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THE CHINA JOURNAL OF SCIENCE & ARTS

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ARTHUR DE C. SOWERBY (SCIENCE)
JOHN C. FERGUSON, PH.D. (LITERATURE & ARTS)



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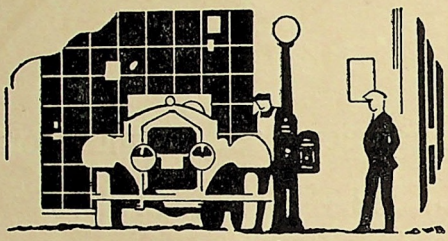

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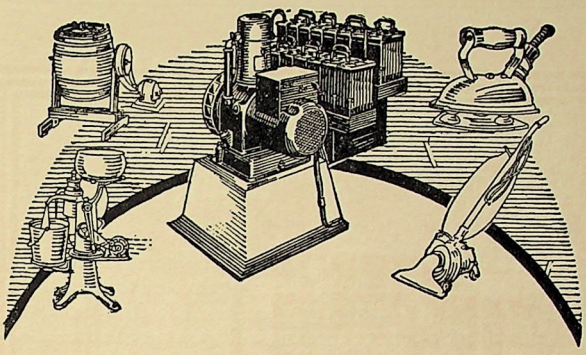

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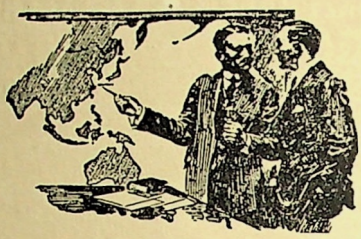

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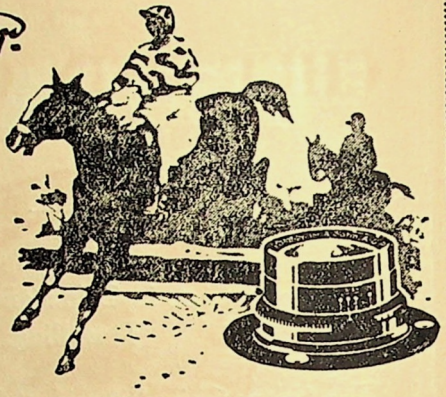

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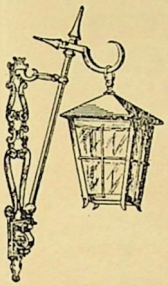

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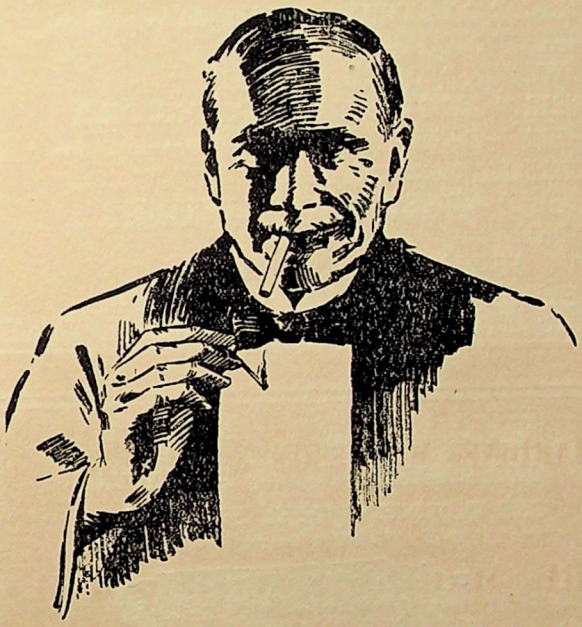

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OF
SCIENCE & ARTS

[REGISTERED AT THE CHINESE POST OFFICE AS A NEWSPAPER]

VOL. II JULY, 1924 No. 4

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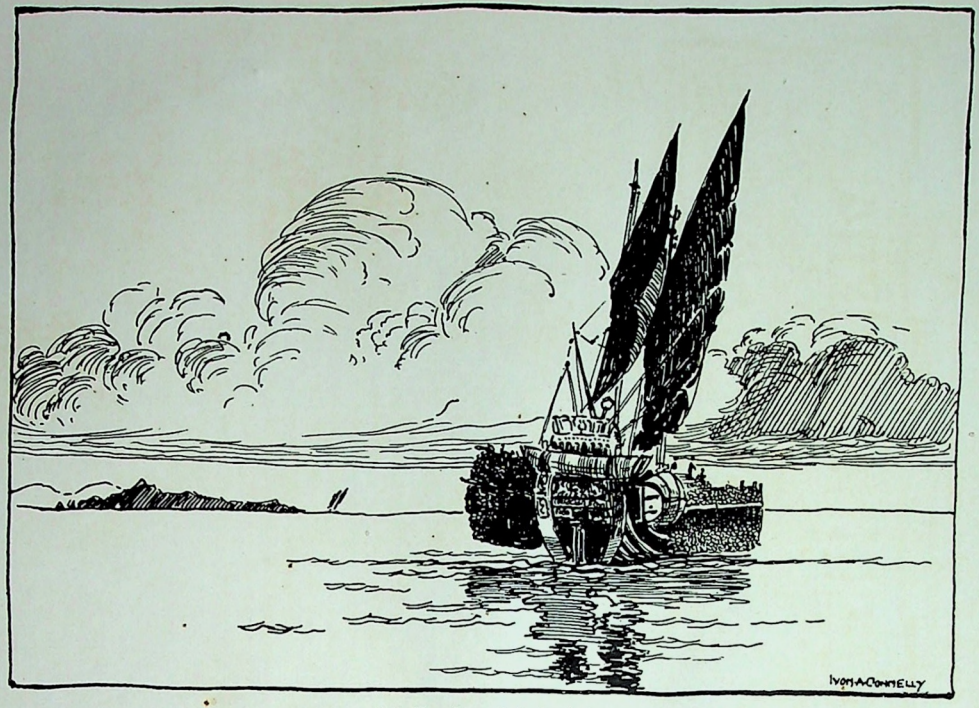


"A Foochow Pole Junk"

This black and white sketch by Ivon A. Donnelly was shown in the recent Art Exhibition

THE CHINA JOURNAL OF SCIENCE & ARTS

VOL. II JULY, 1924 No. 4

FORESTRY IN CHINA

BY

ARTHUR DE C. SOWERBY

To judge from her size, the tremendous stretches of wilderness within her boundaries, and the hundreds of square miles of mountainous country that are totally unfit for cultivation, one might suppose that China was a country of great forest reserves and could at least supply her own timber, if not export large quantities to other less favoured countries. Knowing the thrifty nature of the Chinese, and their unbounded genius for making the soil produce its last ounce of food for its masters, one would naturally suppose that that genius would manifest itself in arboriculture as well as agriculture, and that all places unsuitable for the growth of cereals, vegetables, and other economic plants of a like nature, would be devoted to plantations of good timber-producing trees.

But such is far from being the case. An investigation of China's forests and timber supplies leads to the discovery of a most disappointing state of affairs, and one cannot but marvel that a people like the Chinese, so advanced in many ways, should share with the primitive savage a complete improvidence in matters relating to their country's timber supply and an utter wantonness in regard to the few remaining forest reserves, that are to be found to-day.

And, strange to say, the need in China of an adequate timber supply is greater, almost, than in any other country in the world. The Chinese style of architecture and building calls for a far greater consumption of wood than do those of other countries. A Chinese building consists of a heavy frame-work, or skeletion, of huge upright and horizontal beams,

the roof being constructed of smaller beams and rafters in great numbers, the front of each building, consisting almost exclusively of wood-work, in which windows and doors are set, the partitions within the building which divide room from room also being of wood, and only the back and side walls being of brick, and the roof covered with tiles. Most of their utensils, such as chairs, tables, cupboards, boxes, tubs, and the like are of wood, as also is most of their machinery– looms, agricultural machinery, such as water-wheels, winnowing machines, ploughs, harrows, sowers, all vehicles, and so on *ad infinitum*. Enormous quantities of the very best timber are used in the manufacture of coffins, for the Chinese desire is to be buried in coffins that are calculated to withstand the test of time, and it is no uncommon thing for a man of ordinary means at his death to be interred in a coffin with six or eight inch sides of solid timber. Indeed, there has always been a great demand in North China for timber from Manchuria for no other purpose than that of coffin manufacture, since local trees could not supply sufficiently heavy baulks of timber to satisfy the desire of officials, gentry and merchants alike who desire to remain physically intact even after death.

Taking all this into consideration, it is really remarkable that the Chinese have failed to develop forestry in the way they have agriculture.

The subject of forestry in China is so great that it is impossible to deal with it adequately here, but there are a few outstanding points that may be discussed with advantage. It has already been pointed out that the consumption of timber in the country is enormous, and it may further be stated that the demand cannot under present conditions be supplied from the country's own resources. Annually China imports large quantities of timber, mainly from America.

As regards China's actual resources in timber, the reader's attention may be called to an interesting and instructive book written some years ago by Mr. Norman Shaw, of the Customs Service, entitled "Chinese Forest Trees and Timber Supply." This book was published in 1914, and gave a very complete account of the country's timber supplies and *reserves*—if they can be called such in a country where no care is taken to preserve the forests by the government, and their existence or disappearance is controlled solely by local inhabitants—up to that date.

The present writer has visited most of the forested and wooded areas in China north of the Yangtze Basin and as far south as Fukien in the east, many of them since the publication of that book, and he can vouch for the fact that even the few forested areas described by Mr. Shaw are rapidly disappearing. In fact, the history of China's timber supply is one long tale of the wanton and profligate destruction of the once almost unbounded forests, and an utter disregard for the needs of posterity. Except in the province of Fukien, where the natives actually plant groves of the so-called Foochow pine, which is scientifically known as *Cunninghamia lanceolata* Hooker, and, as the well-known "Foochow poles," used extensively for scaffolding, is exported in considerable quantities to other parts of China, and possibly in certain areas in the upper Yangtze Basin, nowhere do the Chinese replant where they once cut down the timber. They either leave the re-foresting of denuded



From "Through Shen Kan" by R. S. Clark and A. de C. Sowerby

Poplar Trees along the High Road in Kansu



Logging on the Min River, Fukien

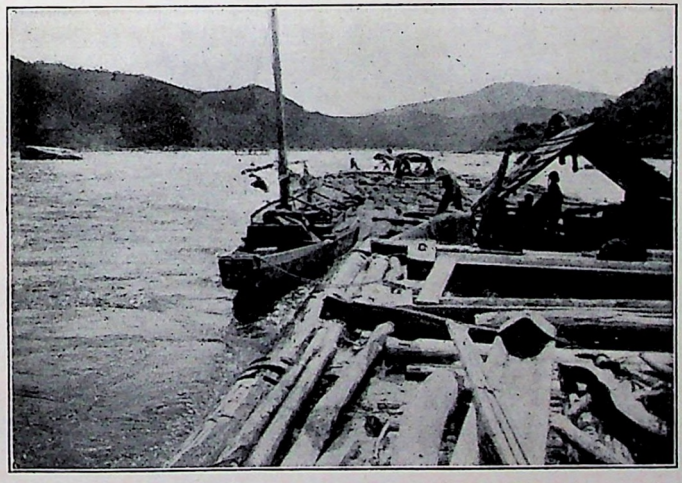


From "The Naturalist in Manchuria"
by A. de C. Sowerby

Log Raft on the Sungari River, Kirin, Manchuria



Logging on the Min River, Fukien



From "The Naturalist in Manchuria"
by A. de C. Sowerby

Log Raft on the Sungari River, Kirin, Manchuria

areas to nature, or, what is far worse, they cut away the new timber as soon as it appears and reaches a marketable size, that is, ten or fifteen feet in height and two or three inches in diameter. This whole process I have witnessed, not once nor twice, but many times and in many places. I saw it going on in several places in West Shansi, I saw it going on in Manchuria wherever there were forests, and I saw it happen in the Tung Ling forested area to the north-east of Peking in Chihli province. And not only so, but in the course of very extended travels in China I have come across place after place where there was every indication that a heavy forest growth once existed, but which had been completely denuded of any but the scantiest vegetation by the natives, within comparatively recent times.

Before dwelling further upon this phase of the subject, it would be well to consider briefly the actual forests as they now exist in China.

In North China there are a number of more or less extensive forested areas. Indeed, in a few spots the forests are actually primeval. Notably is this the case in South-west Kansu on the Ssuchuan and Tibetan borders, along the Liu Pan Range in Central Kansu, along the Tsin Ling Range of South Shensi, which runs into Western Kansu and North eastern Hupei; along the great range of mountains, that runs down Western Shansi, known sectionally as the Ning Wu Shan, the Ko Lan Shan and the Chiao Ch'eng Shan ; and in the Tung Ling (Eastern Tombs) area, already mentioned, in North-eastern Chihli. Besides these there are scattered throughout the northern provinces a number of smaller areas, where younger, but still fairly heavy, forest growths occur. These are to be found on the border of Shensi and Kansu, in North-central Shensi, in Eastern and Southern Shansi, and in Western Chihli.

In Western China, notably in the highlands of Ssuchuan and Yunnan, there are some fairly extensive forested areas, as also are there some in South-eastern China, notably in the provinces of Chekiang and Fukien.

The whole of Central and East China is absolutely devoid of forests, while North China except in the areas already mentioned as being forested is bare of any but the most scanty vegetation.

In Manchuria there are some very extensive forests ; indeed, here, at least, are virgin forests that extend in places for tens and even hundreds of miles. A very large part of the province of Kirin is heavily forested as also are extensive areas in Heilungkiang.

In most of the areas mentioned above the forests are coniferous. Larch, spurce, fir and pine are very prevalent in North China, the larch, however, occuring only where the mountains attain an altitude of over 7,000 feet. In the Manchurian forests there are extensive stands of pine, but deciduous trees, such as oak and walnut, are also very abundant.

In West, South and South-eastern China, many conifers that are more or less peculiar to the country occur. Such are the various species of *Tsuga*, *Pseudotsuga*, *Keteleeria*, *Cunninghamia*, *Cryptomeria*, *Thuja*, *Libocedrus*, and *Fokienia*. A far greater abundance of deciduous and non-coniferous trees occur in this country, however, but it is impossible to go into details concerning their names and species here.

Outside the forest areas in North China, and away from the coasts and easy access to foreign imported lumber, the Chinese are forced to depend for their wood supply upon what may be called casual timber growths such as the poplars, willows and elms that line the highways or mark the cemeteries. In many places in Shansi, Shensi, Honan and Kansu, the timber supply is so limited, that the natives have to live to a a very considerable extent in cave dwellings, in the *loess* cliffs, and it is noticeable that here they have learned to dispense with the usual wooden frame work in the construction of their homes, and have resorted to the use of vaulted dwellings, made of brick or stone.

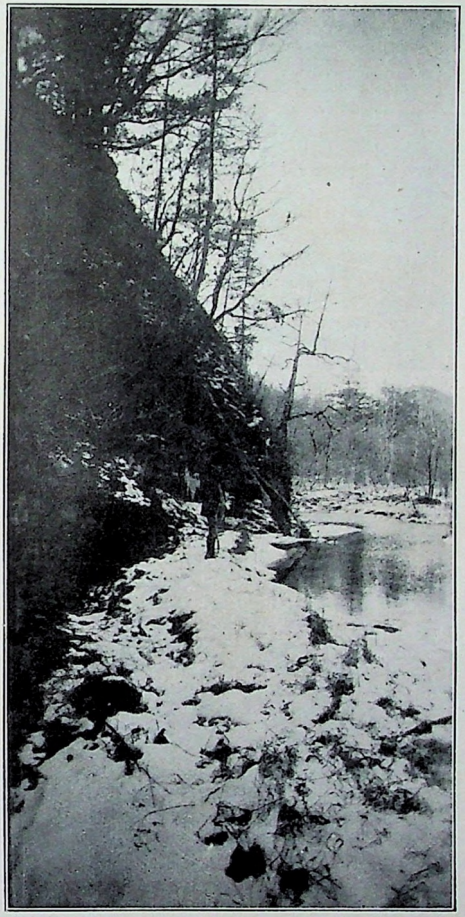
It is interesting to note that in many places in North Shensi and North Kansu, practically the only timber obtainable locally is from stunted willows, and one sees huge barges that travel down the Yellow River, crazy patch-works of crooked willow boards rivetted together in a remarkable and ingenious way.

Some of the roads in these northern parts are bordered by rows of very handsome poplars, and, as far as I have been able to ascertain, these seem to be about the only government protected trees. If it were not for these and the trees in the innumerable patches of graves, the bulk of North China would be absolutely treeless.

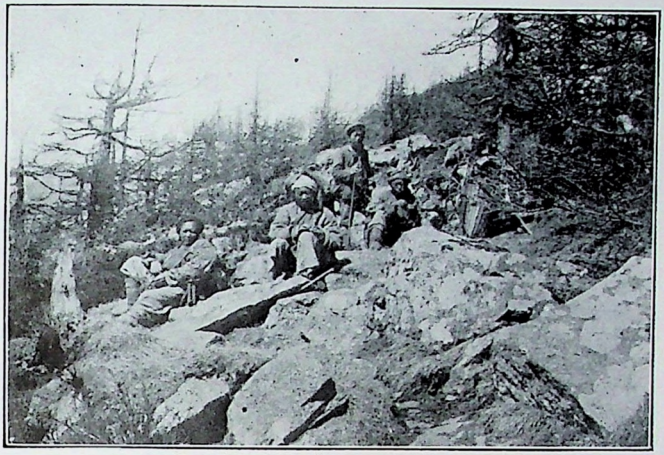
As an example of what is happening to the forests, the story of the Tung Ling area may be told. This was an extensive area which had been set aside by the Manchu Emperors as a great forest and game reserve. Judging from the size of the trees here, the area must have been forested before the advent of the Manchus, and one would venture the opinion that it had been forested from time immemorial. In fact, there is every indication from a botanical as well as a zoological point of view that a great forest belt once extended from South and South-eastern China to Manchuria. This is proved by the presence in this area of such animals as the black fur-squirrel, the little tree-chipmunk (*Tamiops*), the sika deer, the black bear, the Reeves' pheasant and the blue-tailed lizard. The black bear belongs to the Himalayan black bear group (*Selanarctos*), the members of which are forest-loving animals, and whose range extends intermittently from the Himalayas, through Ssuchuan, Honan, and Chihli to Manchuria and Japan, and southward into Hainan Island, South-east China and Formosa. This alone would be sufficient to prove the existence at one time of a continuous forest belt, from Indo-China up to and including Manchuria. The presence of the Reeves' pheasant and the blue-tailed lizard, which elsewhere in China do not occur north of the Yangtze Valley, and of the black fur-squirrel, which is not found elsewhere in China, but is prevalent in Manchuria, is strongly corroborative, for all these forms are forest dwellers, or at least demand a very heavy vegetation.

But to return to the history of the Tung Ling forests. These were strictly preserved till the fall of the Manchus in 1911-12, and the declaration of the Chinese Republic. Then began the work of destruction, both of the forests and the game they harboured.

Chinese settlers soon began to enter the formerly sacred areas, and at once commenced a wanton destruction of the timber. In the winter



A view taken in the Tung Ling area in 1915,
showing the heavy vegetation



Larch forest in the Tai Pei Shan, South Shensi. There, also, the timber is being steadily cut away

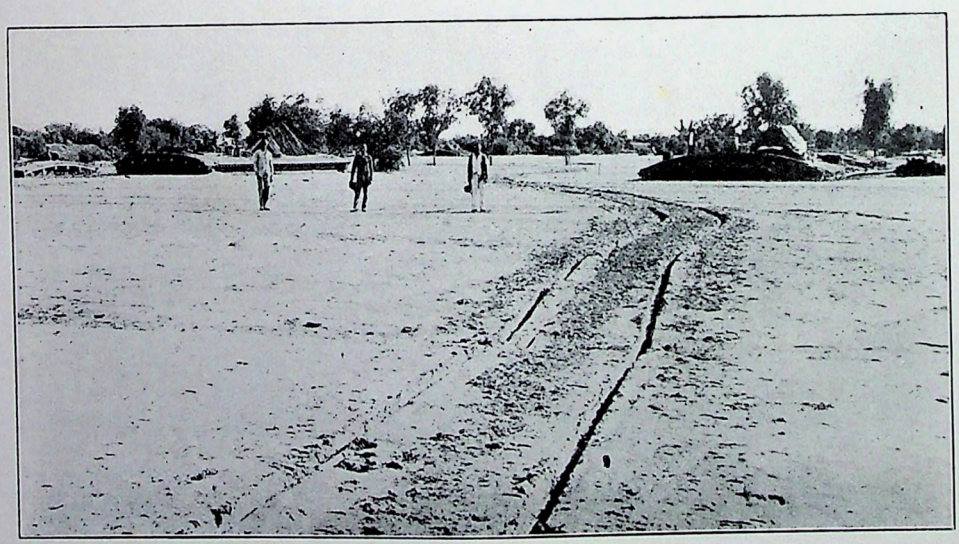


Dense vegetation on the top of a ridge in the Tung Ling area, 1917, just before the serious destruction of the forests began



Photo by courtesy of Rufus H. Lefever, Esq.

The Tung Ling area to-day. Note the tree stumps and charred remains



From "The China Illustrated Weekly, 1917"

A village on the South Manchurian plain buried up to the eaves of the houses with silt brought down by the Liao River in flood. The direct result of destroying the timber on the mountains of North-east Chihli

of 1914 and 15, when I first visited this area, there was ample evidence that this had begun. In the summer of 1917, when I paid my second visit, I was horrified at what had taken place. Enormous tracts of forest land had been completely cleared. The terrible part was that the timber had not been put to any use. The Chinese had simply cut down the magnificent trees of walnut, oak, elm and the like, and burnt the logs where they lay. And the destruction was going on apace. Recently I have received information that almost *all* the timber in this area is gone.

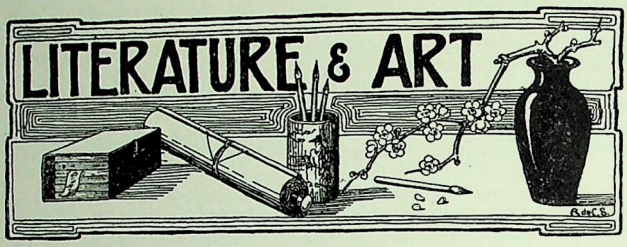
Such an appalling waste of timber in a country where wood is at a premium and such a wanton destruction of a fine forest and its wild animals are nothing short of crimes, and an everlasting disgrace to the Chinese people as a whole. I wrote about this in 1915, calling the attention of the Chinese Government to what was going on. I wrote about it again in 1917. But absolutely nothing has been done in the matter. What, one asks, is the Ministry of Agriculture and Forestry doing to allow such a disgraceful thing to take place ?

And the case of the Tung Ling forest is not isolated. The forests of West Shansi are going the same way, only there the local people are at least making use of the timber as they cut it down. The same is happening on a far greater scale in Manchuria. The same is happening in Fukien province, though in the two latter regions the timber is being exported.

The terrible thing is that no re-planting is being done. Though one reads from time to time of the sporadic planting of young trees by officials in half-hearted attempts to bring about much needed reforms in this direction, one ventures to state that nothing at all adequate is being done to vouchsafe a future supply of timber in China, and China with its vast areas of untillable land, admirably fitted to carry a very heavy timber vegetation, is doomed to purchase all its wood in the future from foreign lands.

And the result ? North China is already faced with climatic conditions such as prevail in the most arid parts of Central Asia. In the May issue of this journal I have discussed this problem under the title " Approaching Desert Conditions in North China," and I make bold to say that these desert conditions have been aggravated and their approach accelerated by the wanton and stupid destruction in North China of the once extensive forests.

Floods, draughts and famines are the result of the lack of vegetation throughout North China, and unless the Chinese people wake up to the situation, and commence a vigorous policy of aforestation, they may expect greater miseries and more abiding poverty in their northern marches then they are subject to even now.



四元玉鑑

THE PRECIOUS MIRROR OF THE FOUR ELEMENTS

AN EXPRESSION OF THE CHINESE GENIUS.

BY

EMMA LOUISE KONANTZ

Author's Note.

"The Precious Mirror of the Four Elements" is a Chinese algebra by Chu Shih Chieh 朱世傑 published in 1303, *of which Dr. Chen Tsai Hsin, head of the Department of Mathematics in Yenching Ta Hsüeh, has made a complete translation, accompanied with numerous explanatory notes. I have been assisting in the work and the "Precious Mirror" itself is my authority.*

The road over which science has travelled from its very beginning to its present lofty height is a most fascinating one, both in its historic development and in its expression of the genius of a race. This is particularly true in the field of mathematics, which has entered so largely into the material, the intellectual, and the spiritual phases of the development of civilization.

Primitive man is concerned above all with that which deals with his daily life. Before a written language is developed the rude savage keeps his simple records on a Totem pole, a series of knots tied in a string, or by means of pebbles collected along the shore. Thus in the beginnings of all civilizations there is a conception of number—the one universal language.

A year ago the world was startled by the discovery of the Tomb of Tutankhamen with its wonderful treasures. About fifty years ago Egypt yielded another treasure, the Ahmes papyrus,* now preserved in the

* Deciphered by Eisenlohr in 1877.

Rhind Collection in the British Museum. From the treasures in royal tombs we see the culmination of Egyptian civilization: from this papyrus we see its beginnings. This papyrus, written about 1,700 B.C., is based upon earlier papyri written about 2,300 B.C. Ahmes, the priest, designates it as "Containing the Knowledge of All Dark Things." From it we learn that the Egyptians had developed the rudiments of Astronomy, by which they calculated the dates of their religious festivals, and that they knew the rudiments of geometry, by which they resurveyed the Nile districts after their yearly inundations and by which they determined the orientation of their pyramids and temples. Thus their astronomy and geometry, so far as we know, were cultivated for their practical ends. Breasted claims that their calendar year of three hundred and sixty five days, introduced in 4241 B.C., is the "earliest fixed date in the history of the world as known to us."*

It is to the Greeks, the heritors of the Egyptians, that we turn for the scientific development of geometry. In Egypt, mathematical knowledge was largely confined to the priesthood, the leisured class. In Greece it was no longer under the sway of the priestly class, and the Greeks, thus freed and unrestrained, took a higher and broader view and became the great geometers of the world. They were not the great sculptors of the world because the Pyrrean Hills were imbedded with beautiful marble, this was only a fortuitous medium for the expression of their thought. While the gladiators in the amphitheater and the heroes of the Olympic games may have given inspiration, they were the great sculptors of the world because they loved form. Elie Faure says, "The Greeks, even to the days of their saddest decline, loved these forms for themselves."†

Greek sculpture, in its dealing with three dimensional space, was born of Greek geometry. Their principles of geometry were a part of their philosophy of life. The Pythagorean school was more mathematical than philosophical. It made geometry a theoretical science. Plato placed his emphasis upon geometry as a training of the mind when he had inscribed above the entrance to his lecture room, "Let no one unacquainted with geometry enter here;" when he said to a student who knew no geometry, "Depart from us for thou hast not the grip of philosophy," and when he replied on being questioned regarding the occupation of the Deity, "The Deity geometrizes continually."

The exquisite lines of the Greek vase, so long the admiration of the world, were based upon geometric laws. Jay Hambridge, in his book on Dynamic Symmetry, shows that the Greeks employed geometry in their all over proportion, the ratio between height and width being based upon root rectangles ($\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$) and other rectangles derived from these. Dr. Caskey, Curator of Classical Antiqities in the Boston Museum of Fine Arts, in his book on the "Geometry of the Greek Vase," has shown that the *amount of error* in the vases of the Museum, measured by the laws of dynamic symmetry, averages less than a millimeter. The Greek genius was nowhere more fully expressed than in geometry.

* Breasted: A History of Egypt, page 14.

† Elie Faure: Ancient Art, page 293.

The genius of the Romans—the great road builders, the great law givers—turned to algebra rather than geometry. Theoretic geometry made no appeal to them. They developed algebra largely upon the basis of what they inherited from the Arabs. Algebra is but another name for Italian Algorism—from Al-Khowarizmi—an abbreviation for Mohammed ibn Al-Khowarizmi, introduced by the Arabs in their migrations into Spain. Thus we inherited the Arabic system of notation. But whence the Arabic system ? From India. If we go back nearer the source, our system is not the Arabic system but the Hindoo system. Whence the Hindoo system ? Did it originate in India or in China ? Did the Indians and the Chinese develop their system independently or was one influenced by the other ? These are questions yet to be answered. It may be, due to the destruction of original sources, that the solution will have to depend wholly upon internal evidences.

We know, however, that we must look to the Far East for the early development of number system and algebra. The philosophy of the East was concerned with number rather than with form. While the Chinese, like other ancient peoples, early discovered certain astronomical phenomena, their greatest achievement was in arithmetic and algebra. They reached the summit of their achievement in algebra near the close of the thirteenth century, when Chü Shih Chieh published his " Szu Yüan Yü Chien," or " The Precious Mirror of the Four Elements."

Toward the end of the seventeenth century a Roman Catholic missionary presented to the Emperor Kang Hsi an algebra translated from European sources. The Emperor gave it, for inspection, to Mei Wên Ting 梅文鼎, one of the prominent mathematicians of the Empire, who pronounced it exactly the same as the old Chinese method known in the thirteenth century or earlier. He also claimed that the Western World derived the science from the East and that algebra meant " Came from the East."

Chu was widely known during his time as a teacher of mathematics, having travelled throughout the country teaching. The number of his students increased daily and he was prevailed upon to write a book to reveal the secrets of his work. " The Precious Mirror," first published in 1303, consists of the solutions of equations up to the thirteenth degree and of simultaneous equations in two, three, and four unknown quantities —or elements—these elements being *t'ien*, *ti*, *jên* and *wu*,—heaven, earth, man, and thing. These problems were solved by means of a calculating board and calculating rods made of bamboo, those coloured red representing positive quantities and those black, negative. Two hundred and seventy one rods commonly formed a set. Their origin will probably never be known, though some have placed it at about 3300 B.C.

