

European planters. It appears to be an exceedingly singular kind of tree, as when it is fully grown its foliage undergoes an extraordinary transformation, and travelers inform us that the same tree will exhibit on its lower branches leaves as round as those of the Judas tree (*Cercis Siliquastrum*), while the leaves on the upper branches have all the appearance of willow leaves.—Letellier et Fils, Caen (Calvados), France; The Garden.

#### THE EIGHTIETH BIRTHDAY OF PRINCE BISMARCK.

ON April 1 Prince Bismarck completed the eightieth year of his eventful life. The world joins with the German empire in congratulating her "Grand Old Man." The emperor began to commemorate the anniversary by honoring the veteran statesman with a personal visit. Four hundred members of the upper and lower houses of the Prussian Diet and of the Reichstag went to Friedrichsruh on March 25 to pay their tribute of affection and esteem. The prince delivered a brief patriotic speech in reply to their congratulations. "If I were in robust health," concluded Prince Bismarck, "I could say much more to you, but I am a feeble old man. I deplore that I am no longer able to work with you, but I am not strong enough to face the multifarious trials of an existence in Berlin. I am old and indolent, and I wish to end my days in the house which I now inhabit. But my thoughts are with you, perhaps to a greater extent than is fitting for a man of my age. But I cannot suddenly abandon my former ideas, because I am old and ill.

time stigmatized by his master as a dunce, he shortly found himself compelled to seek a livelihood in the service of a charcoal burner. However, at length a friendly doctor of his native town persuaded the elder Linnæus that his son was endowed with much greater talents than he was generally credited with, and as the result of this expression of opinion young Linnæus again returned to the college. After a few years had elapsed he was sent to the University of Lund, and subsequently to the Swedish students' goal, Upsala. At this period of his life, to which he often afterward looked back with pleasure, he found himself compelled to mend his fellow students' shoes as a means of increasing his scanty funds of subsistence. This state of life, akin to destitution, proved, happily, but of short duration, for one Olav Celsius, a man well known for his great erudition, formed his acquaintance at this time, and very soon associated him with himself in his labors. He gave him a lodging, a place at his table, and procured him access to a valuable library. The Upsala Academy of Science shortly after sent him into Lapland at the expense of the state to study the natural history of that country. Linnæus at this time was only in his twenty-fifth year, but he gave proofs in this expedition of the most wonderful diligence and perseverance. In six months' time he traversed on foot an extent covering two hundred and fifty leagues of country, not including those deviations from the beaten track which must necessarily be made when natural history is the object of investigation. The adventurous traveler suffered many privations in this wild country, where he was oppressed by heat during the brief summer and benumbed by cold during the long suc-

else than seven hares' heads skillfully put together and covered with the skin of a serpent. Among the Dutch gardens of that period the one richest in exotics was situated at Harlecamp, belonging to a renowned amateur cultivator of the name of Clifford. Linnæus, who notwithstanding his growing celebrity still felt himself in a precarious state as regarded his circumstances, offered his services to the gentleman in the capacity of gardener, in order to provide for his now pressing necessities. His offer was accepted, and he worked there for a time without his identity being discovered. One day, however, he was recognized by a gentleman who had seen him at Upsala, and thus his incognito was speedily put an end to, and he would most probably have forth with quitted the place had not Mr. Clifford anxiously sought to retain him by the offer of a situation of director of his magnificent gardens. He gladly took the place, and it was here that, at his employer's expense, he published the well-known work in which he gave to the world the new system of classifying plants to which his name has been given. This generous patron insisted on Linnæus keeping the proceeds of the sale of his work, and, moreover, furnished him with the means to travel in England.

