University of Chicago in September, 1941. The titles of the papers describe adequately the subjects covered, and the names of the participants are a guarantee of the quality of the contribution. The book will be of particular interest to the serious student and to the progressive physician. A study of it shows how extremely diverse are the various factors which come in its wide range. The contributors realize fully the vastness of the subject and very wisely make no attempt to present a mass of indirectly related experimental data which would merely serve to bewilder. The references are skilfully dovetailed into a clear account. The book is full of stimulating ideas. It is readable, comprehensive and authoritative. In many ways, the present and the past are in conflict, but the references represent the cream of the literature of both. The theories discussed are based upon scientific inquiry and, for the most part, they have proved to be sound.

Each of the fourteen papers is written by an expert who usually attempts to correlate the chemistry, physiology and clinical aspects of the cellular metabolism concerned with thiamine, riboflavin, nicotinic acid, pyridoxine, pantothenic acid, biotin, choline, phosphorus and vitamin K. The delightful personal touch in some of the papers is not often found in scientific publications. Each answers a number of questions but asks many more, especially in the clinical field. In general, the history of the individual members of the vitamin B group is reviewed from the time of their discovery up to and including current investigations. This book is especially valuable for all those interested in working on problems related to the vitamins, whether they be pure scientists or clinicians. Science students interested in the subject will find that it has a great deal of material which will be of value to them.

TOM D. SPIES

# REPORTS

## THE WORK OF THE ROCKEFELLER FOUNDATION[1]

### THE YEAR IN BRIEF

IN 1942 the appropriations of the Rockefeller Foundation amounted to $8,227,867. This is in contrast to $9,313,964 appropriated in 1941. The income of the foundation from investments during the year was $8,271,037, as compared with $8,734,992 in 1941.

The appropriations in 1942 were distributed for the most part in six major fields, roughly as follows:

| | |
|---|---|
| Public health | $2,700,000 |
| Medical sciences | 1,434,000 |
| Natural sciences | 815,000 |
| Social sciences | 1,326,000 |
| Humanities | 982,000 |
| Program in China | 122,000 |

A detailed statement of the appropriations made in 1942 appears at the conclusion of this report, beginning on page 53. Of the money appropriated during the year, 67 per cent. was for work in the United States and 33 per cent. for work in other countries. The amount spent in foreign countries was larger than in any year since 1937, and represents an increase of 30 per cent. over the average of the years 1938 to 1941. This increase is due to two causes: first, the developing program of the foundation in Latin America, and second, the growing needs of the foundation's Health Commission in connection with war activities abroad.

In contrast with the size of public funds now being spent to meet the present emergency, the eight million dollars which the foundation appropriated in 1942 seems insignificant. It is estimated that eight million dollars would take care of the current war expenditures of the United States Government for approximately forty-five minutes. But in times like these, when the intellectual and cultural life of mankind has to be subordinated to a struggle for survival, even a relatively small sum may be used effectively to help build a bridge between what men have valued in the past and what they hope to maintain in the future.

[1] Review of work in 1942 by Raymond B. Fosdick, president.

### VALUES NOT EASILY REGAINED

In this "Review," three years ago, under the heading "Night over Europe," an attempt was made to describe the disaster which the war was bringing to universities and laboratories both in England and on the Continent. The processes of disintegration had already begun. Institutions dedicated to the extension of knowledge were being geared into the war machine. The necessities of military mobilization had decimated faculties and student bodies alike. Cultural values upon which civilization is based were being thrown to the winds as the intellectual blackout spread across half the world.

To-day the long shadows of the blackout are lengthening inexorably over the United States. We are fighting for a future in which free institutions can live, but to achieve that end we are sacrificing values which, once they are lost, are not easily regained. The crisis presents us with a problem of delicate balance, how to win the war and at the same time preserve those intellectual ideals and standards, those "great things of the human spirit," without which a military victory would in the end be nothing but ashes. History shows

us that it is possible to lose a civilization even while armies and navies are triumphant.

As in Europe, so here at home, liberal education has been discarded for the duration. Our universities are now instrumentalities of total war. Technology is left as the one subject which must be taught. History, economics, literature, philosophy—the whole range of the social sciences and the humanistic studies—have been crowded out of the picture by the pressure of higher priorities. Our young men are not to be trained in liberal understanding; they must be made into soldiers. Of necessity, their education must be an education in violence. Their participation in the cultural and social heritage of civilization is adjourned. For the time being, at least, their generation may not share in the humane tradition on which alone the building of a worth-while future depends.