I shall not go into the intricacies of the methods of solution. The difficulties, perhaps, can no better be pointed out than by quoting from the introduction to Chu's work itself. Chien Chin Shih Mo Ju says, " His method of solving equations is by putting the *yuan ch'i* (element of void), at the centre, the element *t'ien* at the bottom, the element *ti* at the left, the element *jên* at the right, and the element *wu* at the top ; by moving the positive and negative terms from the top to the bottom,

from the right to the left, by interchanging and alternating their positions, and by many other different ways of arrangement of the terms . . . . . It is profoundly wonderful. It extends the principles which were founded by the ancient scholars. By the concentration of many elements into one, by controlling the *san ts'ai* (three talents) under the great extremity, and by multiplication and division, addition and subtraction, it reaches out to the great depth and the far distance. It is a book of science in itself.

"Now the science of mathematics is considered very important and an examination of the subject will gradually appear. The book of the master, therefore, will be of great benefit to the people of the world. The knowledge for investigation, the development of intellectual power, the way of controlling the kingdom and of ruling even the whole world, can be obtained by those who are able to make good use of the book. Ought not those who have great desire to be learned take this with them and study it with great care ? "

Tsu Yi Chi Hsien Fu writes, " He (Chu) has travelled through the country and at present is sojourning in Kuangling. People, like clouds, come from the four directions to meet at his gate in order that they may learn from him." . . . . " By the aid of geometric figures he explains their relations (*t'ien, ti, jên* and *wu*). By moving the expression from top to bottom, from right to left, by applying multiplication and division, by various methods in arranging the terms, by assuming the unreal for the real, by using the imaginary for the true, by using the signs, positive and negative, by keeping some and eliminating others, and then changing the position of the sticks, and by attacking from the front or from one side, as shown in the four examples, he finally works out the expression of evolution in a profound yet natural manner. When I was asked to write an introduction I read it through with great care and found that there were many things that I had never seen or heard of before. By not using ' yet ' it is used ; by not using a number the number required is obtained. Hence I know that existing quantities come from non-existing quantities. This profound work is therefore exceedingly progressive as compared with the work of ancient mathematicians. Those who have an interest in the subject may prove my words by working out the problems in this book, thus finding the truth of my statements."

Before discussing the " Precious Mirror " further, let us consider the material Chu had at his disposal. The origin of Chinese mathematics is veiled in myth. Tradition tells that the ancient sage Fu Hsi (2852 B.C.) saw a dragon horse emerge from the Yellow River with a magic square upon its back. Yu, the first emperor of the Hsia Dynasty, is said to have observed the *Shu* (book) on the back of the sacred tortoise. Li Shou, minister of Huang Ti, the Yellow Emperor, about 2597 B.C., wrote his famous work on the "Nine Sections 九章." Lui Hui in his Commentary on the " Nine Sections " places the birth of algebra at this time, since the eighth of these sections contained linear equations of two or more unknowns and positive and negative numbers. The Chinese were acquainted with quadratic equations in the second and first centuries B.C., solved simultaneous equations in the third century, and equations of the third

degree in the beginning of the T'ang Dynasty. Their method of solving quadratics and cubic equations sprang from their old process of extracting square and cube roots.

The unknown quantity being represented by the element *t'ien* (heaven), the solution of an equation was termed the *t'ien yuen* 天元, the "Celestial Element Method." We cannot tell when it arose. Chu, in his *Suan-hsüeh Ch'i-mêng* 算學啓蒙 or "Introduction to Mathematical Studies," published in 1299, solves problems by this method but his work contains nothing in advance of his predecessors. The *Suan-hsüeh* was merely a primer and evidently written as a text-book.

"The Precious Mirror" was a decided advance over the *Suan-hsüeh*. It was known during the Ming Dynasty but not understood, so little mention was made of it by other writers. It the "Precious Mirror" Chu extends the elements to four as indicated, thus carrying algebra to the loftiest height it was destined to reach. In simultaneous equations containing all the elements the different expressions were set up on different calculating boards and the elements were gradually eliminated by addition and subtraction. Another marked feature of his work, and probably the most remarkable, is that his solution of higher degree equations was identical with that of Horner's Method of Root Extension, published in Europe in 1819, over five hundred years later.

The "Precious Mirror" contains Elimination of Elements in Simultaneous Equations, Multiplication and Division by the Synthetic Method, and the Summation of Series. The arithmetical triangle, known in mathematics as Pascal's triangle for determining the co-efficients of the terms of higher degree equations, and published by Pascal in 1643, but engraved on the title page of Apinius August 9, 1526, and, according to Cantor, known to the Arabs in the eleventh century, appears in this work. Here Chu calls it "the ancient method of determining the co-efficients of higher degree equations."

The "Precious Mirror" is made up of three books corresponding to the three talents; four elements corresponding to the four seasons; and twenty-four sections, corresponding to the festivals, as the equinoxes and solstices. The whole book contains two hundred and eighty-eight problems.

I have frequently been asked the nature of the problems. Book I contains eighteen problems on right triangles, eighteen on plane figures, nine on piece goods, six on store houses for grain, and thirteen on equations with fractional roots.

Book II contains one hundred and three problems; two "mixed as you please," nine containing the square and circle, fourteen on making circles with the three values of π, twenty on areas, eighteen on surveying with right triangles, twelve miscellaneous problems in poetic form, seven on different shaped piles of hay, seven on bundles of arrows, nine on land measurements, five on "men summoned according to need." (That is for building public works, or the army).

Book III contains twenty problems on different shaped piles of fruit, nineteen on figures within figures, eight on simultaneous equations with

positive and negative roots, thirteen miscellaneous problems, twelve containing expressions in two unknown quantities, twenty-one on "left and right—you meet elements," eleven containing expressions in three unknown quantities, and six containing expressions in four unknowns.

You will note that the word expression is used and not equation. The absolute term of the expression is called *t'ai shu*, indicated by the character *t'ai*, an abbreviation of the term *t'ai-chi*, the great origin, which is the beginning of all elements. In an expression of higher degree than the second, the last term is called the *yü*, modified by the degree of the expression, that is, cubic *yü*, if it is a cubic expression, or the fourth power of *yü* if it is an expression of the fourth degree. The first term is always called *shih*, and the second *fang*, the terms between the second and the last are called *lien*, and are distinguished by their order; that is, first *lien*, second *lien*, and so on. The first *lien* is called the upper *lien* and the last *lien* the lower *lien*.

Take this problem for illustration :—

Problem.—The volume of an observatory is 18,528 *ch'ih*. It is said that the square root of the sum of the lengths of the upper and lower bases is less than the width of the upper base by thirteen *ch'ih*, equals the difference between the upper and lower lengths, and is one-third of the length; the difference between the widths of the upper and lower bases is six *ch'ih*. It is required to enlarge the observatory into a circular form, using the diagonals as the diameters of the bases, and to complete the work in one day. The rate of one man's work is twenty-seven *ch'ih*. How many men shall be employed for the work? Find also the lengths of the bases and the height and the volume of the arcs.

Process.—Let the element *t'ien* be the width of the upper base of the observatory. From the statement we have 18,774 for the negative *shih*, 702 for the negative *fang*, 391 for the positive first *lien*, 36 for the negative last *lien* and 1 for the positive *yü*, an expression of the fourth degree whose root is the width of the upper base. The other dimensions required can be obtained from this width. The expression in modern form is the equation

$$18{,}774-702X+391X^2-36X^3+X^4=0.$$

The problems in poetic form remind us of the famous Indian problems of Brahmagupta.

"I heard some one talking in the midst of the fog,
Saying he had a mixture of wine, weak and strong,
That it took three of the weak to intoxicate one,
While three could be intoxicated by means of the strong.
Fifty persons were found lying on their seats after twelve *tou* were gone.
May I ask those skilled in calculation,
Those who come from the four directions,
How much was in the mixture, the weak and the strong?"

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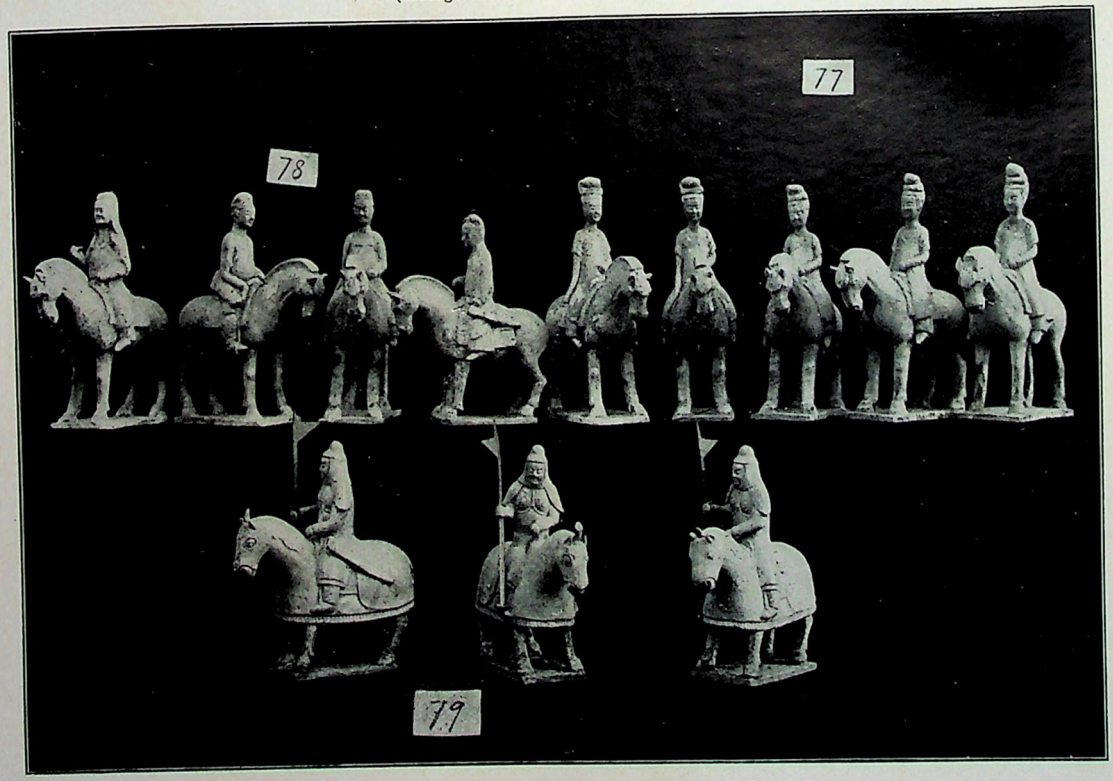
Those who come from the four directions,
How much was in the mixture, the weak and the strong ? "

The work accomplished in algebra by the Chinese is another witness to the fact that they early developed a high stage of culture and that largely without extraneous influences.

While we recognize the great achievements of Modern Mathematics, we must not underestimate the great work accomplished by the pioneers. We marvel that the Greeks were able to achieve what they did in geometry with their clumsy system of notation; we marvel that the Chinese were able to reach the height they did with calculating board and rods. Chinese algebra is no less a product of the Chinese genius than Greek geometry is of the Greek.

ANCIENT POTTERY OF CHINA

(George Crofts Collection, Toronto)



Horse-men of the Tang Period. Note the armour on the lower figures

CHIN KU CH'I KUAN

今古奇觀

THE PERSECUTION OF SHEN LIEN.

STORY NO. XIII.

TRANSLATED BY

E. B. HOWELL.

The incidents narrated in this tale occurred during the reign of the Ming dynasty emperor Chia Ching, when the Prime Minister Yen Sung was at the height of his power. Yen Sung who was a native of Fen-i of Kiangsi Province is usually spoken of as Yen Fen-i, i.e., Yen of Fen-i. After attaining great power, Yen brought together a notable collection of paintings and writings, and to most of these attached his seal. After his dismissal from office and consequent disgrace, his collection was confiscated and the seals were cut out. I have seen several instances in which there is a square hole in paper or silk paintings or writings, showing that the seal of Yen Sung had been removed. Yen Sung had also a small collection of ancient bronze vessels. These collections were evidences of his cupidity rather than of his fondness for artistic products. He is the outstanding example of a man fond of literature and art, with almost supreme power, yet totally devoid of moral ideals in personal life or Government administration.—*Editor.*

I sat one day at home and read of doings long ago,
When suddenly I found a moving tale I did not know;
How by mischance a good man by a villain was beset,
And how his clothes, in his despair, with tears of grief were wet.
Keep your official girdle on! Your hat of state retain!
The sun and moon from out the clouds will surely come again!
Just as the dawn succeeds the night, your heart will soon be glad,
For Heaven will suitably requite the good man and the bad.

"When a Holy one is on the throne, the winds blow in their appointed time, and the good rains fall in due season!"

This saying was amply verified in the days of the Emperor Chia Ching,* for then the country was at peace and the people prospered.

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* *Chia Ching*: The twelfth emperor of the Ming Dynasty who reigned from 1522 to 1567. He is not to be confused with the Emperor Chia Ch'ing of the recent Ch'ing dynasty who reigned from 1796 to 1821. Chia Ching appears to have been a mild and unintelligent monarch, famous for his devotion to Taoism. During his reign China suffered greatly from Tartar forays and from hostile naval action by the Japanese—as herein appears.

But one blunder was made, and that was the employment of a traitorous minister who befouled the good name of the government. But for him universal prosperity would have reigned supreme.

The name of this traitor? It was Yen. His *ming* was Sung, his *hao* being Chieh-hsi, and he came from Fen I, in the Kiangse province.

This man by his obsequious conduct towards the Emperor obtained many favours. He had, too, dealings with the eunuchs; and he never said anything except what he knew the Emperor would be pleased to hear. He was very strict in all religious observances and was an expert in writing out prayers extolling His Imperial Majesty to God*. By such means did he rise suddenly to great official position. He was outwardly very polite and obliging to everyone, but in reality he was both suspicious and of a mean mind. Thus he impeached and obtained the execution of the Grand Secretary, Hsia Yen, so that he himself, a mere upstart, might take his place as a Minister. His authority and his power became very great, but everyone at court looked askance at him.

His son, Yen Shih-fan, while still little more than a student, became straightway an Under-Secretary in the government. He too was an overbearing person, but he had a certain superficial talent, had read widely, and was possessed of a powerful memory; he was moreover a born schemer and was most ingenious. His father, Chieh-hsi, placed the greatest reliance upon what he said and invariably consulted him in every affair of importance. At court they were named the Prime Minister and the Assistant Prime Minister, and the two of them hatched their vile plots to obtain as much power as they could and schemed to lay up vast sums of money by bribery and extortion, selling titles and offering posts of office to the highest bidder. Any official who aspired to riches and high place was obliged first to bribe them heavily and to become their disciple and protégé. Then only could he obtain promotion and rise to eminence; and on this account all the evildoers flocked together like men going to market, and the Censorate was solely composed of the parasites of these two traitors.

If any one opposed them he would be sure to encounter disaster very soon—at least a beating and the loss of his office, at most capital punishment. Terrible indeed was the state of affairs in those days! Only those who were utterly reckless of their lives dared to speak a word against the two Yens, for, unless a man had the courage of Kuan Lung-feng or Pi Kan,† and possessed twelve-tenths of the nature of a devoted patriot, he would sooner see the empire ruined than offend these two.

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* These prayers when written out on suitable paper were burned at the altar and thus forwarded promptly to the proper destination.

† *Kuan Lung-fang and Pi Kan*: Two ministers of the pre-Christian era who ventured to remonstrate with their respective monarchs and paid for their temerity with their lives.

An anonymous poet who deplored the times parodied the well-known "Poem of the Divine Child" * in the following manner :—

When young your books you can afford to hate
Riches alone will bring you to the fore,
For Yen the famous Minister of State
Has little use for anyone that's poor !
At Court, the wealthy only are esteemed,
And woe betide all those that disagree ;
All others of inferior rank are deemed,
And only flatterers rise to high degree.

Thus father and son, relying upon the favour of the Emperor, continued in their ways of oppression and avarice till their crimes were heaped together like mountains ; when a certain virtuous man arose and impeached them, whereby was caused a series of remarkable events which have served as a handle for talk amongst countless multitudes. And when this man died, he left behind him a lofty and illustrious name.

A filial child to parents will bring blessings without cease, and a just and upright minister will fill the land with peace !

II

This man was called Shen Lien, his *hao* being Ch'ing-hsia, and he came from Shao-hsing in the Chekiang Province. His character may be said to have had a military weft and an administrative warp. He was resolute in his determination to be of assistance to the empire and to bring peace to the common people. From his earliest years he had been a fervent admirer of Chu-ko Liang† as a national hero—that Chu-ko Liang, also known as K'ung Ming, in whose collected writings are the two compositions known as "The First and the Second Call to Arms." These Shen Lien was never tired of reading. He copied them out many hundreds of times and pasted them up all over his house. Moreover, after he had taken wine, he would recite them with a mighty voice, and when he came to the passage :—

"Expend your last effort in the service of your country, and only when dead relax your exertions !", he would emit loud sighs and gasps

* The original of this poem was written by Hsieh Chin who lived during the reign of Hung Wu, the first of the Ming Emperors (1368-1399). His effusion may be translated thus :—

When young you must assiduously read,
Merit alone will bring you to the fore.
And those to whom the Emperor gives heed
Are learned all in wisdom's deepest lore.
At Court the virtuous only are esteemed,
So to your daily essays constant be,
All others of inferior rank are deemed
And only scholars rise to high degree !

† Chu-ko Liang (surname Chu-ko) A.D. 181-234. One of the most popular figures in Chinese history. He was prime minister and director of the Shu State, one of the Three Kingdoms into which China was split at that time. His chief enemy was Ts'ao Ts'ao, who as prime minister of the Wei State deposed the emperor and caused his own son Ts'ao P'ei to usurp the throne.

of admiration and regret for K'ung Ming. Then he would finish with a flood of tears. This used to happen frequently and all regarded him as one slightly demented.

Now it happened that in the seventeenth* year of the reign of the Emperor Chia Ching he passed the *Chin Shih*† examination and was given the rank of Magistrate. This position he held in three localities, and in each place he served the state with credit and distinction.

His clerks were careful to observe the law
And he himself was honest and upright.
Bullies and ruffians all held him in awe,
And citizens did sleep secure at night.

But he was an outspoken and frank person and never stooped to flatter his superiors. And on this account he was degraded and reduced to the rank of a petty officer of the Palace Guard.

When he arrived in the Capital to take up this position, he beheld the vastness of the Yen household and understood how it was all accumulated by bribery and what confusion resulted therefrom to the state. Whereat his anger was great.

One day he went out to dinner and met Yen Shih-fan as one of his fellow guests. He noticed with disgust the latter's overbearing and insolent demeanour, which was in itself almost more than he could endure. But towards the middle of the meal Yen Shih-fan began yelling and shouting in utter disregard for the feelings of the company ; and at length he sent round the table a huge goblet full of wine, insisting that each guest in turn should drain this under penalty of a fine. The goblet held about ten *liang*,‡ but one and all were too much in awe of Yen Shih-fan to disobey him, so no one dared to refuse.

Now among the guests was a certain Censor named Ma who had from his earliest days always abstained from strong liquors, and Yen Shih-fan sent the goblet round to him in malice, for he knew of this peculiarity. The Censor again and again tried to excuse himself, but Yen would take no refusal, so at length Mr. Ma took a mouthful of the wine. His countenance immediately flushed, and he distorted his face in disgust, both of the wine and of the humiliating position in which he found himself ; whereupon Yen Shih-fan got up from his seat and going round to Mr. Ma, took hold of him by the ear and tried to pour the wine down his throat. The Censor was forced to submit, and suppressing his indignation he gulped the wine down. But before he had finished it, his brain began to whirl and the walls of the room to circulate round him. His head felt heavy and his feet light, and he could no longer with facility maintain an upright position. At this sight Yen Shih-fan clapped his hands in amusement and broke out into a paroxysm of laughter.

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* 1538.

† *Chin Shih* : The third and highest of the literary degrees which formerly admitted to the Civil Service of China.

‡ *Ten liang* (ounces) : about the capacity of a large tumbler. Wine is, and was also in Ming times, usually drunk from little cups somewhat smaller than egg-cups.

This scene, however, was more than Shen Lien could stomach. Suddenly he rose and, waving his sleeves apart with a gesture of disgust, he took a large goblet and filled it to the brim with wine. This he carried round to Yen Shih-fan.

"His Excellency, Censor Ma," he said to the bully, "was just now honoured with an invitation from you, Sir, to drink! He is now so overcome that he is unable to return the compliment on his own behalf. This humble official, therefore, now begs to act in his place and to offer you a goblet of wine in return!"

Yen Shih-fan stared at the speaker in astonishment at his boldness, and made as if to refuse the proffered goblet with simulated politeness; but he realised from Shen Lien's tone and from the angry flush on his face that he was in no mood to be trifled with.

"This cup has been drained by every one but you!" Shen Lien went on; "and now it is your turn! The others were all afraid of you, but I, Shen Lien, do not fear you!" And so saying he seized Yen Shih-fan forcibly by the ear and compelled him to drain the goblet.

When he had done this, Shen Lien placed the empty vessel back upon the table with a mighty sound and then he clapped his hands and laughed long and loud. The other guests were both astonished and alarmed at what had happened, and all turned pale and hung their heads, none daring to utter a word. But Yen Shih-fan pretended to be drunk and, rising from his seat, took his leave. Shen Lien did not say good-bye to him and did not even rise from the table.

"Ah!" he sighed, "'Han and The Thief cannot exist together!'"

This quotation, which is taken from the "Call to Arms" aforesaid, he repeated seven or eight times, it being his intention to liken the Yens, father and son, to Ts'ao-Ts'ao and his son Ts'ao P'ei.* The rest were afraid lest this reiterated exclamation should reach Yen Shih-fan's ears and all perspired freely from alarm. But Shen Lien showed not the slightest sign of apprehension and filled and drank off several cups of wine. When it was manifest that he was becoming intoxicated, the party broke up.

Shen Lien went home to bed and slept until the fifth watch when he awoke perfectly sober.

"That rascal Yen Shih-fan" he thought to himself, "was compelled by me in my wrath to swallow that wine. He will not easily forgive this and will in all probability make some plot to kill me. It is of no use doing a thing unless one does it thoroughly. He has already this score against me; I had better try again and see what I can do. The evil that this man and his father have wrought is sufficient to incur the resentment of both God and man, but the Emperor is entirely infatuated with them and they are verily in a strong position. On the other hand my own rank is insignificant and I fear that my voice will carry but little weight; but I will strike at once, it will not do to delay. I must imitate

* Ts'ao Ts'ao and Ts'ao P'ei: Vide note No. 5.

the action of Chang Tzu-fang* at Po Lang Sha where he tried to assassinate Ch'in Shih-huang. Though his attempt failed yet it served as an example to others."

Accordingly Shen Lien thought out on his pillow the wording of his impeachment, and when daylight came he had it all prepared. Then he rose from his bed and after burning incense and washing his hands, he wrote out his memorial to the throne. In it he pointed out that the two Yens, father and son, had usurped the power of the Emperor and had been guilty of wholesale bribery; that they were indeed a most depraved and scandalous pair, deceiving the Son of Heaven and bringing ruin to the State.

Thus Shen Lien wrote, setting forth all their crimes; and finally he prayed that both might be immediately executed so as to appease the anger of all creation.

The Imperial reply was soon published. It said that Shen Lien had falsely accused a great minister in order to gain a little cheap noteriety, and ordered him to receive one hundred blows at the hands of the bodyguard, to be deprived of his office, and to be banished outside the Great Wall.

Thereupon Yen Shih-fan sent an order to the officer of the guard to say that Shen Lien was to be beaten to death; but luckily the officer in question was a man of character who had a great respect for Shen Lien's independence and resolution; moreover he was his superior officer and the two were on excellent terms. He took therefore special pains to protect Shen Lien, and when the latter received his beating it was not with the heaviest part of the bamboo,† so he escaped lightly.

The Board of Punishments duly wrote Shen Lien down as a citizen of the town of Pao An, so before the scars caused by his beating had healed, he put together his belongings, and, taking his wife and children, he hired carts and left the Imperial city for Pao An.

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* Chang Tzu-fang (died A.D. 187). "A native of the Han state in which his ancestors had been ministers for generations. He was so chagrined at the destruction of his fatherland by the Ch'ins that he spent the whole of his patrimony in collecting a band of bravos with whom he tried to slay the First Emperor." (Giles' Biographical Dictionary.) The First Emperor, known to the Chinese as Ch'in Shih Huang or Shih Huang Ti was the emperor responsible for 'the burning of the books' and for the building of the Great Wall.

† *Bambooing.* The bamboo was until quite recently used regularly in China both as a punishment for proved offences and as a persuasive influence to induce accused persons to confess or unwilling witnesses to speak. The bamboo was of two kinds, the Heavy and the Light. Here the heavy bamboo was used, a flat section of a large bamboo pole, three or four inches wide and five or six feet long, tapered in thickness so that while the 'business' end was of its original thickness (about ¾-in.) the handle was much thinner. The blows were delivered from a standing or squatting position with the whole swing of the arm, and were applied to the bared upper thigh of the victim who was laid out at full length on his face. A hundred blows delivered with full force with the very end of this implement could easily cause a man's death.

The light bamboo was a thin section of bamboo about 2½ feet long and a much less formidable weapon. The blows were delivered from a squatting position with the forearm only, the victim being prone as above. A light bambooing was not necessarily more drastic than the severer forms of caning with which the previous generation of boys at an English public school were familiar—except, that is, in respect of the number of blows administered.

His wife was of the Hsü family, and they had four sons. Shen Hsiang, the eldest, had already obtained his degree as *Hsiu Ts'ai* and lived at home in Chekiang. Next to him came Shen Kun, while the third was called Shen Pao, both studying for their examinations and living with their parents. The youngest Shen Ch'iu was an infant of one year old. Thus the five of them set forth together on thier journey ; and so afraid of the Yens were all the officials at the Court, that not one of them, civil or military, dared to come and bid farewell to the Shen family on their departure.

His written protest gave offence within the Sacred Hall
So he and all his house are banned and flee beyond the Wall ;
None comes to lay his hand upon their saddles in farewell,
For who would dare offend a wretch whose wrath he knew so well ?

III

It need hardly be said that they had a very trying and troublesome journey. But they arrived eventually at Pao An, a place near Hsüan Hua Fu on the northern frontier—a dismal locality without any of the pleasant sights to which they were accustomed within the Wall. All was strange to them, and wherever their eyes lighted there was nothing but desolation to be seen. Furthermore, when they arrived it was raining in torrents, so that both sky and earth were obscured, a most depressing situation ! Their desire was to rent a small house to live in, but they knew no one who would help them in this and they were at a loss to know where to turn for a resting place. Indeed Shen Lien, as he stood on the road, was at his wits' end to know what to do, when suddenly he observed a man coming along towards him and holding up an umbrella above his head. This individual saw them sitting on their baggage by the side of the road and when he noticed that Shen Lien appeared to be a man of culture, he stood still and looked at him.

" What is your honourable name, Sir ? " he asked after a few moments irresolution " and whence do you come ? "

" My name is Shen " was the reply, " and I come from the Capital."

" Ah ! " said the stranger. " I have heard that recently there was in the Capital one named Shen, a sub-magistrate, who tried to obtain by impeachment, the execution of Yen Sung and his son. I suspect that you are that man, Sir, are you not ? "

" I am none other than that one " returned Shen Lien.

" Then, Sir, let me say that I have long desired to meet you " exclaimed the other earnestly. " Well met ! Well met ! But this is no place for conversation. My humble abode is not far from this place, and I would be overjoyed if you would bring your family and belongings thither, where we will devise some plan for your future comfort."

So Shen Lien, perceiving that the other was altogether friendly and hospitable, fell in with the suggestion and after walking a short distance they arrived at the house which, though not a large one, was yet most clean and elegant. His new friend conducted him very politely within

and when they had entered the guest chamber the host knelt down and kotowed to him, a courtesy which Shen Lien promptly returned.

"Who are you, Sir? he asked "and for what reason are you so kind to me?"

"My name" responded the other, "is Chia Shih," and I come of a well-to-do family, for my elder brother held the hereditary rank of lieutenant in the Imperial forces. But he died some time since, leaving no son; and by right I should have succeeded to his office. Owing, however, to the great power of that villain Yen, it was necessary for me, I found, to bribe him heavily before I could obtain the position. This I refused to do and I am in consequence living upon the property which I inherited from my father; so I have a few poor acres of land which I till to get my living. A few days since, I heard that you, Sir, had impeached the Yens, a deed which proves you to be a noble patriot. I heard too that you had been banished to this place. So I thirsted to meet you. That I have now had the happiness of realizing my desire is clearly due to an act of Heaven which will bring me happiness in the three stages of my existence."

And so saying he prostrated himself once more before Shen Lien. The latter, however, raised him up and then introduced his two sons, after which Chia Shih told his wife to conduct Madam Shen within and make her welcome, and to have the baggage brought in and the carts and porters dismissed. He then ordered his own men to slaughter a pig and prepare a feast for the Shen family.

"This is indeed terribly wet weather!" said Chia Shih after making these arrangements. "And you, Sir, have nowhere to go; you must therefore stay here with me. I beg of you to set your mind at ease, and to take some wine that your former miseries may be dispelled.

"We have met thus" returned Shen Lien, "without any premeditation, like two fragments of waterweed that are brought together on the surface of a flowing stream, and yet you treat me thus munificently. I am indeed ashamed to be the recipient of such politeness."

"I am but a rustic" replied Chia Shih, "and this is but the coarsest of fare. I beg of you not to complain of my lack of courtesy. Nevertheless let us drink together as host and guest, and let us converse of the evils of the present times, a matter upon which we are of one mind. Ah, what a pity it is that we never met before!"

IV.

Next morning Shen Lien rose early and sought his host.

"I am now chiefly concerned" he said "in seeking for a habitation for my family, old and young. Can you, Sir, please recommend to me a suitable house?"

"What sort of a house do you need?" asked his host.

"One like your own would suit me well" was the reply" and the matter of rent I would leave entirely for you to settle."

"There should be no difficulty in that" said Chia Shih, and so saying he left his guest and went out, but returned after a short space.

"There are many houses here which you could hire" he said on his return. "But I fear that each one is both dirty and small. I shall

not be able to satisfy you immediately, so I think that you had better stay in my own habitation here. I will take my family and live elsewhere until you are able to return to the capital, when I will come back here. Would that arrangement suit you ? "

" I am indeed indebted to you, Sir," replied Shen Lien. " But I would not venture to occupy your house ; such a thing would be impossible !"

