Table 1. Approximate composition of component X_2. Each value was averaged from the results of three experiments.

Component	Amount (%)	Range
Protein	76.5	75.4–78.1
Lipid	23.5	21.9–24.6
Sterol ester	6.8*	6.4– 7.0
Triglyceride	18.8*	18.0–20.0
Sterol	6.2*	5.4– 7.0
Phospholipid	68.2*	66.0–69.6

* Percentage of the lipid component.

those of components X_1 and X_2 of the serum. In the egg yolk, these molecules are linked together as aggregates. Such aggregates are readily dissolved by addition of high concentrations of NaCl (5 percent) or low concentrations of $CaCl_2$ (less than 1 percent). Sodium chloride provides a solubilizing medium because of its high polarity; calcium probably acts by forming combinations with the phosphorus groups, rendering them inaccessible for further complexing. The dense lipoprotein, when it is encountered alone, seems to be identical with the water-soluble material in egg yolk which is commonly referred to as "livetin."

The demonstration of very similar two-component systems in both egg yolk and serum from estrogen-treated birds indicates the probability of a common origin of the protein in these biological materials. It is reasonable to suppose that most of the X_1 (phosphoprotein) and X_2 (lipoprotein) molecules in the serum are destined to be deposited in the egg yolk (phosphoprotein and lipoprotein usually occur in the same relative proportions in both systems). But this occurs as the protein is modified both in physical and in chemical form. The differences between the X_1 component of serum and the phosphoprotein of egg yolk appear to be that the X_1 component of serum is a soluble and discrete substance heavily complexed with calcium; the phosphoprotein of egg yolk is largely insoluble (in platelet or granule form) because it is complexed with X_2 lipoprotein (livetin). It is emphasized that components X_1 and X_2 are soluble in plasma only as long as sufficient dializable materials (probably calcium or similar ions) are present to keep them separated. Thus, in laying birds (and also in fish, amphibians, and reptiles, *17*) the elevated calcium-phosphoprotein-lipoprotein system of the serum apparently provides a method of transport and localization of storage nutrients (vitellin) for the embryo (*15*). The mechanism may not be unique to egg materials, but it may be fundamentally similar to other processes involving the deposition of insoluble structures in cells.

References and Notes

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9. These investigations were sponsored by grants-in-aid from the Josiah Macy, Jr. Foundation and the Ayerst Research Council and were completed in part under contract No. AT-04-1-GEN-12 between the Atomic Energy Project and the University of California, Los Angeles.

10. For convenience, lipoproteins floating in a solution of density 1.003 are herein termed *chylomicrons*; complexes floating on solutions of density 1.063 are referred to as *beta* lipoproteins; and those floating on solutions of density 1.21 are labeled *alpha* lipoproteins.
11. These analyses were performed by Adelbert Elek, Elek Microchemical Laboratories, Los Angeles, Calif. Routine clinical analyses for this study were performed by Bio-Science Laboratories, Los Angeles, who kindly donated part of the cost of their services to this project.
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C. Neuberg, Biochemist

With the passing of Carl Neuberg on 30 May 1956 at the age of 78, biochemistry has lost one of its founders and leaders whose interpretation of metabolic events in terms of organic reactions created the pattern of inquiry into the mechanisms of intermediary metabolism.

Carl Neuberg was a complex personality, admired but feared by many, loved and understood by few. The strict social framework of imperial Germany, with its class consciousness and its military code of honor, provided a strange arena for the ingenuity, ambition, and drive of the young Carl Neuberg.

He studied in Berlin and Würzburg at a time when organic chemistry was dominated by such men as Emil Fischer, v. Baeyer, Wallach, Grignard; and physical chemistry by van't Hoff, Arrhenius, Nernst, and Ostwald; while biochemistry in Germany was represented by a sole chair occupied by Roehmann at the University of Breslau. Neuberg received his Ph.D. degree in 1900 with a thesis on the chemistry of glyceraldehyde carried out under the direction of A. Wohl. He was one of the last assistants of Virchow, the great cellular pathologist, and took his first steps in physiological chemistry in Salkowski's laboratory at the Agricultural College in Berlin.

Neuberg made his greatest scientific contributions to our understanding of fermentation and glycolysis. After Neubauer suggested pyruvic acid as the transitory intermediate in yeast fermentation, Neuberg's discovery of carboxylase provided a basis for the metabolic conversions of the keto acid. The cleavage of pyruvic acid into acetylphosphate and formic acid is a recent example of a general reaction first demonstrated by Neuberg in which α-keto acids are split into a fatty acid and formic acid. He introduced the method of the trapping of transitory intermediaries, enabling him to interpret correctly major phases in the mechanism of alcoholic fermentation and of the so-called glycerol fermentation. From these studies emerged the first indications for the mechanism of the cleavage of Harden-Young's hexosediphosphate into two subunits later identified as triose phosphates. Neuberg's four forms of fermentation provided the first attempt at an integrated picture of glucose breakdown in which the dynamics of fermentation was explained by the competition of hydrogen acceptors. The observation that substances extraneous to fermentation may act as hydrogen acceptors and that, thereby, a vast number of aliphatic, aromatic, and heterocyclic aldehydes may be reduced to the corresponding aldehydes led to the formulation of the concept of phytochemical reduction. The significance of enzymes giving rise to carbon-carbon linkages such as the transketolase was foreshadowed in the studies on acetoin fermentation and by the discovery of the enzyme carboligase.