Not only the undergraduate work of our colleges and universities but the activities of many of our postgraduate departments, and of our research staffs and laboratories, are being forced to pay the price which war, however necessary, inevitably exacts. On all sides, fundamental research, except as it relates to the demands of war, is being curtailed or abandoned, as scientists, technicians and students are mobilized for practical types of service. Illustrations of this situation are to be found in almost every branch of knowledge, whether it is biophysics or genetics or agriculture or economics or anthropology or the fine arts. The completion of the 200-inch telescope in California has been indefinitely postponed. The cyclotrons of the country have for the most part been forced to shut down or greatly limit their programs in pure research. Graduate schools across the land are only partially occupied; faculties are becoming scattered. And this is only the beginning of the dislocation; the end is by no means in sight. In time of war the advance of knowledge for the sake of knowledge becomes a luxury which a nation fighting for its life apparently can not afford.

These comments are made in the full realization that we have a war on our hands which must be fought to a victorious finish. But in the achievement of this purpose we need to keep in perspective the requirements of the future as well as the demands of the present. The treasure of learning and the liberal tradition can not be reassembled, like automobiles in a plant, when the long convulsion is finished; nor can scientists, doctors, scholars, philosophers and artists be fabricated over night. We need to keep soberly in mind the price we are paying for victory—not in terms of dollars, nor indeed wholly in terms of human life, but in terms of values by which the worth of a civilization is ultimately measured. Our enemies kill the humane tradition wherever they can; in the realm of the mind and soul it is their chief adversary. Our concern must be that in fighting this barbarian concept we do not inflict so serious a wound upon the intellectual and spiritual life of our country that, though barbarism is conquered without, it finds a low resistance to growth within.

These observations lead to one conclusion. Our schools, our colleges and universities and all the institutions and individuals concerned with the quest for a rational life among men have a dual responsibility in these stern days. We must of necessity serve the war effort, for there is no future for what we most desire in a world dominated by fascism. But we have a responsibility equally compelling to preserve the treasures of the spirit which we hold in trust from the past for the benefit of the generations to come. There must be no broken link in the chain, no flaw in the title deeds by which what we most cherish is transferred to the future.

The Corporation of Yale University, in a recent statement, expressed in the following words its feeling of responsibility as a "custodian of our cultural heritage":

> The Corporation wishes to impress upon Yale graduates and upon the general public the danger of the impoverishment of the nation's mind and soul, should the less tangible values of our culture be allowed to shrivel while our energies are devoted to the task of winning a war to maintain them. Of what worth is freedom from want, if our minds be on a lower intellectual level; or freedom from fear if we have a less cultured life to defend; or freedom of speech if we have poorer thoughts to express; or freedom of religion if we bring a less enlightened faith to the worship of God?

This obligation is laid on the doorsteps of all our educational institutions. It is to them that we look for perspective and leadership in such an hour as this. If they can not carry their responsibility, nobody else will, for nobody else can. In their absorption in military necessities they must not allow themselves to be mere appendages of the war machine. They must not abdicate their high purpose. Unless they keep the candles lit which have largely flickered out elsewhere around the world, we may reach the dim aftermath of war, with victory behind us, but with not enough light left to make it mean anything in terms of a brighter world.

In 1881 the College of William and Mary in Virginia closed its doors for nearly seven years. The battles of the Civil War had been fought up and down the Peninsula and had left the college physically in ruins; and although it struggled to keep going during the bitter time of reconstruction, it was finally overborne by financial catastrophe. But every morning during these seven barren years President Ewell rang the chapel bell. There were no students; the faculty

had disappeared; and rain seeped through the leaky roofs of the desolate buildings. But President Ewell still rang the bell. It was an act of faith. It was a gesture of defiance. It was a symbol of determination that the intellectual and cultural tradition must be kept alive, even in a bankrupt world.

In every school, college and university of America to-day we need to hear that bell ringing.