" Though I am but a peasant, I am well able to distinguish between the worthy and the unworthy " said Chia Shih. " And I esteem you to be a patriot and a sage of the most praiseworthy description. It is a disappointment to me that I was not early privileged to follow you as a retainer. To-day, by the grace of Heaven, you have come hither, and that I am able to give up my humble abode to you I regard as a fortunate opportunity to show my respect to you. I beg of you not to offer opposition !"

Thus saying, Chia Shih ordered a cart to be hired and a saddle horse and an ass to be brought, and directed his wife to pack up their valuables with a view to their immediate departure, but said that all their household utensils and furniture were to be left for the use of Shen Lien. And the latter seeing that his new friend was resolute in his generous intention, intimated his desire to admit him to brothership.

" A mere rustic like myself " exclaimed Chia Shih on hearing of this proposal, " could not dare to raise himself up to the level of a man in your position !"

" Say not so " replied Shen Lien. " We are both men of decent station, and there is no occasion for any artificial barrier between us !"

And so the relationship was established. Chia Shih was Shen Lien's junior by five years, so he made obeisance accordingly, and Shen Lien after returning the salutation made his two sons kotow to Chia Shih as their uncle. Chia Shih then called his wife and introduced her so that they might all become one family. The two men dined together and subsequently Chia Shih took his family to his father-in-law's house.

Thus Shen Lien came to live in Chih Shih's house, as has been recorded in the following verse from a contemporary pen :—

> Umbrellas are laid down,* and friendly bonds are quickly tied ;
> A house is lent to manifest a love that will abide.
> Self sacrifice like this among the best of us is rare,
> And few could show unselfishness with Chia Shih's to compare.

V.

The elders of the place on hearing that Magistrate Shen had been banished to their township for impeaching Yen the Prime Minister, all honoured him and came to pay their respects, for each one was anxious

* " *Umbrellas are laid down.*" i.e., a meeting of sympathetic friends. An allusion to Confucius who, when he met his friend Cheng Tzu, laid aside his umbrella and conversed with him.

to make the acquaintance of such a man. Firewood and rice they sent to help him, and they brought wine and food with them as presents. There were those also who sent their sons and younger brothers to obtain instruction from him, for he held daily discourses among his neighbours concerning the principles of honesty and of filial piety, and told stories of the upright officials and meritorious worthies of ancient days. And on such occasions he used to become so wrought up with his emotions that his hair would bristle up in his excitement as he thumped the table before him and shouted. And then he would weep or sing, and emit long and deep sighs; and in his grief his tears would flow in streams. There was no one, old or young, that did not rejoice to hear him and to watch him.

At times he would indulge in bursts of invective against the two villains, Yen and his son, and in these his audience would join. If there were anyone present on such occasions who maintained silence, the rest would revile him as one without virtue and an evildoer.

These occasions became more and more frequent, so great was the pleasure that they gave to all.

And it became known that the talents of Magistrate Shen Lien were not confined to matters of civil administration but that he was also deeply learned in military affairs, so that all came to practice archery with him. He gave orders that effigies should be made of straw sewn up in cloth to represent the three famous traitors of history, and these effigies he used as targets for his arrows.

Above the first target he inscribed "The Traitor Li Lin-fu* of the T'ang Dynasty"; above the second he inscribed "The Traitor Ch'in Hui of the Sung Dynasty"; and above the third he inscribed "The Traitor Yen Sung of the Ming Dynasty." And before shooting at any one of the targets he would first shout out curses at it. "Li, you robber! Mark my arrow now!" he would cry; and the same with the other two targets.

Now the people of the north are a sincere and simple folk, and when they heard Magistrate Shen denounce the traitors so vociferously, not one of them expressed the fear lest the matter should reach the ears of Prime Minister Yen. But the old saying runs: "The only way to prevent others from knowing what you do is to abstain from the doing"; and those who are possessed of power and influence have also hosts of informers in their pay. So, quite early, some one carried the news of these doings to the Yens, father and son, who resented them excessively and being overcome with rage, sought for an opportunity to kill Shen Lien in revenge.

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* *Li Lin-fu.* Died A.D. 752. A statesman against whom, a year after his death, accusations were brought of traitorous dealings with the Tartars. His coffin was accordingly opened, his sons were banished and all his honours taken away. (Giles Biog. Dict.)

Ch'in Kuei. Another minister who was in league with the Tartar enemies of China. He is chiefly remembered for his judicial murder of the patriot Yo Fei in 1141. After Ch'in Kuei's death his honours were cancelled, and to this day the effigies of himself and his wife in the two temples at Peking and Hangchow respectively, wherein are placed honorific tablets in memory of Yo Fei, are spat upon contemptuously by passers-by.



"And these effigies he used as targets for his arrows"

It happened that about this time the Military Governor of Hsüan Hua Fu vacated his office through death, and Yen the traitor ordered the Board of Civil Office to appoint in his place a minion of his own called Yang Shun. The Board at once did so, and Vice-President Yang Shun was accordingly elevated to be Military Governor of Hsüan Hua Fu.

Yang went to the Yens' palace to pay his farewell visit and Yen Shih-fan prepared a banquet in his honour. When it was over, the host dismissed his other guests and then ordered Yang to investigate and punish the evil deeds of Shen Lien. This the new Military Governor promised to do.

The poisoned cup is ready and awaits the lifted hand.
The sword is sharpened and prepared, the dastard scheme is planned.
Alas for Shen, the virtuous man, who rashly, all alone,
Continues to denounce the knaves in loud and boastful tone!

JUNE OF THE EAST

I am tired of you and your burning deep eyes,
With June-of-the-East, O too beautiful June!
I am sick unto death of your smothering kisses,
Child of the changeless monsoon.

I am tired of you and the music you make,
Slow-sweeping the strings of your tropical seas;
It is melody too full of languor and sweetness,
Too full of dreaming and ease.

I am tired of you and your cloying embrace,
The scarlet-sweet curve of your passionate lips;
And I swoon with the scent of the blossoming lotus
Crushed on your hot finger-tips.

I am thinking of June that I loved in the North,
Who dreams by the lake, on the shadowy sands;
Her voice is the wind in the pines, and the fern-fronds
Twine in her slender, cool hands.

She is deer-eyed, and virginal, to her my heart
Turns always, for always I love her the best;
O take your strange spell from me, Asian enchantress,
Loose me, and let me have rest!

By Maude Hubbard Brown.

SPRING RIVER: FLOWERS AND MOON AT NIGHT

(Literal Translation from the Chinese made by T. Y. Leo and Albion N. Fellows.)

Reprinted from "The Lyric West," February, 1924.

Spring river and tide waters find the sea level.
O'er the sea a bright moon rises with the tide.
Spring blossoms borne on waves—an hundred, a thousand leagues!
Where's a spring river without a bright moon?

The river's flow meanders o'er the verdant plain.
The flowery grove brightened by moonlight looks as snow as sleet!
In the air frost passes: we feel it not as it flies by.
On the bank the white sand we cannot see.

River and sky of one hue! not a tiny speck of dust!
How bright in the air is the moon's lone orb!
On the river bank what man first saw the moon?
In what year the river moon first shone on man?

Men born generation after generation without end.
River moons year by year ever the same.
Know not how many the river moon has shone on.
Only see a great river sending along flowing water.

A white cloud drifts far, far away!
O'er the green-mapled stream—full of sorrows!
Of what house—this night—is the man in the skiff?
Where are there hearts yearning in towers in the moonlight?

Sad, sad the lingering moon glides above the tower.
Her beams may fall on a departed one's toilet-stand!
A screen on a jade-door may not roll them up!
Back they come to the clothes-pounding stones when flecked away!

ART EXHIBITION

OF THE

CHINA SOCIETY OF SCIENCE AND ARTS

(ART SECTION)

HELD IN THE

NORTH-CHINA DAILY NEWS BUILDING

17 THE BUND, SHANGHAI

TUESDAY TO SUNDAY

13TH TO 18TH MAY, 1924



Under the auspices of the "The China Society of Science and Arts" a very successful Exhibition of paintings, drawings and sculpture in European style by artists in China was held on May 13th to 18th in the "North-China Daily News" Building. The rooms were very kindly lent by the management of that institution. Altogether 70 artists participated in the Exhibition, and there were about 530 exhibits. In this supplement some of the more notable paintings and sculptures are reproduced, though it was found impossible to reproduce many of the best pieces.



Portrait of Kang Yu Wei, one of China's most noted reformers and writers, by A. Ketz



Portrait of Dr. J. C. Ferguson, vice-president of "The China Society of Science & Arts," by his daughter-in-law, Mrs. C. J. Ferguson



Portrait of Mr. C. J. Ferguson by his wife, whose paintings were greatly admired



Portrait of Valerie Honnigsberg by Mrs. C. J. Ferguson



A portrait by Mrs. Estelle Nathan



The Tien-an-men, Peking, by Hai Su Liu (Shanghai College of Fine Arts)



A Corner in the Lama Temple, Peking, by Miss Mary A. Mullikin



A beautiful picture by Mrs. Bertha Lum entitled "Frost." Mrs. Lum's pictures are all done in the Japanese wood-cut style. The original of this picture is in the British Museum



A water-colour sketch entitled "Spring" by Mrs. A. H. Swan, Honorary Secretary of the "Art Section" of the China Society of Science and Arts



Study of Ricshaw Coolie's Head by B. Y. Koci



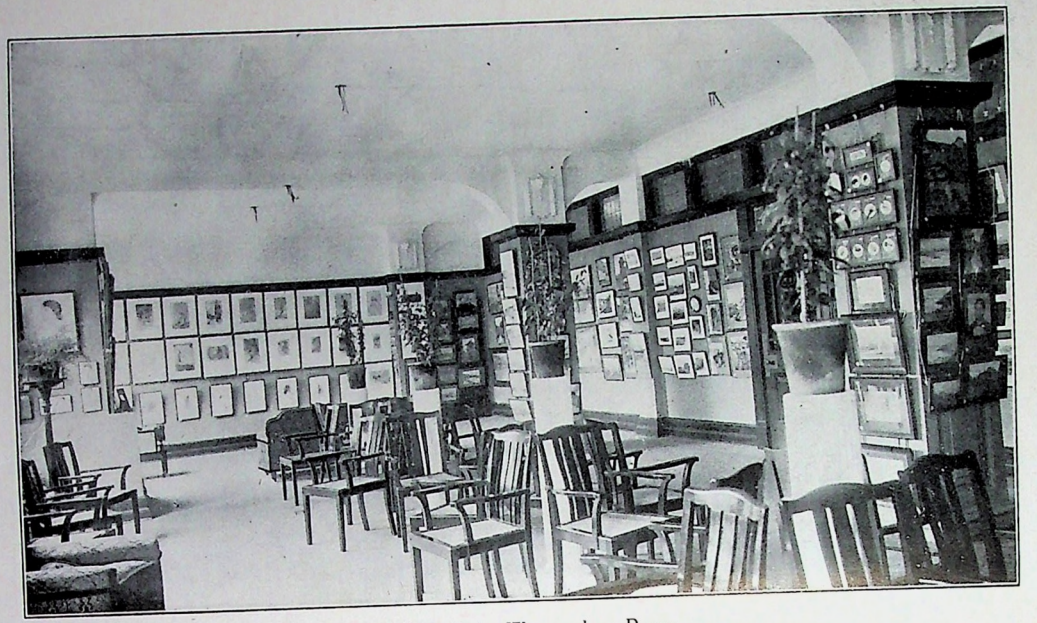
Life-size figure in detail of decorative group at the Astor House, Shanghai,
by B. Y. Koci



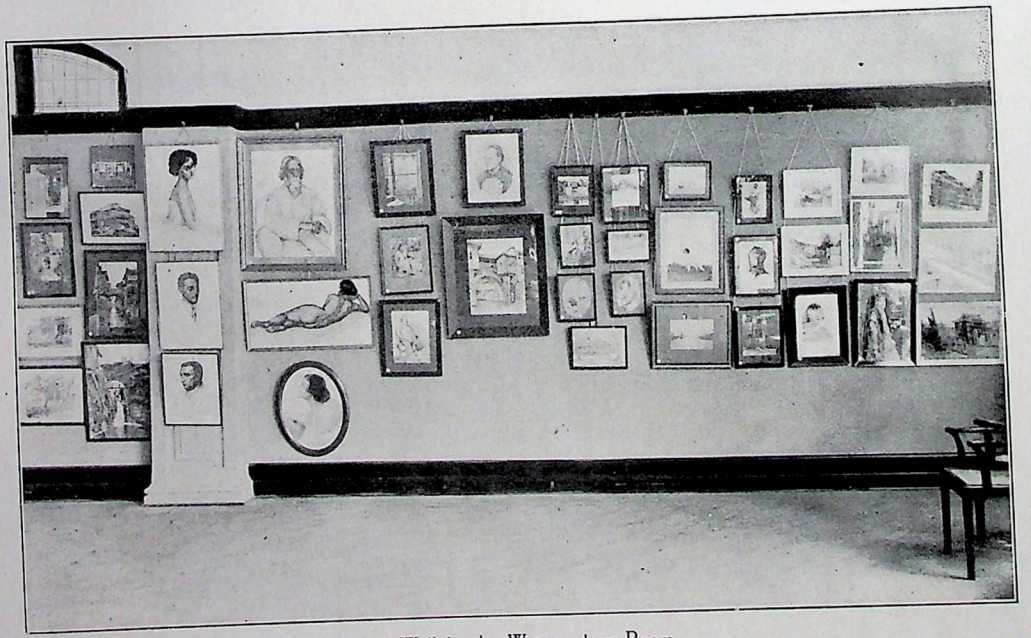
View of One Section of the Oil Painting and Sculpture Room



A Corner of the Oil Painting and Sculpture Room



A View of the Water-colour Room



A Wall in the Water-colour Room

The China Society of Science and Arts.

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Mr. Tsoo H. Lee.

REVIEWS

EARLY CHINESE JADES, by Una Pope-Hennessy, London, Ernest Benn, Limited. 3½ guineas.

This book is frankly the work of an amateur but is dedicated to the learned Dr. Laufer and Dr. Gieseler from whom the authoress freely quotes. Dr. Laufer's "Jade" and Dr. Gieseler's "Le Jade dans la Culte" are well-known works, and these form the basis of this book. There are many quotations from other standard works and all have been arranged in intelligent consecutive order. It would have been better if the authoress had been more careful in the use of various authorities so as to reduce their method of transliterating Chinese names into a common system, but this is only a minor defect. One serious error has been made which could have been readily avoided. Dame Pope-Hennessy has given definitions to some of the Chinese terms used in the text, taken directly from Giles' Dictionary; several of these are entirely misleading, for when Giles' Dictionary was prepared, Laufer had not yet written his book. The first, *pi*, is defined correctly by Giles; the second word, *ts'ung*, is not (as Giles says) a "badge of rank under the Chou dynasty," nor does this agree with the definition given by the authoress on page 36. The third word defined, *kuei*, is not (as Giles says) "a gem token conferred on Feudal Princes by the Emperor," but is correctly described by the authoress herself on page 42 seq. These are only samples of the long list of incorrect definitions, the worst feature of the case being that these definitions do not agree with those in the preceding text. The illustrations are excellent and the description of them fairly accurate. The book will be of help to amateur collectors in much the same way as some of the books which give an introductory survey of Chinese porcelain.

THE ART OF THE CHINESE POTTER, by R. L. Hobson and A. L. Hetherington, London, Ernest Benn, Ltd. Seven guineas.

This book contains 152 plates illustrating Ming and pre-Ming porcelain and pottery. There is a short introduction of seventeen pages which gives a general survey of the evolution of the potter's art but contains no new information. The illustrations are well chosen and the description of each article is as perfect as Mr. Hobson's descriptions always are. We do not profess to know why such a book as this has been published unless the purpose is chiefly commercial as the price of seven guineas might readily suggest.

ORIENTAL THEATRICALS, by Berthold Laufer, Field Museum, Chicago, 80 cents, G.

Dr. Laufer writes as an expert in providing a guide book for the Field Museum to illustrate the collections which show the popular enter-

tainments and theatrical performances of China. In this small book Dr. Laufer has five chapters, the Religious Drama of the Chinese, the Lion Dance, an Imperial play, the Shadow-play and the Thibetan Mystery-play. There is a wealth of legend and lore in these papers that is valuable even for those who are not especially interested in theatricals. As might be expected the interpretation of the legends is that of the stage and does not always agree with the details as given in books of fairy tales. The illustrations are clear and well-chosen.

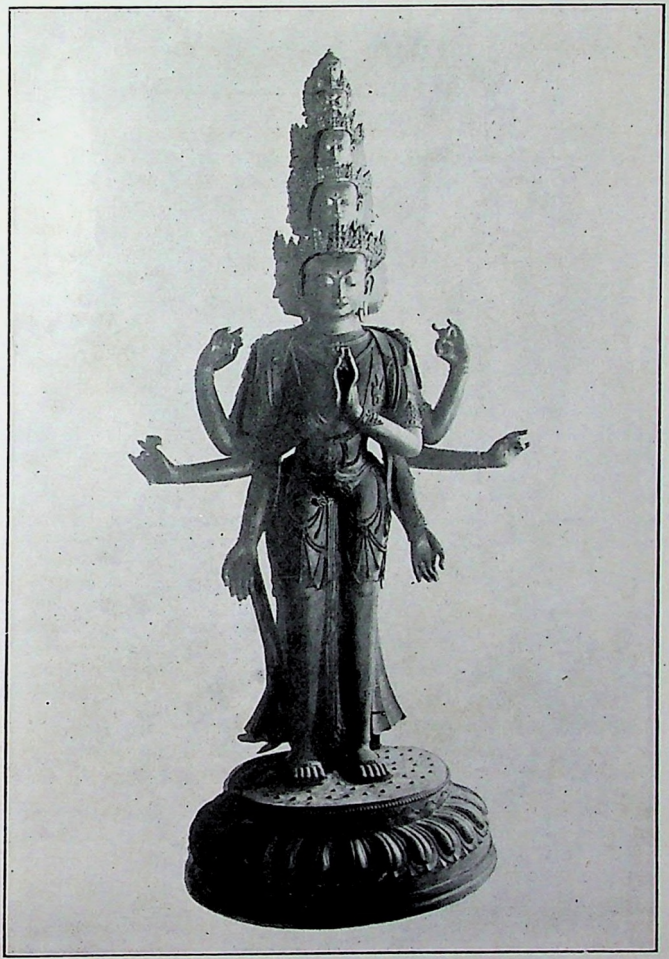
GENERAL PRINCIPLES OF RELIGION (宗教大綱), by Wang Ping-kang (汪秉剛), privately printed.

This book is an illustration of the stirrings of thought in China at the present time. In its first section it treats of many phases of religion, such as its aim, its progress, its relation to philosophy, science and the growth and decadence of temples. There is also a discussion of the soul and of the idea of God. The other section contains an account of the general principles of the religions known to China, Confucianism, Buddhism, Taoism, Christianity and Mohammedanism. The treatment is neither partial nor controversial; it is a fair presentation of what the author considers the essential principles of these faiths. He analyzes the central fact which is common to all as the desire to attain righteousness of life.

LES GROTTES DE LOUNGMEN (Honan), by Pére E. Pelerzi; Shanghai, Oriental Press, Ltd., Avenue Edward VII; $2.50.

This account of the Lungmen grottoes is the best that has yet appeared. It describes in historical sequence the development of this Buddhistic site at which is found the most important religious statuary in China. There are many photographic reproductions of the grottoes and of Buddhistic figures. The original inscriptions are given together with translations covering the periods from the Northern Wei down through the T'ang dynasty. There are also important notes on the ancient site of Loyang, on the Pai-ma Ssu and on the reputed tomb of Kuan Ti. The historical information in this small book, translated from original Chinese sources, is most valuable. Care must be taken in using this work on account of many typographical errors due to faulty proof-reading. For instance, the grotto Pinyang is correctly given on page 32 but on the preceding page it is written Pou-yang. These are slight blemishes which can easily be remedied in a future edition. On the whole, this book is to be highly commended.

J. C. F.



A 16-foot bronze figure that has been hidden away for over 20 years, and is being brought to Shanghai to be sold

EDITORIAL COMMENTS

JOURNAL OF SINOLOGICAL STUDIES: The National University of Peking has performed a service more than national in its benefits by establishing the Journal of Sinological Studies, Kuo-Hsio Chi-K'an (國學季刊). It is to be published quarterly, the first issue bearing date of January, 1923, the same as the first volume of this Journal. Unfortunately the publishers of this new Journal have only been able to issue two additional numbers, those of April and July, 1923, on account of the lack of funds from which the University has been suffering. The contents of these three volumes, however, evidence a high standard of scholarship and a fearless spirit of investigation.

The purposes of the Journal are discussed in the first volume in an editorial pronouncement, which is full of optimism as to the future of Sinological studies. It disputes the position of those who bewail the decline of zeal in Sinological studies due to the new interest in modern subjects and pokes fun at those who considered such studies to be bounded by the limits of orthodox Confucianism. The theory is advanced that during the last three hundred years a movement in China has been gaining force which has had for its object the broadening of the scope of investigation of Chinese cultural life, and that the present activity is only the culmination of this influence. The editors announce their purpose (1) of broadening still more the scope of investigation, (2) of encouraging textual criticism, and (3) of testing the value of various sources of information. This is a commendable programme, and, if we may be allowed to say so, is the first instance in which modern methods of western scholarship have been unqualifiedly adopted by Chinese scholars as applicable to Sinological studies. The editors rightly claim that there is much more in Chinese culture than dallying with pretty phrases in essays or poems and that there must be investigation of the problems of anthropology, linguistics, history of finance and governmental development, art, religion, sociology, etc. In the term "National Culture," Kuo-hsio, the editors claim to include everything that has been studied or written about in the Chinese language. It is a broad platform upon which they take their stand.

We do not think that we can do our readers a greater service than by reprinting the contents of the first three volumes.

VOL. I.

A Facsimile of an Imperial Edict Dated 1651 in which the First Emperor of the Ching Dynasty Confers upon his Uncle (d. 1649) the Posthumus Honors of an Emperor.

An Editorial Pronouncement.

In Defence of the Theory that the "Stone Drum" Inscriptions were made in the Third Century B.C. .. .. Ma Heng.

History of Zoroastrianism in China .. .. Chen Yuan

Transliterated Sanskrit Texts and the Ancient Pronunciation of Chinese Characters .. .. Baron A. von Stael-Holstein.
An Historical Study of the Problem of the Chinese National Language .. .. Shen Chien-shih.
On the Historical Material for the Liang Dynasty (502-556).. .. .. Chu Hei-tsu.
On the Writings of Cheng Chiao .. .. .. Ku Chieh-kang.
On the Books Printed by the Government during the Five Dynasties (907-959) .. .. Wang Kuo-wei.
Recent Discoveries in Asian Philology and History and their Conclusions .. .. Adapted translation by Wang Kuo-wei of an article by M. Pelliot
Appendix I. Catalogue of Tun Huang Books in the British Museum .. .. Lo Fu-chang.
Appendix II. A notice of the Recent Discovery of a Stone-age Culture .. .. Yuan Fu-li.
Appendix III. Proceedings of the School of Sinological Research at the National University of Peking.

VOL. II.

A Facsimile of a Decree issued in 1630 by the "Khan" of the Manchus in which Seven Grave Charges were Enumerated to Justify his Punitive Expedition against the Ming Empire.
History of Manichaeism in China .. .. .. Ch'en Yuan.
On the Ancient Pronunciation of the Characters of the Groups 歌, 戈 (o), 魚, 虞 (ü), and 模 (u).. Wang Yung-pao.
Ts'ui Shu (1740-1816), a Scientific Historian .. Hu Shih
Cheng Ch'iao (1104-1162) .. .. Ku Chieh-kang
On the Historical Material for the Liang Dynasty (concluded) .. .. Chu Hsi-tsu
On the Writings of Cheng Ch'iao (concluded) .. Ku Chieh-kang.
On the Character 皇 .. .. Wang Yung-pao.
Appendix Proceedings of the School of Sinological Research at the National University of Peking.

VOL. III.

Facsimiles :

A Fragment of the Stone Copy of the Classics Made in the year 175 A.D.
Four Fragments of the Stone Copy of the Classics Made in the Era of Cheng Shih (240-248).

Articles :

Remarks on an Eighteenth Century Lamaist Document .. .. Baron A. von Stael-Holstein
An Essay in Proto-Chinese .. .. Pan Tsun-hsing
An Illustration of the Experiment in Tone Changes. Liu Fu

A Study of the Arrangement of the 36 Letters in Shou-Wen's System of Phonetic Notation .. Liu Fu

A Note on Mr. Wang Yung-pao's Article on the Ancient Pronunciation of the Groups 歌, 戈, 魚 and 模 .. .. Lin Yu-tang

On the Reconstruction of Ancient Chinese Pronunciation .. .. Translation by Lin Yu-tang of an Article by Professor Karlgren.

A Study of the Vowels in 死, 時, 主 and 書 .. Translation by Hsu Ping-ch'ang of an Article by Professor Karlgren

A Note on the Fragment of the Stone Copy of the Classics of the Year 175 A.D. .. .. Ma Heng

A Note on the Fragments of the Stone Copy of the Classics of the Era of Cheng Shih .. .. Lo Chen-yu

A Prefectory Note on the Manuscripts of Wang Nien-sun .. .. Wang Kuo-wei

Notes on Six Works in the Wen Lan Library of Hangchow .. .. Shan Pu-an

Appendices :

Two Fragmentary Texts of Manichaeism.

Proceedings and Announcements of the School of Sinological Research at the National University of Peking.

As an example of the admirable way in which this Journal handles its subjects, the paper of Professor Ma Heng may be cited. It discusses the question of the date when the Stone Drums were inscribed. The three theories of assigning them to (*a*) the Sung Chou (宗周) period, (*b*) the Ch'in (秦) dynasty, and (*c*) the Hou Chou (後周) dynasty are carefully examined. The writer states his reasons for following Chêng Chiao in believing that these drums were inscribed in the Ch'in dynasty. He also maintains the theory that these objects should not be called "stone drums," but "Ch'in inscribed stones" (秦刻石). An interesting feature of the paper is the severe criticism passed upon the Emperor Ch'ien Lung for what the writer considers to have been his ill-advised remarks about these stone objects. It will be seen from this brief summary of one paper that no limits are set for the investigations of contributors and that the Journal is intended to be an open form for the expression of thoughts.

EXHIBITION OF CHINESE AND JAPANESE PAINTINGS: The third Joint Exhibition of Chinese and Japanese paintings held in Peking during the last week of April and continued in Shanghai during May was a notable event, revealing the revived interest of the two nations in pictorial art. There was a much better display of paintings than at the first exhibition in Peking three years ago or at the second in Tokyo two years ago. More than a dozen Japanese artists came to China and among

them were Jippo Araki (荒木悌二郎), one of the judges of Imperial Exhibitions, Suiun Komuro (小室翠雲) a judge of the exhibitions of the Board of Education, Shinpo Watanabe (渡邊晨畝) and Shunki Tamanoya.

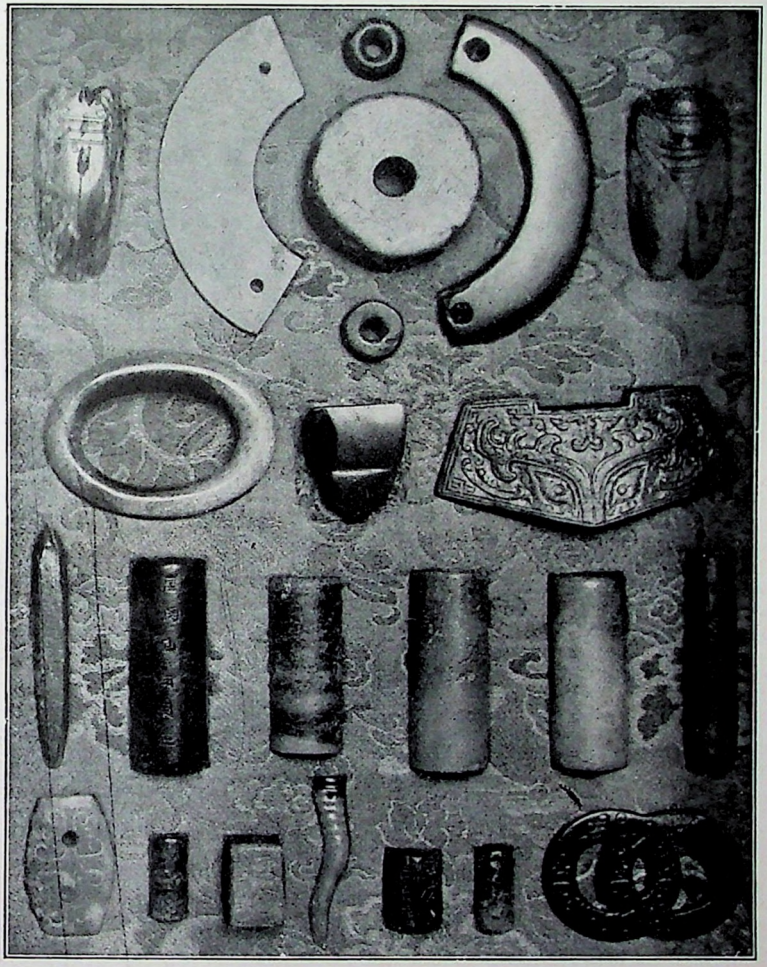
The landscape of Araki called "After Rain" was in many respects the best painting exhibited by the visitors, though Komuro's landscape competed closely with it. Watanabe's "Peacock" attracted much attention on account of the richness of its colouring. The figure paintings of Ota (太田秋民), the flowers by Nagata (永田春水) and Satow (佐藤華岳), the birds and animals by Miyata (宮田司山), the landscapes by Fukada (福田浩湖) and Ogui (荻生天泉), and the snow scenes by Hirosai (廣瀨濟) were all characteristic of the best types of modern Japanese work. In all there were more than 200 Japanese paintings exhibited and of those which were for sale a large number were purchased by Chinese admirers.

