"Population and Food Supply" and "Permanent Agriculture, Population Restriction and National Progress' will give pause to those optimists, who are so, because they ignore facts. Professor East has done notable service in bringing the pertinent facts together in such concise fashion, and in driving them home with all the force of a very clear style. It is true he asks us to take some of his facts on faith, but the tone of his whole discussion rings true, and those of us who have given some attention to the study of the same matters know that his facts are facts, not guesses or surmises.

The chapter on "Racial Prospects and Racial Dangers" effectually disposes of such inaccurate vaporings as those of Lothrop Stoddard in his "Rising Tide of Color." Here, too, he makes concrete application of what genetics has to teach about race mixtures. His discussion of the race problem in the United States is scarcely convincing, but it deserves attention.

The chapter on the "Rôle of Death in the Drama of Life" seems rather superfluous. Such matter as is germane to the general argument could have been discussed under Public Health. The chapters on Birth Restriction and Public Health and The Birth Rate and Social Progress, drive home the truth that only by properly controlled population growth can we hope to make any real progress in social improvement. Without restriction of birth, we will soon be so driven by pressure upon the limited means of subsistence that no forward movement will be possible, and unless this restriction is directed intelligently, the quality of the people is sure to decline. One may feel less certain of the value of the methods now available for picking out the better stock than Professor East does (mental tests in general, and Army tests in particular) and yet agree with his general conclusion regarding the necessity for intelligent selection.

One is also glad to note that he does not assume that modern medicine and charity have entirely eliminated natural selection from the social process as so many biologists, perhaps one should say eugenists, seem to hold. Selection among men has always had an artificial (social) element in it and this element is not greatly changed in intensity to-day from what it was two or three centuries ago.

Other good points are the recognition of the vital rôle of social influences in individual and group development; the realization that there can never be a sound eugenics so long as the rapid breeding of better stocks to replace poor stocks is its sole aim; the emphasis upon the fact that there is much good ability in all classes of the population; the strong faith in the ability of man to control his own destiny; the consequent belief in the efficacy of education; and the conviction that a high type of family life lies at the root of any sound social order.

It is impossible, however, to do justice to the general excellence of this book by trying to give a notion of its contents. It is easily the best book on the practical aspects of our quantity and quality population problems that has appeared in America. It is written in a clear forceful style which proves that science need not be dry as dust to be truthful. It represents the gathering together of an enormous mass of facts, and such a complete assimilation of these facts that the conclusions may seem too little based on evidence to one unfamiliar with this field. A less thorough assimilation and a less skillful presentation would, however, only have wearied the reader with details, without carrying as much conviction.

It is a book no one interested in social problems can ignore.