Neuberg's studies of the enzymic formation of lactic acid resulted in the introduction of its salts as brake fluids in German artillery pieces during World War I. During the last 30 years Neuberg's interest was attracted to the mechanisms of solubilization of insoluble matter in nature. He explored the effects of organic phosphates and polyphosphates arising in carbohydrate metabolism in the solubilization of insoluble salts, observations which up to now have not made their full impact felt on biological thought.

This short outline of some of Neuberg's main contributions to biochemistry cannot but give a very meager impression of his over-all influence in the field. It does not give an account of his discovery of a host of enzymes, of his studies of the structure of natural products and of his synthesis of phosphorylated intermediates of carbohydrate metabolism. His work was particularly characterized by a multitude of methodological and chemical observations, and many of the chemical tools of our laboratory were discovered and developed by Neuberg and his pupils. He usually contributed not only the concepts but also the techniques to his own work.

The enormous amount of work accomplished by Neuberg and his numerous pupils has been set down in about 900 publications from his laboratory. The Kaiser Wilhelm Institute of Biochemistry in Berlin-Dahlem under his leadership gave opportunity and inspiration to generations of biochemists from Europe, Asia, the Western Hemisphere, and Australia. His influence stemmed not only from his original contributions but also from his editorship of the *Biochemische Zeitschrift,* which he founded at the age of 28, and also from his membership in a number of the highest scientific councils of Germany. After he came to the United States in 1940 he continued to work, often under adverse conditions, and the uninterrupted flow of publications up to the last month of his life attested to a productivity and energy unaffected by age and change of environment.

Neuberg's unquenchable craving for knowledge reached beyond the frontiers of his own science. He was amazingly well versed in classical literature and history, and he read Greek and Latin as well as Hebrew. The sleeplessness of his last years of failing health was, in some measure, appreciated by him because it gave him more time to read.

Two weeks before his death he gave, before a distinguished group of biochemists, a farewell lecture on some of the fundamental enzymic reactions of fermentation as demonstrable by simple experiments. He was too weak to stand, his voice had to be amplified, his daughter read part of the lecture, and an assistant carried out the experiments. But Neuberg's love of biochemistry and his unimpaired power of intellect dominated the audience.

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News of Science

Statement on Hungary

A declaration that urges the Soviet and Hungarian governments to permit exchanges of visits between Hungarian scholars and those of other countries and to put an end to restrictions on intellectual freedom in Hungary was presented to the Soviet Ambassador and the Hungarian Envoy Extraordinary in London on 4 Dec. The statement was sponsored by the International Committee on Science and Freedom, Didsbury, Manchester, England, and signed by some 1000 scholars from 108 universities and colleges in 23 countries.

Among those presenting the declaration were Prof. Cyril Darlington of Oxford University (a member of the Committee on Science and Freedom and leader of the delegation); Sir David Lindsay Keir, master of Balliol College, Oxford; Prof. Pulleyblank of Downing College, Cambridge, representing the 16 fellows of the college who had given their corporate support to the statement; H. J. Fleure, emeritus professor of London University; and Dame Kathleen Lonsdale, professor of chemistry at University College, London.

Other British supporters of the declaration in Britain are Sir Thomas Murray Taylor, principal and vice-chancellor of Aberdeen University and the senate of the university subscribing as a body; Sir Hector Hetherington, principal and vice-chancellor of the University of Glasgow; Prof. W. Mansfield Cooper, vice-chancellor of Manchester University; Dr. J. W. Cook, vice-chancellor of Exeter University; and Dr. E. M. W. Tillyard, master of Jesus College, Cambridge.

Universities in other countries represented on the list of signers include the Sorbonne, Harvard, Princeton Institute of Advanced Studies, Columbia (New York), Rome, Padua, Berlin, Göttingen, Tokyo, Canberra (Australia), Athens, Vienna, Leiden (Holland), Hamburg, Ottawa, Buenos Aires, and Istanbul. The American Association of University Professors sent in a supporting declaration.

The document presented to the Soviet Ambassador read:

"We have heard the repeated calls for help from Hungarian intellectuals, scholars, scientists and writers, addressed to their colleagues throughout the world.

"We express to you our deep concern at the fate of our colleagues in Hungary and appeal to you to restore to them the rights of intellectual freedom and free cultural contacts with scholars in other countries.

"We ask you to give your answer in the most practical manner: namely by permitting at once a free exchange of visits between scholars outside Hungary and those in the Hungarian Universities and by ending immediately all restrictions on intellectual freedom."