# SPECIAL ARTICLES

## THE RELATIONSHIP OF VITAMIN A TO RESISTANCE TO NIPPOSTRONGYLUS MURIS

A CRITICAL study of the work of Spindler[1] revealed the fact that lack of vitamin A in the diet lowered the resistance of albino rats to a superinfection with the nematode, *Nippostrongylus muris;* but details were lacking as to the composition of the diet or the extent of the vitamin A deficiency in the experimental animals. It seemed necessary that further work should be done, by methods somewhat similar to those employed by McCoy[2] with *Trichinella spiralis,* and by Lawler[3] with *Strongyloides ratti;* these workers correlated vitamin A deficiency with susceptibility.

It is the purpose of the present paper to give the findings obtained under controlled diet, and with chemical determination of liver vitamin A, on the influence of vitamin A depletion on the resistance of the pied stock rats, McCollum strain, to primary infection and subsequent reinfections with *Nippostrongylus muris.*

In carrying out the tests referred to in this paper, the experimental and control animals were divided into groups such that sex and weight distribution were fairly uniform. The rats averaged 70 to 80 grams in initial weight. The experimental groups were fed, ad lib, two different diets deficient in vitamin A: Diet I the yeast diet and Diet II the "synthetic" diet, respectively; and the control groups were fed the same diets plus a supplement of vitamin A, such that each rat received 150 I. U. per week. The supplement was a vitamin A concentrate diluted with sesame oil, and fed in three weekly doses by medicine dropper. The composition of the two diets will be reported in detail later.

*Chemical Methods:* The vitamin A content of the liver was used as an index of relative depletion. The entire liver was excised, weighed and ground up with anhydrous $Na_2SO_4$ until a uniform powder was obtained. An aliquot portion of liver powder was extracted with 15 cc of petroleum ether in a test tube; after centrifuging, a 10 cc portion of this extract was transferred to an Evelyn photoelectric colorimeter absorption tube. The extract was evaporated to dryness in a stream of dry $CO_2$, with the tube immersed in a water bath at 55–60° C. The residue in the tube was taken up in 1 cc of chloroform, and the vitamin A content determined by the addition of 9 cc of Carr-Price reagent (25 gms of $SbCL_3$ in 100 cc of $CHCL_3$), with the colorimetric measurement of the blue color developed in the Evelyn photoelectric colorimeter. The blood vitamin A was determined by the method of Kimble.[4]

*Parasitological Methods:* Infective larvae (isolated by means of Baermann's apparatus from 9–10 day charcoal cultures of feces of infected rats) were counted by the dilution method, suspended in known volumes of water, and injected subcutaneously into the rats to be infected. At subsequent autopsy, worms found in the intestines were counted. To determine the number of larvae in the lungs, these organs were removed at autopsy and cut into small pieces, pressed between two plate-glass slides (2″ × 3″) and examined microscopically for the presence of larvae.

### RESULTS

*Experiment 1.* The effect of vitamin A depletion upon susceptibility to primary infection. After being on the stated diets for 56 days, the average weight of the 24 rats reached about 140 grams. On the 57th day, each of these animals was given 2,300 *N. muris* larvae, and was sacrificed 12 days later. Post-mortem determinations revealed a complete depletion of vitamin A in the livers, and low vitamin levels in the blood, of the animals receiving vitamin A-deficient diets. These animals harbored more worms in the intestines than those on the same diets supplemented with vitamin A concentrate. It will be noted further that three rats fed on Diet I-a and two rats fed on Diet II-a died on the fifth and sixth days following infection with the larvae; whereas all the control animals, though given the same number of larvae, survived (see Table 1).

*Experiment 2.* The effect of vitamin A depletion upon susceptibility to subsequent reinfections. Rats, the average weight of which was between 70 and 75 grams, were "hyperimmunized" by means of serial infections with 2,000 larvae each. The first infection ran its course for two weeks; 2,000 additional larvae were then administered, followed by a third infection of 2,000 larvae two weeks later. Three weeks after the last infection the animals were divided into groups, according to the diets administered.

After being on the experimental diets for 79 days, the average weight of the 22 rats reached about 180

[1] L. A. Spindler, *Jour. Parasit.,* 20: 72, 1933.
[2] O. R. McCoy, *Amer. Jour. Hyg.,* 20: 169, 1934.
[3] H. J. Lawler, *Am. Jour. Hyg.,* 34 (Sec. D): 65, 1941.
[4] M. S. Kimble, *Jour. Lab. Clin. Med.,* 24: 1055, 1939.