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RESEARCH SOCIETY

1930-1931

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FOREWORD

The constitution of the West China Border Research Society states that "The purpose of the Society shall be the study of the country, peoples, customs and environment of West China, especially as they affect the non-Chinese." The results of some of these studies are now presented in this, the fourth volume, of the Journal of the Society.

In order that the Society might have a larger supporting membership the constitution was amended in May 1931, and the clause limiting the resident membership to twenty-five was removed. The larger membership now permitted will, we hope, make possible the publication of a better journal, and may perhaps permit us to increase the frequency of publication. The present plan is one volume every two years. We hope that an annual volume will be possible before long.

The publication of the photographic plates in this volume has been made possible by a grant from the Harvard-Yenching Fund of the West China Union University. It is hoped that this is the beginning of a closer degree of co-operation between the University and the Society. From the beginning the co-operation has been considerable, and any further development of this will be very much welcomed by the members of the Society.

Once again we wish to express our sincere thanks to Mrs. R. G. Bowyer for her excellent work in copying out drawings for the wood-cutter. All diagrams and pictures in this issue, except photographic plates, have been printed from wood blocks made by local craftsmen. Before this could be done the drawings submitted by the writers of articles had to be redrawn, and often changed in size, but kept to scale. This tedious work has all been done by Mrs. Bowyer, and that it has been well done is evidenced by the reproductions appearing in this journal.

L.G.K.

Chengtu,
December 31, 1931.

PROGRAMMES.

The following have been the programmes of meetings during the past two seasons.

1930—1931.

Nov. 1, Some Influences of Race and Environment upon Life. (*Illustrated*)
L. G. Kilborn.

Nov. 22, Explorations into Ancient Chinese Documents.
D. L. Phelps.

Dec. 13, Notes on Szechwan Architecture (*Illustrated*)
D. S. Dye.

Jan. 2, Symbolism in Chinese Religions.
A. J. Brace

March 7, Some Dietary Deficiency Factors in Eye, Ear, Nose and Throat Disease in Szechwan.
R. A. Peterson.

March 28, A Journey to Tachienlu and Beyond. (*Illustrated*)
H. J. Mullett.

April 18, Mosquitoes of Chengtu (*Illustrated*)
A. E. Best.
Parasites Infesting Man in Szechwan.
D. S. Du.

May 9, The Szechwan Face (*Illustrated*)
A. W. Lindsay.

1931—1932

Oct. 24, Harmony of Contradictions in Taoism, Confucianism and Buddhism.
D. L. Phelps.

Nov. 21, An Anthopologist on the Szechwan-Tibetan Border.
Gordon Bowles.

Dec. 12, One Hundred Years of China's Foreign Relations, 1831-1931.
H. D. Robertson.

Jan. 2, Some Elements of Chinese Lattice, with Notes on Szechwan Specialities (*Illustrated*).
D. S. Dye.

March 5, Spirits and Magic in Chinese Religion.
A. J. Brace.

March 26, Blazing a Health Trail in West China.
W. Crawford.

April 16, Some Economic Aspects of Chinese Agriculture.
F. Dickinson.

May 7, An Excursion into Chinese Mythology.
Miss B. E. Bassett.

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MOUNTAIN MOODS

To Sacred Yuin Hwa Shan.

S. H. LILJESTRAND

I. Magic.

Enwrapped in mist and purple magic
The moody mountains lie afar, and, seldom seen
Deep hide enchanted strongholds, and
The Golden Temple few have seen, nor found again.

Their veins of gold and nerves of jade;
Secret thoughts of turquoise and carnelian;
Dreams in marble many-hued, when cut—behold!
The dream is ready pictured, stream and crag,
And forest haunts . . .

There grow the medic herbs 'neath windswept stars
Whose rays—blue, red and yellow shed strange powers,
A compound light to render potent root and sap . . . .
Flickering and blinking, answer they
The silent thunder of the sleeping mountains,
Signalling the secret formulae of life
To distant worlds. The mountain's heart, deep throbbing,
Is tuned to the same Harmony, and deeply wonders
At the myopic crystal gazing Man, groping
For ultimate knowledge.

II. Mystery

Night. And moonlight bewitching the Mountain's breast.
Quiet now the bird and cicada, that sang today,
Under the spell of Night's magic Light . . .

Sounds only the Torrent
Booming adown the vast valley, obeying
The call of the Great Level,—that Sea
From which and to which moveth all life;
That Sea that was born on the mountain
And from his far career

Feedeth the Mother with great loaves of mists
Borne in the hands of the winds;—
The Sea that swings in his ponderous dance
Obeying the Queen of the Night.

Fretting on distant shore
(But now the headlong youth of the Mountain)
The mountain Torrent is tossing, leaping,
Straining to rise again . . . .

But the wave trough's no deeper
Than the ambitious crest is higher above
The Great Level . . . Man plots these values
In figures and curves . . . . Still Buddha sits
In smiling silence on his Golden Peak;
Sunk in ecstacy and never moves, despite
The multitudes that climb on bruised feet, and say
Their "Omitofu's", pilgrim wave on wave
Of human yearning . . . and they fall but back again
On Life's Sea. Crest and trough are equal—low and high.

III. Tempest Ordeal.

Hissing and twisting like the great Black Dragon
Its talons beating the calm sea of moon-lit night
Into a maelstrom, all shrieking pain, and reeking
With wounded life, comes up before dawn
A mad swirling Fury that eats at one gulp
The innocent Moon and her star children.
Crags reel and stagger. A shivering moan
In the fir forest as one falls
Struck by the fire of the Fury's eyes.

Then comes the cold hand
Of the Mountain Spirit and stabs the Fury
Who shrieking bursts, and his vital fluid
Spatters the cliff and the forest, till the gorges
Vomit the flood from their great mouths.

And the fat squat Plain laughs, and opens her mouth,
Laughing swallows the flood from the mountain's wounds
Laughing watches the fleeing, shrinking shatter
Of the mountain demon.

IV. Religion

Iron-mitred peaks surpliced in mist sheetings
Stand, the High Altar of Ages. Immutable Verities,

The cold winds sweep clean the air, and the Vanities,
Flee to the dank clefts and caves where lie in chains
Prisoners held for ransom by robbers. But stealth
And Murder and cowards' venom climb not up here . . .

But Beauty loves the crag and lives on it
In myriad miracles of hue and scent,
And clean sweet winds communicate
From dell to crag the brooding Spirit's thrill,
And Flora's finest work as altar-cloth she spreads
And sacramental nectar from her chalices.