WARREN S. THOMPSON

MIAMI UNIVERSITY

ORGANIC CHEMICAL TRANSFORMATIONS

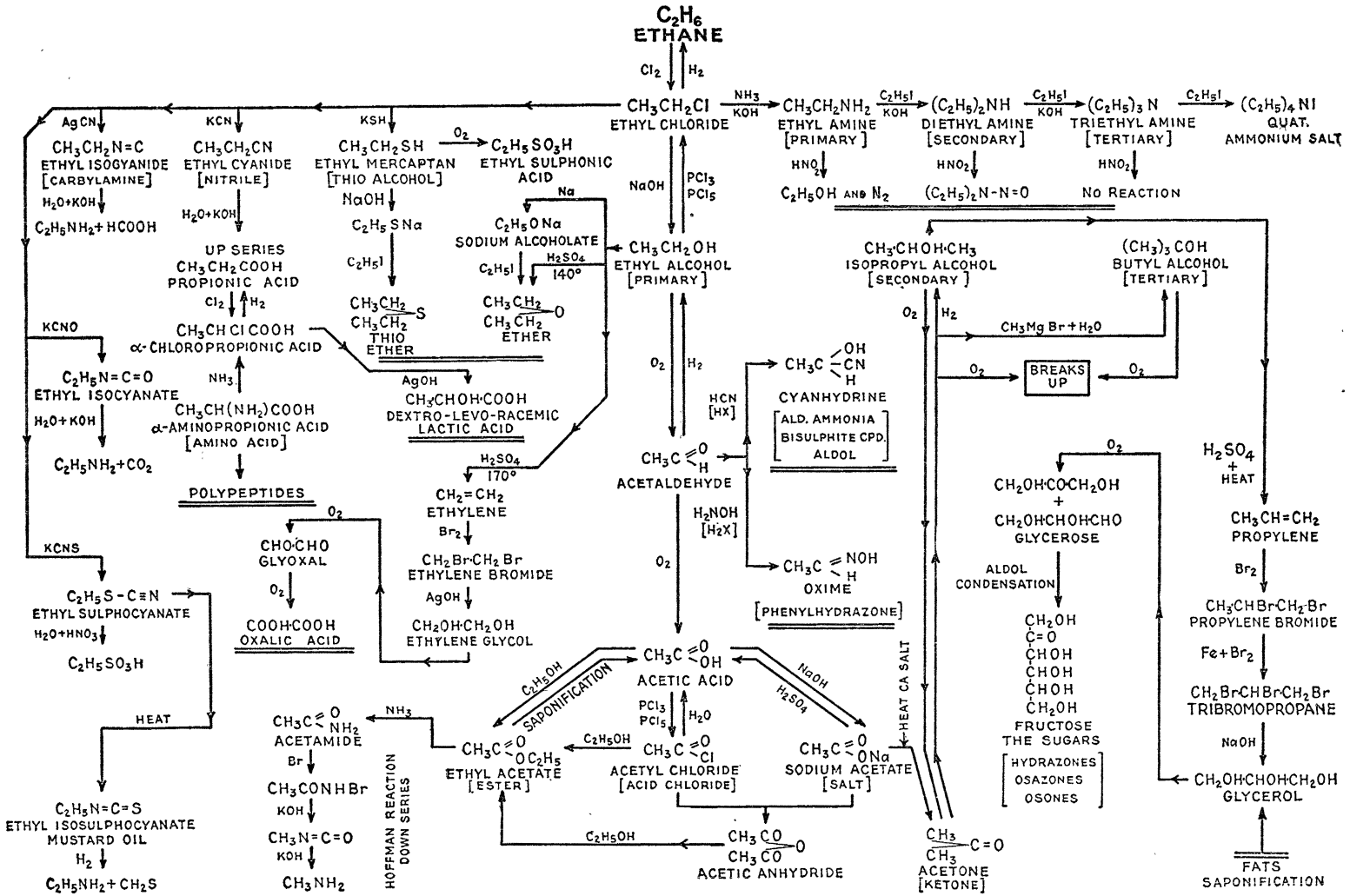
IT is the belief of the writers that the most important thing in the teaching of organic chemistry is to make the student understand the fundamental relations existing between the different classes of organic compounds. To this should be added a knowledge of the typical reactions which these compounds undergo. Only when he has attained this point of view does he begin to see the truly remarkable order which in reality prevails among the mass of material which is presented to him; and only when he appreciates this order will he make good progress in the subject.

As a result, the charts which accompany this introduction were elaborated, with the aim of presenting these fundamental relations and typical reactions in as concrete a form and as small a space as possible.

In the first or aliphatic series chart, the starting point is the basic hydrocarbon ethane, and from this it is possible to pass to every other compound indicated, by following the arrows. The reagent required to effect each change appears upon the arrow showing that change. Ethane was chosen as the starting point because its derivatives are relatively simple. Methane is not suitable, because the reactions of its derivatives present too many exceptions to the general rules holding for those of its higher homologues. The chart includes methods for passing up and down the series, and references to optical activity, amino acids and sugars.