Among Chinese painters there was one whose work has never been seen in any previous exhibition—that of Ex-President Hsü Shih-ch'ang. His writing of Wang style of characters is well-known, but since his retirement from the presidency he has taken up again his studies in painting which he had prosecuted with diligence as a youth previous to his entry into official life. His "Drooping Willow" (垂柳) was splendid in conception and execution and was easily entitled to first mention even though in some places the brushwork was more or less unfinished. Mr. Kungpa King (金拱北) was at his best in his reproduction of a bluish-green landscape originally painted by Chao Po-chü. His reproduction of a snow-scene by Li Ch'eng was a very large painting and exhibited great strength of brushwork and a delicate sense of colour. His grape-vine in black ink showed the latest tendencies of modern painting in China, tendencies due not to western influence but to new conceptions brought about by the changed life of the people. Mr. Ku Lin-Ssu (顧麟士) of Soochow, Mr. Wu Ch'ang-shih (吳昌碩) of Shanghai are well-known artists whose work has come to be highly prized in contemporary circles and the pictures shown by them justify this position. Mr. King's sister, Mrs. Wang, and Mr. P'an Lai-ch'en contributed excellent specimens of their work. There were also many examples of the work of the pupils of the Art School conducted by Mr. King and these showed that there is good hope in the coming generation for a continuance of the best traditions of their national style.

If one may be allowed to contrast the work of the Chinese and Japanese modern schools of painting it may be observed that the Chinese lay great stress upon their brush-strokes and the skilful use of their inks, whereas the Japanese emphasis is upon form and colour. There is a certain amount of crudity in the execution of the Chinese and an extravagance of the decorative element in the Japanese work. The inspiration of the Japanese artists expends itself in adding imaginative to realistic effects; that of the Chinese in toning down their imaginative conceptions to the facts of realism.

ANCIENT CHINESE JADES

(From the K. C. Wang Collection)



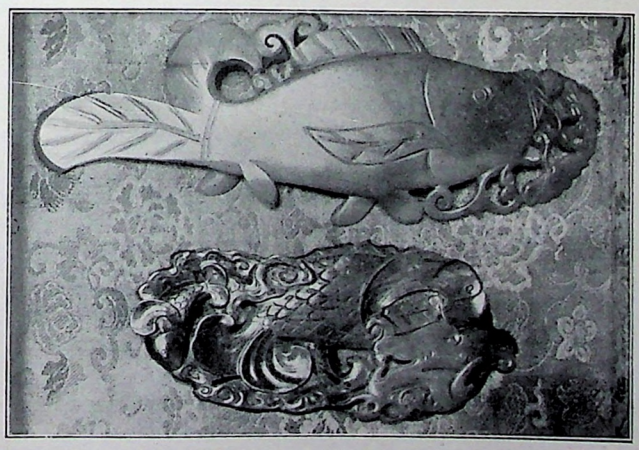
Jade ornaments, pendents and decorations. The cicadas were used to place in the mouths of the dead at burial in order to ensure immortality, the cicada being the emblem of immortality

ANCIENT CHINESE JADES

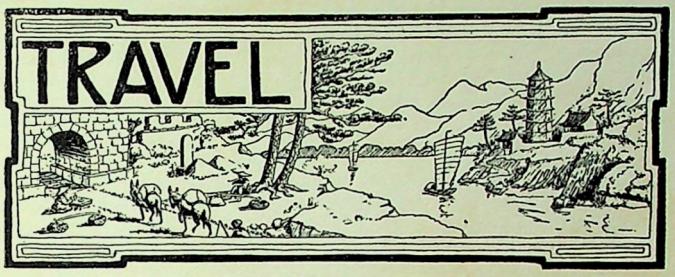
(From the K. C. Wang Collection)



Hwang 璜, Chou Dynasty, used in Sacrificing to the North.
Size: 8½ inches long, 3 inches deep



Jade ornaments of a later period



RECENT EXPLORATIONS IN CHINA AND NEIGHBOURING REGIONS

(*Continued from page* 233)

Amongst the most extensive explorations that have been carried out in China and neighbouring regions of late years are those by Mr. Arthur de C. Sowerby, the well-known explorer and naturalist, and science editor of this journal. Mr. Sowerby's travels have been mainly in the interests of biology, but he has also done a considerable amount of geographical work, including the mapping of certain extensive areas in Shansi, Shensi and Inner Mongolia. His publications, also, have dealt with the physical, geographical and even anthropological aspects of the districts traversed, as well as with the zoology and botany.

Ever since the autumn of 1905, when he arrived in China after a six years' absence in England, he has been travelling about China, hunting big game, collecting biological material, and exploring new or little known regions, and the result of his work is a considerable increase in our knowledge of both the fauna and the physiography of China as a whole, and especially of North China, Inner Mongolia and Manchuria, where he spent most of the years till he returned to Europe to join the British Forces in France at the end of 1917.

During these twelve years he traversed the whole of North China from the Tibetan border in the west to Shan-kai Kuan in the east, and from Kalgan and Kuei-hua Cheng in the north to the Tsin-ling Mountains, in South Shensi, and Anhui in the south, as well as the Ordos Desert, Inner Mongolia, and Chinese Manchuria from north to south and east to west.

He began work in Tai-yuan Fu, where he started a small natural history museum for the Baptist Missionary Society. His next expedition was into West Shansi in the winter of 1906-7, when he discovered the great forests and massive mountain ranges (up to 10,000-ft.), both unknown to Europeans up to that time, of the Chiao-cheng and Ning-wu districts. This was to gather natural history specimens for the Museum of the Anglo-

Chinese College, Tientsin. The specimens, consisting mainly of birds and mammals, were mounted by him in cases with their natural surroundings, the Museum being thrown open to the public the following summer. It was through this work that he came into touch with Mr. Malcolm P. Anderson, an American naturalist who was out in China collecting for the British Museum. The two enthusiasts joined forces, and made a long trip into the interior, visiting the high and forested mountains of West Shansi in several places, crosssing them and continuing into North Shensi, which had never been visited by scientists up to that time, then turning northward and entering the Ordos Desert, and returning by way of North Shansi. This expedition, besides opening up entirely new territory to the scientist and geographer, yielded splendid results in the way of new discoveries in the animal world, over a dozen new mammals being added to the North China list.

In the autumn of 1908 Mr. Sowerby joined the Clark Expedition as naturalist. This expedition revisited North Shensi, continuing thence into Kansu, where Lan-chou Fu, the capital of the province, was reached. Mr. Sowerby and the surveyor, Hazrat Ali, who had been lent to the expedition by the Indian Army, started south from Lan-chou Fu, but had not proceeded very far when the latter was attacked by natives, while engaged in a plain table traverse of the country, and murdered. This sad event broke up the expedition, which returned to Peking. The results obtained were very satisfactory, notwithstanding the unfortunate loss of the surveyor, more new species of birds and mammals being discovered, as well as a wide stretch of territory mapped in and the latitudes and longitudes of numerous important places fixed by astronomical observations.

In the winter of 1909-10, Mr. Sowerby, now working under the auspices of the United States National Museum, again visited the mountainous areas of West Shansi, mapping in large sections of the country, making extensive biological collections, and discovering more forests and new mountain peaks, running well over 10,000-ft. in altitude, as well as some mountain lakes, the last in the Ning-wu district.

In the summer of 1911, after a visit to England, Mr. Sowerby began work again. This was temporarily interrupted by the Revolution, but was commenced again in the spring of 1912, when he visited and explored the wild sheep country of North-west Shansi. The summer of the same year was devoted to an extended trip in Southern Mongolia, which resulted in further extensive maps being made, and the discovery of more new species of mammals.

In the summer of 1913 he commenced the biological exploration of Manchuria, spending several months in the great Kirin forests and on the upper reaches of the Sungari River. In the depths of the former several interesting crater lakes were discovered, while large collections of birds, beasts, reptiles, fishes and insects were made. Little new was discovered, however, owing to the similarity of the Manchurian fauna over large areas, and the fact that much work had already been done by Russian and German naturalists in Russian Manchuria, *i.e.*, the Amur, Ussuri, and Primorsk areas. In the following years he paid three further visits to Manchuria, covering the Yalu Valley, the North Kirin forests, and the

Lower Sungari Valley. These trips were interspersed with others into various parts of China, including the Tai-pei Shan area of South Shensi, where specimens of the rarest and most remarkable of all China's big game animals, the takin (*Budorcas bedfordi*), were secured, the Tung Ling forested area of North-eastern Chihli, and the San-chieh and Ming-kuang areas of Southern Anhui. This completed his exploration of Northern China.

After his return to China in 1921, he commenced an exploration of China south of the Yangtze Valley. He has made several visits to Fukien Province, the fauna of which area he considers the key to that of South China, generally, since it comes within the range of the so-called Oriental Region, which includes the faunas of India, Indo-China, South-China, and the Malayan Archipelago. Faunistically Fukien is an extremely rich province, and already he has made very extensive collections. He found it possible to collect more in one month in this province than in half a year in the north.

He has made two trips up the Min River into the heart of the province, as well as visiting the Fuchin and other districts nearer Foochow.

Owing to the unsettled state of the country it has been found impossible to carry on his work in other parts, and even Fukien has been impracticable during the last six months or so. While it is possible to travel through the troubled areas, keeping to the main roads, it is impossible to leave the latter, mainly because of difficulty in getting transport. This means that nothing new can be secured in the way of biological specimens, since the really wild areas are closed.

It is feared that for the present, at least, extensive expeditions in South and South-west China are impracticable, though it is to be hoped that the prevailing conditions will not last much longer. As soon as South China has been gone over in the same way as the north, it will be possible to compile a comprehensive Natural History for the whole of China.

The specimens taken on the various expeditions mentioned above have been sent to the United States National Museum (Smithsonian Institution), where they are being identified. The results will be published in due course.

Following are the books published by Mr. Sowerby upon his travels and the fauna of China: "Through Shên Kan" (jointly with R. S. Clark, the leader of the Clark Expedition), "Fur and Feather in North China," "A Sportman's Miscellany," "The Naturalist in Manchuria," Vol. I (Vols. II and III on Mammals and Birds ready shortly, the last three books published by the Tientsin Press, Ltd.) and "Sport and Science on the Sino-Mongolian Frontier." A new book "A Naturalist's Notebook in China" is in the publishers' hands, and another on "Fukien Province" in the course of preparation.

(To be continued).

A CORRECTION: In the first instalment of the above series (Vol. II, No. 1, Jan. 1924) the initials of Dr. Gregory, the great American geologist, were given wrongly as W. K. They should have been J. W.—ED.

FROM PURPLE MOUNTAIN ON TSING MING

BY

PAUL DEWITT TWINEM.

From the top of this monstrous dragon,
Whose tail, stretched far to eastward,
Is lost in the low flat valley,—
From the head of this rolling dragon
That looks over the wall of the city,
From the top of this battle-scarred mountain
This rugged, ruinous mountain,
This Golden, Purple Mountain,
We look down on an age-old city,
The Golden Tomb, Ginling,
The Southern Capital, Nanking,
A city whose names are legion.

With its turretted walls and pagodas
In the midst of a low-lying valley
And encircled with hills of sapphire,
It forms the design on the bottom
Of a slow-rounded, low-rimmed vessel.
The browns and the greens are broken
By the broad shining river of silver
And little mirrors of silver
Which reflect the gold of the sunset,
Like crystal mingled with fire.
They speak of the peace of the city
After thousands of years of warfare,
Of bloodshed, massacre, slaughter,
Of plots and pillage and plunder,
Of lightnings, earthquakes, and cyclones,
Of fires and floods and famines
When thrice in the streets of the city
Human flesh was sold in the market,
Of plagues and burning fevers
That took their tolls of thousands,
Of the rise and fall of kingdoms,
And dynasties defeated
Full thirty times or more.

From a little armoury village
Where stands a Confucian temple
It grew until a million
Were harboured in its bulwarks
Full seventy *li* in circuit.

An ancient legend tells us
That to this swampy valley
Three thousand years ago,
There came two wandering exiles,
Two elder sons and princes,
Escaping from their father,
A king of a Northern kingdom,
Lest he might be embarrassed
To crown their younger brother,
The father's certain favourite ;
And disfiguring their faces
They hid their royal lineage
To live among barbarians
Along the mighty Yangtzse.

There stands a noble temple
Upon a little hilltop—
Ch'ao T'ien Kung, they call it—
A fine Confucian temple.
Before the Christian era,
Before the Hans had risen,
While yet the strong Wu kingdom
Held back the Wei and Chao,
Fou-ch'ai had here erected
An armoury, and near it
There clustered then a village—
T'e-ch'eng, the ancients called it.
Then came Wei Wang in splendor
To drive the Wu's before him
And established other cities
On Yueh Tai, near the South Gate
And Tsing Liang Shan, to westward.
Then followed other rulers
Who built the T'ai-cheng city,
The City of the Palace
Where now the great blue flower,
The Peh Chi Koh pagoda,
And the pink-white lotus lily,
The Chi Ming, Cock Crow Temple,
Adorn the distant landscape
On the edge of Lotus Lake.
And on the little summit
Here near the T'ai P'ing gateway,
Where now the soldiers bugle,
Stood Tsing Fou-ch'eng, the fastness
Of the little prince of Kwei-ki.
Where stands the old red Drum Tower,
A small red heart of Nanking,
Upon a rounded hillock,

An Eastern Tsing house emperor
Erected there a palace
Of thirty hundred rooms.
Thus every elevation
Was a city or a village,
While all the wide-spread lowlands
Were flooded then with water—
The lakes and ponds and river
Then reaching toward each other
And joining hands together
In a wide expanse of water.

What marvellous changes
The centuries have wrought!
Thus from a small beginning
There sprang a mighty city,
Where men, about a million,
Were harboured in its bulwarks,
The winding, stretching, circling,
The massive wall of Nanking,
The peer of all such structures,
A monument of Hung Wu.

But now within the ramparts
The bamboo groves are growing
Where people one time crowded;
The fields of rice are lying
Where imperial navies floated;
The dull grey rocks lie scattered
Where the Manchu mansions reigned.

But still the houses cluster
Around the southern gateway
As if they like to linger
To hear the ancient stories
Of Nanking's former glory:
To hear of Yuen Wang's kingdom,
Of Wu Ta Ti's first temple
And the Porcelain Pagoda
Among the Seven Wonders
Of the Western Middle Ages;
Of the coming of the phoenix
To the hills of pleasure gardens;
Of the raining of the flowers
And their change to agate pebbles
To honour Liang Wu-ti
Upon the Yü Hwa T'ai;
Of the beautifying temples

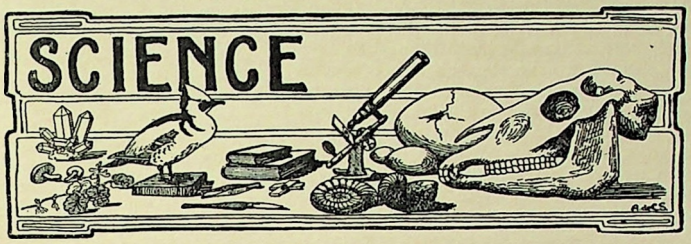
With floors of golden flowers
By that scholar, warrior, emperor
Who walked with ash-grey clothing
Of the holy Buddhist priesthood
Mid the coloured silks and satins
Of his oriental court.

What changes yet are coming!
To-day I see from this mountain
Bright signs of new life awakening.
No more are the Drum Tower warnings
Resounded far in battle,
Nor the warning words of Kan Hsi
Opposing wealth and pleasure,
But a bell rings out the hours
And sounds forth fire signals.
The slopes of land about it
Are revived with trees and bushes
In memory of Li Hsuin
And youths from every province
Of the new Chinese Republic
Are attracted to the colleges
That cluster close beside it.

The Kan Ho Yen, old valley,
A moat of the ancient city
And the home of classic poets,
Is teeming now with students.
The Peh Chi Koh pagoda
Still reigns as queen of the hilltop.
But from that hill at noon-day
A canon speaks the hour
To a thousand busy students
About the massive buildings
In the shadow of the hill.
No longer do kings and princes
Have royal hunts for tigers
On the hills above the River,
But there are spacious dwellings
Where Westerners are living.
The edges of the River
Are lined with business houses
That tell of foreign commerce.
The steamboats ply and whistle
Arriving far from inland
The altar of heaven has vanished
From Lotus Lake's green islands,
And modern Agriculture

Has changed the land's appearance.
While here below the mountain
Where lie the tombs of monarchs
And the Manchu rulers worshipped,
The students have been thronging
In arbour ceremonies.
At the Spirit Valley temple
Of Liang Wu-ti's foundation,
Where Li Tai-po has written
And Wu Tao-Tzu has portrayed
The face of Pao Tzu-kong,—
So far I see them swarming
To re-adorn the foothills
And revive this old dead mountain.

O mountain-guarded Nanking,
O river-bordered Nanking,
O wall-engirdled Nanking,
Our time-worn, war-torn Nanking,
What countless, cyclic changes,
What cataclysmic changes
Your soul has had to bear.
You've had your awful heartaches,
You've suffered even bloodshed,
You've earned your age of calmness,
The peace that follows war.
Now let your former sorrow
Be lost in bright to-morrow.



BIOLOGICAL SURVEY BY PROVINCES

BY

ARTHUR P. JACOT.

Something has already been written about the need of a biological Survey of China. This need is unquestioned. The lack of action is due to lack of workers, method and organization. The workers can well consist of the teaching staff of each University Department of Biology, and of these there are enough to carry on such a Survey if each staff restricts itself to its own province. If the survey is done province by province no general organization is necessary. Of methods there are many. To aid some and provoke action, the following is presented.

It falls to each University biologist, before he can secure the material necessary for his courses and before he can advise the various middle school teachers which it is his priviledge to train and guide, first, to make a survey of the province in which his University is situated and which his University serves, in an endeavor to determine the available material. This then being one of the biologists first tasks he is better fit than any other individual in the province to carry out such a survey, and, having done the work, it becomes his moral obligation to make this wealth of information and experience available to others. Biological science will stagnate without interchange and circulation of ideas and knowledge. If it were not for the correspondance of Gilbert White with Charles Pennant and Daines Barrington would we not be without one of the most refreshing and stimulating pieces of natural history literature ?

Taking each province as a definite unit on which to work, it becomes necessary to acquaint oneself personally with that province. If each summer is divided into two parts and each part is devoted to some section of the province, an excellent reconnaissance may be culminated within two or three, or, with large provinces four, years. It is necessary first to procure the largest and most detailed available map of the entire province. The British ordinance maps with topographic overprint, have been found most satisfactory by the writer. These may be procured

from Edward Stanford, 12-14 Long Acre, London, W.C.2, England. The topographic overprint should be asked for as the topography of the terraine is of the utmost importance, and too much accuracy and detail can never be a burden. From a smaller map, tracings should then be made of the outline of the province. On one of these outline maps all the mountain ranges (with their elevations) should be sketched in, with the rivers draining them. On another outline map all the lakes and the main streams should be traced. On still another such map the different crop regions and wooded areas (which can be ascertained by consulting educated and well travelled Chinese, old missionaries, and the literature) should be blocked in. These maps should then be hung over the desk or work table of the surveyor until they have become indelibly impressed on his mind. Using these maps as a working basis, trips should be planned to the heart of, or near the centre of, each one of the chief physiographic regions, crop regions, and wooded areas, and ascensions made of the highest mountain or range at both the north and south ends of the province.

As a concrete illustration let us take the province of Chihli. This area may be divided into two distinct physiographic areas, the southern or plain area, and the northern or mountain area. This last again contains two distinct areas, namely the high plateau along the northern edge and the lower, broken hills and ridges south of the plateau. The crops correspond to these divisions. It is therefore necessary to spend a month of the summer somewhere on the Chihli plain, another on the Mongolian plateau in Chihli, and another among the hills, preferably on Hsiao Wutai-shan where the life of both the base and the summit should be studied.

These trips will be valueless unless the reconnaisseur observes certain general principles. First he should remember that this is but a preliminary survey and that he should therefore endeavour to secure general though definite impressions and not try to collect everything, or he will return with odds and ends which will be insufficient for the establishment of general principles. Secondly he must have a basis of comparison. For this last it is most advisable to take the University situs, since the observer is most familiar with the conditions, flora, and fauna of that place. As to the first point, the observer should limit himself to the collection of the flowering plants (Spermatophytes) among the plants and to the vertebrates among the animals. He should therefore go prepared to *collect* all the flowering plants which are foreign to his own locality, choosing especially a habitat or habitats similar to those with which he is familiar at his base. For instance, if he is acquainted with the flora of the field margins and grave-yards or canal banks, it would lead him nowhere to collect the flora of a northern, precipitous mountain slope, for he would have no basis of comparison. A grassy tract on the south side of the mountain would be much more appropriate. He should also go prepared to collect some of the vertebrates, as these are the best known elements of the fauna, and so form a more certain basis for comparison as well as being readily identified. It might here be pointed out that the life zones

of the United States and other countries were worked out almost exclusively on the plants and higher vertebrates and that these are still used as indicators of the life zones.

Although the smaller mammals need special collecting apparatus in the form of traps they form the best index. Birds should by all means be secured, especially the smaller *nesting* birds. Migrating birds furnish no data. Summer is therefore by far the best collecting time. Reptiles and amphibians are most easily secured and preserved and form a reliable index. To this might be added the commoner, larger insects. Having chosen the group of vertebrates to be collected, carefully prepare collecting and *preserving* apparatus and get all the specimens you can, especially the unfamiliar species. It is better to collect thoroughly from one type of habitat than to brouse over many.

The note book should be pocket size with a stiff cover for use as pad. A fairly hard pencil is the best recorder ; a soft one is an abomination as it smudges. If in the notes you do not have a name for any species, a field name should be given which will recall the appearance of that species to the mind. There are three things that should be recorded for each species : the date on which it is taken (if possible the date of flowering, fruiting, or egg laying) ; habitat and exact or particular locality ; and the relative abundance. Notes should be copious and detailed. Nothing should be trusted to memory, especially the most striking or outstanding factors. It is better to record a few outstanding factors than to get a flood of impressions which will later become mixed with impressions from other areas, or to get a little bit of everything that greets the eye and have no *relative* information concerning them.

Every biologist will immeasurably broaden his experience and intimate knowledge of life principles by making a special study of some one group of plants or animals as a hobby. Too much cannot be said for this form of recreation and diversion. If one does not aspire to Isaac Walton one may at least become a specialist on the *Cruciferae*, skipping spiders, birds, mosses, copepods, diatoms, or even mosquitoes. Having chosen some group, thorough and detailed collecting should be made in this group and repeated endeavours made to secure material by co-operation with biologists from all over China and the East. The resulting data will furnish an excellent check from entirely different groups on the data secured in the general observations.

On repairing to a physiographic region previously selected, the surveyor, immediately he enters a different life zone, will recognize it as such, not only from the presence of different species, but also from the absence of familiar species, so that the combination of species is quite different. Caution, however, should always be used to differentiate clearly between a habitat and a zonal difference. To avoid such confusion the same habitat should be secured at all places. Such general habitats are fields, small groves, hill slopes facing the south, open, shallow-water ponds, grassy ditches, etc.

Having thus determined the life zone (or zones) of each region, an endeavor should be made to locate the boundaries of these zones in

the province. These boundaries usually follow the physiographic features of the land and may thus be theoretically worked out from the topographic map and later checked up. The list of species from the different regions should be published as soon as possible in order that they may be used by others to check up work in adjacent provinces. This completes the preliminary survey.

When once the province has been divided into its various life-zones and their limits ascertained and charted out on the maps, the biologist should endeavour to find typical habitats in each of the zones, not only endeavouring to find the largest number of different habitats but also trying to find habitats as nearly exactly similar as possible in the different zones. Thus a ready and accurate comparison can be easily made. For instance, locate a typical shallow-water pond in each zone and compare their flora and fauna. It should be definitely born in mind that difference in soil may cause striking differences in flora and fauna. For instance, a calcareous soil may abound in land molluscs and be lacking in *Equisetum*, while nearly the reverse would be true on siliceous soil. Such typical habitats or stations should be located on the maps and referred to as type habitats. Whenever possible such stations should be located in juxtaposition or close together and at such a point a laboratory may be erected with profit to the schools and colleges of the province or workers of other provinces.

Furthermore, a passing glance at the same plant community in two different localities but at different times of the year may have very different aspects. It is necessary to view them at the same time of the year, even to the week, to secure the same aspect. This is especially true of woodland or shade-loving plants which have short periods of inflorescence and therefore cause a rapid succession of flowers. A careful survey, however, would bring out the true plant content of the community. If the survey is to be rapid, the same time of the year should therefore be chosen.

Having located typical habitats for the commoner types of habitats, special habitats should be sought for, located (on the map) and looked over. By special, is meant, unusual or limited, as spring fed mountain lakes, glacier fed mountain lakes, sphagnum bogs, hot springs, salt lakes, wooded tracts, wooded mountain streams, swamps, etc. Such isolated tracts are islands containing a very different complex and different species than are to be found elsewhere and should be constantly sought for as they make important contributions to the biology of any province and are generally the most interesting.

Having completed the reconnaissance and located the laboratory sites or field stations, the staff may proceed with the detailed survey, preparing reports on each type of habitat, and on the flora and fauna of each. Research problems and special work at these stations can be assigned to advanced students. Life histories may be worked out. Co-operation in working up any group may be more definitely secured from " outsiders."

Anyone who has had no training in systematic work should not endeavour to do his own identifying unless he has excellent and detailed

literature. This is especially true among the mammals where the subspecies are difficult to discriminate (except for the specialist) and are very limited in distribution and therefore excellent indicators of life-zones. The birds present no such difficulty (with but very few exceptions) and are highly commendable to the general worker. The reptiles and amphibians are likewise easily identified and are no trouble to preserve.

As these reports are published and the surveys progress, the material may be correlated into a biological survey of China by assembling the literature.

A ZOOLOGICAL COLLECTING TRIP TO THE COAST OF CHEKIANG

BY

CHI PING

(Professor of Zoology at the National Southeastern University, Nanking, China).

It is our plan to make a zoological survey of the Chinese coast. This plan was started two years ago with a four-fold purpose : to study the taxonomy and distribution of Chinese marine fauna ; to exchange specimens with European and American Museums for the National Southeastern University and for the Science Society of China ; to supply laboratory material to schools in China ; and to investigate sea food in a way that may help the future development of the fishing industry.

Owing to the limited funds appropriated for this purpose, it is possible only to make an expedition to the coast in the summer of every other year. In 1921 our collecting party visited Chefoo, Lung Kow, Teng Chow and Weihaiwei, from which places a great number of specimens were brought to our laboratory, and they are now being studied by ourselves as well as by specialists abroad. A general report on that trip was published by the author in *Science*, Vol. 7, No. 1, 1922. Continuing to execute our plan, we made last summer a second expedition to the coast of Chekiang Province, our work and experiences being recorded in the present paper. It is hoped that this brief account may be of interest to the zoologist who desires to know the faunal conditions in those regions.

Places Visited.

Starting for the coast in the first part of July, we selected four accessible points, namely, Ningpo, Chow-Shan Islands, Yü Hwan Island and Yen Ting. The last named place is near the northern border of Fukien Province, where we went first and whence we worked northward. On our way to Yen Ting our party first reached Wen Chow by steamer, where we collected specimens for two days. The mouth of Ou Kiang, a river running through the city, was extremely muddy, and nothing could be found in the water, except fiddler crabs (*Gelasimus*), which inhabited the bank and the shallow bottom. Numerous holes were seen, but most of the crabs were running about outside after the tide had receded. During our stay we collected mainly in the suburbs of the town, the specimens obtained consisting mostly of insects (Lepidoptera, Coleaptera and Odonata) and of crabs, (*Gelasimus*). Lizards such as *Plestiodon elegans* and *Gekko japonicus* were occasionally found in dwellings and gardens.

From Wen Chow we proceeded by a small steamer in a canal to Jui Ann for another brief period. We obtained a fairly good number of *Gela-*

simus, *Balanus*, *Lepas*, *Mytilus* and various other forms of molluscans and crustaceans from the native fishermen who went to the sea. *Harpodon nebereus* and *Pagrus* were abundant in the fish market, crabs (largely *Portunidae*) being eaten by the people here all the year round. From this locality onward there was no steamer for us to travel by, so we had to go on by *sanan* on inland waters. The next place we stopped at was Ping Yang, which proved no better than the former two for collecting purposes. With the exception of insects and spiders which were found abundant on the mountain slopes, nothing could be easily obtained. After a day and half a night's tedious journey south-eastward, with stops here and there, we reached our destination, Yen Ting, where we began to collect marine forms.

The port at Yen Ting is a narrow one, almost like a gulf between two mountains, where tides invade and overflow the land to a large extent. The natives who live here are practically all of the fishing profession. During the months of July and August there are probably few fishing boats going to the sea daily, though at other times of the year there are many.

With such small means as ours for collecting we were, nevertheless, able to find a great many interesting things after the tide had gone out. More than thirty genera of *Mollusca*, carried up by tides, could be picked up on the sandy beach. Rocks and the foot of the hills along the shore also offered good places for collecting. In rock crevices as well as on the surface we found *Raniella* of yellow or red colour, *Gorgonea verrucosa* and another species of stone coral, *Actinia mesenbryanthemum*, *Sagarita leucolea*, *Anthopleura japonica* and two other forms of sea anemone, *Acmaea* and *Chiton*, four or five species of *Balanus*, two species of *Ligia*, several species of *Catometopa*, *Ocypoda*, *Cancer* and a few species of *Amphipoda* and *Decapoda*. The fishing boats brought to the shore a great many forms from regions farther out to sea. Besides edible forms like *Pagrus*, *Trichiurus*, *Stromateoides*, *Scomber*, *Salanx*, *Heterodontus*, *Pristiphorus*, *Trachinotus*, *Platycephalus*, *Cynoglossus*, *Pleuronectes*, *Sciaenidae*, *Latilus sinensis*, *Stereolepis*, *Carrangidae*, *Sphyrna*, *Myliobatis*, *Spheroides*, *Mustelus*, *Raja*, *Platyrhina*, *Trygon*, *Urolophus*, large *Octopus*, *Dorippe japonica*, *Squilla*, *Neptunus*, *Penaeus*, *Ommostrephes*, *Loligo*, *Maretrix*, *Arca*, *Rhopileum esculanta*, etc., there were *Virgularia Physalia*, certain *Virtillae*, *Murex tenuispina*, *Oliva* (two species), *Lambrus*, *Pagurus*, *Pleurobranchus* and other forms of *Techtibranchiata*, *Lingula*, forms of *Ophiuroidea* and *Asteroidea*, several species of *Oxyrhyncha* and many miscellaneous forms, largely of *Arthropoda* and *Mollusca*, all left in the boats and uncared for. We availed ourselves of the opportunity to search in the boats after the fishermen were gone, with the result that a great many interesting specimens were be found. By staying at Yen Ting for a week, through our frequent visits to the fish market and the fishing boats, and instensive search on the shore, we collected a fairly good quantity of specimens consisting mostly of the above mentioned forms.

