locality; later after the glaciation it returned to the southern land mass, there to develop its high variation and specialization. Probably during its exile the mammalian stem arose. The North American Pelycosauria (though having a common ancestry in pre-Permian times) never came in contact with the southern Anomodontia, and played their rôle independently.

Dr. W. D. Matthew described a new four-horned pelycosaur from the Permian of Texas; also a mole from the Lower Miocene of South Dakota.

Mr. Walter Granger, summarizing his studies on the American Hyracotheres, showed that the generic term *Eohippus* covered all the Wasatch, Wind River and Huferno Basin species of the family; *Orohippus* all the Bridger forms; and *Epihippus* all the Uinta forms. He also demonstrated that on premolar 3 of the upper jaw, the last cusp to develop was the anterior-internal, while on premolar 4 it was the posterior-internal which developed last. This striking divergence in the phylogeny of two adjacent teeth causes a demand for much further study, before the history of the various teeth can be summarily treated.

Mr. Harold Cook described a new hornless acerotherine rhinoceros from the Lower Miocene of Nebraska.

Dr. F. B. Loomis discussed the fauna of the Lower Miocene of Nebraska, describing a new *Parahippus,* a hornless rhinoceros (*Acerotherium*) and two new Dicerotheres. A review of the fauna and consideration of the nature of the sedimentation led him to advocate an eolian origin for the beds. The last session of the meeting was devoted to museum methods, the discussion being led by Mr. A. Herrman, Dr. Matthew and Professor Chas. Schuchert.

At the business session the following officers were elected for 1908:

President—Professor R. S. Lull, of Yale.

Secretary-treasurer—Dr. W. D. Matthew, of the American Museum.

Executive Committee—Dr. C. R. Eastman, of Peabody Museum; Mr. O. A. Peterson, of Carnegie Museum; Professor Wm. Patten, of Dartmouth College.

F. B. Loomis,
Secretary

THE NEW EDUCATION IN CHINA

That most popular simile of schoolboy compositions, of Juno springing full-armed from the head of Jupiter, may be applied to the new education in China. From the Chinese government the new education came forth by imperial edict. The edict and the consequent commands and directions present a fully articulated scheme of education.

Four grades of education were made: (1) The primary school, of five years; (2) the common school, of four years; (3) the middle school, of five years; (4) the provincial college, of at least two years, and for some students one; (5) the Imperial University, at Peking, of such a length as may be desired.

Such a course, in its whole duration, covering from sixteen to twenty years, represents a most impressive endeavor to introduce the western system of education into the Middle Kingdom.

The system is indeed western, but it is western colored by Japanese influences. The martial conqueror of China has become her teacher in things intellectual, and more willing has China become to receive her conqueror as a teacher since this teacher has become the conqueror also of Russia. The rapid advancement of Japan to a place among the great nations gives to her example and teachings a peculiar impressiveness. Japan in turn, it may be added, found in Germany and America her intellectual and pedagogical models.

The Avon to the Severn flows, the Severn to the sea;
And Wycliffe's dust must spread abroad, wide as the waters be.

The content of this prolonged course is quite as significant of the modern touch as is its length. Throughout the nine years of the primary and the common school Chinese is the chief subject, representing ten hours a week. Writing covers six hours the first year, but diminishes, becoming only two hours in the ninth. Arithmetic begins with three hours, but increases to four at the close of the course. History and geography begin in the fourth year, each subject being allowed two years, but in the sixth year the allowance of time granted to history is increased one hour, In each year of the four of the common school some science is taught two hours a week, and drawing one. Throughout the whole period two hours are given to ethics and three hours to physical drill.

