come more and more specific whenever possible, the employers of cuckoo words become more and more abstract. Onward and upward we are carried until at last we are left floating about a cuckoo-land of verbalisms, flattered perhaps at having risen so high but utterly at a loss to know where we are.

Please, no more "space-time frame of reference" . . . "the manner of theoretical-factual construction that can be studied in the line of progress" . . . "liberation from traditional philosophic-linguistic conventions" . . . "framework of the best-formulated evolutionary naturalism."

These leave me flattered but utterly lost.

AARON APPLEBY
William Douglas McAdams, Incorporated
New York

Destruction of our Cultural Heritage

WITH a widespread program planned or already under way in the vast Missouri Basin, as well as in the Ozarks region of Missouri and Arkansas, for construction of flood-control reservoirs and hydroelectric dams by the U. S. Corps of Engineers, serious thought should be given to a program of scientific research that has as its aim a complete, cooperative study of the historical, archaeological, geological, and botanical resources of the areas to be inundated. There has been no joint scientific study by the interested agencies to determine if these dams are really the most satisfactory and most economical answer to the problem of river control and electric power production. The Corps of Engineers has, in most instances, gone ahead with construction without advice and without the scientific information that is available on the rivers involved.

Science can play an important role in the planning of adequate river control and utilization. For example, Weather Bureau records on the climatic conditions of a given area rarely go back more than 60 or 70 years. Careful examination of available historical documents as to climate and river conditions may carry the record back another hundred years, although such information also is scanty and incomplete. Yet, the rivers in the Missouri Basin and in the Ozarks, such as the Missouri, Osage, White, Current, Eleven Points, and others, have been the scene of human occupation for 10,000 years—perhaps longer. Through archaeological research, information can be obtained as to how these early people lived with respect to the rivers, and how stream and climatic conditions changed and varied over thousands of years. Such information, provided through scientific research, could give river planners a tremendous amount of highly valuable data that cannot be obtained from any other source. To plan the control of a river intelligently, engineers must know how that river has acted and what it has done over as long a period as possible. Yet, under the present system, dams are being constructed and reservoirs are being formed that are flooding the only—and the last—information available as to the past history of these midcontinent waterways. Present river planning is based largely upon inadequate information and guesswork.

In the recently completed Bull Shoals Reservoir area on the White River in Missouri and Arkansas, some 400 archaeological sites were located by scientists from the University of Missouri and Arkansas University. Even this number is little more than a fraction of the total, and only three or four of the known sites were partially excavated. Funds were not available to either university to make a more thorough study of the region. No historical research was done in the Bull Shoals district, and very little botanical exploration. Thus we have an area in the center of the Ozarks, covering thousands of acres, about the prehistoric and historic inhabitants of which we have almost no knowledge. Future archaeological and historical research in the Ozarks will suffer because of this void in cultural knowledge. We cannot go back now and learn more, for the Bull Shoals Reservoir site will be inundated for an incalculable period of time.

With the Congress of the United States appropriating hundreds of millions of dollars for the continued construction of flood-control and hydroelectric dams, some provision should be made for the adequate study and preservation of the archaeological, historical, botanical, and geological records about to be destroyed. One half of 1 per cent of the money spent on the construction of Bull Shoals Dam would have been enough to conduct many such essential scientific studies. And, from such study, it would have been possible for the Corps of Engineers to acquire vitally important information upon the past behavior of White River and to plan the project more intelligently. In addition, Missouri and Arkansas would not today be in the dark as to the ecology of the men, plants, and animals that once lived in the inundated area. Archaeological research, carried on in close cooperation with geological, botanical, and historical studies, can contribute much important knowledge to our present-day planners and to future generations. Only by studying the past can we hope to cope intelligently with the future.

The people of the United States, especially those engaged in scientific pursuits, should exert their influence to see that in future river projects we will not destroy critical relics of our cultural heritage.

MARVIN E. TONG, JR.
Committee on the Pomme de Terre Basin, Springfield, Missouri

Interrelation of Succinic Acid Dehydrogenase with Apodehydrase and Codehydrase[1]

ALCOHOL dehydrogenase and, as we have found, succinic acid dehydrogenase require for their action the presence of a codehydrase, diphosphopyridine nucleotide. Theorell and Bonnichsen (*1*), working with crystallized alcohol dehydrogenase from horse liver, established that the coenzyme is bound by its pyridine

[1] The technical assistance of Friedrick Roewer is gratefully achnowledged.

ring to a sulfhydryl group of the apoenzyme. In our experience, apodehydrase and codehydrase form an easily dissociatable system. Fully activated succinic acid dehydrogenase from mouse liver is completely inactivated by diluting the liver homogenates twenty times. The reduction of triphenyl-tetrazolium chloride (TTC) to formazan and the reduction of methylene blue to its leuco base were used as tests for enzymatic action. Similar inactivation by dilution takes place in the system alcohol apodehydrase from yeast that had been activated by the coenzyme. The activity of the enzyme that was lost by dilution is again restored to its full value by the addition of excess codehydrase. There exists a dissociation equilibrium between apoenzyme and coenzyme which changes in relation to concentration, and which corresponds to the respective enzymatic activities. Apodehydrase and codehydrase are therefore bound differently than is cytochrome *c* to its complementary protein (*2*).