The temple priests at evening kindle logs
Green logs for weary footsore pilgrims, cold—
Thru the chill mists they came, a score or more
To reverence Yo Wang, King of Healing—here
His exploits in the Annals are recorded,—
So at the smoking choking fire they sit
And crowd together making room for me
Smiling,—"Come warm yourself", and I am warm
From the divinity of human kind.

V. Music

Towering harmonies in throbbing tempo,
Vibrant crescendos of mighty cascades set
Like silver strings on the great viol's breast
Sing with surging emotion as Storm
The conductor sways the soul of the Mountain, with
Emotion in deluge of thunderous feeling.

Now sing the firs, a thousand flutes ecstatic
By Wind o'erbent. Come interludes when rest
The great symphonic tones. Then the cicadas
In the rain-fresht forest fiddling
In shrilling ensemble maintain
The rejoicing theme, filling the lull in the thunder.

Now blares the brassy gale all past the crags
And gorges boom and roar, the torrents deeply drumming . . .

I stand on the crag and worship, while again
The great orchestral number shouts the Hymn
In praise of the Creator's power . . . Silence falls
And whispering, only the still small voices remain
Of breathing creatures . . . . The Spirit broods
And darkness mantles all the mighty theatre.

ADVICE TO TRAVELLERS ON THE WAY TO LHASA.

TRANSLATED BY J. H. EDGAR

The scales of CH'MDO do not weigh;
The DRAYA folk resent horse play;
And when at KIANGKA no one may
Upon the threshold steps delay.
Remember too, that BATANG wives
Are much inclined to changeful lives;
And if in need you must not try
Good *tsamba* at LITANG to buy;
And Oh! beware, no one repeats
The gossip heard on HOKOU streets.

Notes.

1. Cheating is a fine art in Ch'mdo.
2. The Draya folk are bold and warlike.
3. The Kiangka winds are very boisterous.
4. Batang women are reputed to be very immoral
5. Litang is nearly 14,000 feet high.
6. Hokou village is highly endogamous.

NOTES ON TRADE ROUTES CONVERGING AT TACHIENLU

J. H. EDGAR

A very important part of the Tibetan frontier is guarded by a North and South barrier between eight and twenty-one thousand feet above sea level. Only stern necessity, with an opportunity in the form of striking anomaly, would explain the town of Tachienlu. The Tibetans' demand for tea suggests the necessity, and a stupendous gap in the range hereabouts provides the opportunity. Indeed, Tachienlu is a hub from which spoke-like extensions, not always evenly spaced, reach out to irregular peripheries; and these as roads North, South, West and East will now be examined in some detail.

1. The road from Yachow, 140 miles away, is one of the most important feeders of Tibet, and is especially famous as the tea route *par excellence*. It is on the whole, as roads go, hard and tiresome; and apart from two heavy passes over 9000 feet in altitude introduces the traveller to some of Szechwan's most sun-scorched basins. But an exceptionally impressive section is the 15 miles between Tachienlu and Wasikeo,—the Tibetan Gulch,—3200 feet lower than Tachienlu and near the junction of the local river and the Tung. The Tachienlu river descends as a milk white torrent in rapids, falls and furious reaches, churning, dashing, splashing and roaring like an army of excited furies. The walls of the gorge rise harshly and chaotically at all angles between 45 and 80 degrees to heights sometimes 15,000 feet above the bed. Perhaps nowhere on earth does nature present such a confusion of cliffs, ravines, bastions bold, and erratic crags, which as a rule are covered with jungle brakes and forest groves. But in one place even above the realms of bare and frowning rocks we admire a peak of eternal snow, and lower down a waterfall with a drop of 200 feet, over which some decades ago an avalanche descended and in the twinkling of an eye buried a thriving settlement in its ruins. The road itself is a nightmare: a rise of 3200 feet in 15 miles demands some engineering ability, but this being lacking to some extent, men and animals lunge and flounder over granite slabs often erratically huddled together, or walk warily over fragments of the same material reposing at all angles, and with projections capable of inflicting injury on anything with a capacity for suffering. In some cases, however, the hoofs of the animals have worn sections as smooth as glass and these demand the same care as when traversing an icefield. In three or four places pretty bridges span the lateral torrents but almost

invariably the uncertain avalanche sweeps away the works of man or ploughs out a new course for the furious waters. Now and again, also, fields and gardens around houses and hamlets speak of human industry and fertile soil; but the presence of boulders as large as churches not far away tells with equal emphasis of the accident about to happen. At Wasikeo an important traffic from non-Chinese regions joins the main road; the Tien Chuen route meets it at Lu Din Hsien where the Tung is spanned by a marvellous iron suspension bridge; two bifurcations in the vicinity of Hwa Lin Pin eventually combine to form a much discussed New Road; and at Chin Chi Hsien exiles from Lhasa and Mandalay entering different city gates, a few hundred yards apart, might discuss politics or compare notes in the same inn. The road for many years has been infested with robbers especially in the vicinity of the passes, and even now important caravans make arrangements to be heavily escorted.

2. The main road from North-West Yunnan—a region connected racially and commercially with Tibet—courses North-East through Muli to the "Rong" region in the South-West of Szechwan, and continuing through the settlements of Chuentzi and Mirgyu, enters nomadic country in the upper Yü Lung and reaches Tachienlu either by the Chazam or the Lanyibar pass, the altitude of each being 16,000 feet. The descent from the former is wholly vile to Yü Lin Kong where it joins the track to Mo Hsi Mien. Later both join the main road to Batang. The Yunnan road although of some importance is little known, and apart from rough country in Muli has problems at the Yalung crossing as well as with the ascents and descents on both banks. Europeans have used it occasionally since 1898 when E. Ammundsen penetrated much unknown country.

3. The Batang-Tachienlu road was for more than 200 years chiefly concerned with Tibetan administration. It was the main official road to Lhasa. Officials connected with the transportation of supplies; courier stations concerned with the task of forwarding imperial despatches; colonies in charge of ferries; and garrisons for the protection of all and sundry were stationed in strategic positions and settlements along the line permanently or otherwise as circumstances demanded. In Lhasa, also, the Manchu interests were attended to by two high officials known as imperial residents; and as these functionaries, as well as every other individual, were changed after a term of three years, it can be imagined very easily what the nature of the traffic, and the importance of Hokow, Litang, Batang, Chamdo and similar centres on the main line, would be. But after all the road, abounding in elevated plateaus and higher passes, was an artificial one, and when its justification—the Lhasa occupation—ceased it at once reverted to an original condition which surprised those who scorned the Manchu programme. In the old days ten passes about, or over 15,000 feet, and the tablelands 2000 feet lower confronted the traveller, but he could make himself at home in cosy log cabins or later in the commodious rest houses of Chao Er Fung.

