cases, located in the posterior half of the animals. In a few individuals one extra vacuole was found in the anterior end.

5. It was tentatively suggested that this new character might have been the result of heat, as the animals in the original culture had been used in temperature experiments.

The last statement now seems doubtful, for since the appearance of these papers I have heard from other investigators of similar paramecia being observed in widely separated parts of the country. They have been reported in Wisconsin, Indiana, Massachusetts and Connecticut. Those discovered in Indiana possessed either three or four vacuoles.

This note was prepared in hope that attention might be attracted to the vacuole numbers so that more data on this variation may be obtained. The possession of extra contractile vacuoles makes this race of paramecia exceedingly important, not only because it is a variation of the common type but because the sensitive response of the vacuole number to changes in the environment may make these individuals useful as indicators in certain classes of experiments.

Robert T. Hance

Zoological Laboratory,
University of Pennsylvania

MATHEMATICAL INSTRUCTION AND THE WAR

In view of the evident desirability of establishing a central agency for the gathering and dissemination of information pertaining to mathematical instruction in relation to the war, the *American Mathematical Monthly* is opening a new department, entitled "Collegiate Mathematics for War Service." Any reader of Science in possession of suitable information is urged to send it in at once. If the information is of sufficient importance, and in the opinion of the editorial staff of the *Monthly*, delay in publication might greatly diminish its value, preprints will be made for the earliest possible distribution. Already preprints of several articles dealing, in the main, with mathematical training for naval service, are in the course of preparation. The chief consideration relative to the new department is maximum possible service in our war program; other considerations, such as ideals of accuracy, completeness and scholarship must be regarded as secondary. Suggestions for making the new department as useful as possible will be welcome from all quarters.

Henry Blumberg

810 W. Oregon St.,
Urbana, Ill.

QUOTATIONS

SCIENCE AND THE CIVIL SERVICE

The great technical developments of the nineteenth century, which were due in a large measure to the influence and progress of science, have undoubtedly introduced not only a great transformation in the internal affairs of the country, but also an altered outlook in the external relations of the state. In consequence, many and extensive have been the changes gradually brought about, during the past century, in the duties and responsibilities of the civil service. Every government department has been affected to some extent; in some of them there have come into existence innovations which are of a very far-reaching character. The outstanding feature of this evolution is that the work of government departments has to-day entirely ceased to be of a purely administrative order, whether it be in relation to legislative measures referred thereto for preparation, revision, or criticism, or to the operations conducted therein, or to the sphere of human activity superintended, controlled, or managed thereby. The business of every government department is to-day to some extent technical or scientific; in the case of some departments the administrative aspect predominates; in others it is the technical or scientific aspect that plays the more important rôle.

What, then, has the state done to ensure that the personnel of the civil service, through whom its responsibilities must be largely exercised, shall be properly qualified and equipped for dealing, under present-day conditions, with the social, industrial and commercial problems which must come before it for legislative, executive, or other action?

One important step has been taken in relation to this matter: it has been definitely laid down that candidates for the civil service shall, before appointment, be required to undergo some test as to their knowledge and capacity. To give effect to this decision the Civil Service Commission was, by an order in council dated May 21, 1855, appointed to organize a system of examination; the Commission continues to be charged to the present day with the duty of providing suitable candidates for the public services. In 1870 the principle of open competition was introduced for the purpose of filling certain specified situations in the civil service, without, however, entirely abolishing "patronage" appointments. Afterwards, in 1876, the clerical establishment of the civil service was divided into a higher and a lower division; in 1890 the name "lower division" was altered to "second division," and a provision introduced making it possible for a "second division" clerk to be promoted to a higher division clerkship. It is the clerical establishments of the civil service which have alone received attention in the foregoing legislation.

Obviously, it is on the complete success of the competitive examination scheme in force that the welfare of the civil service, and, therefore, the protection of the public interest, must depend. It is here that a serious failure has occurred; the open competitive scheme has not been an entire success; it has been productive of a very unfortunate result. The system of marking adopted in the examination favored candidates whose education consisted largely in the learning of ancient Greece and Rome, and handicapped those whose *forte* was science.

Furthermore, in practically every case the officials who have in recent years received "patronage" appointments in the higher division of the civil service are men whose education and training have been identical in character with those of civil servants entering the service by open competition. In consequence, at the present day the highest administrative posts in nearly every department are monopolized by men whose learning is entirely literary. Further, the technical officers—that is, those in whose education science has played the preponderating rôle, and on whose skill and knowledge the welfare of many of the public services very largely depends—are almost entirely excluded from a share in the important administrative posts; needless to say, much to the injury of the public services.