A similar scheme of equal elaborateness is prescribed in the middle school of five years. In this whole period, Chinese is still studied for six hours. English is introduced, being allowed also six hours; mathematics is continued for four hours, including algebra, geometry and trigonometry as well as arithmetic. Drawing and ethics are also continued, each having one hour, and physical drill still has its former allowance of three hours. Both foreign and Chinese history is studied in the first two years four hours, and in the last three years three hours a week. Such are the "constants" of this higher school course. In addition the "variables" are significant. For four years geography commands two hours a week. For three years four hours a week are given to sciences in which chemistry and physics fittingly occupy a leading place, and allied with them are physiology and hygiene, physical geography, geology and mineralogy. But the sciences are not suffered entirely to exclude literary studies, for political economy and law are studies of two hours a week each for the last year of the long course.

The student who has completed these three schools, the primary, the common and the middle, covering in all no less than fourteen years, has reached the age of at least twenty—the age of the ordinary sophomore in the American college. On reaching this stage he may pass on to the college of his province. He may enter the normal school, preparing himself to be a teacher to his countrymen, in a course covering either one year or three years. This school includes such subjects as would be found in a good American normal school. Or, this graduate of a middle school may desire, probably does, to become an official. In this case he enters a special school. The prospectus of one of these schools—that at Ningpo—says:

> To teach the modern methods of law and government, especially as they are related to those of China, and laying emphasis on the study of Japanese law and methods of government. Resident students must, previous to their entrance, have taken a Chinese degree, or be graduates of a middle school. The course extends over two years and the students who have been successful in their examinations will receive certificates, and will then be recommended by the prefect to the governor for official appointment, or for further study in Peking.
>
> The course of study includes commercial law, theory of government, international law, penal law, judicial law, army organization, Japanese and a little English.

Such, in bare and bald outline, is the educational system which China has adopted. As a system, comprehending the chief subjects of modern learning, it deserves and receives the highest commendation. The government merits great praise for laying such foundations under most serious difficulties.

Schools to teach these studies have been established throughout the empire. Some of the schoolhouses are large and impressive structures. Thousands of these schools are now trying to educate hundreds of thousands of Chinese boys and girls. The

spectacle is one of the mightiest triumphs of education and of government ever known, despite all the haltings and failures to which the undertaking is subjected.

In carrying out the system the making of text-books has become an important factor. Text-books have been produced in enormous quantity and one great variety. Many of them are translations of English or Japanese text-books. In some of them the Japanese influence is strong. Of them all, perhaps none are more important than the Chinese National Readers. The series contains readings on subjects of all sorts—scientific, historical, ethical. It may be added that these books frequently argue against superstition and idolatry. One who knows them has said that they contain nothing which opposes Christianity. But besides this series are numerous others, especially in the sciences. History is also well represented.

But more important than the system of education or the text-book is the teacher. The old Chinese teacher does not easily lend himself to the new order. He is by nature conservative. He clings to the old methods. He is himself so wedded to the old that he confesses to a sort of intellectual awkwardness when he tries to use the new learning and methods. He keeps himself, in his fear of making mistakes, closely to his text-book. He still emphasizes the value of memory. He himself is not a thinker, and he is not inclined to adopt methods which quicken thinking in his students. Modern pedagogy is to him so new a science and art that either he has little appreciation of its worth, or, if he is able to appreciate, he is not able to use it with facility and efficiency.

The teacher, the text-book and the course of study are all designed for the advantage of the student. The Chinese student has a mind strong and virile. The mental quality is akin to the physical. But his mind, like the feet of his sisters, has been fettered by ages of unreasoning limitations. The education of his forefathers has been either no education at all, or, if it has existed, it has been unreasoning and irrational. He himself in his newly-found freedom feels himself strange: he sees trees as men walking. But gradually he is finding himself. His conception of education is rather of a vocation than of culture. The vocation may take on somewhat of a materialistic basis and color. He desires those physical advantages which education is supposed to create. "What are you going to do?" asked a teacher of a graduate—an able man—of Nan Yang College. "Commerce," was the answer. "And why commerce?" persisted the questioner. "Is it for the sake of enriching yourself or helping your country?" The reply indicated that the purpose was not altogether altruistic.