Now, however, if the rude and uncertain hospitality of the nomads is despised, tents are the only alternative. One's memories often luxuriate in those old rest houses! One was on a plain 15,000 feet above sea level, and at Sanpa the settlement where Huc's abandoned guide was laid low, ramparts of manure, higher than the houses, shut it in, and volumes of smoke from cow manure and brushwood fires busy for 200 years overlaid the rafters with a rich glossy jet. But the insinuating hovels with protecting ramparts of refuse are no more; and while brigands plan deviltry in the environs the virgin snows of Uyen Da watch over the grave of Souter the missionary. Batang, once the most famous of the extraprovincial centres is now a *cul de sac* with a Chinese garrison; Hokow is dead and smells unsavourily; and Litang, alone, with its lamasery and converging trade routes seems to have come out of the storm unscathed. In any case, a large percentage of exports come from and go to Litang.

4. At present the most flourishing route to and from Tibet is the North-West road, which leaving Tachienlu passes through Tai Nuig, Dawa, Hordrangu and Kanze and proceeds either to Derge or Ivekundo where it meets the converging routes from Sungpan to Hsining, Kansu. The passes on this route are never difficult; five great lamaseries exist; and their corollaries in the form of ethnic groupings are conveniently placed and admirably spaced. One such institution at Rongpatsa is known as the Garden of Tibet. The traveller on this highway will always find suitable accommodation and a moderate supply of provisions. The caravans from the North-West are both numerous and enormous. On one occasion H. Stevens and the writer found one with sixty tents and 3000 animals. Naturally such a trade coming into Tachienlu undivided would embarass the city so at Taining a bifurcation conveniently allows one part of the caravans to proceed over the Cheto and another to reach its destination via the Haitzi Shan. The increased traffic and general prosperity evident on this route during recent years shows how readily the normal course is pursued when artificial restraints are relaxed.

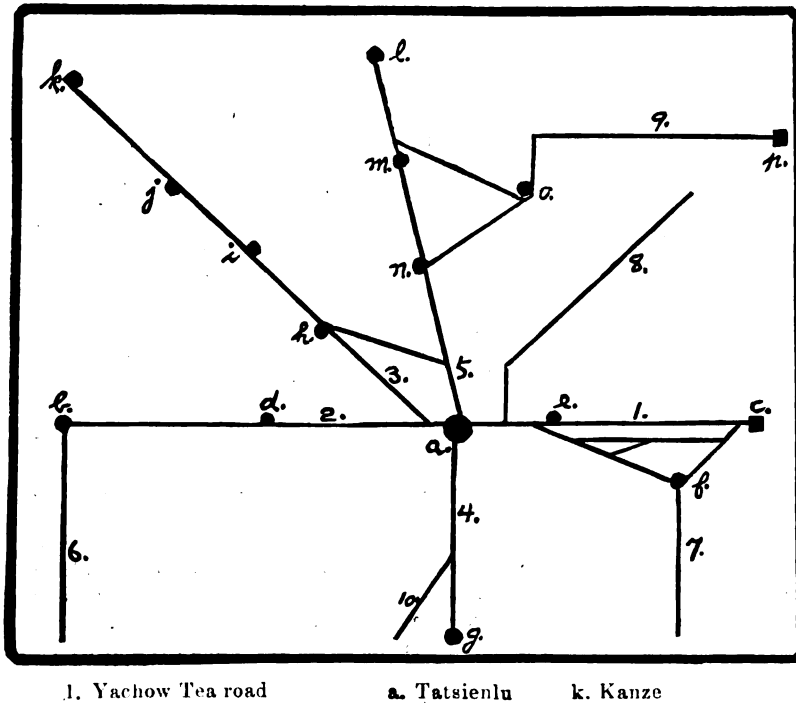
The enormous caravans have filled the land with vultures, loathesome creatures which are ever ready to pounce on the sick and injured animals so often abandoned on the passes and tundra like wastes. They may be seen at times sitting on the spurs and ridges like sentinals of an army. These same vultures also eat the bodies of dead Tibetans, a service that saves the rivers from pollution. But perhaps only a Dante or an Upton Sinclair could graphically describe a flock of such creatures stained with blood and stinking with offal, hissing, hopping and quarelling as they tear the entrails from a dead or dying animal.

5. Another route of importance which converges at Tachienlu supplies an outlet for the non-Chinese of the Ta and Hsiao Kin Chwan colonies,—the Tuen Cheng Fu of the Manchus and some principalities attached thereto. Although Kwanhsien is a counter

attraction the Southern and Eastern sections are included in Chwanbien. Roads and tracks, therefore, which naturally meet at Romi Crangu, now Tanpahsien, become one at this point and continue over the Ta Pao pass and join the Eastern bifurcation from the Northwest just below the Haitzi Shan. The Ta Pao is very steep on the Tibetan side and in winter is subject to dangerous blizzards. Robbers also are very often met with; but the inclusion of Tanpa in the Kham jurisdiction gives, in spite of all disadvantages, a permanent importauce to this route.

6. Tibetan roads lead out from Lichiang which has trade connections with Tachienlu. The most important of these crosses the Mekong-Salwin divide, then proceeds up the valley of the Wi Chu and reaches Lhasa via the Bömed cruntry. This is probably the route followed by Tsön Kapa the reformer and founder of Yellow Lamaism.

A Diagram of Roads from Tatsienlu



1. Yachow Tea road
2. West Main road
3. N. West Tea road
4. Yün-Nan road
5. Kin Ch'uan road
6. Hsiang Ch'eng road.
7. To Burma
8. To Muping
9. To Kwanhsien
10. To Lichiang

a. Tatsienlu
b. Litang
c. Yachow
d. Hokow
e. Luting
f. Chingchi
g. Chiurung
h. Taining
i. Dawo
j. Luho

k. Kanze
l. Hsuching
m. Tsunghwa
n. Tanpa
o. Meokunghsinkai
p. Kwanhsien

THE OLD COURIER SERVICE BETWEEN TACHIENLU AND LHASA

J. H. EDGAR

The Courier System, the subject of this article, was cancelled in 1911 after functioning for more than 200 years. The following investigation was made about 1910, and as the information presented will now be impossible to obtain readers might welcome it as a present day contribution.

About 30 English miles to the east of Tachienlu, at a point where the former quasi-independent principalities of Shenpien and Lengpien meet, there is a peculiar natural feature known as "Buddha's Ear." The local legend declares that despatches starting from this point would arrive in Lhasa and Peking respectively at the end of nineteen days.