Linnæus made numerous disciples in this country, and such was the enthusiasm with which his discoveries were received, that he was for some time doubtful whether he should make this country his home. But he finally determined to return to Sweden, visiting France on his way, and at length landed once more on the shores of his native country, whither he may be said to have been called by the unanimous voice of his countrymen. This was in the year 1738, and from that time forward he enjoyed a life of uninterrupted outward happiness, and of brilliant success. United to the daughter of Dr. More, to whom as before stated he had long been betrothed, he was soon chosen as botanist to the king, president of the Academy of Stockholm, professor of anatomy in the University of Upsala, and, moreover, professor of botany and director of the botanical gardens. In fact, he attained the highest position to which a man of science could attain in Sweden, inasmuch as the government of that country interdicted to scientific men all situations which could in any way turn them from their pursuits. Satisfied with this private life at home, Linnæus declined several lucrative appointments that were offered to him by foreign sovereigns. Here he passed the latter half of his life, until at length, toward the close of 1775, he was, on the occasion of his delivering a lecture on the different botanical systems, seized with an apoplectic fit. This attack was followed two years later by another, which deprived him of the proper use of his faculties, and soon afterward brought him to the grave, on January 10, 1778, in the seventy-first year of his age.

All the inhabitants of Upsala displayed mourning on the day of the obsequies of this great botanist, whose biography has been here briefly narrated. The king of Sweden caused a medal to be struck in his honor, raised a monument to his memory in the Cathedral of Upsala, and delivered a discourse in eulogy of him before the States of Sweden.

In stature Linnæus was above the middle height, slight, but well made; his head large, his countenance frank and open, and his quick, clear eye betokened an intellect of uncommon acuteness. His constitution was robust, and he withdrew from his occupations only when he felt his mind no longer capable of pursuing a continuous train of thought. Possessing a spirit of no ordinary depth and superiority, Linnæus ever united the profoundest study of nature with the proper respect due to religion. Over the door of his study was inscribed these words, "Live innocently; God is present." The first lines dictated by this great man for the opening of his work, entitled "Systema Naturæ," contain an admirable profession of faith. The influence he exercised over the age in which he lived was prodigious. He not only submitted to certain rules the study of the natural sciences, but also impressed a new character on the physical sciences in general, and gave the public mind an impulse toward order and method. It may be added that through his lucid system of classification he greatly abridged the labors of his successors, and thus conduced materially to the advancement of science, as well as to the progress of the human mind.

W. NORMAN BROWN.



PRINCE BISMARCK ON HIS EIGHTIETH BIRTHDAY.

They never leave me. I cannot give better expression to the sentiments which fill my heart than by requesting you to cling fast to the imperial idea, even in the Prussian Diet, not to forget that you are citizens of an empire, and to think of him who is your king and emperor, and who has duties toward the empire and his confederates. I beg you not to pursue a Brandenburg or a royal Prussian policy, but an imperial German policy." Prince Bismarck then called for cheers for the emperor, which were enthusiastically given. A varied programme, sufficient to tax the strength of a much younger man, has been arranged for the next few days. Prince Bismarck, as will be seen by his latest portrait, has visibly aged.—Illustrated London News.

[THE GARDENERS' MAGAZINE.]

#### CHARLES LINNÆUS.

CHARLES LINNÆUS, the eminent botanist, who has been most justly designated the Prince of Naturalists, was born on May 24, 1707, at Rashult, in Sweden. He was the child of poor but respectable parents, who professed the Protestant religion. His early youth, like that of so many who have subsequently achieved fame and renown, was passed in a constant struggle with poverty and misery, those frequent attendants at the cradle of genius. Destined by his parents for an ecclesiastical life, Linnæus early left home to enter college, which, in the land of his birth, is alike open to the poor and the rich. Here, however, he evinced but little inclination for those studies necessary to be pursued by one destined for the church, his love for botany having at that early period of his life already become the all-absorbing passion of his mind. Being after a

