afford security against depletion of the stock. The principal task for which the *Discovery* will be employed is to ascertain the geographical limits of the whales, to trace their migrations and to form some idea of their numbers and the rate of reproduction. But the expedition will also afford opportunities for adding to scientific knowledge in many other directions and particularly in oceanography, meteorology and magnetism. As the *Discovery* will require extensive reconstruction, it is not anticipated that she will be ready to sail before next year. The enterprise will be carried out under the instructions of the Colonial Office, and the Duke of Devonshire is taking steps for the appointment of an executive committee to undertake the management. It is proposed that the Colonial Office, the Admiralty, the Ministry of Agriculture and Fisheries, the British Museum (Natural History) and the Royal Geographical Society should be represented upon the executive committee. The committee will keep in close touch with other institutions and individuals who are interested in Antarctic research. The *Discovery*, a strong wooden ship of about 700 tons register, was built at Dundee for Captain R. F. Scott's expedition to the Antarctic, which started in 1901. The ship was frozen in at its winter quarters and Scott received orders to abandon her and return in the relief ships sent, but the *Discovery* broke out of the ice in February, 1904, and Scott brought her home in perfect order.

THE governments of South Africa, Australia, the Argentine Republic and possibly the United States will cooperate with Great Britain in an Antarctic expedition, preliminaries of which are being discussed. In all probability plans will be completed in London.

UNIVERSITY AND EDUCATIONAL NOTES

ANNOUNCEMENT was made at commencement at Lafayette College, by President John H. MacCracken, of the gift of $200,000 by Mr. John D. Larkin, of Buffalo, to endow "The John D. and Frances H. Larkin professorship of chemistry." In accordance with the conditions of the trust, four fifths of the income is subject to an annuity for one life, the other one fifth of the income will be immediately available for the work in chemistry.

THE Michigan College of Mines has received a gift of $10,000 from Dr. Edgar Kidwell, head of the Kidwell Boiler Company, of Milwaukee, for the founding of a scholarship in memory of his son, who was killed in the war. Dr. Kidwell was formerly professor of engineering in the college.

DR. EDGAR FAHS SMITH, formerly provost of the University of Pennsylvania, laid the cornerstone of the new chemical laboratory of the Rice Institute, Houston, on June 4. The laboratory, which will be erected at an approximate cost of $1,000,000, will be ready in September, 1924.

PROPOSALS for the removal of Randolph-Macon College to Norfolk and for its consolidation with American University at Washington have been rejected by the board of trustees, following a meeting attended by members of the faculty and alumni of the institution.

JOHN H. MUELLER, Ph.D., associate professor at the College of Physicians and Surgeons, Columbia University, has been appointed assistant professor of bacteriology at the Medical School of Harvard University.

DR. LESLIE A. KENOYER, assistant professor of botany in the Michigan Agricultural College, has been chosen professor of biology at the Western State Normal School, Kalamazoo, Michigan.

MR. J. T. SAUNDERS, senior fellow of Christ's College, Cambridge, and demonstrator of animal morphology, has been elected tutor of Christ's College, in succession to Dr. F. H. A. Marshall, F. R. S., who has resigned.

DISCUSSION AND CORRESPONDENCE

NOTE ON PREPARING COLOR STANDARDS

WHEN it is desirable to develop a colorimetric method for measurement of the small amounts of substances met with in biological studies the worker must frequently devise his own color standards. After a color has been matched to that produced by the substance to be

detected a colorimeter may often be employed for the determinations. But when a colorimeter is prohibitive, a series of tubes ranging by the smallest perceptible variations in color may prove satisfactory.

One difficulty in preparing a set of tubes in this fashion lies in the fact that to the unaided eye a change in color is less noticeable between deep colors than the same change between diluted ones. This is apparently a geometric relationship, as demonstrated in an article[1] recently published by the author.

This finding is not at variance with that of Lovibond.[2] But it is not necessary to have recourse to a "specific color factor" for practical purposes, as it is only essential to dilute the colored solution sufficiently to ascertain roughly the number of tubes required for a geometric series that will fulfill the requirements at hand.

Having a colored solution that matches the heaviest shade of the substance to be estimated, we dilute an aliquot with an equal volume of water, part of this we dilute again, etc., till there is but a perceptible difference in shade between our last two dilutions. We can then calculate the number of tubes required for the series and may ascertain the factor for the set, using the formula

$$r = \sqrt[n-1]{\frac{1}{a}}$$

Of course, the number of tubes required to complete a series graded by the nearest perceptible change in color will vary as the intensity of the terminal solution and in the case of a very weak solution many less tubes will be necessary than in a strong one. Then, too, if the grading is through a definite number of tubes rather than by intensity of color and the tubes are too few in number, these large jumps in color by reason of their geometric relationship may give rise to errors when interpolating, especially in the deep colors. The size of the factor rests somewhat on the degree of accuracy desired in reading between tubes.

It is suggested that color standards may be more easily and reliably prepared in the manner outlined above than by matching or diluting by the unaided eye.

ARTHUR P. HARRISON
BUREAU OF PLANT INDUSTRY

[1] "Geometric progression in optically prepared standards," *J. Amer. Op. Soc.*, May, 1923.

[2] Lovibond, J. W., "Light and color theories," 1915, Appendix II, p. 77.

A FACTOR CAUSING THE ASSIMILATION OF CALCIUM

IN the work of Dr. Forbes, formerly of this station and the earlier work of Hart and his associates and of Meigs and his associates it has been demonstrated that milking cows receiving a ration of grain and dry hay, with and without mineral supplements, are brought into a decided negative calcium balance. Hart has also shown that goats, after a period of negative calcium balance, have been able to produce a positive calcium balance when placed on green feed. He states that apparently there is something having its source in fresh green material which controls or assists calcium assimilation.

Working on the hypothesis that most of the calcium, in whatever combination it may be, in the cells of green plants is in a highly dispersed form and hence better assimilated than the calcium in the dry plant, the drying of which no doubt causes a change in the physical properties of the cell and its content, we set about to imitate, in a rough way, the cell content as far as it represents our idea of the highly dispersed form in which the calcium exists in green plants. A starch paste was made up with a known solution of $CaCl_2$ (2 Molar). Then an equal volume of Na_3Po_4 of the same strength as the $CaCl_2$ was added. The starch acted in a slight degree as a protective colloid for the calcium ion and the final product, Ca_3 (Po_4) was left in a highly dispersed form. This starch paste was added to the ration of grain and dry timothy hay, which in turn was fed to two milking goats.

The goats were mature animals in their third and fifth months of lactation and weighed 30 and 40 kilograms respectively.

This test was carried on for a period of 26 days preceded by a preliminary period of 10 days. The 26 day period was divided into three periods of 7, 7 and 12 days respectively. The calcium intake was from 5 to 6 grams per day. Out of the six complete accountings of the calcium five were positive, the sixth showing a negative balance of 0.32 grams calcium for