In a general way nothing would seem easier than to get correct information about the Manchu courier service in Tibet but upon inquiry one is amazed to find how ignorant men and officials are about matters in departments and regions other than their own. As a matter of fact, the whole system was so involved that one almost despairs of presenting anything that might be of real value. I have occasionally been tempted to give the various versions, gleaned at different times and places from officials and agents, but that would only mean pages of absurd contradiction of little use to practical men. So what I have done, finally, is to weave into an article information obtained from the military official in charge of the Batang department, couriers in the Lhasa region, courier stations between Batang and Tachienlu, and the meagre information to be gained from the literature on the subject. The courier service referred to was practically the system instituted more than 150 years ago and was one of the many details in the Chinese administration of Tibet. The sole object of the system was to keep up communication between Peking and Lhasa and its efficiency was such that despatches were carried between the two cities in 38 to 40 days. The following matter was dealt with by the courier service :

(a) Imperial despatches to Lhasa.
(b) Memorials to the Throne from residents in Lhasa.
(c) Official despatches connected with inland administration: (1) with date of delivery specified, and (2) less important official matter unspecified as regards time of delivery.

The distance between Tachienlu and Lhasa is roughly about 5000 *li*, and the system seems to have allowed for 104 Yichan or Post Houses. This would make each "Post House" on an average

about 50 *li* apart, but after the most careful questioning and counting, it was impossible to discover more than 60 bona fide stations. In the remaining 40 in some cases, probably in most, there were no animals, but with few exceptions there were paid caretakers who acted in emergencies either by forwarding the despatches on foot or rendering other assistance.

The couriers were of two kinds:

(a) The long distance couriers or "Chün Kong" who resided in the official centres. In such places as Litang, Batang, and Chamdo, there were from 5 to 6 (?) such factors whose business it was, in turn, to carry imperial despatches, vice-regal memorials, or state documents from centre to centre within the ordinary or extraordinary limits required from headquarters.

(b) The short distance couriers who resided at intervals between the centres. Unlike the former, who were exclusively Chinese, the latter might consist of either Chinese or Tibetans.

The Chinese department was known as the "Han T'ang." There, in each station, three men were supposed to be located, and each man was bound to furnish and support two animals at his own expense. This meant in a general way about 180 Chinese or half-caste families and 360 animals in the 60 stations, but what the number was in reality will never be known. For instance, in the section between Hokow and Tachienlu, the stations had only two families and four animals, but in this case the deficiency was made up by an extra number of Tibetan couriers. The Post House, or short distance, couriers and their animals only traversed the regular stages to the east or west of their residence.

The Tibetan department was known as the "Man T'ang." It generally supplemented the former, and in theory supplied five animals, each animal representing a family. If the practice accorded with the theory in this department we should have had 300 animals and an equal number of men.

The Man T'ang couriers were never changed and their exact knowledge of the passes and atmospheric conditions made them practically the guides of the service. If my information is tolerably correct the results in animals and men would be approximately:

Animals owned by Chinese and Tibetans, 660.

Adults or Chinese and Tibetan factors, 480.

The 5000 *li* between Tachienlu and Lhasa was divided into ten unequal sections between established Chinese civil or military centres. Each section had in turn a varying number of stages. In the centres were the civil and military officials who controlled the couriers in the section, and paid their yearly grants of Imperial silver. In these centres, too, resided the Chün Kong or section couriers mentioned above. The "Han" and "Man," or short-distance couriers, on the other hand resided at Post Houses.

The sections and stages between Lhasa and Tachienlu are given tentatively as follows:

Between Lhasa and Chamdo were four sections:

1. Lhasa to Changta, 8 stages or stations.
2. Changta to Nali, 5 stages or stations.
3. Nali to Shopendu, 9 stages or stations.
4. Shopendu to Chamdo, 7 stages or stations.

This meant that four section couriers were employed between Lhasa and Chamdo, and they changed horses 29 times, each time being accompanied by either a Chinese or Tibetan representative stage courier.

Between Chamdo and Batang there were three sections with the following stages:

1. Chamdo to Draya, 7 stages.
2. Draya to Chiangka, 3 stages.
3. Chiangka to Batang, 5 stages.

The distance from Batang to Tachienlu is 1200 *li*. The following were the stages and sections:

1. Batang to Litang, 7 stages.
2. Litang to Hokow, 5 stages.
3. Hokow to Tachienlu, 5 stages.

In this latter section there were no Chün Kong but the short distance couriers carried despatches from stage to stage. On the first four sections, from Lhasa to Chamdo, according to Chinese guide books, 2426 *li* is done in ten days, on the next three sections from Chamdo to Batang, 1300 *li* in five days, and on the last three sections 1.00 *li* in four days. This is ordinary time.

The system in operation was highly efficient. The distance alone is 5000 *li*, but it must be remembered also that physical difficulties of an exceptional kind confronted the courier at every turn. Forests, weird ravines, moraines and morasses made the name "road" often a misnomer. Then the greater part of the journey was probably above 14,000 feet, and the lowest dip only reached 8000. Dozens of passes between 15,000 and 18,000 feet lay between, and had to be crossed summer and winter, day and night, in hail, rain and snow. Robbers, too, haunted the wilderness wastes and were a constant menace to the tired courier and his unarmed escort. It was in such country and on such roads that the couriers between Tachienlu and Lhasa were in the saddle day and night.

The system was quite as exacting as a railway service. Imperial despatches, vice-regal memorials, and extraordinary communications travelled day and night by section courier with his stage courier escort, or by the stage courier from post to post with regard to the time limit. In case of delays the mode of procedure was simple; if the time could not be made up in the following section, the fact, cause and extent of delay was noted on the despatch and the emperor informed by return memorial. The ordinary communications were sent from station to station quickly but without escort. They did not travel by night nor more than 120 *li* a day. The specially urgent despatches and memorials could cover the journey to Tachienlu in 15 days or 360 hours. Thus the quickest average was 333 *li* or 85

English miles, in 24 hours, while that of the less important ones, with the 20 day limit was 250 *li* or 60 miles in 24 hours. Very often important matter known as a *ho p'ai* and too heavy for the courier was sent in as baggage, which travelled moderately fast night and day, and changing regularly and without delay, reached Lhasa easily in 25 days. Indeed this was simply a light load travelling in the quickest way with little strain on men or animals. In the case of *ho p'ais* courier animals might be excused and the "ulag" ones pressed into service. In conclusion, officials and others were warned that this service was for government courier purposes and should not be demanded in case of individual and official emergencies.