The vicinity of Yen Ting was frequently explored too, where insects and molluscans were collected. Once or twice we attempted to go on

the sea with a small boat, following the fishermen in order to make out the regions where they caught their quarry. Unfortunately our launching party was driven back by a storm. A little way from the shore, even in comparatively calm day, rough waves arose, which might have been due to irregularity in the depth of the bottom. Besides, there were other inconveniences to be experienced when going to sea, so that we were obliged to give up any idea of taking a launch by ourselves and had to confine our collecting to the shore.

Our party returned to Wen Chow in the latter part of the month, and went to Yü Hwan Island soon afterwards. Along the shore of Kan Men, one of the large ports of this Island, we found the fauna similar to that at Yen Ting. There were, however, a few forms not to be found in the previous place. The most interesting form we collected here was *Porpita pacifica*. The colony is disc-shaped. The upper surface of the disc is silvery white with an azure blue band around its margin. Numerous filaments, attached to the margin, and looking like the tentacles of a medusa, are dactylozooids. Quite a few specimens of this form were floating on the surface of the water, each looking like a silk button with tassels around its brim. Extremely delicate as they were we experienced a great deal of difficulty in collecting and preserving them in perfect shape. The dactylozooids were too easy to detach. Frequently we found a great number of them had only the discs left, after being brought to our residence from the shore. They did not live near the shore, but were to be found in extensive areas of the open sea.

In the rock crevices at the shore a sea urchin (*Anthocidas purpurea*) was found, whose spines are coarse and blackish-purple in colour. This species was very rare and difficult to obtain at the shore during this time of the year. I was informed that there are other species of *Echinoidea* to be found here and this information was confirmed by the specimens subsequently brought to our laboratory from this island. These are probably two different species of *Strongylocentrotus*, but we failed completely to find them while staying here. On the sandy beach when the tide was out we found two different forms of *Coelenterata*. One of these was *Cavernularia obessa*, while the other was the larva of a certain jelly fish whose name has not yet been determined. Sea-anemones, cirrepids, crustaceans and molluscs that occurred on the rock surfaces and in the crevices were practically the same as those in Yen Ting. Large specimens of *Nereis* hiding in sand were difficult to get without breaking, while razor clams (*Solen*) were very quick to escape into sand holes. Elasmobranchs and Teleosts were all the same as in Yen Ting, the former, however, being comparatively abundant, especially the genus *Heterodontus*.

Through the aid of Mr. S. Lee, a student of the National Southeastern University, who lived in Yü Hwan, I succeeded in employing two fishmen with their boat to carry us visiting some of the fishing areas on the sea on a very fine morning, but the sea was the same as at Yen Ting, with rough waves arising all the time, and the boat, which was not large enough rocked considerably, rendering it impossible to stand. Here and there we met a fishing boat, and expected to see

something interesting that the fishermen might have caught on their hooks or in theirinets, but, contrary to our expectations, they showed us a catch consisting of nothing but *Urolophus* and some other elasmobranchs, while forms of either *Coelenterata* or *Echinodermata*, which we were anxious to get this time, were not seen.

I visited every fishing port and some fishermen's homes. I saw each fishing boat, after it had gone to the sea over night or for a longer period, and had returned with a large quantity of sharks and rays, together with a small percentage of teleost fishes. All the fishes had been cut open along the spinal cord and eviscerated while still on the boat, and so naturally were of no use for our purpose. A fisherman informed me that in winter and spring one boat going to the sea usually brings back several thousand fishes of considerable size, largely elasmobranchs. In a period extending from September to April, a fisherman, who owns two boats, used to catch forty thousand catties (more than twenty tons) of fish, which he shipped to Ningpo for sale, every year.

The shore of every small bay abounds with molluscan shells of various sizes which are of commercial importance to the natives. They burn large quantities of them in a sort of kiln in order to extract lime by a somewhat crude method. The product thus obtained is generally used locally for building purposes.

One fine morning Mr. Lee accompanied me to see a muddy plain about three miles distant from port Kan Men. The area of the plain is about twenty square miles, and it extends along the sea shore. The soil is clayey and very soft. As the sea is gradually receding and is not likely to flood the area except at unusually high tides, the muddy plain will in the course of years become dry land. It was noted that there was no vegetation except at the outermost portion close to cultivated fields. Here and there on the plain areas were fenced in with sticks by the natives, who grew razor clams within them. I was informed that early in the spring the lavae are sown as seeds in a field, and in August, or later, the adults are dug up and sold. On account of the extremely soft mud on which it is hard to carry anything heavy, the clam-grower uses a small sleigh which can be pushed forward on the mud with one hand, while the clams are dug out with the other. Snails and crabs also inhabit the mud, and are caught by the people for food.

We returned to Wen Chow again in the first part of August. During our brief stay we were twice caught by typhoons, which almost wrecked our dwelling, while the heavy down pours soaked most of our belongings, but fortunately our specimens were carefully stored and remained undamaged. In favourable weathers we explored the mountains. Each time a number of *Lepidoptera*, *Odonata*, *Coleoptera*, freshwater fishes, frogs and snakes were brought in. Previous to our trip to Yü Hwan some of our party went inland to collect insects and freshwater forms. They experienced typhoon weather while they stayed at Hai Men. When the weather improved, we left Wen Chow for Hai Men to meet them. They brought to us from the Tien Tai and Yen Tong mountains a number of beautiful specimens of *Odonata*, a large number of *Pachitriton* and many

freshwater forms which meant quite an addition to our collection. We left together for Ting Hai, where is a Bureau of Fisheries, and where we have maintained a collector. From him we used to receive numerous elasmobranchs and various teleosts in spring and winter. He had also secured for us a young whale *(Physeter)* from the fishermen before we arrived. We were informed by the staff at the Bureau that the marine fishing areas were rather far away from the shore, nor was the time, when we were there, favourable at all for collecting.

From Ting Hai we went to Putoa Island. Around the island the rocky shores and sandy beaches resembled those of the previous places we visited. The water was turbid owing to the sand being washed out from the rock crevices. Small *Anthozoa* (sea Anemones and two kinds of corals, one of which was probably *Plumorella*) grew in the rock crevices and holes immersed in the water. Searching along the shore, we reached a point where the rocky bottom looked similar to that at Chefoo (not in a strict geological sense), but to our disappointment, except for *Ocypoda*, limpets, *Balanus* and *Ligia*, nothing could be found in the water.

On land we collected a few *Odonata*, *Hemiptera*, *Lepidoptera*, *Coleoptera* and different species of *Arachnida*. Both keeled and blue tailed Lizards were found in the gravelly grass fields.

Leaving Putoa for Ningpo, we stopped for a night and half a day at Shen Chia Men, which is known as a great fishing centre and market in spring and winter, though during the month of August there was nothing to see. From a store we secured a few triton's shells, said to have been brought here from Amoy. After meeting with another typhoon while we stopped for the second time at Ting Hai on our way, we went to Ningpo to look for specimens, especially marine molluscs, which could usually be secured from the fishing boats or from the fish market. They were, however, not obtainable at this season.

Continuing our collecting trip along the coast, some of our party, including myself, went up to Chefoo again, working there until the end of September. The conditions there were similar to those reported by me on our last visit, and our stay here ended our trip for the Summer of 1923.

Specimens Collected.

As the last part of our trip was spent in Chefoo, the specimens obtained in the above mentioned places represent only a part of our total collection, amounting to about six thousand, large and small. They do not, however, represented exclusively the fauna of the places visited as our collecting trip lasted only a short period. It is impossible to make a precise statement as to how many species there are in the collection before they have been identified. We are sending them to specialists in different countries, besides studying them in our own laboratory, and we expect to have an annotated list published after they have been determined. For this reason, I have been able only to group them in principal divisions in the following table, with an estimated percentage of each group in the

collection, which serves to indicate their abundance or scarcity in the field :

Phyla	Classes	Percentage.
Porifera	Demospongiae	1
Coelenterata	Scyphozoa, Anthozoa	12
Platyhelminthes	Tubellaria	less than 1
Groups of invertebrates of uncertain systematic position		less than 1
Echinodermata	Asteroidea, Ophiuroidea, Echinoidea, Holothuroidea	1
Annelida	Chaetopoda	1
Mollusca	Amphineura, Gastropoda, Scaphopoda, Cephalopoda, Pelecypoda	26
Arthropoda	Crustacea, Myriopoda*, Insecta*, Arachnida*	25
Chordata	Pisces: Elasmobranchia	10
	Pisces: Teleostia	16
	Amphibia: Anura*	2
	Amphibia: Urodela*	3
	Reptilia (Squamata*)	less than 1
	Mammalia (Odontoceti)	less then 1

*Land and freshwater forms.

Comparison of Conditions Between the South and the North.

During our experiences in the above mentioned places, we noticed some contrast with what we found at certain points on the Shantung coast from a collector's point of view. While collecting last summer we found that the water along the coast was generally turbid, a yellowish sandy colour extending about fourty feet out from the shore, and it was impossible to see any specimens at the bottom through the muddy ripples Furthermore, at Yen Ting, Yü-Hwan and Putoa violent waves were of frequent occurrence along the shore, while at Ningpo and Ting Hai the muddy stream reminded one of the mouth of the Ou Kiang in Wen Chow. Conditions like these are not to be found at Chefoo, Lung Kow Teng Chow or Weihaiwei, where the water is calm and clear during fine weather, and a great many specimens are visible below the surface. Con-

sequently in collecting specimens in the south we had to work much harder and spend much more time even after the tide had gone out.

The faunas show a great deal of difference from that which we had collected in the North. Of *Coelenterata* we found in Yen Ting the edible form, *Rhopileum*, and one of the order *Cubomedusa* rather common, but the form which we found most abundant in Chefoo was *Auralia*. The *Actinaria* of Yen Ting and Yü Hwan were also different in size and colouration from those of the North ; while *Porpita* and *Cavernularia* we failed to see when collecting on the Shantung coast. Of *Echinodermata*, *Anthocidas* was rare in Yü Hwan, while *Strongylocentrotus* lived far away from the shore. *Strongylocentrotus senensis* was found most abundant clinging to the rocks on the Chefoo coast, where *Holothuria* were also common. Of *Mollusca*, interesting forms like *Murex tenuispina*, *Scalaria pretiosa* and two species of *Oliva*, which were common in Yen Ting and Yü Hwan, were not found in the North ; while the common and interesting forms we did find in Chefoo and in its neighboring ports were *Vivipara angularis*, *Chlorostoma rugata* and the like. Of *Arthropoda*, crustaceans like *Dorippe japonica*, *Lambrus validus*, *Limulus longispinus* and a species of *Oxyrhyncha* were common in Yen Ting, though the interesting form, *Orithyia senensis*, which was found abundant in Chefoo, was not seen. There are at least two species of *Balanidae* extremely common on the rocks along the shore at Yen Ting, Yü Hwan and Putoa, which differ from those found on the Shantung coast. Of fishes, a species of *Heterodontus*, *Raia maculata*, *Pristiphorus* were found neither in Chefoo nor in any of the other three ports of the North. This comparison does not take into account certain species, genera, families and even orders which were found in the South but not in the North, owing to the fact that their names have not yet been worked out. As our collecting expedition was local and confined to the summer season, the above comparison on distribution is by no means conclusive, but it may serve to indicate to a certain extent that the coasts of the two provinces under discussion belong to different faunal zones.

MIGRATION NOTES*

BY

G. D. WILDER.

Field work in bird study has had to give way of late to browsing in boxes and drawers of bird skins and conning old field notes in preparation of a " Check List of the Birds of Chihli Province with Notes " by G. D. Wilder and H. W. Hubbard. It has, however, proved quite as fruitful of new birds for this province (and possibly even new subspecies and forms) as the same time spent among the wild birds would have done. The necessity for measuring a number of wings and bills and tails and tarsi for each form has impressed me anew with several things, as, for instance, what a fluid thing a species is, how the forms do actually grade into each other, and how complicated the geographical distribution of varieties is with the variations of elevation and abundance of water, etc. The study of the September, 1923, supplement to Hartert's great work " Die Vôgel der Palâarktischen Fauna " and of Dr. Hugo Weigold's first four issues of his studies on the collections he made when on the Stôtzner Expedition in Szechuan, East Tibet and Chihli, almost drive one to despair of ever seeing anything like finality in the nomenclature of our birds. It is indeed difficult to find or recognize our oldest friends even among the tits and crows. *Corvus macrorhynchus* is now *Corvus coronoides hassi*, and our pretty little Japanese chichadee, *Parus major* has the burden now of *wladiwostokensis* to carry in addition. In regard to the crows it certainly would seem that Dr. Weigold's suggestion is good that our big-billed crow should be called *C. macrorhynchus hassi* rather than to change the old and descriptive specific name of *macrorhynchus* to *coronoides*. At any rate the crows still need study, and so do the tits and jackdaws, to say nothing of the rest of the birds.

Among the discoveries of new forms is that of the little house martin *Hirundo urbica whiteleyi* (Swinhoe). It was described from Siberia and its range given as possibly in North China. It nests under the eaves of houses in Europe and Northern Asia, but in North China we have found it nesting in remote mountains only and in high cliffs, preferably near water. It occurs in the mountains north of Peitaiho almost at sea level, and also high up on Hsiao Wu T'ai Shan, probably 5,000 feet at least, nesting in colonies. Old specimens of our China form measure as follows, the measurements of the Siberian form being given in parenthesis for comparison: Wing 94-97mm, (110-112); Tail 43-48 (65-68). Fork in tail, which is a mark of difference from the European form in *whiteleyi*, is only 7 mm deep, (in *whiteleyi* 10, in *H. u. urbica* 17-20); Culmen 7-8 (9); Tarsus 9-10 (9-11.5). Our form being so much smaller we propose that it should be called the Little House martin and give it the

*Peking, May 1st.

varietal name of *sinensis*. It should thus be known as *Hirundo urbica sinensis*.

Another suggestion for a new form is a large black-capped, silvery-grey tern, which we have considered up to now to be Nordmann's tern. The specimens we have from Mongolia and Peitaiho, however, vary much from the descriptions. Still as tails and wings in these birds vary greatly we are rather reticent in suggesting new names.

In scrutinizing our notes we also find record of having seen brought in to the taxidermists' shop in 1916 a beautiful specimen of the swallow tailed or black winged kite, *Elanus caeruleus caeruleus* (Desfontaines). The former popular name is common in America, the latter in Europe seemingly. I had killed and mounted one of these in the States so it was very easy to identify, as the slender wings and long forked tail, ash gray and blue-black mantle and pure white forehead and underparts are very striking. This is credited to South China but not to North China so far as we know.

Even as I am writing a note from Mr. Hubbard says that he has discovered among his bird skins a specinen of *Porzana paykulli* (Lungh) taken at the Summer Palace in June, 1923. This had not been reported before from North China, though recorded from Manchuria.

Since the last instalment of these notes, that of the May number, I have secured my first two specimens of the desert bullfinch, *Erythrospiza monogolica*, Swinhoe. The original description of the species was from a bird taken in the Nankow Pass, near here, by Swinhoe. It seems to come down from the desert in winter. The first was bought in the market on March 5 and the other ten days later. Both seemed freshly caught. The second was so much darker brown as to be in a melanistic condition. The bills of these two are in winter coloured brownish yellow. In spring and summer they become bright red. I have also at last bought a male specimen of the long-tailed rose finch. From the three female specimens I have seen I was not quite certain whether the species was *Uragus sibiricus lepidus* or *U. s. sanguinolentus*. The male is certainly the latter and probably the females are also. They were caught in the hills not far from Peking, probably about the same time in the winter. The male is in beautiful rosy plumage with rose-silver frontlet in spite of having been kept in a cage for two months or more. The bird men held him for a high price until he died and could be bought at my own price.

As for early spring comers, the female Daurian redstart as usual was the first arrival, February 15, and then, March 8, if, indeed, she had not lurked in the vicinity all winter. The same bird probably stayed in our compound all through March. The vanguard of the ducks, green-winged teal, smew, mallards, falcated teal, and pintail, appeared the first week in March when the ice went out of the ponds. The bean goose, swan goose or Chinese goose, Bewick's and whooper swans, Swinhoe's duck, and mergansers, all came in shortly after in March. In April the market exhibited in addition the shoveller, Baikal teal (only one specimen noticed where often they are in large numbers) and the pochard, in unusual numbers this year when it is usually rare or absent entirely.

Then, last of all, the tufted duck, garganey or summer teal, and cormorant. Most of these were seen on the lakes in Peking as well as in the markets and all of these birds were seen at the Summer Palace. Two Mandarin ducks were reported as a rarity in the city by a Chinese friend. The little grebe appeared soon after the ice went out of the ponds and later, April 30, a large grebe that must have been the great crested grebe, though I could detect no crest at all, possibly because of the distance and its continual diving which might have kept the feathers plastered down tight.

The first red-flanked bluetail was noticed in our compound on March 28 in the shrubbery with the redstart. The large white rumped curlew, the grey lapwing, the lapwing, common snipe, wood sandpiper, grey heron, all came during the first ten days of April. The house swallow was seen at Paotingfu April 3 and in Peking on the 10th. The false gold crest (willow wren ?) also was seen at Paotingfu on April 6 and came with the first willow leaves. It seemed to follow the opening of those leaves, arriving in Peking, 100 miles north, five days later, April 11. Before daylight, April 11, was heard the triumphant scream of the Peking swift and on rising we noticed that there were two or three pairs flying about the compound and already visiting the holes under the eaves where they nested last year. They have visited them daily since and at present writing, May 1, they may already be sitting.

Freshly snared bustards have been sold in the market along with the stale birds that have hung there for months all through April, and a flock of about 100 was seen on the Hun River sands on April 22. They pass north from the south in larger flocks than while spending the winter here, it seems. Mollendorf in 1877 assumed that the bird is getting more and more scarce in Chihli. It seems to be on the increase and quite common if one goes to its haunts like the sand flots and the fields north of Yen Ch'ing Hsien, beyond Nankow Pass.

To return, in closing, to rare birds, Mr. James Hunter saw two female capercailies, huge grouse, in the Peking market early in April. Pére David reported them from Hupei K'ou. I purchased a cage worn mountain accentor on April 21. This is the first live specimen I have seen and it was said to be a nameless bird by the bird trappers at the fair. I also found a hooded grosbeak which can be bought only in occasional years.

A NEW CAT FROM WEST CHINA

BY

ARTHUR DE C. SOWERBY, F.Z.S.

Mr. A. C. Baines of the Chinese Customs Service has recently presented the Museum of the Royal Asiatic Society (North China Branch) at Shanghai with the skin of a large cat related to the so-called golden cat (*Felis temminckii* Vigors and Horsf.) of India, purchased by him at Tungyueh in S. W. Yunnan. It differs from the golden cat sufficiently to warrant its separation as a distinct subspecies at least.

In going over the material in the R. A. S. Museum I found a skin from Tibet, presented by a Mr. Barrie, which belongs to the same group of cats but is almost black in colour, and which therefore must be referred to Hodson's *F. nigrescans* (*Cat. Mam. etc., B. M. 2nd edit. p.* 4) said to be a dark variety of *F. temminckii*. The R. A. S. Museum also contains a mounted specimen of La Touche's *F. dominicanorum* from Kuatun, Fukien, S. E. China (*P.Z.S. 1898, pp. 1 & 2, Pl. I*), which was described as being like *F. temminckii* but differing in some ways, and of a "reddish brown colour." The coloured plate accompanying the description does not show a reddish brown colour, but a dark greyish-brown, in which it agrees rather with the description in Blanford's "Fauna of British India" of *F. nigrescens*, from Nepal and Tibet.

The specimen of *F. dominicanorum* in the R. A. S Museum is of a strong and rich ferruginous, or reddish brown colour.

Blanford's description of *F. temminckii* gives the body colour as "Deep ferruginous or chestnut, darker (bay) along the back, paler on the sides, still paler and whitish below." As a matter of fact the description given by him almost exactly fits the specimen of *F. dominicanorum* in the R. A. S. Museum, except that there is very little darkening of the back in the latter.

From these facts it appears that India, Tibet, West China and South-eastern China (and probably intervening areas) are inhabited by a group of large cats in which the chief characters which distinguish them from other species of cats are the plain unmarked body colour, ferruginous, chestnut, greyish brown, greyish black, or even nearly black, light under parts, including the under surface of the tail, and strongly marked faces. These cats are subspecifically separable from one another, so that, taking the Indian species as the specific type, they may be known severally as :—

1. *Felis temminckii* Vigors & Horsfield, of India.
2. *Felis temminckii nigrescens*, Hodgson, of Tibet and Nepal.
3. *Felis temminckii dominicanorum*, La Touche, of S.E. China.
4. *Felis temminckii bainsei* subsp. nov. of Yunnan.

FELIS TEMMINCKII BAINSEI subsp. nov.

This fine cat, as already indicated, may be considered as a subspecies of the Indian *F. temminckii*, from which it differs in being of

much browner colour, there being little or no ferruginous colour in the pelt, in which particular it differs from *F. dominicanorium*. It differs from *F. nigrescens* in being less black or less greyish black as the case may be.

Type: A large skin from Tungyueh, S. W. Yunnan, China, collected by Mr. A. S. Baines and presented to the R. A. S. (N. C. Branch) Museum, Shanghai, where it now lies. No skull. No number.

Colour: A general brownish colour, browner on the crown and nape of neck, with a tendency to greyish on sides; face darker and greyer, with strong deep brown or blackish markings, much as in *F. temminckii*: a light perpendicular line in front of each eye, and a strong, rather broad, horizontal light streak on each cheek; chin, light cream, or white; ear, light inside, black outside, with only a very slight touch of grey in the centre of back. A fairly strong dark median dorsal line extends from the shoulders down the back and along the upper surface of the tail, the tail being light creamy or greyish white on the under surface and black at the tip on the upper side. The under surface of the body is light greyish or creamy white with a few round dusky spots anteriorly and on the chest and throat. Paws, same as body on upper surface, dusky below.

Dimensions: Judging from the skin this cat must be fully as large as *F. temminckii*, that is, from 2′ 6″ to 3′ in length, not including tail.

I take great pleasure in naming this interesting subspecies after Mr. Baines, its discoverer.

THE TERMITES (WHITE ANTS) OF CHINA
WITH DESCRIPTIONS OF SIX NEW SPECIES

BY

S. F. LIGHT.

(From the Laboratory of Zoology, University of Amoy, Amoy, China)

(*Continued from page* 265).

CAPRITERMES SOWERBYI SP. NOV.

COLLECTIONS EXAMINED.

C 28	Kuliang, in mountains back of Foochow, 2,500-ft.	Sowerby	4-VIII, '23	W.	Under a stone.
C 31	Baekliang, in mountains back of Foochow, 1,200-ft.	Light	10-VIII, '23	S. W.	In passageways in the soil. Associated with *Reticulitermes fukienensis.*
C 33	,, ,,	,,	,,	S. W.	In a stub of *Cunninghamia.* Associated with *R. fukienensis.*
C 35	,, ,,	Kellogg	8-VII, '23	S. W.	Under a stone.[18]
C 36	,, ,,	Light	7-VIII, '23	Q. W.	Under a stone.[18]
C 37	,, ,,	Sowerby	7-VIII, '23	W.	Under a stone.[18]

DIAGNOSIS.

Imago (Young Queen).—7 mm long without wings ; head 1.38 mm wide ; postclypeus yellow, considerably shorter than half its width ; antennae of 15 segments, III much shorter and narrower than II ; pronotum not notched anteriorly ; fontanel behind the middle of the head, in posterior region of an elevated oval area ; mesonotum and metanotum with long, tapering, bluntly pointed processes.

Soldier.—Labrum with deeply bifurcated anterior margin, terminal processes tapering to very sharp points ; mandibles about as long as the head, slender, not strongly bent, each with a sharp incurved tip ; head large, much more than half as wide as long (1.42 mm wide by 2.40 long) ; longitudinal suture very distinct, situated in a groove ; occipital articulation far forward on the under surface of the head ; submentum less than half as long as the head ; antennae of 14 segments, II and IV slightly shorter than III.

Worker.—Similar to that of *C. sulcatus* but larger, postclypeus more than twice as broad as long.

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18 Workers were found under stones in many cases where specimens were not taken due to failure to obtain soldiers or adults.

Descriptions.

Imago.—This description is based on a young queen taken from a colony in which no soldiers were found (C 36). Since no other species of *Capritermes* has been reported from this region and it seems unlikely that we will have more than the one species and since the workers found with this adult agree with those from colonies in which soldiers were taken it seems sufficiently certain that we are here dealing with the imago of the species whose soldiers are described below.

The head is dark brown, the labrum, postclypeus, antennae, palpi, legs and the anterior sclerite of mesonotum and metanotum are yellow with a faint brownish tinge. The pronotum and abdominal sclerites are a smoky brown with an olive green tinge, the posterior sclerites of the mesonotum and metanotum are somewhat lighter and their projections are dark yellow or orange. The wing scales, particularly their costal margins are dark. A rather dense coat of hairs of varying length covers the head and body.

The postclypeus is yellow but distinctly shorter than half its breadth. The eyes are prominent, the ocelli narrow and elongated and placed at an angle of about 45 degrees with the long axis of the head, and are separated from the eyes by about twice their short diameter. The fontanel, in the only specimen available, is not slitlike but a short oval aperture in the posterior region of an oval elevated area and is behind the middle of the head. The antennae consist of 15 segments of which III is much shorter and narrower than II and V the smallest. The anterior margin of the pronotum is unnotched.

Measurements of the Young Queen of *Capritermes sowerbyi* sp. nov.

Length	7 mm
Head width (including eyes)	1.38
Head length :	
To tip of labrum	1.22
To labral suture	1.10
To clypeo-frontal suture	0.93
Pronotum width	1.15
Pronotum length	0.605

Soldier.—The body is whitish with a yellow tinge as is the labrum. The head with the palpi and the legs are light yellow. A chitinous fold just above the fontanel, the fontanel duct, the mandibular articulations, the bases of the mandibles, the margins of the antennal foveolae and the antennae are light brown to red. The head bears a few scattered hairs, the body numerous hairs of different size including a row of long spiny hairs at the posterior margin of each abdominal tergite.

The head is large, much more than half as wide as long, the sides weakly convex, the posterior margin rounded and the postero-lateral corners broadly rounded. The sides and posterior surface of the head are rounded, the mid-longitudinal region marked by a groove in which lies the longitudinal suture. The dorsal surface of the head is not flat but rises in a curve at first and then in a straight line from the posterior margin to a maximum height just behind the level of the fontanel beyond which it is

distinctly declivitous. The occipital articulation is set far forward on the under surface of the head, its anterior border marking about the middle of the lower surface. The submentum is, therefore, less than half as long as the head. The longitudinal suture is prominent, a smoky yellow in colour. It is first visible about as far posterior to the fontanel as the fontanel is from a line joining the inner mandibular articulations. It runs back over the mid-dorsal surface of the head in a groove, passes over the posterior surface of the head and along the mid-ventral surface to the middle of the posterior margin of the occipital foramen, which is triangular in outline.

The mandibles are straighter, longer and more slender than in most *Capritermes* species. They are approximately as long, measured from their outer articulations, as is the head measured from the same point. The right mandible is nearly straight, but weakly sinuous. It is dorso-ventrally flattened and its inner margin is marked near the distal end by a low tooth beyond which it falls away to the pointed, down-curved, distal tip, which is a continuation of the outer margin. The left mandible is band-shaped, except in its distal one-fifth, where it shows a ball-like swelling ending in the sharp, incurved distal tip. At the base it is horizontal, beyond that it is tipped downward and inward. The proximal two-thirds is marked by a deep curve inward and upward.

The labrum is longer than broad, twisted toward the right, its outer margin deeply bifurcated, its lateral margins ending in two tapering, sharply pointed processes. The fontanel is small, directed somewhat forward and marked by the darkened folding of the chitin above and by the long brownish duct. The antennae consist of 14 segments of which III is slightly larger than II or IV.

The pronotum is short, its anterior and posterior regions very greatly uplifted, its centre greatly depressed. The anterior margin is sharply notched in the middle and the posterior margin weakly so.

Measurements of the Soldier of *Capritermes sowerbyi* sp. nov.

Length	7.0
Head length	2.39
Head width	1.42
Right mandible	2.13
Left mandible	2.22
Submentum length	1.06
Submentum, minimum width	0.18
Submentum, maximum width	0.355
Pronotum width	0.9

Worker.—The head, antennae, legs and palpi are a pale whitish yellow. The inner mandibular articulations are marked by a dark red spot. The outer region of the mandible is light brown. The very transparent white abdomen is nearly always given a dark appearance by the earthy contents of the alimentary canal.

The fontanel is large and circular, the postclypeus, swollen and nearly half as long as wide. The antennae are of 14 segments, II approximately equal to III plus IV.

The head is held at an angle of about 45 degrees with the horizontal and this with the arched and dark appearance of the abdomen differentiates the workers of this species in appearance from other Chinese termite workers.

Measurements of the Worker of *Capritermes sowerbyi* sp. nov.

Length	4.0–4.5
Head width	1.065
Head length	
To tip of labrum	1.29
To labral suture	1.15

Systematic Position.—The new species differs widely from all other oriental species of the genus in the position of the ocelli of the adult, and in the combination of long slender mandibles, not strongly bent with a large broad head in the soldier. While the form of the submentum is neglected in the descriptions of most of the species of this genus I feel it to be probable that a study of this sclerite in its proportion to the length of the head would give us another character in which the present species is widely different from all other oriental species save perhaps *C. incola Wasmann.* In *C. sowerbyi* the occipital articulation is far forward and the submentum correspondingly shortened. In this character as in several others I believe the new species to be most closely related to *Capritermes incola* Wasmann of Ceylon and India (Bombay). In *C. incola,* however, among other differences, the mandibles are much heavier than in the new species.

I take great pleasure in naming this species for Mr. Arthur de Carle Sowerby, editor of this journal and well-known student of Chinese zoology who made the first collection of the species, as a slight token of appreciation of the work he is doing for the cause of science in general and zoology in particular in China.