ceeding winter. The young naturalist climbed mountains, crossed streams and rivers and penetrated the darkest caverns, encountering great difficulties on his way. The fruits of this journey were a splendid collection of plants, insects and minerals, which became the property of the University of Upsala, where it still remains and is much prized. He also wrote a valuable work on the natural riches of Lapland. After a short interval of rest, Linnæus went to visit the Swedish mines, and applied himself with so much ardor to the study of mineralogy that on his return to Upsala he was fully qualified to lecture on the subject. He made such rapid progress that he excited the jealousy of Prof. Rosen, a well known savant of the day, and the result was that his course of lectures was suspended by order of the authorities. Justly irritated by this proceeding, Linnæus went himself to Rosen and provoked an altercation, but, happily, his good friend Celsius interposed his mediation, with the result that a reconciliation was effected between Linnæus and the professor.

However, shortly after this event he came to the conclusion that it would be best for him to quit Upsala, and accordingly he departed to practice medicine in other Swedish towns, among others Telgum, where he fell in love with a young lady, the daughter of a Dr. More, to whom he was soon betrothed. He then went to Denmark, traveled over part of Germany, and finally passed over into Holland, at that time famed for its vegetable products, with the intention of taking up his residence in that country for a time. It was during his visit to Hamburg that he exposed an imposture that had caused a great sensation in that city. This was the seven-headed hydra. Linnæus attentively examining the monster discovered that it was nothing

#### DOES A NUCLEUS EXIST IN THE RED CORPUSCLES OF MAMMALIAN BLOOD?

By Professor JOHN MICHELS, late Chief Microscopist, Bureau of Animal Industry, U. S. Department of Agriculture.

THE importance of the blood as the vital principle of the human body is, of course, a recognized fact, known to everybody, and the recent discovery of the use of antitoxine has made it evident that the condition of the blood can protect us from the most deadly diseases and, on the other hand, blood containing poisonous elements will cause in some cases almost instant death, or after a short interval, according to the nature of the poison.

It is a remarkable fact that although a knowledge of blood is of such importance, and probably the key to a perfect knowledge of the treatment of disease, little or next to nothing is known relating to its physical properties, its constituents, or its effects on the human economy, in health or disease. No physician ever makes a microscopical examination of blood in making his diagnosis, and if he did, he would be unable to interpret the appearances he would notice, for there is no guide to the subject, the medical profession remaining under a cloud of ignorance in regard to this matter, and they appear to be content to wait and have this knowledge forced upon them by chemists and biologists rather than make any effort on their own part to relieve their condition of disgraceful ignorance.

In man blood consists of a clear fluid, the liquor sanguinis or plasma, in which a large number of corpuscles are distributed. Of these there are two prominent varieties, differing much in character, the red and the colorless or white. The former are greatly in excess, and give to the fluid its characteristic red appearance. In one hundred volumes of blood there are said to be thirty-six volumes of corpuscles and sixty-



four of plasma. This ratio is, however, subject to frequent changes.

The red corpuscles in man and most mammals are bi-concave bodies, circular in outline, but in birds, amphibia and most fishes, they are also bi-concave, or hollowed out in the center, but have an elliptical contour. There is a remarkable exception in the contour of the red corpuscles of the camel and animals of the camel tribe, as they have them elliptical, like the blood of fish, birds and reptiles, which is an extraordinary fact, which science has not been able to explain. I have myself examined camel's blood and found it as above stated.

Under the microscope a nucleus is always found in the blood of birds, fish and reptiles, when the red corpuscles are examined, but all text books claim that no nucleus exists in the red corpuscles of man and the mammals, although they are found in the fetal stage.

Knowing that the nucleus is the vital and most important part of all cells, and that the nucleus was

mammalian red blood corpuscles has been opposed by several biologists, a member of the Johns Hopkins University faculty stating that there was no resisting the fact that I have seen and photographed something that has the optical appearance of a nucleus, still as they could not show it themselves by their methods, it could not be a nucleus, but something else, what else they could not say. I have, however, submitted my work to every possible test, and while perfectly aware of all the errors of misinterpretation which are possible (see my own article in the Popular Science Monthly, on the misinterpretations of the microscope), I still consider my position to be correct.