The amount of courier business may be inferred from the following fact: During a rebellion in the Marches the Tibetan couriers fled and the Chinese in the Litang principality had to continue unassisted by their Tibetan colleagues. It was found, however, that the 24 men and 48 animals were quite inadequate to perform the duties, and the government was obliged to reinstate the old Tibetan supplementary service.

The question of finance is an exceedingly complicated one. But as a general principle we may say it cost the government relatively very little. In the first place we may hardly reckon the civil and military officials of higher rank because the courier service was only a minor detail in their programme. Again, the Tibetan service received no money from the Imperial Government, but was supported by the local chiefs or Lhasa authorities. This part of the system was a direct tax on the Tibetan people; it had, however, nothing to do with the "ulag." Then again, the sum paid to the Chinese couriers was insufficient in many regions, and consequently the Tibetans were required to furnish grass, grain, and domestic service to the couriers. This meant that in Tibet proper even the Chinese courier service was largely supported by Tibetan contributions and service. In some regions both the men and animals of the Chinese stations were curtailed by the local agents. But the deficiency was made up by increased levies on the Tibetans. If we keep all this in mind it will not seem strange that the imperial expenditure in connection with the courier service probably did not reach Tls. 20,000 per annum.

The salary for each Chinese courier was in theory Tls. 64 per year. I therefore give the following tentative statement:

(a) 50 "Chün Kong" or section couriers at Tls. 64 per annum	Tls. 3,200
(b) 180 couriers—"Han T'ang" at Tls. 64 per annum	11,520
(c) Minor officials connected with the service	1,000
	Tls. 15,720

This sum might represent the amount paid out from the Peking treasury. The couriers and station caretakers without animals received about Tls. 13 per annum, but I have not counted them.

The Tibetan service was supported entirely by the Tibetans. The couriers did not receive money, but grain and land which would leave them in theory better off relatively than the Chinese.

The Chinese couriers might claim the privilege of being changed every three years, but they seldom asked such permission. As a rule they married Tibetans and formed their homes in fixed localities, and it was no uncommon experience to find the "Han T'ang" families Tibetan in everything but name; and undoubtedly such a development was not only conducive to their material welfare, but to efficiency also.

In conclusion it may be questioned if this system could be much improved unless railways, or aeroplanes enter Tibet. Better roads, fairer officials, and increased remittances might have made the lot of the Chinese and Tibetan couriers easier, but the great passes and inclement climate must still be a menace to health and life, and the indomitable pluck of the inland courier will demand the respect and admiration of all who know anything about the herculean tasks which he was called upon to perform.

THE GREAT OPEN LANDS:

or

What (a) Is China's Policy in the Tibetan Marches; and (b) Its relation to Mission Programmes?

J. H. Edgar.

It may be doubtful if there are any nations today of even minor importance that can legitimately claim to be pure races; and certainly China and Tibet are no exception to the rule. The above universal fact simply means that weaker peoples unfavourably placed in relation to stronger ones have been absorbed by friendly intercourse, enslaved, exterminated or forced into mountains or deserts where they survive as garrisons do in an extensive fortress. The rapidity with which any of the above results is accomplished depends, among other causes, more particularly on race affinities; geographical position; and national ideals. But in our day there is another suggestion which as a solution of human problems accords favourably with an enlightened world conscience. It is known as "self determination" and implies that weaker races, as the proteges of wholly altruistic nations, will have the right to refuse absorption, extermination, enslavement or geographical imprisonment, and be encouraged to develop as the local controls and their peculiar genius dictate.

The above remarks it is hoped will fittingly introduce readers to the interesting conflict that has long been, and now is, in progress between the cognate, but culturally diverse Chinese and Tibetans. In the case of the latter their allies the Earth and the Sky, with the people's peculiar genius, have enabled them to survive for centuries with a large amount of success under almost fortress conditions. But as no true finality can be assumed, it must still remain an open question whether these interesting waifs on the planet's roof will not be forced, in the long run, into an ethnographical stratum in the great mass that has absorbed so many ethnic details on the Asian continent. Certainly China for two thousand years, consciously or unconsciously, has been steadily accomplishing some such result; and the present problem is not so much a question of what to swallow, as of digesting the abundant material already in her maw. But no one who knows Tibetan history will deny the fact that a virile section of these people not only refuse to be swallowed, but are here and there busily engaged in the interesting work of beating China at her own game. Consequently, today the conflict which is in progress will, in the future, end either with Tibet becoming a

politically independent nation on the Earth or an interesting constituent in the world's greatest human amalgam.

It is not our intention to show sympathy with one side or the other, but rather to examine processes; suggest the inevitable; and advise as to the likely bearing of the conflict on the activities of the frontier missionary. If we, then, ignoring the suggestion of tautology again ask for a statement of China's Policy in Eastern Tibet the answer must be emphatic and unequivocal. It is here, as it always has been elsewhere, to absorb non-Chinese material by Chinese males breeding with local females; and then by the power of cultural influences, leave the human alloy largely indistinquishable from the male constituent. If we examine Chinese history past and present it seems that China has recourse to armed force only when the usual peaceful policies fail. But all the same she assumes that any effort on the part of sensitive or irritated aliens to resent her "peaceful penetration" is an unfriendly act and if persisted in may result in the sharp reminders incidental to "punitive expeditions." But hostile action in all such cases is merely to clear away temporary obstruction; later the work usually proceeds with marked acceleration.

The next question is: Has China any warrant, in the form of specific results, for continuing her policy in the Tibetan country? Apart from the present Empire which is surely a notable success, we shall simply bring forward some facts relating to Kham or Eastern Tibet, and allow those interested to judge for themselves. This particular region may have a superficial area of one hundred thousand square miles; and as Tatsienlu, at its eastern margin, is by far the most important of its human concentrations it will occupy our attention first. The new arrival in this frontier mart is at once struck with the quaint garbs, unusual features, and the swinging strides of a non-Chinese people who make themselves very conspicuous in this city under the shadows of snow clad peaks. A visit to the North and South gates, also, will give him as likely as not a view of yaks, dogs, camp fires, cow manure, mud and many other items obtrusively characteristic of nomadic life. Indeed, Tibetans of all kinds, and in such numbers, visit Tatsienlu, and make such small concessions to Chinese etiquette, that our guest, enthusiastic and inexperienced, may imagine himself in a true Tibetan town. And it would be quite correct but rather suggestive of ill-humour to state bluntly that it is no such thing.