Biology.—This species like the others of the genus is pre-eminently an earth-dwelling termite. Its chief source of food seems to be the organic matter of the soil with which the alimentary canal of the workers seems constantly to be filled. It builds no covered passageways, seems never to attack exposed wood and only buried wood when far gone into decay. They hollow out narrow winding tunnels an inch or two below the surface of the ground. The tunnels which are about one-eight of an inch in diameter open at intervals into chambers about half an inch in diameter. These passageways are very often found exposed under stones but for some reason the soldiers are seldom to be found in such colonies. No royal chamber has yet been discovered but numerous chambers containing eggs and young were found in connection with collection C 31.

The curiously asymmetrical form of the mandibles of the soldier of the species of the genus *Capritermes* is one of the striking characteristics of the genus. These misshapen mandibles are apparently incapable of use to cut or pierce and are used to deliver a blow or to propel the body by delivering a sharp sudden blow against the ground which throws the animal through the air for several times its own length.

The Known Distribution of Chinese Termites.

Species	Japan	Formosa	Fukien	Hongkong	Hainan	Kwangtung Mainland
Cryptotermes campbelli Light					*	?
Kalotermes sinenisis Light						*
Coptotermes formosanus Shiraki	*	*	*	*	*	*
Reticulitermes fukienensis Light		*				
Macrotermes barneyi Light			*	*		
Termes formosanus Shiraki		*	*	*	*	*
Termes hainanensis Light					*	
Capritermes sowerbyi Light			*			

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Photo by Sun Sun Studio

"Laddy Boy," the champion dog of the Show, and winner of the first prize amongst the Boston bulls

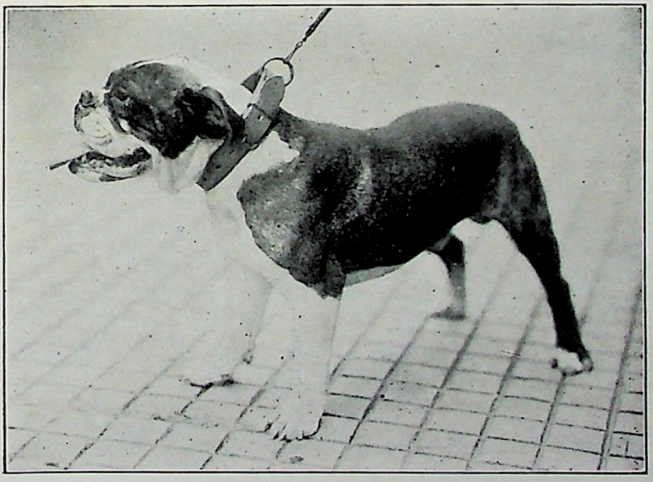


Photo by Sun Sun Studio

"Briton Ambassador" (dog), winner of the first prize amongst the bull dogs. Owner: Captain J. Gordon Dyson

DOG SHOW IN SHANGHAI

The second Shanghai annual dog show which was held on the premises of the Shanghai Race Club on Saturday, June 14th, was a conspicuous success, considering all things, in spite of a certain amount of carping criticism in the local papers by apparently disappointed exhibitors.

The committee, and especially the honorary secretary, worked extremely hard, while the judging was all that could be expected, considering that there are comparatively few real dog fanciers in the community, and of these few, the majority were exhibitors and therefore disqualified from judging the classes in which they were most interested.

Some 350 dogs were exhibited, being divided into 19 classes, of which some were again subdivided according to sexes. Of these the pure bred and unmixed classes were, of course, the most interesting. Setters, Pointers, Alsatians and Terriers of various classes were best represented, the Alsatian Class being the most popular and containing the greatest number of competitors, though Chows, Spaniels and Retrievers made a good showing. Of mixed classes that entitled Big Dogs contained some very fine animals. One wonders why there should be a class for crossbreeds. Such animals should be discouraged rather than encouraged, unless a serious attempt is being made to breed a strain of sporting dogs that will stand the climate, diseases and other adverse conditions in China. This might be done by a judicious mixture of the Chinese sporting dog, usually a Wonk that has been trained to the field, and such foreign dogs as Setters, Pointers, Retrievers or Spaniels. Such a thing as a cross between a Chow and an Airdale is a monstrosity that ought never to be exhibited in any show. The same may be said of some other crosses that were exhibited in the Wonk class.

The two champions of the whole show were Mr. F. B. Scott's Boston Bull Terrier (dog) "Laddy Boy," and Mrs. Schregardus' Japanese Spaniel (bitch) "Kiku San." The latter was an exquisite little creature.

The prizes in the form of silver cups were distributed by Mrs. E. T. Byrne in the afternoon.

Following is a list of the officials :—

Chairman : Mr. E. T. Byrne.

Committee : Major H. E. Keylock, Dr. J. Edgar, Messrs. M. O. Springfield, H. E. Gibson, A. de C. Sowerby, J. C. Thomson, W. R. McBain.

Honorary Veterinary Surgeons : Major H. E. Keylock and Dr. J. Edgar.

Judges : Miss Vera McBain, Miss Jean Armstrong, Mrs. Tycho Wing, Messrs. Trevor Twentyman, H. E. Gibson, J. F. W. Milne, E. T. Byrne, A. de C. Sowerby, J. F. Duncan, C. H. Green, P. W. Goldring, M. O. Springifield and R. Neumann.

Honorary Secretary and Treasurer : Mr. Harry K. Strachan.

BIOLOGICAL NOTES AND REVIEWS

FISHERIES OF BRITISH MALAYA: In his "General Report upon the Fisheries of British Malaya with Recommendations for Future Development," issued by the authority of the Colonial Secretary, Strait Settlements, and the Chief Secretary of the Federated Malay States, 1923, Mr. David G. Stead, Fisheries Enquiry Commissioner, presents us with a fascinating story of the very extensive fisheries of these parts. It is a highly instructive report of his several years' work and investigation, and though it contains a mass of important detail, is not too technical for the casual reader. Everybody interested in economic questions in this country should get this book, for, while investigations recorded in it refer to British Malaya, they might equally well have been written about China. The Chinese have settled all over the Malay States, and have carried their culture with them. The *jala* or casting-net depicted in one of the illustrations on plate VIII is identical with the net used in China. It is interesting to find that the Chinese in these parts go in for the cultivation of fish in ponds, just as they do in their own country.

Special investigations were carried out in regard to the kinds of nets used by fishermen, especially the fine mesh types used by the Chinese, with a view to ascertaining the amount of danger they constitute to the fisheries generally by catching the young fish before they have had time to grow to a reasonable size. This line of investigation might well be carried out in China, and the use of too fine nets, especially the type of *seine* net with which the Chinese comb every creek, pond and stream in the country, or sweep the inshore spawning grounds of marine species, be restricted, or, if necessary, prohibited, as they were in the Malay States.

The book is divided into fifty-seven chapters (without numbers) and these cover every phase of the main subject. A very significant chapter is that under the heading the "Rôle of Museums in Fisheries Investigations." On pages 231 to 235, is a useful list of the principal kinds of edible fish marketed.

Even such subjects as the education of fishermen, and leprosy and fish-eating, are dealt with. The book is well-illustrated throughout.

ENTOMOLOGICAL RESEARCH IN CHINA AND OTHER COUNTRIES OF THE PACIFIC: Under the title, "Applied Entomology," Dr. J. F. Illingworth, of the United States Department of Agriculture, gave an extremely interesting lecture before the Royal Asiatic Society on March 6. Dr. Illingworth is out in China looking for parasites which will kill the so-called Japanese beetle (*Popilia japonica*, Newman), an insect that has somehow been introduced into the Eastern States of America, where it is doing incalculable damage to economic plants. The main theme of his lecture was the combating of

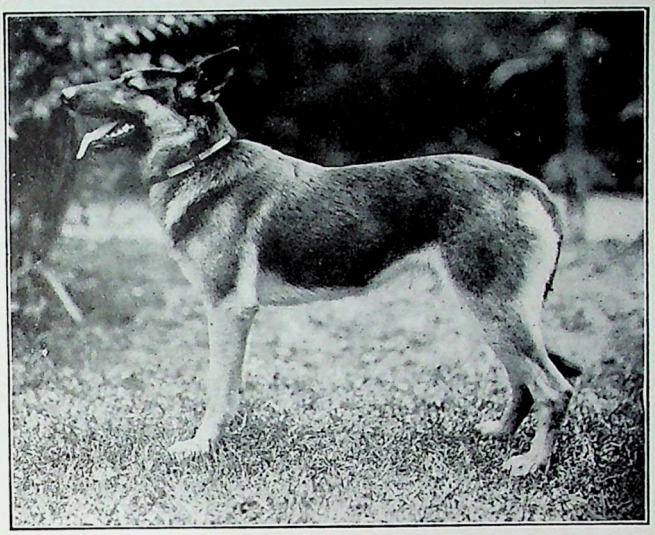


Photo by Sun Sun Studio

The winner of the first prize in the Alsatian (dog) class. Mr. H. Schoenherr's "Klaus von Warnowtal"



Photo by Sun Sun Studio

"Tellus von Leipzigerbaum," winner of the first prize amongst the puppies in the Alsatian class. Owner: Mr. P. H. Duncan



Photo by Sun Sun Studio

The Rev. T. W. Hall's bitch "Theresa Squeaks," the winner of the first prize in the "Wonk" class



Photo by Sun Sun Studio

Mr. D. B. Verney's bitch "Nigger," a cross between a setter and a retriever, which won the first prize in the Foreign half breed class

insect pests by means of parasites, and the story he gave of the steady development of research and experiment along this line sounded like a romance rather than a statement of scientific fact.

Briefly, the latest method of getting rid of an insect pest is to find some parasite that will attack and exterminate it. Minute ichneumon wasps, certain flies and even beetles have been found most effective for this. It has been found that any insect in its native home is kept down by parasites of some sort or other indigenous to the same country. It is only when such an insect is introduced into some new and favourable country where its particular parasite does not occur, that it becomes a pest, since it then multiplies unchecked. When, therefore, an insect becomes a menace in any given country, it is the duty of the entomologists of that country to discover the original home of the pest, and there find the particular parasite or enemy of that insect, introduce it into the affected area and so restore nature's equilibrium.

Outstanding instances of the effectiveness of this means of combating insect pests were cited, notably the case of a little leaf-hopper which almost destroyed the sugar-cane industry in Hawaii. A search was inaugurated which resulted in the discovery of the leaf-hopper's home in Queensland and there a parasite in the form of a minute wasp, which laid its eggs in the leaf-hopper's eggs and destroyed them, was found. This wasp was introduced into Hawaii and within a year, sugar-cane to the value of Gold $1,500,000 was saved. To-day, the leaf-hopper is kept within bounds by the wasp in Hawaii.

A species of beetle (*Anomala*) was introduced by accident into Hawaii from Japan. It began to spread with alarming rapidity, destroying the cane completely as it went. Entomologists were sent out to the Orient and finally they discovered a parasitic scoliid wasp in Manila, which they introduced into the islands, where it soon checked the pest, and has since held it completely in control.

Further instances of similar work in Australia, with the enormous benefits derived, were cited.

A very interesting case was mentioned in which a wasp preys parasitically upon the larva of a beetle, only to have its own larva preyed upon by that of a fly, whose eggs in turn are devoured by the larva of another beetle.

A certain species of ant (*Pheidola megacephala*), in the Philippines, South China and neighbouring countries, helps to keep flies down by preying upon their eggs and larvae.

THE COMMON EEL OF CHINA: We have received recently through Mr. H. F. Meyer, of the Whangpoo Conservancy Board, and the Danish Consulate here in Shanghai, a request from the well-known Danish ichthyologist, Dr. Johann Schmidt, of the Carlsberg Laboratory, Copenhagen, for specimens of the common eel in China, and notes concerning its distribution. The reason for this request is to correlate our

knowledge of the habits and distribution of the eels of the Pacific with those of the Atlantic.

Dr. Schmidt's famous work in connection with the search for the spawning grounds of the common eel of Europe (*Anguilla anguilla*) should by now be known to everbody, even to these who are not usually interested in natural history.

The story of this fish is one of nature's most fascinating romances. It will bear repeating, in view of the fact that the assistance of naturalists and others interested in the problem out here is sought.

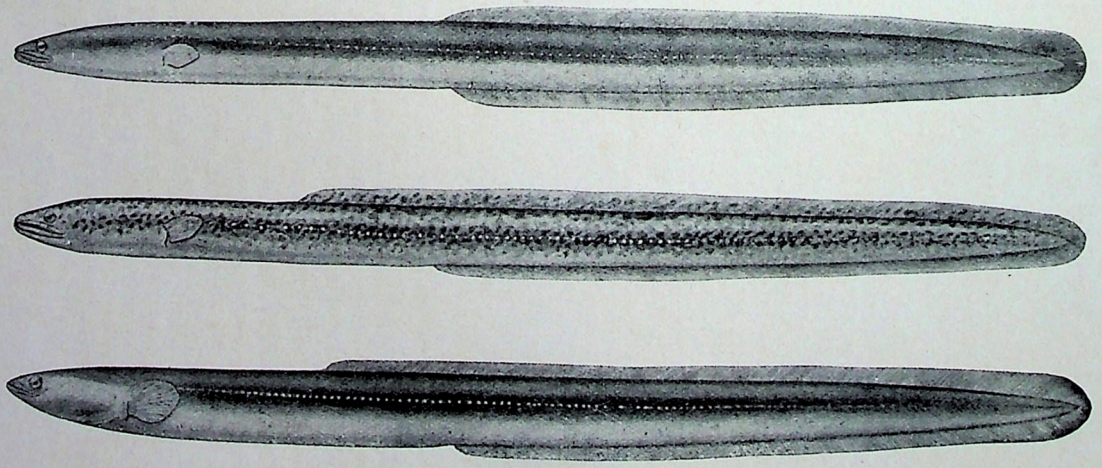
Fully adult European eels, which at this stage are living in rivers, streams and even ponds far inland, at the call of nature, begin journeying towards the sea, if necessary, crossing open land to accomplish their purpose. Arrived at the mouth of the river they start out across the floor of the Atlantic Ocean towards their spawning grounds, which are situated somewhere in the vicinity of the Azores. Here the eggs are laid and the young hatch out. The latter begin to rise to the surface and are carried back by the Gulf Stream and other ocean currents towards the European coast. At this stage they are known as *leptocephali*, being transparent lanceolate creatures, which at one time, when they received their name, were thought to represent a distinct species. When nearing land a change takes place. They grow shorter and become cylinderical, and, finally, on reaching shallow water at the mouths of rivers, become pigmented. Then, as elvers, they begin to ascend the rivers to the homes of their parents, becoming as they grow, yellow eels and silver eels, respectively, the latter being the name for the fully adult. What happens to the parent eel after spawning is not known. So much for the European eel.

In Eastern Asia we have a species that is very closely related to, if not identical with, the common eel of Europe. It is known as the Japanese common eel, *A. japonica*, though Basilewsky has described the Chinese form as *A. Pekinensis*.

It must be presumed that these eels follow the same habit as their European cousins, and breed somewhere in the deeps of the Pacific Ocean. The question is where. If this place is discovered, very valuable fishing grounds will also have been found.

We have secured some eighty or so specimens of the local common eel for Dr. Schmidt, but he requires specimens and data from all over China, and neighbouring regions, and we feel sure that biologists out here will not be slow in communicating with Dr. Schmidt and offering their assistance. Accompanying is a plate showing the type of eel to look for..

EELS, SNAKES AND TERRAPINS IN SHANGHAI: While on the subject of eels, reference may be made to what was considered by many a remarkable zoological phenomenon which occurred in Shanghai during the early part of May. According to reports large numbers of snakes, turtles and frogs were seen on two consecutive days trying to



Types of Eel required by Dr. Johann Schmidt in his world-wide investigations regarding the Spawning Grounds of Eels

crawl out of the Whangpoo on to the Bund (river front). The daily papers contained more or less facetious reports of this strange visitation, and asked for an explanation. On investigation it was found that the first date on which the animals appeared, May 12th, according to the European calendar, concided with the 8th day of the 4th moon of the Chinese calendar, and on that day it is the custom of the Chinese to purchase all manner of living creatures and set them free. By doing this they hope to acquire merit. Amongst the favourite animals thus purchased to be freed are snakes, frogs, terrapins and a certain species of eel which is very common in China and which is known to science as *Monopterus javanensis*. It is remarkable in that it has no external fins, and in general appearance is very serpent-like. It is one of the cheapest food fishes in these parts of China and the majority of what were taken to be snakes on the occasion referred to were probably eels. The terrapin referred to above is known scientifically as *Geoclemys reevesii* (Gray). It is probable that the reptiles and fish that invaded the water front had been released further up the Whangpoo, either near the Chinese City or else on the opposite bank.

SHOOTING AND FISHING NOTES.

SHOOTING

SMALL-BORE GUNS : Now that the shooting season is over, and sportsmen must put away their guns till the autumn, unless, of course, they go in for trap-shooting, we may profitably turn our attention to the subject of the guns themselves, and discuss some of the outstanding questions in regard to them.

Probably the most important question in regard to modern rifles and shot guns is that concerning their calibres. There are two very distinct schools among sportsmen, whether they be big-game hunters or are content with the humbler pheasant, duck or snipe. One school is all for the heavy-bore guns used by our forefathers, while the other is equally in favour of the small bore, high velocity rifles and small-bore shot guns that have appeared on the market in increasing numbers of late years.

The controversy over the respective merits or disadvantages of large or small calibre guns is a very hot one, and, we may add, a very vital one, for, especially in the case of rifles for big-game shooting, their efficiency as game-killers and game stoppers may mean all the difference between life and death to the hunter.

Having derived our conclusions from actual experience in the field, and not from theories and arguments set forth in books, we claim that our opinions should carry a certain amount of weight and we are unreservedly in favour of the reduction of the calibre of guns and the increase of muzzle velocity, such as is the marked tendency in gun-making these days. And it may be remarked that our experience in the field dates from a time when small-bore rifles had not yet been invented, or, at least, had not come into vogue among big-game hunters. In our first rifle the old black powder was used and it was necessary to wait till the smoke had cleared away before it was possible to see the result of the shot.

In those days we were firm believers in heavy bore rifles, and for a very good reason. The slowness of the powder and, consequently, the low speed of the bullet made it necessary to increase the weight of the latter in order to ensure sufficient shocking power. Otherwise, the quarry would get clean away and die hours, perhaps days, later, in the jungle. In the case of charging animals it was necessary to have a bullet large enough to stop them in their tracks, hence the old-fashioned 10-, 8- and even 4-bore guns used by elephant and other big-game hunters.

One of the first moves in the direction of the modern small-bore rifle appears to have been the 45 Express, in which the size of the bullet was reduced, but the charge behind it greatly increased. Nowadays, some of us have come to swear by guns of a calibre not more than .25 or .3 of an inch, but with a muzzle velocity of something like 3,000 feet per second, which are capable of knocking out such large animals as tigers, bears, the largest species of deer, and even wild cattle, providing, of course, that the aim has been reasonably accurate. And the beauty

of such guns is that they are so light, the recoil is so slight, and the trajectory so low, that accurate shooting is made easy.

In the old days, the sight of a rifle had to be raised when firing at an object over 50 yards away, and on this account the accurate gauging of the distance was all important. With one of these modern rifles there is no need to raise the sight for anything under a distance of 400 to 500 yards, and in a country like North China, where there is so little cover and stalking one's game to within a distance of a couple of hundred yards is almost an impossibility, the advantage of this can be realized.

But the last test must always be the effect of the bullet on the quarry, its shocking, killing or stopping power. And it is just here that we consider the high velocity small-bore rifles score so heavily and are most effective.

Whatever the reasons may be, the fact remains that a pointed, soft-nosed, nickel-jacketted bullet, even of a light weight, travelling at a high velocity (*e.g.*, 2,800-3,000 feet per second) does an enormous amount of damage inside any large animal, even if it does not strike a bone. It seems to have an explosive effect, the bullet disintegrating more or less completely. It does not leave the body which means that the whole of the force behind it is imparted to the body, and the shocking power of this is enormous—every whit as great as that of a much heavier bullet with a lower velocity. Of course, it must be admitted that it is better to get the quarry in a vital spot, but, on the other hand, the superior accuracy of the small-bore rifle materially assists the sportsman in this.

There are, however, some remarkable cases of large animals being killed instantly with these small-bore, light power rifles, even though hit in spots that are normally not immediately vital. Mr. H. R. Caldwell, of Fukien, once killed a full-grown tiger with a .22 high power Savage, the bullet having taken the brute in the liver. Apparently, the effect of the bullet was to disrupt the blood-vessels.

Another case we know of occurred in the Chinkiang district where a sportsman brought down a 350-pound wild boar with a .22 high power Savage bullet through the shoulder. In this case, contrary to what usually happens, the bullet passed out of the body, tearing half the shoulder out with it. The pig was killed instantly.

Cases can, of course, be quoted, in which these rifles failed to kill, and serious accidents have followed, but they are no more numerous than cases of accidents with the old-style, heavy-bore guns, probable not as numerous.

MINIATURE RANGE RIFLES: Another type of small-bore rifle is that designed for target practice on miniature ranges. These, of course, are very different from the high-power weapons already discussed. Their accuracy is assured more by the nicety of finish and delicacy of sighting than by a high velocity of bullet and a low trajectory. Such a rifle is the Vickers .22 Martini Miniature Rifle, which has been adopted by so many miniature rifle clubs of late, including that of Shanghai. It has been designed to produce a weapon of extreme accuracy for target practice,

but of such a weight and balance as to be suitable for sport in the field, providing the quarry is not too large, or too difficult of approach. It is an ideal gun for such game as the smaller deer, bustards, geese and swan.

Its charm lies in its sighting, which is particularly good. It has a tubular target foresight (ring and blade) and open backsight of special design (see accompanying figure). There is also a very fine peep sight with wind guage. These render the gun, which is beautifully finished, an extremely accurate weapon.

SMALL-BORE SHOT GUNS : The chief thing to be said in favour of these is that they improve the user's accuracy of aim, while they are just as hard-hitting as the generally-used 12-bore. And since sport, and not slaughter, should be the aim of every good sportsman, there is no reason why each should not take every means to improve his shooting, even at the expense of the day's bag.

Best of all of the smaller bore shot guns is the 20-bore, for this secures the advantage of lightness, without sacrificing killing power, providing, of course, that the user is accurate in his aim.

SNIPE : If snipe shooting during the Easter holidays was disappointing, the same cannot be said of the holidays during the spring races, which occupied the first week in May. Those who went-up-country instead of attending the races had some splendid shooting. Mr. C. D. Field and Captain Purton paid a visit to the Sashu district between Chinkiang and Nanking, where they secured 27 couple of snipe in one day's shoot (May 6th). The bag consisted of pintails Swinhoe's and winter, or common snipe, the pintails predominating. Mr. Field also secured a painted snipe, which, of course, is not a true snipe, but belongs to a different genus, and in its general form is a connecting link between the snipe and the rails.

Other sportsmen also reported good bags.

FISHING

SEA-FISHING AT PEI-TAI-HO : We have received details from one of the gentlemen who enjoyed such good fishing last summer at Pei-tai-ho, and since it is certain that many of our readers will want to share in this sport this summer we give the details here. It seems that the Chinese fisherman were already " on " to the possibilities of taking the sea bass with an imitation fly, and it was by watching them that the Europeans at the holiday resort discovered the sport. All that is necessary, it appears, is a small cork out of a medicine bottle, a fair-sized hook and some chicken or duck feathers. The Chinese used sorghum pith instead of cork. The hook and a few feathers are bound on to the cork with a piece of red silk cord, and this serves as an excellent lure for the hungry fish.

The angler may either stand out on the rocks and cast from there or he may wade out from the beach and cast well out seaward. The best

VICKERS

·22 (5·59$^{m}/_{m}$) MARTINI MINIATURE RIFLE

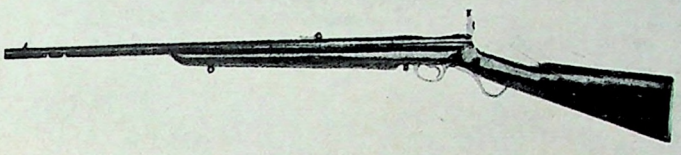


Fig. 1.

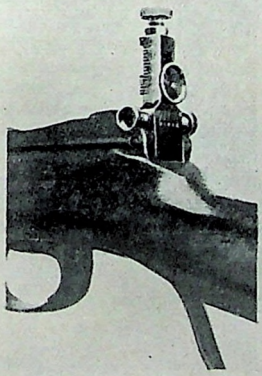


Fig. 7.
Aperture or Peep Backsight, with Windgauge.

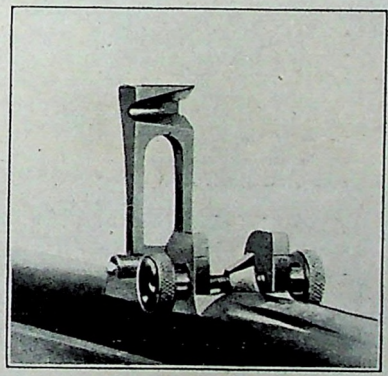


Fig. 6.
Backsight. The leaf is raised to show the wedge and adjusting screw.

time for this sport is just at the turning of the tide. Bass were caught last summer in gratifying numbers, many of them of three and four pounds weight.

FRESH-WATER FISHING IN HONGKONG: A well-known angler, who is acquainted with conditions in Hongkong, informs us that the fishing there is very much more satisfactory than it is in the Shanghai district. In the stream in Fanling Valley especially are good fish to be had. In days gone by he used to get culters and other species up to 3 and 4 pounds in weight. On one occasion some sixteen culters were caught in one afternoon, most of which were about the above weight. This means very good sport, since these fish are good fighters.

Our informant does not appear to have come across the "rainbow carp" in Hongkong waters, but we can assure him that they do occur there, since we have seen specimens in the British Museum collection from that locality. In fact this delightful species and its relatives occur throughout Eastern and Southern China, the range of the group extending from Manchuria into the Indo-Chinese region. We have been informed that a fish known by the same name is found in India, and it may be that it represents, in fact, the same species or another of the same genus.

GRASSHOPPER BAIT: "Wherever there are fish, they may be taken with a grasshopper bait," is the dictum of one of our best-known anglers in China. It may not be sporting, but it certainly is effective, and we would suggest the use of this bait to local sportsmen in their search for good fishing "grounds." The art of angling as regards Europeans in China is in its infancy, and we do not yet know the possibilities that lie before us. Hence, any kind of bait, and almost any means of taking fish will be legitimate in order to find out where the fish are and what species are available.

TROUT FISHING IN MANCHURIA: We can safely recommend our readers to try the places in Manchuria which are being advertised in local papers as good summer resorts where fishing may be had. All along the Chinese Eastern Railway there are the most delightful spots where the ardent angler may fish to his heart's content. Two or three kinds of trout are to be had, one, *Brachymystax lenok*, a fine spotted variety, very like the British brook trout. The grayling is also to be found, as also is the rainbow carp, the notch-jaw and a species of bass. A true pike is also to be had, and may be taken with a live minnow. It is closely related to the European species, being known to science under the name *Esox reicherti*.

We can especially recommend I-mien-po, and neighbouring stations, where the streams and woods are very beautiful, the former being full of fish, and the latter of game.

WHAT IS SHAMANISM?

BY

S. M. SHIROKOGOROFF.

(Read before the Quest Society, February 18, 1924.)

(Continued from page 279).

The term Shamanism is borrowed by science from *shaman* of the Tungus language. A Shaman is a man or woman, who, according to the Tungus belief, knows the methods of entering into direct relations with the spirits. Properly speaking, the shaman acts not by himself or herself but through his or her soul, the thought-soul. I will now give a short description of the shaman's performance, which will better explain these methods.

The Shaman before performing must repose, eat well and sleep well. Then he begins to sing the songs inviting his own spirits to assist him in his work, asking them to come and help him carry out his task of discovering the causes of some malady or misfortune. He puts on special clothing representing a deer or a bird or some complex of symbols, which is covered with designs on pieces of cloth and skin, symbolizing different objects such as the anatomical parts of animals, boats, bow and arrows, swords, bones, or feathers. All these things help the Shaman to assume different forms in order to cross rivers and seas, kill enemies and so on. To this clothing are attached several pieces of iron, brass and tin representing and symbolizing different objects. The Shaman also has a kind of drum, whose size and form varies. The rythmic movement of the Shaman provoking a rythmic noise of the metallic trinkets, the rythmic sounds of the drum and the rythmic words of his songs hypnotize him and after a little while he falls into a state of ecstasy. Then a spirit enters into his body and he begins to speak as this spirit. Then the soul of the Shaman can go away to visit the heavens, or distant places on the earth in order to find the spirits who caused the malady or misfortune. During the travels of the Shaman's soul it is supposed to be out of his body and if it does not come back he must die. Such a case occurs if the soul, because of the Shaman's enemies' intrigues, cannot return to its owner. During a performance the Shaman changes the spirits, because every spirit has its proper capacities. Therefore a good Shaman must have many spirits at his disposal. Some of these special Shaman's spirits have animal forms, some of them have human forms and some of them have some fantastic form combining human and animal aspects. If the Shaman needs to cross a big river or sea he must introduce in himself a spirit which has the form of a fish and this fish spirit can bring the Shaman's soul across the water. As soon as the Shaman finds some spirit which has a bad influence, he prays it to leave alone the person or group of persons and asks it what it wants. Then the spirit more or less clearly says to the Shaman what it wants. The Shaman must understand the

spirit's will. This calls to mind the practice of Pythia's prophesy in Ancient Greece. The Shaman's bargain with the spirits is translated by a special person—the Shaman's assistant, who must be able to understand the Shaman's speaking, which is very difficult because he speaks for himself and answers for the spirits simultaneously.

During performances the Shamans assume some capacities which are not common to other people. They can, for example, jump as high as 4 or 5 feet, in spite of age and their very heavy costume (sometimes about 80 pounds); they can cut their hands and faces in such a way that recovery takes a very short time; they can burn their hands and faces almost without leaving traces the following day; they can cause their blood to drop from the front and so on. All these experiments have no serious consequences so long as they are made during ecstasy. In the normal state Shamans do not differ from other people, except that they become old sooner, which is quite natural because they spend their nervous energy very largely.

