of the sections are being organized by the following chairmen: Meyric R. Rogers, St. Louis, Art; Hardinge Scholle, New York, History; Katherine Coffey, Newark, Instructors; Ned Burns, Washington, National and State Parks; Sarah Newmeyer, New York, Public Relations and Radio; H. L. Story, Boston, Registrars; Robert Glenk, New Orleans, Science; Charles R. Toothaker, Philadelphia, Technical, and John W. McCabe, Cleveland, Superintendents.

A UNITED STATES CIVIL SERVICE open competitive examination has been announced for psychologist (Public Relations), at a salary of $3,800 a year in the Forest Service, U. S. Department of Agriculture, Washington, D. C. Applications must be on file not later than May 3. The work of the position is "Under general supervision, to apply the principles and techniques of psychology in a program for securing intelligent public cooperation in the protection of forest areas from fire; to determine the origin of man-caused fires; to determine current attitudes in forest areas toward fire prevention and toward the policies and practices of the Forest Service; to develop various methods of securing more effective public responsiveness to protection measures, and to evaluate the effectiveness of such methods; to make trips to field units; to supply technical psychological advice as consulting expert, and to perform other work of a related nature as assigned." Competitors will not be required to report for examination at any place, but will be rated on education and experience and on a thesis or discussion to be filed with application. The necessary application forms may be obtained from any first-class post office or from the United States Civil Service Commission, Washington, D. C.

THE Council on Physical Therapy of the American Medical Association has announced in its report of the annual meeting that grants of limited sums, to aid in research, are available to those who have problems of merit in the field of physical therapy. Application should be made to the secretary of the Council on Physical Therapy, The American Medical Association, 535 North Dearborn Street, Chicago, Ill.

DENISON UNIVERSITY at Granville, Ohio, is celebrating on April 16 the fiftieth anniversary of the founding of the Denison Scientific Association. A correspondent writes: "It is not often that a school serving no more than 850 students at the most, and definitely labeling itself a College of Liberal Arts, has been able to maintain such a vigorous interest for so long a period. A good share of the credit for this record must go to *The Journal of the Scientific Laboratories* and to the sponsors and editors of the same, who have built up, over a period of fifty-two years, a journal which goes to the far corners of the earth and brings in, in return, a wealth of scientific material and contact not often met in similar institutions." The celebration consists of bringing back to the campus alumni who have attained prominence in various scientific fields. Dr. Carey G. Croneis, professor of paleontology at the University of Chicago, is to speak on "Science and the College."

WITH a view to the encouragement of postgraduate training in scientific research, chiefly in the graduate schools of Canadian universities, the National Research Council of Canada has awarded 47 scholarships for the year 1937–38. These include three fellowships at $700 each, 12 studentships at $600, and 27 bursaries at $500, all of which will be held in departments of science at the universities. Five other scholarships, tenable in the National Research Laboratories at Ottawa, will enable the holders, all of whom have already done postgraduate research at the universities, to gain experience in the field of industrial research before engaging in commercial work. Classified according to the departments of science in which the scholarship holders will work, the awards show that chemistry in its various branches heads the list with 25, physics comes next with 12, followed by 4 in biology, 2 in genetics, and one each in botany, geology, mathematics and mechanical engineering. Applications were received from graduates of 18 Canadian universities, and awards have been made which will enable the holders to work in the graduate schools of eight different universities in Canada, namely: Dalhousie, Laval, McGill, Montreal, Queen's, Toronto, Western Ontario and Saskatchewan.

DISCUSSION

COBALT—AN ESSENTIAL ELEMENT

SOME months ago Dr. H. G. Denham, chairman of the Council of Scientific and Industrial Research of New Zealand, visited Minnesota and among other things told of the amazing success which they have had in curing "bushsickness" in domestic animals in New Zealand by the addition of traces of cobalt salts to the diet of the animals. Dr. Denham stated that alfalfa might grow luxuriantly in a cobalt deficient area, but the animals suffered severe deficiency symptoms if fed only on the forage of that area. He stated that certain "iron" salts cured the disease, whereas "iron" salts from other sources failed to cure and that the same was true for "copper" salts, and in each instance the cure had been traced to small amounts of cobalt in those salts which produced the cures.