In the first place it might be pointed out that the Tibetans do not build cities. But who are and from whence come, all these people of undoubted Tibetan affinities? And the answer is easy and beyond dispute. The Tibetans seen are local or interior representatives of business firms; caravan drivers; traders from near and very distant parts of Lamaland; half caste employees of the local warehouses; pilgrims and visitors; and lamas of many sects from monasteries in the city, its environs, and far off regions unknown to European geographers. But a closer and unbiassed inspection, will reveal a

preponderatingly large proportion of the resident population to be pure Chinese or half castes with Chinese names and not easily distinquished from their fathers' race. Indeed, the fact will soon be admitted that Tatsienlu *is* officially a Chinese city. For there resides the High Commissioner of the Szechwan Marches with an area not far short of the British Isles, and politically, at least in some ways, independent. Tatsienlu, also is unquestionably directly governed by a Chinese magistrate; and the flourishing customs are entirely controlled by functionaries of the same race. The houses are almost without exception Chinese; and streams of coolies from the East supply the warehouses with tea; and the shops and stalls with produce of all kinds from many important centres in the provinces. And while Chinese soldiers keep order in the city when necessary tea carriers, pedlars, artisans, teamsters, beggars and gamblers of the same race ply their trades, crush, shout, jostle and wrangle everywhere and at all times of the day.

Again, the country more correctly contiguous to the city has lost its distinctive Tibetan character and has become Chinese in varying degrees. North, South, East and West are certain long, deep valleys worn out by the feeders and main stream of our furious mountain river. Here a considerable population of farmers seem to live and propagate themselves without any exceptional difficulty. What they were originally we cannot say with confidence; but, certainly, a Chinese male element taking advantage of the Tatsienlu concentration settled on any patch of land capable of being reached without captive balloons; and they, and their half caste families, later spent their days tilling the soil, evading taxation, and driving hard bargains with consumers in the adjacent city. As the years rolled on these hybrid progenies marrying among themselves, with occasional additions of new Tibetan and Chinese blood, formed a race differing in many details from the parent stocks. Our visitor, it is true, would not be struck with their cultural development, but a further acquaintance would prove them to be as industrious, efficient, peaceful and law abiding as are the farming communities around any other important centre in the provinces. And it may be said with all sincerity that this hybrid material is as capable of exploiting opportunities as any similar class anywhere.

But a more remarkable vindication of China's policy may be found in the T'ong valley, a narrow strip of arid country 200 miles North and South, and perhaps 25 East and West. When we visited Tatsienlu nearly 30 years ago the direct jurisdiction of Chinese officials ended at the Fei Yüeh Pass, more than 50 miles *East* of Tatsienlu. And later, as we journeyed up this torrid semi-desert valley of unusual natural features, including cactus clad precipices, we either passed through, or sighted, the territories of five native princes or hereditary barons. On enquiry we found that centuries ago, the Manchus had theoretically conquered these regions; but wisely shirking the fatigue implied by direct administration, divided

the country into Native States and bequeathed the same to imperial favourites, military heroes, and perhaps to men who in the provinces would have embarrassed the government. As regards the ancestry of the native population we are uncertain, but we can quote the tradition of the people themselves which affirms bluntly that all their ancestors arrived at their destination in chains and to the day of their death could show the marks of the fetters on their limbs. Indeed, the region was considered so bad that in experimenting with it only criminals and rebels from conquered native communities were thought sufficiently worthless to face the risks involved. It was truly a "sink or swim" policy. What happened to the majority of exiles we do not know but many with patches of land and native wives reared and supported hybrid families. And later it only required a free intermarriage among such groups to pave the way for the next phase of China's policy.

We can easily imagine how the population would increase; how more extensive areas would come under cultivation; and how new opportunities would be exploited. This would lure in Chinese traders and colonists, and demand frontier markets for the exchange of commodities. And the implied increased intercommunication would gradually add to the Chinese strain in the prevailing hybridism. Consequently it is by no means strange that even a casual observer then could see that China's Policy was nearing a successful completion, for the free influx of Chinese males with extra-territorial privileges and their native wives had filled the villages and best patches of land with hybrid men and women proud of their Chinese names, and sound in their sympathies for their fathers' government. But what about the native rulers with high sounding titles and perpetual privileges? It is true they were to rule as long as they could find heirs to succeed them. But that lack of restraint that is so often the deadly enemy of despotism sterilized their bodies and their minds; so again and again we found them without a true heir to their titles and territories. At the same time the tyranny and oppression of their courts made the subjects crave for the freedom and benefits enjoyed by their Chinese neighbours. So when a proclamation a decade and a half ago deprived the princes in Chagla, Tsali, Lengpien and Shenpien of their seals, no one was surprised, nor doubted the wisdom of China. Just lately, also Muping, the most important of all the native states, owing to the lack of an heir has shared the same fate. Moreover the native ruler of Yü T'ong is now so much of a "deputy-provisionary-sub-vice pro-acting" agent of China that his so called princely status is more of the nature of "light opera" than serious politics!—The population of these 'desealed" territories may amount to 11,000 families or about 50,000 souls, and all, with the exception of Yü T'ong and Muping, have their centre in a capital newly formed at the Luting Bridge. Hence an unbiassed observer reviewing the outcome of China's programme in this wild region must marvel at her patience

and wisdom. But even if he witholds his praise the farms on the mountain sides, the villages, groves and burdened fields on a thousand fan-shaped flats; and the busy official city of Luting bear witness to a colonizing genius that nullifies the value of the critics' silence or even expressions of ignorance or ill humour.

The regions west of Tatsienlu are as different from those in the T'ong Valley as regions possibly could be. But here also, the unchanging policy of China is at work, in its initial stages however, when success or failure must still remain as matters for speculation. Earlier in this discussion a Tibetan aspect of Tatsienlu was mentioned but not explained. Lhasa, a Holy City and the abode of a god, magnet-like draws myriads to its monasteries. This does not surprise us; but why should Tatsienlu the city of an enemy's court become a respectable rival of the other? The large and important population of the Chinese ruled Kham must not be ignored; but we remain ignorant of the true cause until it is remembered that *Tea* is as necessary to the Tibetan as Religion. But as Lhasa cannot give him the former and Tatsienlu offers it lavishly, we can readily understand why his attentions are about equally divided between two cities almost poles apart. And we are not surprised that China, ever watchful, began to exploit the Tibetan's need whole heartedly. But lining the gowns of Shensi merchants was only adventitious; the true object was to make the Tibetan region west of the Cheto as permanently Chinese as the cities and settlements in the T'ong valley. And this could only be accomplished by a liberal infusion of Chinese blood which would be conserved later by the moulding influence of her superior, or at least, more practical culture. So more than two hundred years ago Chinese males as officials, soldiers, traders, couriers, and adventurers settled in stratetic localities between Tatsienlu and Lhasa, and by a liberal use of native women produced a hybrid progeny which tenaciously adhered to the parent's family name in a land where the non-Chinese have none. It was then as the years rolled on that the most valuable areas in Tibet became in an appreciable measure Chinese centres with a considerable modification of moods and aspirations among the natives of contiguous regions. Indeed Hokow, Litang, Batang, Chamdo and even Lhasa were in varying degrees Chinese towns. But in spite of the results just mentioned they were too vague and sporadic to suit Chinese statesmen. And the critics were not far wrong, for the clever Tibetans in the earlier days had insisted on (a) making three years the limit of Chinese residence; (b) denying Chinese women the right of entry; and (c) recognizing the mother's right to her child by a Chinese parent. Was this not turning the tables against the most peaceful and thorough going "penetrators" of the world? Yea; verily, and the unpleasant fact became forcibly impressed on the Chinese mind 25 years ago by the murder of the Imperial resident Feng near Batang by Tibetans a few miles away. This roused China to definite action, and a prolonged frontier war was begun with the