I will now explain my methods to enable any microscopist to test my work for his own satisfaction.

Draw blood from the finger. I find the best method is to cut the skin with a knife on the upper part of the nail, when the blood will flow freely, pricking the finger being painful. Place a drop of the blood on the ordinary 3 by 1 glass slide, and taking another slide, place the end in the blood and draw it rapidly across

puscle, the only one present. Fig. 2 shows what the Germans call a homogeneous corpuscle. Fig. 3 a red corpuscle showing nucleus and nucleolus. Fig. 4, red corpuscle well in focus showing nucleus. Fig. 5, granular red corpuscle.

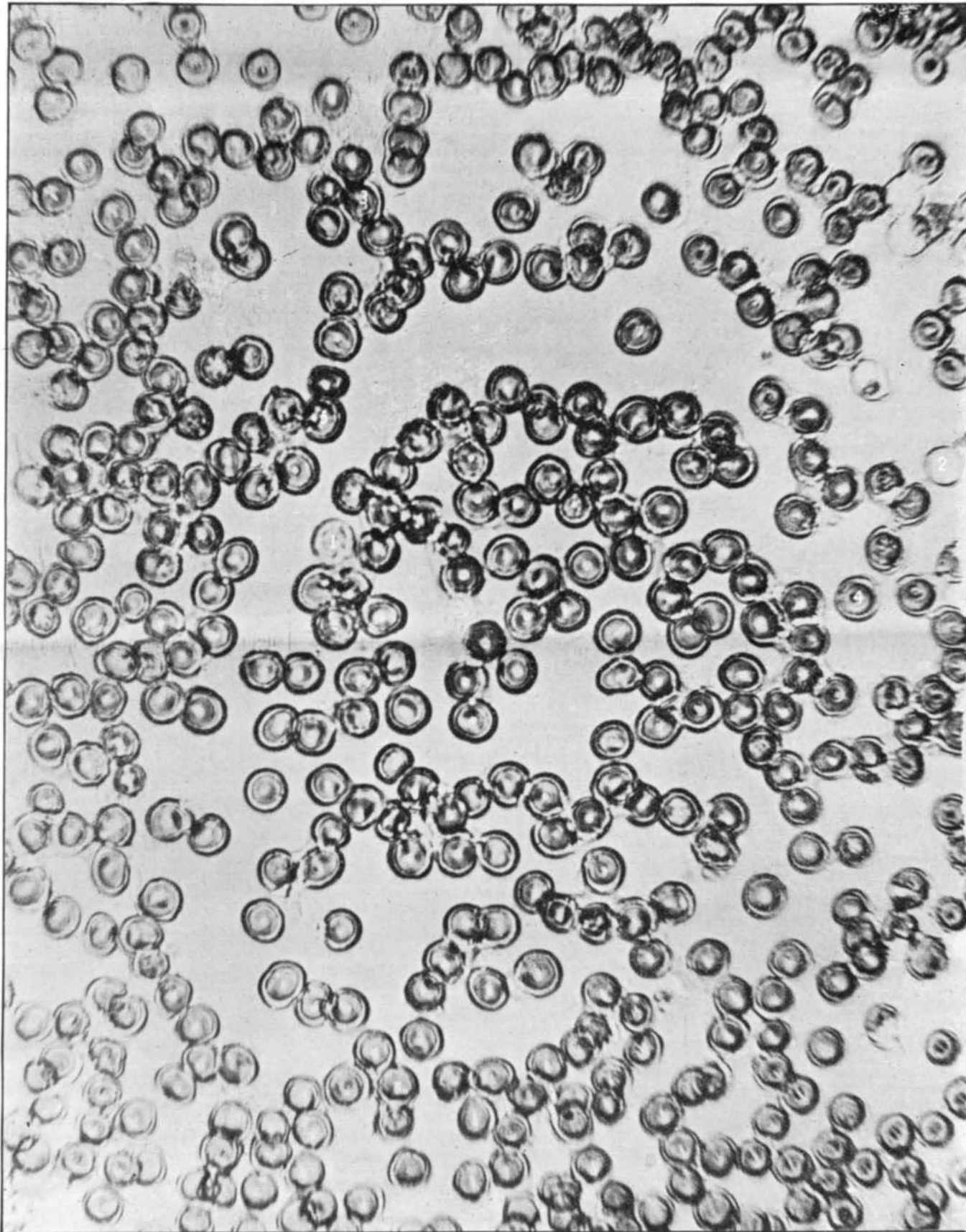
The specimen of blood not having been pressed under glass cover, the corpuscles are not on one plane. This accounts for many being out of focus. The photograph was taken with a dry one-eighth by Powell & Lealand.