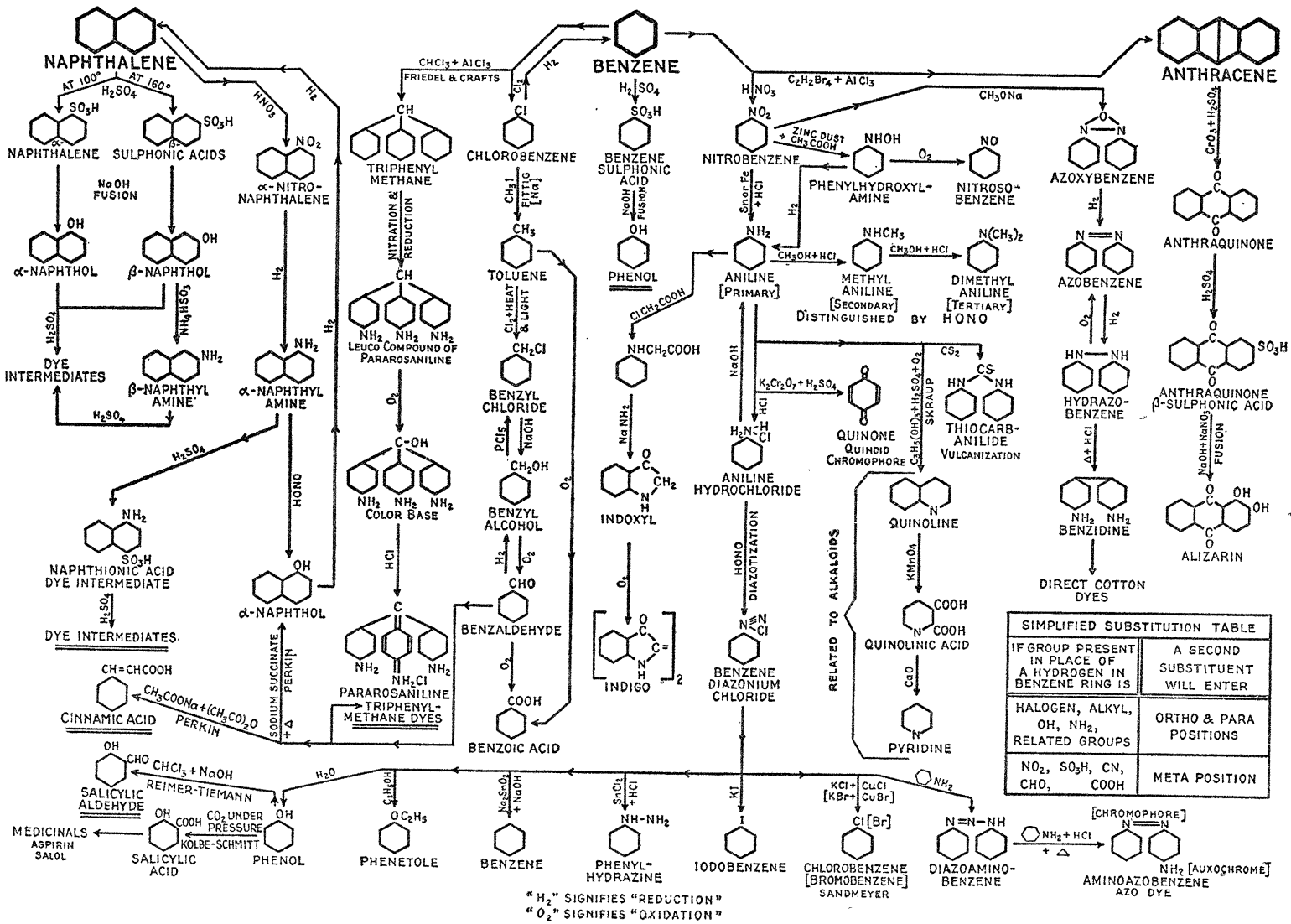
In the aromatic series chart, the basic hydrocarbon is, of course, benzene, supplemented by naphthalene and anthracene. It is possible to pass from benzene to every other compound shown on the chart. In this series the vast number of important derivatives present a real difficulty, which has been obviated in part

ALIPHATIC SERIES



"H_2" SIGNIFIES "REDUCTION"
"O_2" SIGNIFIES "OXIDATION"

AROMATIC SERIES



by presenting, essentially, only the monosubstitution products of benzene. Reference is made to several types of dyes, including the azo, benzidine, triphenyl methane, indigo, alizarin and naphthalene varieties. Reference is also made to certain medicinals, and to pyridine and quinoline, as related to the alkaloids. A simplified substitution table is included.