Could it be shown that a purely classical or literary education really tends to develop or to produce administrative talent in an individual superior to that which can be obtained by means of a scientific education and technical training, as is sometimes claimed, there might indeed be some excuse for the retention of the principle of selection adopted; but there is none in actual fact. There exists, on the contrary, abundant evidence to prove conclusively that administrative talent is no exclusive privilege or quality of those who have received a purely classical or literary education: the names are familiar, in wide circles, to high and low, of men who have proved themselves capable administrators of the highest order; men, possessing the capacity of a Cromer or of a Kitchener, in whose education instruction in science also occupied a very prominent place; men whose early years were, too, spent in technical spheres.

The opinion has been gaining ground for some time past that the administrative system of government departments is unsatisfactory. The extracts from the reports of the Exchequer and Audit Department published from time to time, wherein publicity is given to the defects in the administrative arrangements in connection with the public services, have provided, in relation to such matters, authentic evidence tending to confirm, in the public mind, the unfavorable opinions that prevail so widely as to the unbusinesslike methods of the civil service and the general lack of capacity shown by a large majority of its members. Other authentic evidence is available—some recorded, some not; some public property, some not—which provides an indication that scientific knowledge and technical experience are held in disrepute in many, happily not in all, government

departments; and, further, that the professional opinions of technical officers too frequently are not given the due weight which they deserve. Science has done much for the civil service; it has not, in return, received the recognition which it merits.—*Nature.*

SCIENTIFIC BOOKS

The Physical Chemistry of the Proteins. By T. Brailsford Robertson. New York, Longmans, Green and Co. Pp. 483. $5.00.

The limiting adjective "physical" might be omitted from the title of Robertson's new edition, so completely does it cover the field of protein chemistry. Part I., including the first third of the book, is devoted to the chemical constitution of the proteins, their preparation, methods of estimation, and the various types of compounds which they form with each other and with acids, bases, salts, heavy metals, etc. Part II. is devoted to the electro-chemistry of the proteins; Part III. to their physical properties, such as gelatinization, swelling, coagulation, viscosity and surface tension, not included under Part II.; and Part IV. to the hydrolytic and synthetic actions of enzymes on proteins. Throughout the work statements and discussions are placed on a quantitative basis by the use of mathematical treatment wherever data sufficiently complete and accurate to justify it are available. Biological applications are kept continually in view. Despite the fact that he covers so wide a field and thoroughly reviews the literature, the author seldom fails to augment the interest of his material by presenting it from a view-point developed from his own experimental and intellectual researches.

Donald D. Van Slyke

SPECIAL ARTICLES

UNLIKE REACTION OF DIFFERENT INDIVIDUALS TO FRAGRANCE IN VERBENA FLOWERS

In classifying the floral colors in a certain pedigree of verbenas, the writer noticed a considerable difference in the amount of fragrance evident in their flowers. Some plants appeared to have flowers devoid of odor while the flowers of others were strongly fragrant. One with pale pink flowers, which may be called plant *A*, was especially pleasing in this respect. In showing it to my assistant, Mr. B. T. Avery, Jr., I remarked that it should be called an arbutus verbena since the flowers resembled the arbutus in both color and odor. To my surprise he failed to find any fragrance at all in the flowers of this plant. Moreover, when he arranged the pedigree according to the strength of fragrance which they gave to him it was roughly in the reverse order from that in which I should have arranged them. The most fragrant of all to him was a red-flowered plant the flowers of which to me were absolutely without fragrance. This for convenience we may call plant *B*. The flowers of plant *B* then were fragrant to him but not to me while those of plant *A* were fragrant to me but not to him. Each of us agreed that the other's favorite had a very slight odor that could be best described as a leafy or plant odor which apparently was the same as that of the foliage. Moreover, he described the fragrance from plant *B* as of a spicy nature resembling that from a carnation flower to which I am not insensible, while the fragrance of plant *A* seemed to me to closely resemble that of arbutus, with which he is also familiar. It did not seem to be the case that we both perceived the same odors but, having different preferences, dignified the one which we liked with the term fragrant. Rather the facts indicated that he was insensible to the odors in the flowers of *A* while I was insensible to odors in those of *B*. We repeated the tests many times under various conditions with the same results. He never was able to perceive any fragrance from *A* while, except upon a few occasions when I detected a slight odor such as he had described, I was unable to find any fragrance in his favorite.

In addition to ourselves, others in the community were tested for their reaction to fragrance in our plants *A* and *B*. The later tests were made in October. Due perhaps to the lateness of the season or to other conditions, the few remaining flower clusters then produced by plant *A* were not always fragrant.