[Continued from SUPPLEMENT, No. 1008, p. 16118.]

#### ON THE NATURE OF MUSCULAR CONTRACTION.\*

THE physiologist may deem his purpose attained when he succeeds in tracing a certain vital phenomenon back to processes which may also be observed in lifeless bodies.

However, though we should, perhaps, be inclined to



PHOTOGRAPHIC APPEARANCE OF BLOOD CORPUSCLES, ENLARGED.

Natural size, 3,200 corpuscles to the inch.

present in the red corpuscles of fishes, birds and reptiles, I have reasoned by analogy and come to the conclusion that the nucleus must be present in the blood corpuscles of man and all mammals. To prove this I have for many years carried on a series of microscopical experiments to demonstrate the fact.

By adopting new methods in staining and preparing blood, I found that I could show them under suitable powers in the microscope, both a nucleus and a nucleolus in mammalian red blood corpuscles, and have succeeded in demonstrating the fact by photography, and believe this is the first time it has been accomplished and published.

All new discoveries in science meet with opposition when they are contrary to the recognized dictum of authorities on the subject, especially when the new discovery is in opposition to the text books, which are held sacred in the eyes of the average academic professor. Thus my demonstration of a nucleus in the

the glass, by which means a single layer of corpuscles will be obtained. Allow this to dry, and then pour on some iodine which has been diluted with water. Pour off and allow to dry. Examine with a dry  $\frac{1}{8}$  or  $\frac{1}{10}$  inch objective. If you have no lens which cannot be corrected for objects viewed without a cover, you can place the blood on the under side of the glass cover, and attach same to glass slide, not using Canada balsam or any other medium.

It is really a most important matter to decide if the nucleus does exist in the red corpuscles of man and other mammals, and I will be glad to have my work confirmed, or explained, so that the question can be settled one way or the other.

DESCRIPTION OF PHOTOGRAPH.—This photograph represents human blood, the average size of the red corpuscles being  $\frac{3}{2500}$  of an inch. The original photograph measures  $2\frac{1}{2}$  by 2 inches, the enlargement here shown is  $9\frac{1}{2}$  by  $7\frac{1}{2}$ . Fig. 1 represents a white cor-

infer from the foregoing that we have successfully acquitted ourselves of this task with regard to muscular contraction, we will be careful not to overlook the numerous important respects in which a muscle as a living body, that is one subjected to constant chemical transformation, differs from our lifeless strings. The study of these differences is most instructive, since it throws a new light on a series of processes nearly allied to contraction, especially on the phenomena of rigor mortis and tonus of muscle.

But before entering into this we shall first have to meet another important objection to our views. It is based upon the absolute amount of muscular force. This amount may, as you know, be very high. Human muscles at the strongest tetanic contraction can shorten with a force of about 10 kilogrammes to 1 sq.

\* The Croonian Lecture, delivered by Prof. Th. W. Engelmann, at the Royal Society, on March 14.—Nature.