The inspiring motives of the casting off of the old education and the adoption of the new are manifold. The immediate occasion is, undoubtedly, the failure of the Boxer movement of 1900. The entrance of the allied forces into Peking in the summer of that year was the entrance of intellectual light quite as much as of armies. The government became aware, as perhaps never before, that there was a world outside of China, and superior in at least some respects to China.

Connected with this occasion is the rise of Japan into a place as a world power. China saw and was moved. She saw, moreover, correctly—that the rise of Japan was due in part at least to education. China, therefore, determined to adopt similar means and methods. She went about the business of education. Japanese methods, text-books, she adopted. She imported Japanese teachers. She sent thousands, even tens of thousands, of her young men to Japan, to Tokyo, to Waseda University

and other schools. Her old rival, and her conqueror, became her teacher.

A third cause of the educational advancement lies in the force of the progressive men of China. The character of Chang Chih-Tang—one of the two greatest Chinese—and his writing, as, for instance, his book, "China's Only Hope," represent a mighty influence. Against hard odds and good fighters do the progressive leaders contend. Chang Chih-Tang himself has described them in his book:

> The anti-reformers may be roughly divided into three classes:
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> First, the conservatives, who are stuck in the mud of antiquity. The mischief wrought by these obstructionists may be readily perceived.
>
> Second, the slow bellies of Chinese officialdom, who in case of reform would be compelled to bestir themselves, and who would be held responsible for the outlay of money and men necessary for the changes. The secret machinations of these befuddled, indolent, slippery nepotists thwart all schemes of reform. They give out that it is not "convenient," and in order to cloak their evil deeds rehearse the old story, the usual evasive drivel about "old custom." And if we attempt to discover what this precious old custom in the matter of education and government is, there will be remonstrances on all sides. Old custom is a bugaboo, a password to lying and deceit. How can any one believe it?
>
> Third, the hypercritics.

But against such forces the reform party has won, and is still winning; though no prophet would intimate how long it will prove to be victorious.

But, above all, the missionary and Christian forces of the Middle Kingdom represent a permanent cause of her interest in education. Christianity has not been in China for three hundred years, or for a hundred years with special power, for nothing. Christianity is far more than a religion. It is an education. The church and the schoolhouse historically stand side by side. The priest is also a teacher. Protestant Christianity has for the last hundred years in its missionary propagandism given special heed to education. Such a force operating for generations, even in a most conservative society, could not fail to effect results of comprehensive and also of definite significance.

Under the influence of these four occasions and motives, not to mention others, China has entered into the work of education. She has come to realize that the work is more complex and more difficult than it seemed five years ago. She undertook the tremendous task without proper forethought. It was a leap in the dark. But the leap was taken and the consequences of taking it she must, for better or for worse, endure. What are some of the peculiar difficulties which are now besetting the pathway of education in China I shall discuss in some detail. For these difficulties are formidable and unique.

SPECIAL DIFFICULTIES OF THE NEW EDUCATION IN CHINA

ONE'S heart goes out in great interest to the educationists of China. For the difficulties which beset them are very serious. I doubt if in the history of the world difficulties more serious have beset those whose duty it is to establish and to promote a system of education.

One difficulty lies in the necessary doubt regarding the sincerity and earnestness of the Chinese government in its endeavor to foster the education of its people. The government may be honest in the desire to educate; it may not be. Even if the desire be real as far as it goes, doubt also arises respecting the earnestness and fullness of this desire. The edicts abolishing the old system of examinations followed not long after the cataclysm of the summer of 1900. This break seemed one of the inevitable results of that catastrophe. This and other consequences could not be avoided by the court, however conservative were the governmental tendencies. With these results

were naturally united the necessity of giving to China such a system of education as had seemed to lift the rest of the world into civilization. But with it China did not enter with that spirit which moved the German people after their Napoleonic distresses into education both university and common. The Germans were inspired by most personal and national ambitions; and the result is read in the history of the University of Berlin. The Chinese were primarily moved from without; the degree of cooperation which the outside influence found in the Chinese heart was and still is a matter of grave doubt. This element of doubt in the sincerity and earnestness of the Chinese heart in promoting public education is a chief difficulty which the educationists meet. It is not a stone wall, which can be struck down; it is a malaria which represents conditions that can be dealt with only by indirection.