During performances they have very great influence over people and consequently they possess an exclusive power of hypnotizing. The people who believe in the Shaman's power are very susceptible to his influence and in these cases his intervention is very effective. For this reason Shamans do not use intervention in the cases of maladies that cannot be cured by hypnotism, as for example, typhoid fever, small-pox, pneumonia and so on. If the Shaman's intervention does not help he says that the malady is caused by a special spirit beyond his power and in this way the number of spirits is increasing. Thus, the practice of Shamanism does not exclude the possibility of medical intervention in the cases of infectious maladies, surgical cases, child-birth and so on.

The spreading of psychic and nervous maladies among the Tungus is sometimes similar to an epidemic of contagious disease. If there is no Shaman, the malady spreads further and further and finally almost all the young men and women, also sometimes the children, succomb, and the normal life of the clan stops. It is very characteristic of the Tungus (and some other people) that the spreading of these maladies is usually limited to within the clan units, but in some cases it spreads beyond the clan and the whole tribe can be affected. At such times of public danger several candidates appear for the post of Shaman. Then at a special examination the tribe, or, practically speaking, the seniors decide which of these candidates can perform the functions of Shaman. As soon as the election of Shaman is made and he begins to shamanize the maladies stop and the clan or tribe re-establishes its normal life. The Tungus believe that the Shaman knows the will of spirits, which, being mastered by him, do not need to harm everybody. Every clan has its own Shaman because every clan has its own spirits. It is necessary to note that the Shaman must be a healthy person because if he is not he cannot perform and know the spirits' will and intentions. Thus, the psychic state of the Shaman during performance is very complicated. On one hand the Shaman being in the state of ecstasy is not, of course, in a normal state; on the other hand the Shaman cannot let himself fall into a nervous fit, so that he must keep his

state just on the limit between these two psychic states, which is not so easy and sometimes very tiresome for the performer. Usually big performances are practised only once a year and even once every three years. Small performances are practised more often—once a month and even more often, if the Shaman is a healthy person. It is very characteristic of the Shaman's psychology that they themselves need to perform from time to time and to have opportunity to shamanize. If they do not perform for a long time they seem to accumulate energy for shamanizing, and from this standpoint their psychology calls to mind the accumulating of pathological energy which is observed among people who are subject to hysterics. But it should be noted that the Shaman's performances and psychic state in general are different from those of hysteria. I cannot now go into the details of this purely medical problem, because it would take too long.

From the above exposition it can be deduced that the Shamans are peculiar accumulators of the pathological energy of the group of people to which they belong. They are a kind of safety-valve. This is a very original method of solving this problem, and if the theory of spirits bears in itself the sources of psychic and nervous maladies, Shamanism is the best method of self-curing discovered, as shown, unconsciously, by the Tungus and other peoples who practise it. In this lies its practical importance.

I have already noted that some kinds of psychic and nervous maladies in the conditions of European life are never cured at all and the persons who are *de facto* ill live without medical survey. Among the Tungus all these persons would be cured by the Shaman's hypnotic influence and would return to their normal activity. This explains why the Tungus, in spite of their very unstable psychology, have usually such a normal and healthy method of acting and thinking, and at the same time assimilate new knowledge very easily.

I must now draw your attention to the aesthetic side of Shamanist performances. They are usually performed at night, when the sunlight does not obstruct the Shaman from falling into an ecstatic state. At the place where they shamanize there are usually many people, rythmic sounds of drumming, rythmic movements of the Shaman, rythmic tinkling of iron and brass, rythmic words, the meaning of which is especially mysterious, and these really produce a very profound impression on the audience. The uncertain light of the burning wood in the centre of the wigwam, the singing of the Shaman's assistant and the immensity of the forests where for hundreds of miles there is no town, no railway, no civilization, complete the mystic impression of the performance. Moreover, the Shaman's ecstasy influences the people and they fall into a state which facilitates the hypnotic influence. The reason for shamanizing—some malady or some misfortune—makes the performance more significant, more mysterious and sometimes absolutely indispensable for the safety of people. The closeness of the mysterious spirits who have entered the Shaman's body, the immensity of their power and Nature herself, finally the mystical meaning and rythmical running of the performance pro-

duce among the people present a very high aesthetic feeling. This aesthetic feeling is characteristic of all peoples of the earth, and it takes only different forms corresponding to the individual psychology and to the cultural environment.

The practical intervention of the Shamans into the psychic life of the people and aesthetic excitation are characteristic of Shamanism. From the above exposition it may be seen that Shamanism has as its basis the animistic theory on the one hand, and on the other hand a predisposition to psychic and nervous maladies which must be cured by some means. It seems to me that all these maladies, being characteristic of the human species in general, are more variable among the people of non-European civilization. One of the causes of these maladies is, possibly, the theory of animism. It is true that psychic and nervous maladies can assume very varied forms which cannot be recognized at once as real maladies. The Tungus do not consider them as "maladies," but as the malevolent activity of the spirits. It is quite possible that some manifestations of nervous and psychic anomalies which exist now among the peoples of European civilization, are not recognized as maladies but are considered as normal products of some social and political phenomena. Some time later these anomalies will probably be treated as we now treat the religious excitation so characteristic of Middleage.

In conclusion I want to add that among Europeans the idea of animism, animistic philosophy and especially animistic modes of thought are not yet dead. As a consequence of this state of mind, different kinds of mysticism are especially fashionable among people who are not prepared for scientific research. But we do not want to shut our eyes to some phenomena of our psychic power, as for example, some variations of hypnotism which cannot be understood with our usual methods of investigation, and we want to have the daring to say that now some questions cannot be answered and must be left till some later date as unsolved problems, because our scientific methods may cause us to build very audacious and at the same time very erroneous theories, which sometimes are as attractive as the Tungus animistic system.

SOME SHANSI WATERS, CHEMICALLY EXAMINED

WITH NOTES REGARDING WATER ANALYSIS IN GENERAL AND ITS INTERPRETATION.

BY

E. T. NYSTRÖM

Contribution No. 7 from the Nyström Institute for Scientific Research in Shansi.

(Continued from page 289)

Division II.

Waters from the Western Border of the Taiyuan Plain.

The Fen Ho River.

Five *li* west of Taiyuanfu the Fen Ho flows past in a direction almost N. to S. It emerges on to the plain at a point 40 *li* N.W. of Taiyuan at a temple and village called Lan Tsun. It breaks through the hills in a narrow canyon with a depth of several hundred metres, and emerges in a picturesque gap about 150 metres wide. Its sources lie in the wooded hills in the Ning Wu district about 300 *li* to N.N.W. of Taiyuan. It flows through the greater part of S. Shansi and joins the Yellow River at the district city of Hotsin, 700 *li* to the S.S.W. On the whole it is not much of an asset to the province. Except for carrying some lumber rafts down from the Ning Wu hills to Taiyuan it is not much of a trade-carrier. Its waters are used to some extent for irrigation on the plains, but its chief characteristic is its unfortunate inconstancy of capacity, dwindling, as it does, in the winter to a small muddy stream of perhaps 20 cubic metres per second and swelling during the rainy season to a devastating torrent, which very often inundates large parts of the Taiyuan plain and comes near (as happened in 1923) to invading the capital itself. It is the old story of N. China rivers, deforestated hills and the absence of storage capacity, also of the inequality of rainfall as seen in the meteorological tables already given.

At certain times of the year the Fen Ho is actually not a real river with uninterrupted flow, but is dispersed into irrigation channels and its bed partly left dry. This was noticed by me last June when the debouchement of the river from the plain was completely dry, except for a few scattered pools. Further down there were springs, which, so to say, started the river again.

The quality of water is also unequal along its course. At Lantsun it may emerge quite clear and sparkling, but at Taiyuan fu it is always laden with sediments and quite muddy. Apart from the sediment the

water of the Fen Ho at Taiyuan is not at all bad, showing how exterior appearance may deceive when judging waters.

WATER No. 11.

Water from the Fen Ho due W. of Taiyuanfu.

The water was filtered from its heavy sediment.

Analysis :	*Total Solids* (filtered water) : parts per million ..	248
	Chlorine : mgr. per litre	17.6
	Total Hardness : mgr. $CaCO_3$ per litre	157
	Temporary Hardness	57
	Permanent Hardness	100

This is really, as Shansi waters go, a very excellent water, low in total solids and exceedingly low in chlorine. Notice how the temporary hardness assumes a very low figure, proving the well-known fact that rivers lose their bicarbonate of calcium through dissipation of carbonic acid gas. One might say that this is a better water (when filtered) than the limpid and beautiful artesian waters in Taiyuanfu, at least from an industrial point of view. It must still be called hard (more than 100) but should be a good and wholesome water for human consumption after filtering from bacteriological contamination. This might be of interest when contemplating a future water supply for Taiyuanfu, which still lacks waterworks. The total hardness of the Fen Ho is exactly the same as that of the Thames (see above).

WATER No. 12.

Water from the Spring at the Westernmost Temple at Lan Tsun.

Proceeding westwards on slowly rising ground we arrive 15 *li* distant from the river at the marginal hills. They represent the up-throw of a fault line, and this has much to do with the existence of springs at certain places along the margin of the plain. Taking, for example, Lan Tsun 40 *li* N.W. of Taiyuan, the place mentioned above, where the river emerges from the hills, we find at this place a whole series of exceedingly strong springs, which supply water both for the river and special irrigation channels. This is a beautiful place, what with the gap in the hills, the springs feeding a small lake as clear as crystal with spouts of sand visible on the bottom where the strong springs emerge, a fine temple and a picturesque park. The aggregate of supply is hard to estimate, the springs being so scattered ; but several cubic metres per second are certainly produced.

Appearance : Perfectly limpid and colourless.

Analysis :	*Total Solids :* in mgr. per litre (parts per million) ..	274
	Chlorine : mgr. per litre	9.1
	Total hardness : mgr. $CaCO_3$ per litre	237
	Temporary Hardness	86
	Permanent Hardness	151

The solids are very largely made up of calcium salts, and a very small percentage of chloride of sodium, of which the quantity is unusually

low. The hardness (total) is greater than the Taiyuan artesian supply. It is not very suitable for industrial use in its natural state. Its origin from the Ordovician Limestone cropping out here makes a useful comparison with a similar supply, which is not in Shansi, but is well known throughout N. China, *i.e.*, the famous springs of Tsinanfu, the capital of Shantung. Prof. G. B. Barbour of the Peking University in his paper "The Tsinan Intrusive" (*Bull. of the Geological Society of China, Vol. II*) gives the following analysis, executed by Prof. William H. Adolph of Shantung Christian University, on the Bao Du Ch'uen of Tsinanfu. Total Solids : 251 per million ; Sodium chloride 17 (this makes 10 mgr. chloride per litre); Total hardness : 174 ; Temporary Hardness : 110 ; and Permanent Hardness : 64. The total solids and chlorine show a good coincidence, but the Lan Tsun water is harder.

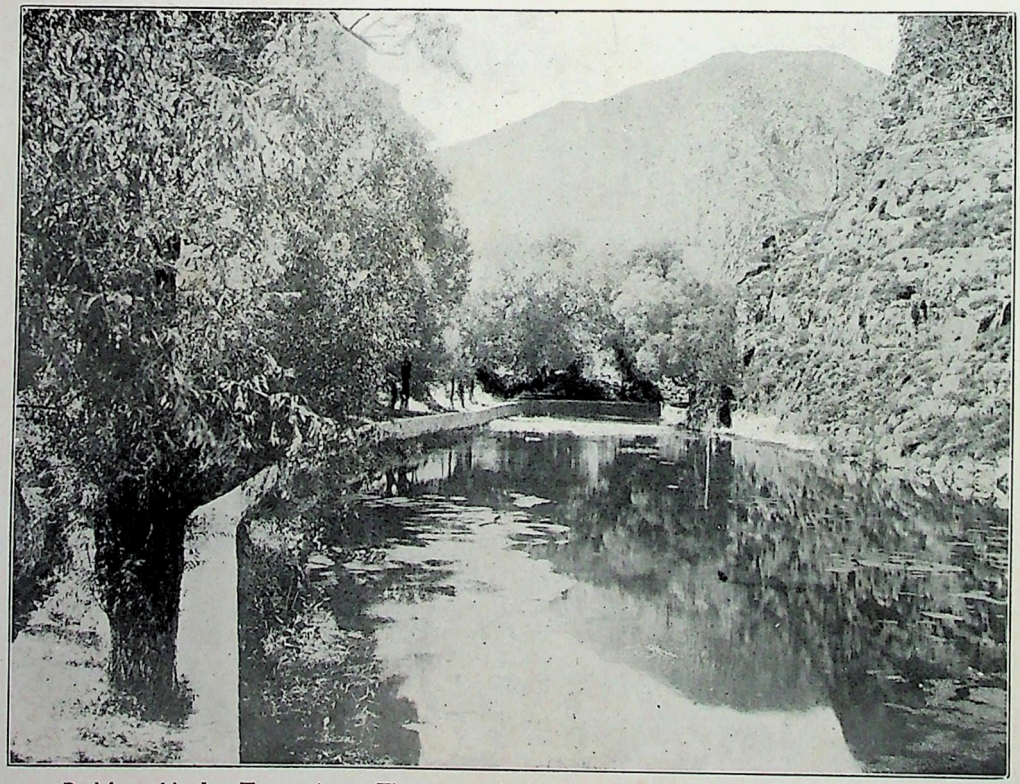
Barbour adds : "The water analyses do not differ from typical waters of limestone areas."

The Chin Szu Springs.

Though the Lan Tsun springs may enjoy a fair reputation yet this is nothing compared with the "First Spring in Shansi," *i.e.*, the Chin Szu springs, 45 *li* S.W. of Taiyuan. This is *the* beauty spot of the province, what with the great volume of perfectly crystal water and the fine temples and pavilions built about the springs, and dating from very ancient times. There are trees there (*Thuya orientalis*) which have been put down by the famous botanist, the late Mr. Frank Meyer, to be 2000 years old. The main temple was founded during the Chin Dynasty 1122-255 B.C. The place has lately been put in repair and cleaned up.

There seem to be various legends about the origin of these glorious springs ; one is as follows : A young girl in ancient times used to fetch water from afar to her sick mother, but one day, when nearing her home, she dropped the jug and broke it, to her great dismay. But then and there a spirit appeared and the spilt water was transformed into the present magnificent stream. Another legend, told to the writer by the old priest now in charge of the temple, explains the origin of the spring thus : A young girl used to fetch water from a long distance to her ailing mother. On her way home she met a tired horseman and upon his request offered the water to his thirsty horse. In recognition of this generous act the horseman gave his riding whip to the girl and told her that upon arrival at her home she should choose a large water jar *kang* and stir inside with the whip. The girl did as she was advised, when a great spring welled out from the *kang*. The horseman was evidently a benevolent spirit.*

* Another variation of this story is told which is substancially the same as the second version but runs that the girl was given the whip and told to stir *once* round in the water *kang*, which immediately became full of water. One day the girl was out when her mother wanted more water, the *kang* being empty. Her little sister told her mother not to bother as she knew how the elder sister secured the water. Thereupon taking the whip she stirred it round in the *kang* a number of times. The water welled up in a gushing torrent, flowed out of the house, down the hill and on to the plain, carrying with it the little girl, who was transformed into a lotus lily. The water never stopped flowing, and to this day the lakes and pools at the foot of the hills are noted for their lotus lilies.—ED.



Pool formed by Lan Tsun springs. These emerge both at the sides and from the bottom. The water is clear as crystal

One of the sights of the temple are four iron warriors, three of which date from the Sung dynasty and which are powerfully and artistically sculptured.

The water comes from several springs but above the largest one a pavilion is built with an image showing the girl with the water "kang." Just below this pavilion the water is divided by ten outlets, and in the proportion of three to seven is directed away in two irrigation channels. Then it drives several small flour mills and ultimately debouches on to the plain, there irrigating several square miles of rice fields (the famous Chin Szu rice). The contrast between this stream with its overhanging willows and peach trees and the temple park with its stately old trees and the surrounding hills, bare and grey as usual, is striking.

The geologist must come forward with a less poetical explanation of the origin of these springs. It is again the fault-line which runs along the margin of the plain which we believe to be the true cause of the appearance of the Chin Szee springs. It reveals itself by the "downdrag" of the strata just behind the temple.

The water loses something of its charm under the prosaic judgement of the analyst. It is limpid and clear to perfection and evidently suitable for irrigation, but it is full of foreign substances as seen below.

WATER No. 13.

The Chin Szu Main Spring.

Analysis :	*Total Solids :* mgr. per litre (parts per million) ..	716
	Chlorine : mgr. per litre	16.2
	Total Hardness : mgr. $CaCO_3$ per litre	315
	Temporary Hardness : not ascertained	
	Permanent Hardness : not ascertained	

Temperature of water taken 18/11/13=17.5° C.

A quantitative analysis (precipitation with ammonium oxalate and calcination to CaO) gave a tenure of $CaCO_3$ per litre of 332 mgr., a fairly good coincidence with the figure 315 found above by the soap test. An addition of barium chloride to the (acidified) original water gave a great precipitate of $BaSO_4$ showing a large tenure of the SO_4-ion. ($CaSO_4$). No iron or alumina were found. So the objectionable qualities of the water (the local people do not use it for drinking purposes) must be put down to its large tenure of gypsum. The presence of this may be explained by the frequent nodules of pyrites found in the region behind Chin Szu making the waters there often very strong in iron sulphate (inky taste). In this case the pyrites has been also oxydized to form sulphuric acid, which in passing the limestone rocks at the temple have given rise to gypsum. Magnesium (probably as sulphate) is also present.

The chlorine of the Chin Szu water is very low but the total solids high, more than twice that of the Taiyuan artesian waters, and three times those of the Fen Ho, while the hardness is excessive—"very hard" (above 300) according to the scale given above. It is, therefore, not

suitable for human consumption nor for laundry or boiler feed, though its agricultural possibilities cannot be disputed.

The quantity of water differs slightly according to the dryness of weather, but seems to be about 3 cubic metres (3,000 litres or 660 gallons) per second from the main spring and much less from the others.

Division III.

Waters from the Eastern Border of the Taiyuan Plain.

Near this border and about 55 *li* (27 km.) S.E. of Taiyuanfu is situated the important town of Yü Tse. It is here that the railway turns to the N.W., and it is also from here that most of the freight for South Central Shansi and the West (also the neighbouring province of Shensi) is dispatched. It is a commercially strategic point and assumes also industrial importance on account of the construction here of a large cotton mill owned by the Chin Hua Cotton Spinning & Weaving Co., Ltd.

Yü Tse station is at a height of 798.63 metres (above sea level), only slightly below the altitude of Taiyuan, which is about 800 m.

The main water supply of this region comes from irrigation channels originating either in the river Shou Shui (or Shou Yang river) which passes the city some *li* to S.E., or at the large springs at Yuen Ho about 10 *li* E. of the city at the station of Pei Ho Liu. The river is shorter and smaller than the Fen Ho, previously described, but resembles it in its very irregular habits. The springs at Yuen Ho give a fairly constant supply of water all the year round (perhaps ½ cub. metre per sec.)

Water No. 14.

Surface Well at Yü Tse Station.

At Yü Tse station there is a surface well dug for the railway which gives the usual poor quality of supply seen in the following analysis:—

Appearance: Much floating film and mud.

Analysis:	*Total Solids:* mgr. per litre (parts per million)	.. 1,508
	Total Hardness: mgr. $CaCO_3$ per litre	596
	Chlorine: mgr. per litre	180.8
	Temporary Hardness	267
	Permanent Hardness	329

A test was made with barium chloride, which gave a strong precipitate of $BaSO_4$, probably originating from sodium sulphate. This water is very bad and is not and should not be used for boiler purposes.

Water No. 15.

The Cotton Mill's Intake at Yuen Ho, 10 li E. of Yu Tse.

The Cotton Mill (which at date of writing has not started operations) after several efforts to obtain a sufficient local supply of water was obliged

to get it by piping from the above mentioned springs, which, however, in quantity are not at all to be compared with those at Chin Szu. The water is also here used for irrigating rice fields, though the area is not very great, perhaps ½ sq. km.

Appearance : Perfectly limpid and colourless.

Analysis :	*Total Solids* : mgr. per litre or parts per million ..	324.5
	Chlorine : mgr. per litre	18.5
	Total Hardness : mgr. $CaCO_3$ per litre	212.0
	Temporary Hardness	78.0
	Permanent Hardness	134.0

A test with barium chloride showed some SO_4, but not much. However, the great preponderance of permanent hardness above temporary should indicate the presence of calcium as sulphate rather than as carbonate. The water is hard but not " very hard." It should, however, be treated with soda before using it in boilers. This would remove the permanent hardness, and the remaining hardness would be small. Its total solids reminds us not of Chin Szu water but of the Taiyuan waters. The chlorine content is as in the Chin Szu water. It is of course a much better water than that from Chin Szu, though its natural occurence is similar. Geologically its surroundings belong to a higher and less calcareous formation (Triassic), which may account for its superiority in relation to the Chin Szu water, which comes from the boundary between Cambro-Ordovician Limestone and Carboniferous deposits. (Hence great tenure of lime and sulphate, the latter from pyrites in the Carboniferous, (see above.)

Water No. 16.

Surface Well at Taiku Electric Light, Company.

Appearance : Some whitish films floating about.

Analysis :	*Total Solids* : mgr. per litre or parts per million ..	684.5
	Chlorine : mgr. per litre	64.4
	Total Hardness : mgr. $CaCO_3$ per litre	256
	Temporary Hardness	106
	Permanent Hardness	150

About 60 *li* (30 km) S.W. of Yü Tse lies the old and prosperous town of Taiku, long famous for its commerce and banking and now the headquarters of much educational effort. A company for supplying the town with electric light has recently been started here. They used at first a surface well for their supply.

This is not so bad, as surface wells go in Central Shansi, and the water is comparable to that of the well-known Hsiao Wu T'ai in Taiyuan-fu.

DIVISION IV.

WATER No. 17.

Well at Shou Yang Station.

Proceeding Eastwards along the Tsing Cheng railway line we arrive at the town of Show Yang, 150 *li* or 75 km. in straight line E. of Taiyuan. This town lies at a considerable altitude, the elevation above sea-level at the station being 1047.88 metres. The climate here is very cool in summer, and it is called by the Chinese "Cold Shou Yang." The country rock here belongs to the "Ueber-Carbon" of Richthofen (Triassic), and consists of sandstones and shales with no limestones.

Appearance : Limpid but with occasional small films floating about.

Analysis :	*Total Solids* : mgr. per litre or parts per million ..	295.5
	Chlorine : mgr. per litre	23.0
	Total Hardness : mgr. $CaCO_3$ per litre	226.0
	Temporary Hardness	109.0
	Permanent Hardness	117.0

Test with barium chloride gave reaction for SO_4 after some time. This is rather like, but purer than, the Yuen Ho water, the two hardnesses are more evenly balanced.

WATER No. 18.

Railway Supply from a Spring at Tche-Che-I Station.

East of Shou Yang the railway passes over a loess ridge and attains here its highest altitude, viz : 1,075 m. exactly 1,000 m. above its terminus at Shih Chia Chuang. Then it slopes down almost the whole way. A good supply for the railway engines is at Tche Che I (Ts'e Shih Yi) at an elevation of 871.09 m. The country rock being still Triassic sandstones and shales.

Appearance : Perfectly limpid and colourless.

Analysis :	*Total Solids* : mgr. per litre or parts per million ..	181.5
	Chlorine : mgr. per litre	15.0
	Total Hardness : mgr. $CaCO_3$ per litre	173.0
	Temporary Hardness	101.0
	Permanent Hardness	72.0

This is the purest water of all those analysed in Shansi. It easily attains the lowest record in total solids, and in the matter of hardness is just beaten by the Fen Ho. The latter comparison is not quite fair, however, as rivers naturally lose their hardness by exposure to air (see above). The Tche Che I water is still somewhat too hard to be called a perfect water for steaming purposes, but for human consumption it seems ideal. A test with barium chloride gave the reaction for SO_4, but only very little and after some time had elapsed.

Water No. 19.

Water from Well at Yang Ch'uan Station.

Continuing eastwards along the railway by a gradual descent we arrive at the coal mining centre, Yang Ch'uan, whose altitude above the sea at the station is 661.13 metres. Here the Pao Chin Mining Company is working the anthracite seams, some of which are actually seen cropping out in the railway cuttings. The mining is largely done with modern machinery, and the usual output is somewhere about 2,000,000 tons annually. The company has also built a small steel works, but this is only in partial use. This is at present the chief mining centre of Shansi. It was here (as well as in other districts of Shansi) that the Pekin Syndicate had their concession, which, however, was bought back by the Shansi people many years ago.

A sample of the local water supply taken at the railway station well shows the following composition :

Appearance : Perfectly limpid and colourless.

Analysis :	*Total Solids* : mgr. per litre or parts per million ..	346.5
	Chlorine : mgr. per litre	14.3
	Total Hardness : mgr. $CaCO_3$ per litre	250.0
	Temporary Hardness	110.0
	Permanent Hardness	140.0

This is a fairly good water reminding us of the Taiyuan artesian supply in regard to total solids and hardness, but with much less chlorine. The rather predominant permanent hardness is proved also by a test with barium chloride, which gives a rather strong precipitate of $BaSO_4$, showing much gypsum in the original water. This is easily understood as the well is sunk in the Carboniferous area where Pyrites (FeS_2) is frequently found (see above discussion of Chin Szu water).

Water No. 20.

Niang Szu Kuan Springs.

Proceeding now along the line right to the Eastern border of Shansi we arrive at the station Niang Szu Kuan at an altitude above sea level of 375.11 metres. This is an exceedingly picturesque place, and just where the line leaves Shansi it crosses over a deep canyon, where a swirling torrent of beautiful green water rushes down and forms waterfalls and rapids. This water originates in strong springs some distance to the west. The province derives only a small benefit from this stream, as it leaves Shansi almost at once and the canyon is too narrow for extensive agriculture and irrigation. The stream is mainly used here to drive a number of flour mills (interesting objects for travellers showing the application of vertically shafted turbine wheels).

The water seems to originate in the thick Cambro-Ordovician limestone, which forms here the country rock, but it comes probably a long way underground, as the analysis shows a large content of gypsum, probably from the overlying Carboniferous.

If one should take a guess at the quantity of water supply it might be in the neighbourhood of 3 cubic metres, or 660 gallons, per second.

Appearance : Perfectly limpid and colourless.

Analysis :	*Total Solids* mgr. per litre or parts per million ..	635
	Chlorine : mgr. per litre	44
	Total Hardness : mgr. $CaCO_3$ per litre	245
	Temporary Hardness	33
	Permanent Hardness	212

This water gave an immediate and very strong precipitate with barium chloride, showing a great tenure of gypsum, which is also confirmed by observing the excessive permanent hardness shown above. It seems that much of the temporary hardness has had time to disappear through exposure after leaving the springs. The water reminds us somewhat of the Chin Szu springs, but the total hardness is less and the chlorine content is higher. The uncommonly high permanent hardness will be troublesome in boilers unless the water is first purified by soda.

Summary.

This paper deals with some important sources of water supply in Central Shansi. It includes a discussion of the climatic factors in Shansi especially with regard to rainfall. It gives, with the purpose of helping other investigators, a few pages of information regarding the inherent qualities of natural waters in general, and the judging of same, also a description of the methods followed in our analyses. Twenty of the latter are then given, including waters from Taiyuanfu and neighbourhood, from the Western border of the central plain and the Eastern margin of same, also analysis of important waters along the Cheng Tai railway, including the coal mining district at Yang Ch'uan.

Discussion of Results.

A tabulated exposé of the analyses is given below. It has been attempted in the various divisions to put the "best" waters first (*e.g.*, A.B.) and the rest in decreasing order of quality, but it is frankly admitted that such an arrangement is somewhat arbitrary, as it is a fact that waters may be judged from many different points of view, not only with regard to contents of different kinds of matter, but also with regard to the use to which they are intended to be put, whether for human consumption or for industrial uses, or both. However, by taking both into consideration the following classification has been attempted:—

DIVISION I.

1.

Artesian Waters in and Near Taiyuanfu.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Per.
A. (Anal. No. 4) Industrial College ..	317.5	23.5	229	167	62
B. (Anal. No. 1) Famine Relief Committee well ..	336.5	24.8	211	111	100
C. (Anal. No. 2) Governor's live stock farm	404.5	60.5	188	50	138
D. (Anal. No. 9) University Artesian well	441	48.5	207	110	97
E. (Anal. No. 8) Gen. Chao's Artesian well	465	53.4	233	130	103
F. (Anal. No. 5) Taiyuan Electric. light well	549	37.6	225	143	82

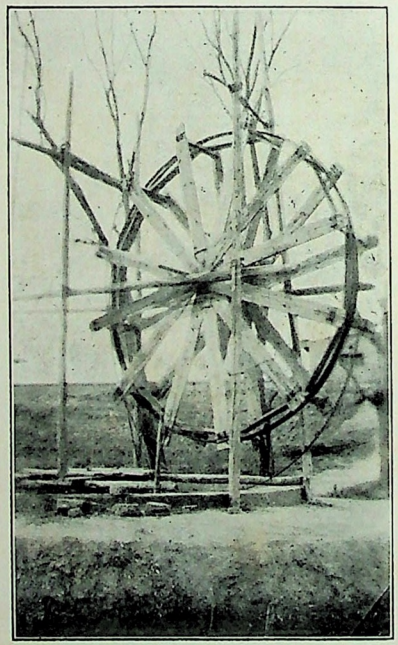


Photo by E. T. Nystrom

The home-made apparatus used to sink the bamboo-lined artesian wells in Taiyuan Fu. The sinking tool is attached to a rope of bamboo strips which is wound round the wheel shown in the picture

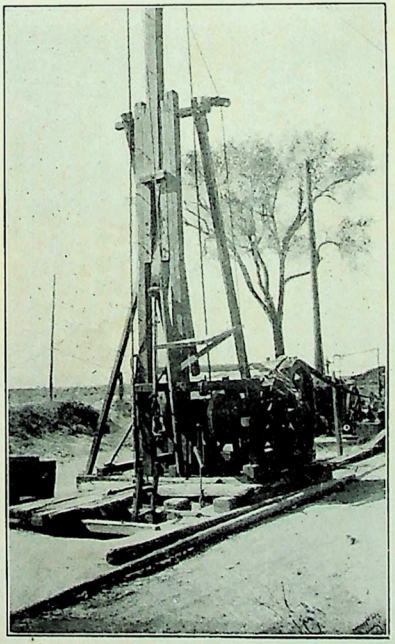


Photo by E. T. Nystrom

The International Famine Relief Committee's well-sinking machine at Huang Liu Tsun, near Taiyuan Fu

2.

