl-α-c^{14} propanoate-1-c^{14}	
acetamide-n^{15}	
hexabromoethane-1,1,2,2-br^{82}	

1. The sixth compound above was recently referred to by long descriptive name: "hexadecanoic acid labeled at carbon atom six with carbon fourteen" (William G. Dauben. Abstracts, Atlantic City Meeting, American Chemical Society, April 1947, p. 5M).

2. The seventh compound above was recently referred to as "acetic acid containing isotopic carbon in the methyl group" (H. S. Anker. *J. biol. Chem.*, 1946, **166**, 219).

3. The same principle could be applied to the new Dyson system of notation (G. Malcolm Dyson. Lecture, Royal Institute of Chemistry, London, 1946) for organic compounds, *i.e.* the isotope notation would immediately follow the "operation" which first refers to the atom or atoms in question. From our limited knowledge of the Dyson system it would appear that the use of a colon to set off the desired symbols is feasible. Thus, the third example above would be C8.3,4,5C2:11,14C14, the seventh would be C2:2C13.X, and the last would be C2.1,1,1,2,2,2BR:1,1,2,2BR82.

[1] Although the use of lower-case letters is consistent with the deuterium system of nomenclature, there is doubt in the minds of the authors as to whether the symbols of other elements should likewise be in lower-case letters, since this represents a more abrupt departure from convention. Also, confusion may result when lithium, lanthanum, or lutecium are involved, since a lower-case "l" may be confused with the numeral "1". However, this very departure may serve to draw attention to the fact that a special nomenclature is being used.

On the other hand, if a compound is generally referred to by a common name and cannot be conveniently characterized by the Geneva system, the use of the suggested nomenclature becomes simple only when the atoms of a particular element are isotopic in all positions of that element in the molecule. This situation will undoubtedly be frequent; some examples are: tyrosine-n^{15}, thyroxine-i^{131}_4, cystine-s^{35}_2, ergosterol-o^{18}, fructose 1,6-diphosphate-p^{32}_2.

It is hoped that these ideas will initiate further studies on this nomenclature problem so that publications in the near future which are concerned with isotopic compounds may be indexed conveniently and consistently.

NEWS *and Notes*

The fires which swept through Bar Harbor, Maine, this past week totally destroyed the Roscoe B. Jackson Memorial Laboratory for Cancer Research. C. C. Little, director of the Laboratory, reported to *Science* that the replacement value of the buildings, library, equipment, and mice is approximately $500,000. Little of this was covered by insurance. In addition to destruction of the Laboratory itself, the staff suffered almost complete loss of personal property. The summer student colony equipment was likewise consumed by the fire. An ABC announcement on Sunday, October 26, stated that the Damon Runyon Memorial Fund for Cancer Research is giving $50,000 immediately toward reconstruction work. Dr. Little indicated that less than 100 of the pedigreed mice were saved and that these are in scattered strains which cannot be identified. Because of exposure to fire and heat, those rescued are in very poor condition.

The staff is already making plans for renewing its work. Scientists everywhere may assist in rebuilding the library by sending pertinent reprints in the fields of genetics, embryology, cancer research, and experimental biology and medicine, and by advising the Laboratory about strains of mice from which extra litters are available for beginning the breeding work.

The Nobel Prize in Medicine was awarded jointly on October 23 to Carl F. Cori and his wife, Gerty T. Cori, of Washington University, St. Louis, and to Bernardo A. Houssay, of the Instituto de Biología y Medicina Experimental, Buenos Aires. The Coris, who received the Prize for their discovery of the "mechanism of enzymatic synthesis of glycogen, or animal starch" through the isolation of the enzyme, phosphorylase, are the third husband-wife team to be so honored, having been preceded by Pierre and Marie Curie (physics) and Frederick and Irene Curie Joliot (chemistry). Dr. Houssay, a diabetes specialist, who will receive half the Prize ($24,460.50), was honored for his "discovery of the significance of the hormone produced by the frontal lobe of the hypophysis."

AAAS–UNESCO Fellowships

These are anxious days for scientists. These are worried days for everybody who thinks about the future. The membership of the AAAS, the readers of this journal, know that everything possible should be done to maintain international peace and stability. Europe's economic distress, our own jittery struggle with prices and wages, our growing suspicions of Europe's policies and plans, and the feeling, in once friendly Europe, against "comfortable America" are bad, but still they are trivial compared with the social upheavals that would be inevitable throughout the world if a new bombing and poisoning war should build up out of international ill will and misunderstanding.

What can we do? We can work for international good will and tolerant understanding. Every group that has examined the situation reports that the liberal exchange of key personnel among the nations is one of the surest ways of attaining the goal. And scientific exchanges must rank high, because the scientist is so readily and naturally international and peacefully cooperative. The United Nations, UNESCO, the National Research Council's UNESCO Committee, the various associations of scientific workers, and many other groups are on record as to the high importance of scientific interchanges. Traveling politicians are frequently viewed with alarm; traveling merchants may be suspected of working for special interests rather than for the world at large. Scientists, scholars, and artists, however, are relatively clear of suspicion; they are heartily welcomed nearly everywhere.

I am inviting you to help in arranging for some important exchanges. We know that hundreds of advanced students of science in Europe, Asia, and elsewhere are at this moment desirous of continuing their specialized training at the educational institutions of other countries, especially America. Unfavorable monetary exchanges, high traveling costs, and the high price of living in America have made it impossible for most of these gifted students to carry through a plan that should serve science, serve their native countries, and promote international understanding.

At a recent meeting, the Executive Committee of the AAAS endorsed enthusiastically the proposal of its newly formed Subcommittee on International Relations that funds be raised to provide special international fellowships for the next two or three years, to be administered with the assistance of UNESCO and to be known as AAAS-UNESCO Fellowships.

Our Association does not have accumulated resources that can be used for such fellowships. I am authorized to appeal to the membership of the Association, and to the readers of this journal, for contributions for the establishment of the Fund. Although I would not want to discourage large contributions (in fact, many will be necessary), it will be most satisfactory if the major support of the AAAS-UNESCO Fund comes from a very