object of clearing away obstacles to Chinese progress. Destructively, districts were exterminated officially if not actually; many princes were either sent to their graves or to exile; and the Dalai Lama had his nose tweaked by the expulsion of his agent from Chantui. But constructively a new province was born and endowed with a capital and 31 districts! Then by much over-rated accounts of unoccupied lands, and a plethora of beautiful and healthy Tibetan women, thousands of Chinese were inveigled into this "Land of Peace and Plenty". The idea of a new China in Tibet was a good one and its formation was to be along the old lines that had made the Empire what it is today. Unoccupied alien lands were to be settled with Chinese farmers and their progeny by native women were to be standardized by the powerful culture of their fathers' nation. This is the programme that was begun about 1905; what is the opinion of a conscientious observer 25 years later? We admit that a quarter of a century does not warrant a final opinion regarding any programme in China. Still today Chao's scheme may be described as only half successful; that is more than fifty percent of the "hsiens" have gone back to the Dalai's control. And although the latter has lost Chantui, China's claim to suzerain power in his temporal dominions is definitely in abeyance. It may be argued, also, that the new "hsiens" still controlled by China in Kham were those regions practically hers during the Manchus. But this only proves how sure her methods are; and that after due and orthodox preparation her conquests are final even where the Earth and Sky seem allied against her. Indeed an examination of the regions that have returned to Lhasa proves that they are just those where the quiet work of generations had not been completed. So after watching Chao's audacious programme from its inception; and well aware of detailed failures; it still seems to us certain that China only requires time and a moderately sane world conscience to absorb what may be numerically, the most important section of the Tibetan people. Whether the remainder continues independent; or, benefits finally, by its non-identification, are questions too involved to justify opinion[8] even if we were free to have them.

The above survey is to prepare for the question: "How will Christianity most readily reach the Tibetan people?" And to us only one answer seems possible: Recognize the value of China's time honoured policy and act so as to be in a position to benefit by it. This statement will no doubt call forth some adverse criticism. But certain facts must be faced, and if the mind is kept free from sentiment and bias, a fair presentation of contrasted conditions in Tibet proper, and similar regions under China should outweigh a multitude of dogmatic statements or pages of special pleadings. While we agree that many men might favour a free and independent nation composed of Tibetan people everywhere, still, such if anxious for the extension of Christianity, must be either very ignorant of the power of the Tibetan hierarchy, or have great faith in imaginary reforms not recognized

by the most experienced Tibetologists. Moreover; it is only fair to stubbornly insist that such should not seek membership in "The China Inland", or residence in Tibetan territory ruled by China. But a presentation of certain contrasts will speak for themselves.

Tibet is at present, and has been for decades, in a missionary sense, legally out of bounds. Indeed; for any British subject to enter the Dalai's region on his own initiative might be interpreted as an offence punishable by law. Again; it is probable that the constitution of the most aggressive mission in China debars its workers from opening stations in an independent Tibet. In any case, no mission known to us openly prosecutes work in such regions. And if such a programme was tentatively considered the site for its operations would be, perforce, in the vicinity of a large lamasery—the only equivalent of the town in Tibet, and from the missionary's view point suspiciously like an enemy's stronghold! Once more; it seems impossible as things are now, for Christianity to develop in Tibet proper, because its antagonist, Lamaism, is a tithe from *all* Tibetan families, as well as a local and national form of government. Hence, the Christian, if banned by his local organization, would become a hopeless outcast. His only prospect would be a possible martyrdom, unless he was willing to specialize in hiding his light under a bushel. It might, however be pointed out that medical missionaries have been invited to Lhasa by the Dalai Lama. "Yes"; and so would engineers of any race if they would introduce cheap dynamos to turn praying machinery! So, in summing up, we would confidently proclaim that Christianity is not officially tolerated by the Dalai's government; and neither in the lamaseries nor other human concentrations, can we find atmospheres of a permanent nature likely to sustain Christian life or develop Christian character.

But such a conclusion does not mean that Tibetans must remain outside the Gospel influence. For, fortunately, more than half the Tibetan population is not directly under the Lhasa hierarchy. That is: China, politically, controls both Kham and Kokonor. Now note the contrast: in the latter regions the missionary has *legally* the same privileges as in China. Our right to reside in E. Tibet is never questioned; we travel widely with a Chinese passport; and, if necessary we are supplied with a Chinese escort, and even use relays of Government animals. Moreover; even in the most isolated places —and it may be in the vicinity of very orthodox lamaseries— we are rarely annoyed, and never hindered in our work of preaching and literature distribution. Indeed; we have travelled during the last 25 years over practically the whole area of Kham and can testify that we have only been insulted on rare occasions; have not lost $5 worth of goods; and have never been injured with malice aforethought. But if any enthusiast of the Didymus cult wishes to make an experiment we would advise him to journey up the North road. For 14 days he will never be far away from large settlements and powerful lamaseries. He will take advantage of many opportunities

for service, and will comment volubly on the urbanity of the natives. But on the fourteenth day, just beyond the populated areas, he is suddenly confronted by armed guards who order him to halt in peremptory tones. Are these unpleasant fellows the Tibetan brigands of the text books? "Oh! no; they are simply the Lhasa guards who are there to hinder their foreign 'friend' from putting one foot on the Dalai's sacred and uninhabited wastes." No doubt the wayfarer would return disappointed, but consoled that, after all, the embargo was on the regions that mattered least of all. As regards residence the missionary in Kham will find the Chinese centre safe and friendly where the abundant opportunities incidental to such a concentration may be exploited to the utmost. We may mention also the visiting caravans and the numerous halfcaste populations which may in time furnish valuable material for the evangelistic programmes of the future.