ERNST WALDSCHMEIDT-LEITZ
HELMUTH SPRINZ

Hepatitis Research Laboratory, 98th General Hospital, U. S. Army, European Command

References

1. THEORELL, H., and BONNICHSEN, R. *Acta Chem. Scand.*, **5**, 1105 (1951).
2. THEORELL, H. *Biochem. Z.*, **301**, 201 (1939); THEORELL, H., and AKESSON, A. *J. Am. Chem. Soc.*, **63**, 1804, 1818 (1941).

An Index of Educational Qualifications of a Faculty

SEVERAL years ago the writer compared the formal educational qualifications of the faculties of corresponding departments of two similarly organized colleges during the preceding decade. From a study of data compiled from catalogues and bulletins issued by the two institutions, it was apparent that the formal educational qualifications at one college were superior to those at the other, but the comparative trends at the two colleges were not so evident. In an attempt to show the comparison more clearly, two indexes (Table 1) were tried.

TABLE 1

INDEXES OF FORMAL EDUCATION

(B = bachelors, M = masters, D = doctors)

$$\text{4–5–7 Index} = \frac{(4B + 5M + 7D)}{7(B + M + D)} \times 100$$

$$\text{1–2–4 Index} = \frac{(1B + 2M + 4D)}{4(B + M + D)} \times 100$$

The 4–5–7 index is based simply on the total number of collegiate years generally required for each of the three academic degrees, but, in order to give more weight to advanced degrees, the 1–2–4 index was tried. Qualitatively, the comparison and trends were similar with both indexes, but the 1–2–4 index brought them out more clearly. Consequently, and for the sake of brevity, only the 1–2–4 index will be considered here.

Since the data used in the study were unofficial and were subject to some error in compiling and processing, assumed data will be used for illustration. Accordingly, synthetic data for corresponding departments of two hypothetical colleges are given in the first four columns of Table 2. For both departments the resulting calculated 1–2–4 indexes are shown in the fifth column.

TABLE 2

FORMAL EDUCATION OF TWO FACULTIES

Year	Bachelors	Masters	Doctors	1–2–4 Index
	College 1, Department X			
1937	1	6	10	77.9
1938	0	6	11	82.3
1939	0	6	12	83.3
1940	0	6	13	84.2
1941	0	5	13	86.1
1942	0	4	13	88.2
1943	0	4	13	88.2
1944	0	3	15	91.7
1945	0	3	16	92.1
1946	0	3	16	92.1
	College 2, Department X			
1937	3	5	6	66.1
1938	3	5	7	68.3
1939	2	6	8	71.8
1940	2	6	9	73.5
1941	2	5	10	76.5
1942	2	5	8	73.3
1943	2	6	7	70.0
1944	2	7	7	68.7
1945	2	8	7	67.6
1946	3	8	6	63.2

The data given in the first four columns of Table 2 show that formal educational qualifications at College 1 are superior to those at College 2. A brief inspection of the calculated 1–2–4 indexes given in the fifth column of Table 2 will serve to show clearly the trends at the two colleges and the comparison between the trends. These relations are shown more concisely in Fig. 1.

In this paper, the expression "formal educational

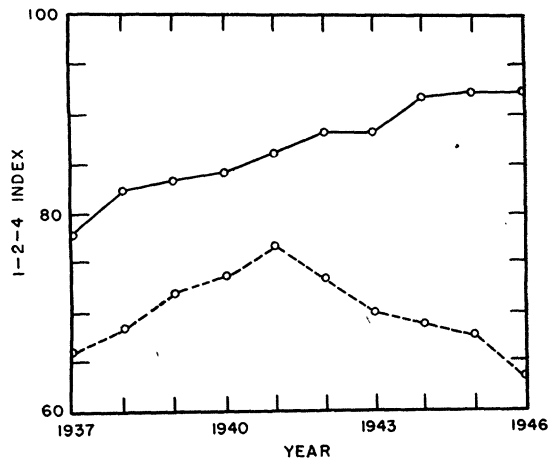

FIG. 1. 1–2–4 Indexes of formal education: solid line for Department X of College 1; broken line for Department X of College 2.