Surface Waters in and Near Taiyuan.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 10) Hsiao Wu T'ai well ..	622.4	40.1	348	150	198
B. (Anal. No. 6) Hai Tzu Lake ..	1202.5	153.5	643	310	333
C. (Anal. No. 3) Arsenal surface well ..	1574.5	133.3	402	240	162
D. (Anal. No. 7) Nystrom's well ..	3299.8	348.3	veryhard		

Division II.

Western Border of Taiyuan Plain.

1. River Fen Ho.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 11) Fen Ho	248	17.8	157	57	100

Springs. 2.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 12) Lan Tsun springs ..	274	9.1	237	86	151
B. (Anal. No. 13) Chin Szu springs ..	716	16.2	315	subordinate	preponderant.

Division III.

Eastern Border of Plain.

1.

Surface Wells.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 16) Tai Ku Electric Co.'s well	684.5	64.2	256	106	150
B. (Anal. No. 14) Well at Yü Tse station	1508	180.8	576	267	329

2.

Springs.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 15) Yuen Ho spring ..	324.5	18.5	212	78	134

Division IV.

Water Supply Along Cheng Tai Railway.

1.

Wells.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 17) Well at Shou Yang I station	295.5	23.0	226	109	117
B. (Anal. No. 19) Well at Yang Ch'uan station	346.5	14.3	250	110	140

2.

Springs.

	Tot. sol.	Cl.	Tot. hard.	Temp.	Perm.
A. (Anal. No. 18) Spring used for railway at Tche-Che-I ..	181.5	15.0	173	101	72
B. (Anal. No. 20) Ninag Szu Kuan springs	635	44.0	245	33	212

The best water of the twenty analyzed is that from Tche Che I station, the second the Fen Ho water (after filtration), and the third the water from the Shou Yang well.

SCIENTIFIC NOTES AND REVIEWS

NEW MONOGRAPH ON THE MONGOLS : The latest issue of the journal of the Russian Orientalists' Society at Harbin, *The Herald of Asia*, No. 51, 1923, Harbin, as usual includes very varied material on the questions lying along the line of this Society's work. Among this material the first place belongs to the monograph on the common law of the Mongols by Professor W. A. Riasanowsky, whose researches upon the problems of common law have already secured for him the recognition of specialists. This work is Part I of his monograph entitled " Common Law of the Mongols." Part II of this work has already been published (in Russian) in Chita (Transbaikalia) in 1921, but it needs to be revised and republished. This study is not a new one among the very numerous works written by Russian scholars, though it is the first attempt to give some generalizations based on Russian investigations. The author has analyzed the most important Mongol legislative acts from that of Chinghiz Khan up to the last reform of 1815 by the Chinese Government (Emperor Chia Ch'ing).

Professor Riasanowsky says that the legislation of Chinghiz Khan was merely a codification of the Mongol common law, and he points out that this system was absolutely characteristic of these nomads and cattle-breeders. Traces of typical Mongol ideas still exist in the common law of some Mongol groups. Chinghiz-Khan's legislation was characterized by a very liberal standpoint in regard to religions : in principle it recognizes all the religions to be equally worthy of esteem. Secondly, this system was very severe in its punishment for the various crimes of adultery, robbery, theft, and so on, which was always that of death. The same punishment is prescribed in cases where a person walks across the fire-place, urinates in the fire, or splits the fire with a stake. At the base of all these prohibitions lie, of course, different religious ideas. A very essential difference between this and other systems was the lack of imprisonment of criminals. Professor Riasanowsky considers that Chinghiz's act was never written but was only reproduced by travellers, as for example, Rashid Eddin, Plano di Carpini and others.

The second important stage of Mongol legislation was the Act of 1640, which was a product of a special meeting of all influential Mongol princes. This act, as well as the preceding one (in the 16th century), was already under the pacifist influence of Buddhism, so that the original Mongol system little by little became more liberal and in many cases the death punishment was replaced by fines always calculated in head of cattle, horses, camels, and sheep. Meanwhile, this act was not less severe than that of Chinghiz-Khan when the question concerned state crimes, and it recognized Buddhism as the only religion allowed for practice. Owing to this it included several articles concerning religious organization, penalties for crimes against the Buddhist officials and the like. This act also introduced a state organization for the prosecution and trial of criminals, and with this act the Mongol jurisprudence entered into a state

where a preponderant place was given to the state. However, it preserved many survivals of ancient private systems of prosecution and process from which even the Chinese judicial organizations were not free.

The third stage of evolution of the Mongol system was the introduction of Chinese legislation, the first act of which was in 1789, the second in 1815. This system was a combination of the ancient Mongol system (Chinghiz-Khan), Buddhistic innovations and Chinese penal ideas. There appears a spirit of cruelty in punishments and their specification unknown to the Mongols, as well as several articles resulting from Chinese control. Professor Riasanowsky points out that these acts do not touch all phases of Mongol life, so that even now the original Mongol system continues to exist as common law, yet he notes that the Mongols became more cruel in their punishments. He also states that neither the Mongol common law nor Chinese legislation overcame the difficulty of creating a penal system not based on casual principles, and from this standpoint both are absolutely unsatisfactory.

From an ethnological standpoint it is interesting to note that the " perfection " of Mongol legislation was not to the benefit of the Mongols, whose ethnical, and, in particular, military power was decreasing proportionally to the perfection of legislation and the development of Buddhistic ideas. It is also worthy of note that the Mongols in spite of all reforms and political pressure preserved their ancient social system and ideas of ancient Mongol law, and that as an ethnos they continue an independent existence, which does not show any symptoms of ethnical degeneration.

Professor Riasanowsky's monograph is interesting not only from a purely scientific viewpoint, but also from a political one. Since the last revolution in China, when this part of Asia fell under particularly strong and diverse political influences, Mongolia has found herself under pressure from various countries. Russia, Japan, China and some other powers have economic and political interests in Mongolia. Generally speaking our knowledge, except, perhaps, that of Russian scholars, on Mongolia and the Mongols, is very unsatisfactory. Such a detailed and valuable work as this of Professor Riasanowsky is, therefore, exceptionally important, and we must thank the author and the editors of *The Herald of Asia* for publishing it. Our wish is to see Part II, dealing with the Buriat common law, published in the same review that has already enriched scientific literature with many valuable publications. Another of our wishes is to see, as soon as possible, an English translation of this monograph, which will make it more accessible to politicians and scientists of other countries and which will also permit the author to detail the parts dealing with the present practice of common law, the social value of this phenomenon and deductions which may be drawn.

S. M. Shirokogoroff.

THE PEKING UNION MEDICAL COLLEGE (ROCKEFELLER FOUNDATION) : Contained in a splendidly got up volume issued by the above institution under the title " Dedication Ceremonies and Medical

Conference, Peking Union Medical College, 1921," are accounts of its history and of the dedication conference held in its precincts in September (15-22) 1921. There are also a number of most valuable papers on medical subjects, which were read before the conference by specialists engaged in investigations in China. The first part of this fine publication will be interesting mainly to educationalists and organizers of medical work in China, the second part to medical men generally. It is altogether too comprehensive a book to review in detail, but it may well be recommended to the notice of the professional brotherhood not only in China but in other countries. The work of the P. U. M. C., as the institution is generally called, being mainly investigation and research, is extremely important, and its results must be very far-reaching. A splendid body of experts is engaged in this work and already the results obtained more than justify its establishment. The opportunity for medical research in a country like China, where there is an almost unlimited supply of material, is enormous, as also is the need, and we cannot but wish that there were more such institutions in the country.

EARLY MAN IN CHINA : " *Nature* " states that for the last decade the French Jesuit, Father Licent, has been exploring the fossiliferous deposits of northern China, and has sent some valuable collections to Paris, including a fine series of remains of Pliocene mammals. A year ago he was joined by Father Teilhard de Chardin, professor of geology in the Catholic University of Paris, who has had much experience of collecting in the caverns and rock shelters of France and Spain, and was associated with the late Mr. Charles Dawson in collecting from the river gravel at Piltdown, Sussex. According to a despatch from Peking to the *Manchester Guardian*, Fathers Licent and Teilhard have now made an important discovery of human remains at a depth of sixty meters in a river deposit in northern Kansu, through which the existing river Shara Osso Goh has cut a deep gorge. There seems to be evidence of six individuals, and one well-fossilized skull with retreating forehead and large orbits may prove to be of special interest. No lower jaw was found. With the human remains there occur numerous bones of rhinoceros, horse, bison, camel, deer, elephant and other mammals. One horse is said to be no larger than a collie dog. It is reported from another source that at least ten well-preserved skulls of rhinoceros have been obtained, and that they closely resemble the skull of the ordinary woolly rhinoceros. With the human and other remains there are also numerous small rude implements of quartzite.—*Science*, Vol. LIX, p. 356.

PALÆONTOLOGICAL AND ARCHÆOLOGICAL EXPLORATIONS IN KANSU : Mr. George Findley Andrews, for many years a missionary in Lan-chou Fu, the capital of Kansu, recently arrived in Peking with 150 cases of palæontological and archæological specimens collected by Dr. J. G. Andersson, mining adviser to the Chinese Government, and head of the Geological Museum in Peking, in the Sining,

Ti Tao and Tsin Chou districts of Western and South-western Kansu. Dr. Andersson has made some very interesting discoveries, having found several sites of Neolithic, or at least pre-matalic age, culture. Mr. Andrews reports that Dr. Andersson will not return to Peking himself before the autumn. His return and the announcement of details of his finds may be looked forward to with a great deal of interest, as he is reported to have information of a revolutionary nature as regards present-day ideas of the origin of Chinese culture.

PAN-PACIFIC FOOD CONSERVATION CONFERENCE

The Pan-Pacific Food Conservation Conference which is to be held at Honolulu from July 31st to August 14th of this year under the auspices of the Pan-Pacific Union bids fair to be a very successful and important undertaking. Amongst the subjects to be discussed are :

1. International Law
2. Fisheries
3. Economic Entomology
4. Plant Pathology
5. Plant and Animal Quarantine
6. Animal Industry
7. Crop Development & Improvement
8. Climatology
9. Forestry
10. Topography of Land and Sea
11. Transportation and Distribution of Food Products in the Pacific Areas.

Scientists and those interested in food economy generally from all over the Pacific have announced their intention of attending this important conference, while Universities, Chambers of Commerce, Rotary Clubs and other organizations from every country bordering the Pacific Ocean are sending delegates.

Special invitations have been sent to scientists in China, both native and foreign, and it is to be hoped that there will be a good response to these, and that a large and representative body of delegates will go to Honolulu from this country.

SOCIETIES AND INSTITUTIONS

THE CHINA SOCIETY OF SCIENCE AND ARTS

The fourth monthly meeting of the above society was held on April 26th at the home of Mr. and Mrs. G. A. Bena, 90 Jessfield Road, when Professor W. M. Porterfield delivered an extremely interesting lecture entitled " What is Bamboo ? " The meeting was well-attended and the discussion which followed the lecture showed that the talk had been keenly appreciated by the audience.

Professor Porterfield discussed the biology of the bamboo plant, pointing out its remarkable characteristics. Among the most interesting points brought out was the fact that the bamboo as it appears above the ground is only one part of a very large and extensive plant. This part is called the culm and it is an off-shoot from a very widely-spread network of rhizomes or underground stems which constitute the main plant.

Starting as a small plant, these rhizomes spread, sending up culms as they go. This progresses for a considerable period until the bamboo fructifies, an occurrence which takes, in some cases, as long as thirty-two years, after which the whole plant dies.

A very interesting point made was in regard to the simultaneous flowering of all the bamboos in Europe, *i.e.*, in England, France, Spain and even, across the Mediterranean, in North Africa, some years ago. It was found that all these plants were originally derived from a single plant taken to Europe many years before, which accounts for the simultaneous flowering.

The bamboo is a tree grass and as such is among the most primitive and oldest types of grasses known, Professor Porterfield said. He exhibited some flowers which had been gathered by Mr. Sowerby in the Minghong region near Soochow, as well as several other interesting specimens of the plant. He also gave figures in regard to the extremely rapid growth of the bamboo culm, as much as thirty-six inches of growth having been recorded in twenty-four hours.

At the end of the meeting a vote of thanks was proposed to Professor Porterfield for his lecture, and to Mr. and Mrs. Bena for their kind hospitality.

The Practice of Medicine Amongst the Chinese

On Saturday, May 17th, Mr. A. de C. Sowerby delivered a lecture before the whole Society at the home of Mr. and Mrs. Bena, 90 Jessfield Road, upon the subject " The Practice of Medicine Amongst the Chinese." As this lecture will be published in the Journal at some future date there is no need to report upon it here further than to say that a great many very interesting points were brought out by the lecturer, who is well acquainted with the subject, having spent the greater part of his life in China, where he has travelled extensively.

Some very interesting exhibits, borrowed from the Museum of the Royal Asiatic Society, of which Mr. Sowerby is curator, were displayed.

Professor C. H. Robertson on Radio

The last general meeting of the Society for the current session was held on Saturday, June 14th, at the home of Mr. and Mrs. Bena, when Professor C. H. Robertson, head of the lecture department of the Y.M.C.A. in China, delivered a fascinating lecture upon the subject of Radio, using some new and very beautiful and ingenious apparatus to illustrate his points. A considerable amount of trouble was taken in setting up the complicated apparatus, a fact greatly appreciated by the unusually large audience. After explaining the theories of Radio, ether wave vibrations, and electrons, the lecturer gave instances of the marvels that had already been accomplished in the subject, winding up by delving into the future and telling his audience what was to be expected when the use of radio should take the place of both hearing and seeing. A hearty vote of thanks was accorded Professor Robertson for his very interesting lecture.

After the lecture the President announced that this would be the last meeting of the session, promising that the coming session, beginning September or October next, would be full of good things. Enormous strides and been made by the Society, but these were nothing compared with what was coming. With a successful series of highly interesting lectures, by far the largest and most successful Art Exhibition held in China, and the launching of an Anthropological Expedition to its credit in the short year of its existence, and an ever increasing membership roll, the Society was destined for great things.

A very hearty vote of thanks was extended to Mr. and Mrs. G. A. Bena for their generous hospitality in placing their charming home at the disposal of the Society for the latter half of the session.

Medico-Biological Section

On May 6th, Dr. Eugene C. Peck, of St. John's University, president of the above section of the Society, gave an extremely interesting lecture entitled "Locally Obtainable Foods and their Nutritive Value" before the section. The meeting was held in the lecture hall of the Royal Asiatic Society, Museum Road, and it was very well attended. Dr. Peck discussed the question of vitamens and applied our present knowledge upon this and kindred subjects to the various foods obtainable in China. He ran through the foods obtainable in local markets as used by both foreigners and Chinese, and gave details of their nutritive contents, specially emphasizing their protein, vitamine, mineral and energy values. He exhibited several interesting charts for the consideration of housekeepers in their choice of foods in Shanghai. In the discussion that followed many interesting points in regard to local food products were raised, especially in regard to vegetables, and their vitamen contents, milk—buffaloes', cows', and imported dried and condensed milk—fruits and fish. The question of whether Europeans were taking the fullest advantage of the fish-foods offered in the local markets was raised, and

Mr. Sowerby, who presided at the meeting, was asked whether he would not publish a popular account of the various species of food-fishes to be had locally.

Professor A. Bary, M.D., the well-known Russian Psychologist, was announced as giving a lecture on June 3rd upon the subject "Modern Theories of Mental Diseases in Relation to Treatment." Owing to unforseen circumstances the lecture was not delivered, though a *resumé* of it was published in the local papers. It is hoped that this lecture will be delivered some time in the coming session.

Mr. Dyson's Visit to the North

Mr. Verne Dyson, the Honorary Secretary of the Society, recently spent a month in North China in the interests of the organization, dividing his time between Tientsin and Peking. In both cities he discovered a very encouraging interest in the Society and its official organ, *The China Journal of Science & Arts*. In the two cities approximately one hundred new members were enrolled. A meeting of the Tientsin membership was held at the Union Church Hall when there was a general discussion of the affairs of the Society, led by Mr. Dyson, the Rev. C. E. Darwent and others. Mrs. Estelle Nathan was hostess at a meeting of the artists, held at the Lyceum Club. Mr. Dyson also spoke before the Tientsin Rotary Club and at several of the colleges and universities. In Peking he had the loyal support of Dr. J. C. Ferguson, vice-president of the Society, of Dr. Wu Lien Teh, and of other members. He also spoke at Yeng Ching University, Peking University, and several other colleges and universities, in each case explaining the aims of the Society. The newspapers both in Peking and Tientsin were liberal in giving space to articles about the Society and its art exhibits, lectures and various other enterprises. Upon his return to Shanghai, Mr. Dyson declared that the Society has a very strong hold on the interest and attention of the educated classes, both Chinese and foreign, in North China.

Art Exhibition

The Art Exhibition mentioned in our last issue was duly held in the fine rooms on the second floor of the *North-China Daily News* building, which were generously placed at the disposal of the Society by the management. The exhibition was opened at 11 o'clock, Tuesday, May 13th, by Mr. E. H. Gibson, who took the place of Mr. Sterling Fessenden, who should have presided, but was prevented by a case in the American Court being heard at the time. In a few well-chosen words Mr. Gibson congratulated the committee on the splendid work it had done in getting together such a fine collection of pictures. The president, Mr. A. de C. Sowerby, also spoke, thanking all those who had contributed to the success of the exhibition, including the members of the committee, the management of the *North-China Daily News*, and Messrs. Arts and Crafts, the last having kindly supplied the furniture at the exhibition.

It was originally intended to hold the exhibition for three days, but the attendance was so good that it was decided to keep it open over the week end.

Artists from Tientsin, Peking and Shanghai participated in the exhibition to the number of 70. One lady sent pictures from Fukien province which arrived too late to be inserted in the catalogue. Five Peking artists and five Tientsin artists exhibited, the remainder being Shanghai residents.

Altogether, some 342 water colour sketches, drawings in inks, crayons and pastels were shown, together with 169 oil paintings and 13 pieces of sculpture, making a total of 524 exhibits. The sale of pictures was far from satisfactory, due, it is feared, to the fact that a great many of the best pictures were too highly priced to meet the pockets of would-be purchasers, and those who had seen good pictures were not desirous of buying those of inferior quality. Many inquiries were made as to whether an artist would not be willing to lower the price, and in cases where they were, sales were negotiated.

Some 36 pictures were sold, fetching something over $1,000. The best sales were made on the first day of the exhibition.

That the exhibition was highly popular may be judged from the number of people who passed through. Estimating from the number of tickets sold, some 962 foreigners visited the exhibition, while at least 200 foreign school children, mainly from the Thomas Hanbury School, the Cathedral School, and the French School, took advantage of the special hours set aside for children who were admitted free. Chinese art students were also admitted free, fully 500 passing through during the six days the exhibition was in progress. The majority of these latter came from the Shanghai College of Fine Arts. The Pootung Middle School also sent a large number, as well as the Ecole Speciale des Beaux Arts.

Fully one-third of the exhibitors were Chinese who have taken up the European style of art with considerable success. If a criticism may be made regarding their work, it is that their colours are somewhat too crude to please European patrons of art, which doubtless accounts for the fact that there were not more sales of their pictures. They have yet to learn a lot in regard to the blending of colours, though their workmanship and technique are particularly good.

The sculptures of Mr. B. Y. Koci showed excellent modelling and an imagination in carrying them out which was very effective. Mr. Chang Yu-Kon's "Labour" epitomized Chinese philosophy in a single head, and Professor Taverelli's study of heads was especially successful.

Reproductions of a number of the pictures and sculptures exhibited are given elsewhere in this Journal.

Dr. Shirokogoroff's Visit to Hongkong and Canton

Dr. S. M. Shirokogoroff, the Russian Anthropologist, who must by now be well known to the readers of this Journal owing to his many contributions, has made an appeal to the Society for funds to assist him

in completing his anthropological and ethnographical investigations upon the Chinese.

According to Dr. Shirokogoroff it is necessary for him to visit Canton, Hankow, Chungking and, possibly also, Tai-yuan Fu in Shansi, Si-an Fu in Shensi, and some place in Kansu in order to secure the data he requires. As is well known he has already done considerable work in this direction in East Siberia, Manchuria, Mongolia, and North and East China.

The matter was taken up by the Society and Mr. Sowerby, the president, made a public appeal for funds through the *North-China Daily News*. This has resulted in donations from the following :—

Mr. A. E. Algar.. ..	$100.00	Mr. R. D. Abraham ..	$50.00
The Royal Asiatic Society	100.00	Mr. V. G. Lyman ..	25.00
Mr. P. Grisogono ..	50.00	Dr. H. Chatley	10.00
		Mr. E. Luthy	10.00

With the money thus collected Dr. Shirokogoroff has left Shanghai for Hongkong and Canton, where he will carry out measurements and make other investigations, thus completing the first part of his program.

Election of Officers

According to the constitution and rules of the Society the election of officers will take place during the month of October. All members of the Society who are willing to serve as officers or on the committee should send their names in not later than July 31st. Ballot slips listing these names will be issued with the September number of the Journal and all members of the Society should register their votes thereon and return them to this office by September 30th.

Professor C. R. Kellogg, honorary secretary of the Biology Section of the Society being away on furlough, Professor W. M. Porterfield is acting in his place and all communications concerning this section should be directed to the latter.

THE SHORT STORY CLUB OF SHANGHAI

The Short Story Club of Shanghai, a small group of writers banded together to study and write short fiction stories, closed a successful year with a reception at the home of Dr. and Mrs. A. H. Swan in May. It was announced at that time by Mr. Verne Dyson, the president, that twenty-five original stories had been completed by members and submitted to the editorial committee. Since the club has a membership limited to thirty, this output of fiction was regarded as most encouraging.

It is proposed to print the stories in a book which will be issued in the early autumn, and the officers of the organization now have this enterprise in hand. All of the stories produced deal with Far Eastern situations.

Most of them have a Chinese setting and of these several have a Shanghai background. Others went to Japan, Korea, the Philippine Islands or other countries of Eastern Asia for local colour.

At a meeting of the executive committee, held in June, it was voted to enforce the regulation of the club constitution which provides that all members of the club who fail to write a story within the prescribed time limit are automatically dropped from membership. The list of those qualifying for membership in the club next year will be made known shortly.

THE QUEST SOCIETY

The above society has continued to hold its very interesting meetings at the R. A. S. Hall, 5 Museum Road. The March 31st meeting was as follows :

Dr. F. Reiss spoke on the subject of " Sex Education," advocating a compromise between full disclosure and reticence. He favoured a quasi-religious training of children as a moral safeguard.

On May 12th, the president lectured on the " Origin of the Earth," describing the nebular theory and its discrepancies. He mentioned the " capture " hypothesis and showed the arguments in favour of the ejection of the planets from the sun by reason of the disturbance caused by a passing star.

At this meeting the amalgamation of the society with the China Society of Science and Arts was discussed and a small committee was appointed to go into the matter.

H. CHATLEY,
President.

ROYAL ASIATIC SOCIETY

The following meetings of the above society have been held recently :

On March 6th, a lecture on " Applied Entomology " was given by Dr. J. F. Illingworth, Specialist of the United States Department of Agriculture.

On March 19th, a paper was read by Dr. J. C. Ferguson on " The Migration of the Sung Dynasty to Hangchow."

On April 17th Mr. L. Newton Hayes gave a lecture on " The Gods of the Chinese." The lecture was illustrated by a large collection of idols.

W. STARK TOLLER,
Honorary Secretary.

BOOKS AND PERIODICALS RECEIVED

We have to acknowledge the receipt of the following publications :—

Agriculture & Forestry Notes, College of Agriculture & Forestry, University of Nanking : No. 6, April, 1924.

Chinese Economic Bulletin, compiled and published by Chinese Government Bureau of Economic Information: Nos. 154-165, February-April 19).

National Problems, by Chandra Chakraberty. Published by author.

Endocrin Glands (In Health and Disease), by Chandra Charkaberty. Published by author.

Principles of Education (Theoritical and Applied), by Chandra Charkaberty. Published by author.

Study in Hindu Social Polity, by Chandra Charkaberty. Published by author.

Food and Health, by Chandra Chakraberty. Published by author.

Les Grottes de Loungmen (Honan) par le Père E. Pelerzi, Missionaire Apolostique. On sale at the Oriental Press, Avenue Edward VII, price $2.50.

Social Organization of the Manchus—A Study of the Manchu Clan Organization, by S. M. Shirokogoroff. Published by the Royal Asiatic Society, North China Branch, Shanghai, extra Vol. III, price $4.

The Herald of Asia; Bulletin of the Russian Orientalists' Society, No. 51, 1923, Harbin.

Journal of the Association of Chinese & American Engineers, Vol. V, No. 1 (Special Year Book Number).

French Colonial Digest : Nos. 3-6, February-May, 1924.

Journal of the West China Border Research Society, 1922-3, Chengtu, China.

On the Birds of South-East Yunnan, S. W. China, Part III, by J. D. LaTouche, M.B.O.U. (From the Ibis for October 1923, pp. 629-645).

The Quarterly Journal of the University of South Dakota, 1923. No. 1, Vol. 14.

The Franco-American Musical Society Bulletin, Vols. 1 and 2, September and December, 1923.

The Lingnaam Agricultural Review, College of Agriculture of Canton Christian College, Canton, China, Vol. 1, Nos. 1, 2, June 1923, December, 1923.

Report of the Secretary of the Smithsonian Institute for the year ending June 30, 1923.

The Chinese Political and Social Science Review, Vol. VIII, No. 1, January 1924.

Bulletin of the Geological Society of China, Vol. 2, Nos. 3-4, Peking.

The Philippine Journal of Science, Vol. XXIV, Nos. 1 and 2, January and February, 1924.

La Chine. No. 63, April 15th.

The American Journal of Science, Vol. VII, No. 38, February 1924. New Haven, Ct.

The New Zealand Journal of Science and Technology, Vol. VI, No. 4, December, 1923. Wellington, N. Z.

Natural History, Vol. XXIV, No. 1, January and February, 1924.

The Works of Li-Po, the Chinese Poet, translated by Shigeyoshi Obata; J. M. Dent & Sons, Ltd., price 10/6.

China, By Emile Hovelaque, translated by Mrs. Laurence Binyon. J. M. Dent & Sons, Ltd., London & Toronto, price 7/6.

Addresses & Papers, Dedication Ceremonies & Medical Conference. Peking Union Medical College, September 15-22, 1921.

Far Eastern Review, Vol. XX, Nos. 1, 2, 3, 4 and 5, January-May 1924.

Asia, Vol. XXIII, Nos. 1-12; Vol. XXIV, Nos. 1-4, January-April.

Asiatic Motor, October-December, 1923; January-June, 1924.

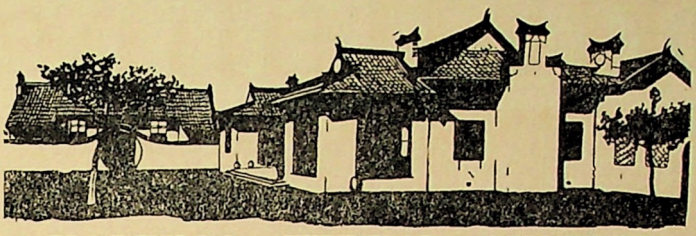
China, Weekly Review, January-June, 1924.

Mid-Pacific Magazine, February-May, 1924.

The Litological character of the Permian sediments of the Angara series in Central Shansi, N. China, by Erik Norin.

Monthly Weather Bulletin, February, 1924. Dept. of Geology and Geography, National Southeastern University, Nanking.

The Critical Review, No. 28, April 1924.



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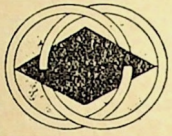

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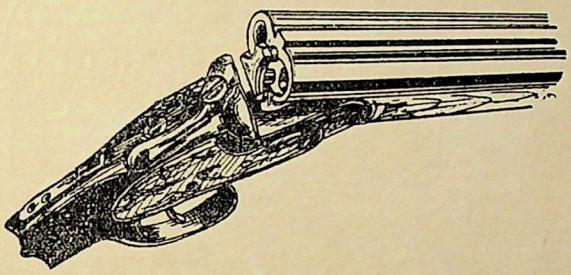

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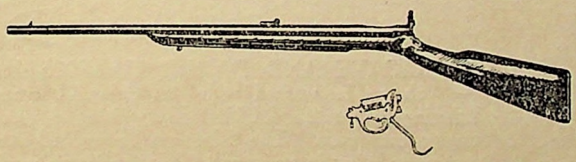

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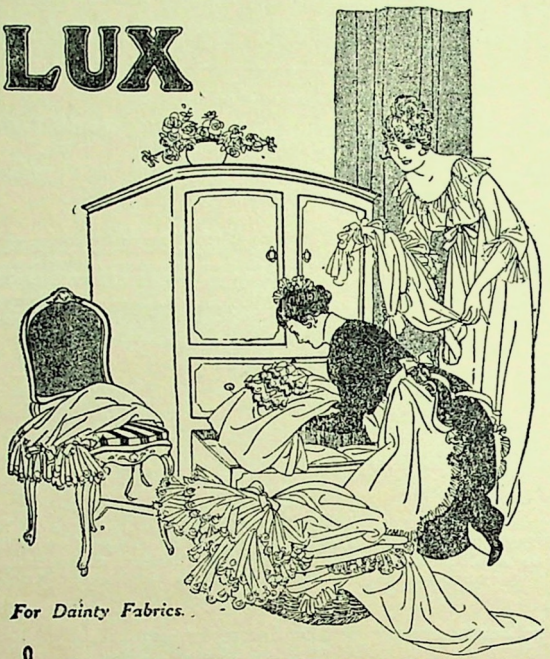

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COMPOSITION

The analysis of Lactogen as packed, and when suitably diluted for use, is as follows :

	Lactogen.	Lactogen diluted with 6¼ parts of water by weight.	Average Composition Human Milk.
Fat	23.49	3.13	3.10
Lactose	47.86	6.38	6.60
Proteids	21.00	2.80	2.00
Ash	4.65	0.62	0.20
Water	3.00	87.07	88.10
	100.00	100.00	100.00

Lactogen contains ALL the fats of milk, and NO foreign ingredients.

勒吐精代乳粉

乃是純淨之牛乳用特別方法製煉而成爲最純全優美代乳品

此粉成分請閱上列之表