A second difficulty is the constant change of the educational purposes of "the authorities" and also of the less constant change of these authorities themselves. Shall the provincial colleges be literary or scientific institutions? If scientific, shall they train agriculturists, or mechanical, or civil, or electrical, engineers? In the course of a few years these different purposes may be imposed upon the teachers of a college by their official superiors—superiors who are superiors in only the official sense. Such changes are disastrous. No less disastrous are the changes wrought in the transfer of governing powers from one official board to another. At one time Nang Yang College, at Shanghai, for instance, may be under the charge of the Board of Agriculture, and at another under the charge of the Board of Communications—Post and Telegraphic. At one time a college may have a president who serves as the source of immediate authority, at another it may have no president, but be governed by a council. The changes, too, in the viceroys of the different provinces may fundamentally affect the fortunes of a college. One viceroy esteems education and promotes it; his successor may despise it and seek to limit its progress. All these conditions throw doubt into that most important part of college administration—the budget. Such instability is most trying and perplexing to the heart and the mind of the educationists of China.

Another difficulty lies in the divorce which has for many centuries existed in China between the scholar and the man of affairs. The scholar, be it always remembered, has from the early time held a high place in Chinese society. The learned man has been esteemed, and learning honored. The learning has, however, been an end in itself. The scholar has filled his mind with the paragraphs and the sentiments of the old moralists. Such stuffing has given him pleasure. That his knowledge should be of any worth or benefit to humanity has been quite foreign to his thought. Most egoistic has he been; and the community has been content to let him be egoistic. But modern education has for its primary note service. It is in purpose, method and content altruistic. If it promotes scholarship and makes scholars, it looks beyond the accumulation of knowledge to the worth which this wealth may prove to be to humanity. It is the introduction of this altrusitic ideal which the teachers of many Chinese schools find of great difficulty.

Allied to this specific course is a general condition, out of which possibly the cause to a degree springs. I allude to the doubt which pervades at least some orders of Chinese society regarding the real worth of human character. Is man, the ordinary man, worth educating? Is it well for man to seek to lift man by education? Once a

coolie, why should not a coolie he always remain? Is not education disquieting to the individual and disturbing to society? Is it not better for man to be half blind and content than to see plainly and be discontented? Such questioning is in the air at Peking, Wauchang and Shanghai. It serves, if not to cut the name of education, at least to dull its enthusiasms.

But the severest difficulty found in the progress of Chinese education lies in the lack of a sufficient number of good teachers. The government, provincial and national, went into the work of education as a sort of leap into the dark. It adopted and created the material forms and forces of education, which are evident and impressive enough. It built schoolhouses, large and long and high. In not a few capitals the schoolhouses are the most impressive structures. But the government failed to take proper account of the fact that, if it is easy to build a schoolhouse, it is hard to get a teacher. Teachers can not be made in a year as can a schoolhouse. The government did not put the cart of the school before the horse of the teacher, for though there was the cart there was no horse. Teachers in a sense are grown; and growth, unlike manufacturing, takes much time. Therefore, while there were and are schoolhouses, and also pupils, in abundance, too great abundance in a sense, there was and is a dearth of teachers. The gun was made and mounted, but there was no gunner to fire it. In such a dearth incompetency flourishes. But the dearth was and is so great that the number of even incompetent teachers proves to be insufficient. Some schoolhouses are, therefore, houses without schools, and other schoolhouses are only half occupied. In such a condition Japan would even now be plunged, had she not established normal schools—and some excellent ones, too—for training teachers. This need of Japan President Eliot pointed out a generation ago. China has normal schools, but they are new, and they, too, lack proper teachers. The fact is that China went into this great work of the education of a quarter of the population of the globe without proper prevision or provision. The mission schools and colleges, such as St. Johns, at Shanghai, and the North China Union College, near Peking, are implored by the government officials to send teachers to the government schools, but these colleges and others like them, in many cases, can not, simply because the supply is inadequate.