Some weeks later at the Chicago meeting of the National Academy of Sciences, during the discussion of a paper, I commented on Dr. Denham's statements, and pointed out that this study had added cobalt to the known "essential" elements. Much to my chagrin these statements were distorted in press reports of the academy meetings, and I and my laboratories at Minnesota were credited with this discovery. In so far as I could, I attempted to correct the false report, for we have made no studies of this sort at Minnesota. Nevertheless we were given the credit in the "Summary of Science for 1936" in the columns of one of the New York daily newspapers. Accordingly, I wrote Dr. Denham and asked him to prepare a short statement outlining the scope of the work and the essential findings which could be submitted for publication in the United States in order that credit may be given where credit is due. Dr. Denham's statement, submitted in response to my request, follows.

Ross Aiken Gortner
University of Minnesota

Cobalt Investigations in New Zealand

In the course of the Liversidge Lecture delivered at the recent bi-annual meeting of the Australia and New Zealand Association for the Advancement of Science by Mr. T. Rigg, director of the Cawthron Institute, the progress of the cooperative investigations of the Department of Scientific and Industrial Research of New Zealand and the Cawthron Institute in regard to cobalt deficiency in New Zealand was reviewed.

Mr. Rigg stated that at both Morton Mains, Southland, and Glenhope, Nelson, the use of cobalt drenches supplying 8 mg cobalt per week had been completely effective in preventing and in curing sheep ailment. Furthermore, in both localities the curative properties of drench materials, which in former years had given success in the treatment of stock ailment, had been shown to be dependent not on their iron content but on a relatively high content of cobalt. Nelson soil used with success in earlier experiments at both Morton Mains and Glenhope contained 56 parts per million of cobalt. Whangarei limonite (Reyburn's), which had been shown by B. C. Aston to be so beneficial in controlling "bushsickness" on the pumice soils of the North Island, contained likewise approximately 60 parts per million of cobalt. Other drench materials, which have not proved successful in the control of stock ailment of the bushsickness type, contained relatively little cobalt. At both Glenhope and Morton Mains, acid extracts of beneficial drench materials, carefully freed from iron, gave the same results as pure cobalt salts. Recent experiments of the chemistry department of the Department of Agriculture of New Zealand had likewise shown, in the case of typical bushsickness of the North Island, that carefully purified ferric ammonium citrate was non-effective in the control of bushsickness and that cobalt salts were highly beneficial.

Much work is now in progress to determine whether there is an actual deficiency of cobalt in the pastures, soils and animal organs of the areas affected with stock ailment. Investigations are not complete, but substantial evidence is being obtained of a low cobalt status associated with affected areas. Askew and Dixon in a paper presented at the same meeting and dealing with the cobalt status of animal organs at Glenhope and Morton Mains showed conclusively that the liver, pancreas and blood of affected sheep contained very much less cobalt than corresponding organs from healthy sheep. Frequently the amount of cobalt was one tenth in the case of livers of that associated with healthy sheep, *e.g.*, cobalt content of healthy livers 0.15 to 0.25 p.p.m. compared with 0.02 p.p.m. for affected sheep. The cobalt content of livers taken from sheep drenched with cobalt salts was approximately 0.20 p.p.m. on the dry basis, corresponding closely to the cobalt content of livers from healthy sheep killed at the freezing works.

Determinations of cobalt in pastures have not proceeded far enough to enable the position to be summarized, but in the case of Glenhope pasture there is every indication that the cobalt content of affected pastures is considerably lower than that of adjoining healthy pastures. One interesting feature of the pastures investigations is the rapid intake of cobalt by pasture plants, demonstrating the possibility of using small top-dressings of soluble cobalt salts in the treatment of affected pastures. The cobalt survey of New Zealand soils made by Miss E. B. Kidson in the main has confirmed a low cobalt status of soils in association with stock ailment. One or two soils, however, gave anomalous results. These results could possibly be explained on an assumption of difference in "availability," but so far attempts to determine available cobalt in soils have not proved successful. The soil results indicate that a low cobalt status of the soil is not always a satisfactory index of the need for cobalt supplements for stock.

H. G. Denham,
Chairman, Council of Scientific and Industrial Research for New Zealand

THERMODYNAMICS AND THE RATES OF COUPLED OR REVERSED REACTIONS

Thermodynamics can give us more valuable information concerning reaction velocities than is often suspected. It is of course true that with thermody-