It is hoped that the charts may be of a certain service to the teacher as an aid to the presentation of his subject; and as a help to the student to fully appreciate that presentation. It is further designed to aid the student in reviewing his work, and in comprehending it as a whole, as well as in its component parts.

Realizing that it is virtually impossible to include all compounds or all reactions which are of importance, in a classification such as they are presenting, the writers will appreciate any constructive criticism from teachers of organic chemistry, by means of which the charts may be made more useful.

These may be obtained in any quantity, in a folder including both, from D. Van Nostrand & Company, New York.

LUCIUS A. BIGELOW
KURWIN R. BOYES

BROWN UNIVERSITY

SPECIAL ARTICLES

A SATISFACTORY RATION FOR STOCK RATS

As long as actual feeding trials must serve as the means for determining the nutritive sufficiency of rations, laboratory animals such as the rat, rabbit, dog and guinea pig will always be used in large numbers for this work as well as for cultural work in bacteriology, for pathology, immunology and kindred sciences. For this reason anything which can be done to facilitate the breeding and maintenance of these animals in sufficient numbers and in excellent condition will often free the laboratory worker from much uncertainty with respect to maintaining the continuity of his researches.

The writer has been especially impressed with the desire for information in regard to rat culture as brought out by the numerous inquiries received in the last five years for a ration formula satisfactory for rats. From the character of much of the experimental work reported from different laboratories it also is evident that many of the rat-feeding experiments are now being carried out on rats not entirely suitable for the various problems under investigation. This is true by virtue of the fact that most young rats are undersized, due to limited milk production of the mother causing them to not only partially starve but also to eat excessively of the mother's ration before their time. The rations on which they are kept are often too low in good proteins, too low in calcium, sodium or chlorine or too low in the fat-soluble vitamines. The trouble may not always be on the deficiency side, however; the ration may contain too much indigestible material, too much protein, and sometimes even too much fat-soluble vitamines, the latter not inhibiting growth but causing excessive storage which is very disturbing in experiments designed to test for these constituents.

In spite of the need for a good economical rat ration practically nothing appears in the literature to meet the situation. In view of this the writer sees fit to publish the composition of his stock ration, which, finely ground and fed with fresh whole milk and water in separate containers ad libitum, has given him excellent results for a number of years. It is constituted as follows:

Yellow corn	76.0
Linseed oil meal	16.0
Crude casein	5.0
Ground alfalfa	2.0
Sodium chloride	.5
Calcium carbonate	.5

From the theoretical standpoint it would be best to have different rations for growth, for reproduction and lactation and for maintenance, but that is a refinement which probably is not practical under most laboratory conditions, as most of the animals are either growing, reproducing, lactating or recuperating from the strain of the latter, all of which conditions require a ration with a narrow nutritive ratio. As to whether or not the requirements are satisfactorily met is best indicated by the ability of the mother to withstand the strain of reproduction repeatedly and by the growth of the young. With this we have had absolutely no trouble. The females are kept for breeding purposes for a year with no signs of premature senility, and the young average in at least 90 per cent. of the litters 40 to 55 grams in weight at an age of 23 days; in fact, when they weigh less at this age we discard them as unsuitable for experimental work.

When milk is omitted from the ration the results are not as satisfactory. This is due to a number of factors. In the first place, the content of available fat-soluble vitamines is not sufficient. This we have remedied by the addition of one to two per cent. of cod liver oil, but it leaves the ration less satisfactory when the rats of the colony are to be used for work on these vitamines. In the second place, the calcium content is too low; in fact, even with milk included in the ration, the calcium is not too high for optimum results. We have purposely kept the calcium added as carbonate low because it is apparently not the best salt to use in