It may be said that the dearth of good teachers in the government schools of China should prove to be an impressive fact to the American man who is graduating at his college. Teachers of English and of the sciences are specially needed. Many motives, selfward and altruistic, would urge him to go to China on graduation. He can earn twice as much money as a teacher in China as he can at home. He can gather up into his manhood experiences, new, diverse, moving and enriching. Whether he can do more good than at home is a personal question, in which a stranger should not meddle. But, if meeting responsive minds, eager and by nature strong, which are to become makers of other minds, represents an opportunity for doing much good, certainly the Chinese government schools represent a very rich opportunity.

These difficulties which I thus outline are very general and constant. The teachers now on the ground are dealing with them as best they may. Both foreign teachers and native are laboring together to overcome what obstacles they can not remove, and to remove all that can be removed. The problem is hard. The quantitative relation is significant. To educate four hundred millions is a problem unlike edu-

cating forty millions—as in Japan. In their endeavors the present teachers of China deserve sympathy. To condemn the inadequacy of Chinese education—and it is inadequate—means ignorance of the conditions. Sympathy should be given by the teachers of the world to their professional brethren in China, and reenforcements, too. For these reenforcements the Chinese government is loudly calling.

Charles F. Thwing
Western Reserve University

SCIENTIFIC BOOKS

A Text-book of Physiology for Medical Students and Physicians. By William H. Howell, Ph.D., M.D., LL.D. Second edition. Philadelphia and London, W. B. Saunders Co. 1907.

"Economy," wrote Burke, "consists not in saving, but in selection." This principle Professor Howell has applied in writing his text-book of physiology. Instead of attempting to condense the great mass of fact and theory which constitutes the body of present-day physiology, he has chosen subjects which have seemed to him most desirable for the man with medical interests to know. And these subjects he has presented with simplicity and lucidity. The result of this method has been the production of a treatise which states with a fair degree of completeness the facts and theories of many important phases of physiology, while other phases are wholly eliminated. The method permits the writer to avoid the bleak statements of fact which characterize attempts at too great condensation, and allows a variety and discursiveness, at times into the historical development, at times into the practical bearings of the subject, which are entertaining. This text-book has already been used two years by medical students, and they report to their instructors, "Howell is interesting reading."

The first exception which might be made to a text-book based on the principle of elimination rather than condensation is that the writer may emphasize his special interests and may eliminate subjects which seem important to others. Fortunately Professor Howell's extensive experience as a teacher and investigator in different medical schools has served him well. This experience, together with the fact that in all the larger medical schools in which the laboratory method is an important feature of physiological training the subjects taught do not greatly vary, has led to a selection of material which would be generally admitted as desirable for students of medicine to know, and to the elimination of little that is at present medically important.

The first section of the volume deals with the physiology of muscle and nerve—the fundamental tissues for most of the systems which follow. The second section on the physiology of the central nervous system is concerned with the governing agent of the muscular structures already studied. A discussion of the physiology of sleep in this section is an unusual and commendable chapter in a physiological text-book. Treatment of the special senses as the recipients of stimuli for the central nervous system is taken up in section three. Blood and lymph are next considered as a preliminary to section five which is devoted to the organs of circulation. The discussion of the physiology of respiration in section six, and digestion and secretion in section seven presents further application of the fundamental activities studied in the earlier chapters. In all these general subjects the chemical side of the physiological activities has received due recognition. This is also true of the treatment in section eight of nutrition, and heat production and regulation. The formal exposition closes with an excellent account of the physiology of reproduction. An appendix, however, gives a brief description of proteins and their classification, and a clear statement of some of the facts and principles of physical chemistry in their application to physiological processes. The large array of original illustrations is a pleasing feature of the volume.

In this second edition a number of small errors which crept into the first edition have been corrected, and additions have been made with the object of keeping the book abreast of the times. As far as possible, however, these