To sum up:—(*a*) China has provided us with an extensive field for Tibetan work and to ignore it is to fail to exploit a wonderful opportunity. (*b*) but to encourage racial distinctions by ignoring the frontier Chinese and their valuable halfcaste progeny, proclaims us to be the friends of "self determination", and the enemies of China's time honoured policy. Surely, there should be no hesitation in choosing between a friend who offers considerable freedom of action, and an enemy who would use our assistance to carefully exclude us and ours from his premises forever. Of course such an absurd programme, if insisted on, will, eventually close the doors in the regions where the obstacles are at present of a negligible kind. (*c*) Therefore, we consider it sound mission policy to accept Kham, or E. Tibet, as potentially Chinese; and work for a harmonious union of the Tibetans and Chinese races along lines suggested by the latter, and fully explained earlier in this article. In this way we shall have an assured field for feasible work among "pure Tibetans"; and owing to the peculiar functionings of Chinese centres, by faithful preaching, kindly social intercourse, and discreet Scripture distribution, no small influence will be extended to regions in Independent Tibet. And if the day ever comes when Tibet's ability to become a "Nation in the Sun" is beyond dispute, the Christian forces and evangelistic equipment at the disposal of Mission Boards will be so ample; and the infiltration of Truth through Christian literature and social contact into the non-conforming regions so profound, that a speedy conquest might be assumed with the utmost confidence. Indeed; in those days it might be in no way irreverent to praphrase and ask "Where now is the great mountain?" And the answer will be "Before the Gospel armies it has become a plain!"

N. B. The term "Tibetan" is used as equivalent to "Lamaist". In a "pure race" sense there is no such thing.

J.H.E.

A JOURNEY THROUGH NYARUNG* FROM LITANG.

J. Huston Edgar

The object of this journey of five hundred miles was

(*a*) to test midwinter conditions in the highest altitudes;

(*b*) to report on unknown country between Litang and Chantui; and

(*c*) to study the effect of recent political developments in the Marches and their bearing on missionary work.

My companion was Dr. A. Heim, a geologist, who had been in Greenland, Mexico, Sumatra, Java, New Caledonia, New Hebrides and Australia. He was a good a man and a pleasant companion all the time.

We set out under the worst conditions on November 23, 1930. Heavy snow had fallen at Tatsienlu, 8,300 ft., and at Cheto the first evening my companion was in a fainting condition with severe muscular pains and high fever. Our caravan master, also was surly, abusive and generally obstructive. So it was with much hesitation that we set out next morning to cross the low (14,800) but rather terrifying Cheto pass. However, apart from half an hour in a perishing blizzard on the summit, our party reached Ti Ru, the first settlement on the Tibetan side and passed the night comfortably in the miserable hovels of this once important settlement. The next three days, down and up over plains and open valleys between 11,500 and 13,000 ft., were slow but pleasant. The sun was bright and warm and the highway was entirely free from snow, and moderately so from ice fields. The only other pass, the Kazhi (15,000 ft.) was crossed easily. The long plateau, however, had a thin coating of snow but this gave us no trouble. From this pass the road drops 6,000 ft., in 30 miles. On the way we pass through fine forests of fir and pine, but the Tibetans have formed numerous settlements and take full advantage of the fertile soil. Ho K'ow, or Ya Chiang, one of the new Hsiens, on the left bank of the Yalung, is in a deplorable state, and although it is the centre for three thousand families the diverting of the trade route to the North-West has killed it as a city, and

*Nyarung or Chantui was until 1911 controlled by Lhasa. In Chan Hwa now there is a proclamation on stones with the name of the Resident in Lhasa.

made the famous ferry of minor importance. Its situation in a deep gorge, also, adds to the depression and the ruins of the famous bridge built by French engineers seem to underline the plainly inscribed "Ichabod". At Ho K'ow, now Ya Chiang, we crossed the Yalung and entered the jurisdiction of Litang, five days' journey to the west.

The road to Litang goes through the principality of Ch'ong Hsi and a levy of $50 is paid by all caravans. Europeans are no exception to the rule, and this explains why we were at the mercy of a cave man ruffian named "The Highest Excellence". The people are not only wild and lawless, but the general elevation of the country and five high passes over 15,000 ft., make the road rather the *bête noir* of travellers. Of this the cave man was perfectly aware and he exploited his opportunities by extra incivility, new agreements, irritating conduct, and high-handed actions generally. After crossing the Yalung the road goes up roughly and gradually for ten miles through forests to Makehtsong, (10,500 ft.) and the next day crosses the Rama La, a famous pass 15,000 ft. This feature has three summits and a long weary plateau about 14,500 ft., before a very steep descent of 2,000 ft., takes us to the Hsi Golo depression where there are settlements and farms. Here we leave the main road and go up a pretty fir and cedar clad valley, cross over dangerous icefields; and pass the fine castle and fortified farmsteads of Ch'ong Hsi to a ridge which descends abruptly to a river where gold diggers had been active many years ago. A stiff pass in the region of 15,000 ft., is then crossed before we camp in a fine open valley on the site of a recently vacated nomad camp probably 14,000 ft., The next day we were in high country,—the passes being about, or over 15,000 ft.,—and the intervening plains 1,000 ft., lower. Towards evening we come to grazing grounds with hundreds of tents and thousands of animals and, finally, camp at 13,800 ft., on frozen ground in the settlement of our escort. For grazing stock the site is perfect but the cold was unusually severe. The last day we went gently down the open valley, crossed the Hor C'hu ascended gradually the summit of the T'o Lo La; (15,000 ft.,) and dropped abruptly to Litang. The last three days were in unsurveyed country and it was the richest and most populous nomad region ever visited by me. Unfortunately, at present, owing to the attitude of the chief and his unreasonable demands, it can only be reached indirectly by missionaries from Litang or Tatsienlu. At Litang our boorish escort made extortionate demands, and my plain duty as pay master caused me to be cursed obscenely and deluged with spittle from his unclean mouth. Probably it was my guardian angel working overtime that saved me from serious, if not fatal, injury.

To Chan Hwa our route was through unknown country almost due north for about 120 miles. It is supposed to occupy six days but we found eight necessary to complete our task. There were nine passes or ridges ranging from 15,000 ft., to 16,400 ft. Our tents on

three occasions were pitched unusually high, 14,000 ft., 15,000 ft., and 14,500 ft., respectively! The ascent to the passes was never very arduous but as a rule rather tedious. The descents, however, were so tremendous in two cases that we were deeply impressed with the difficulties of a return journey. The first three days were through nomad country with good pastures but no permanent structures. Forests were seen on the third day where trees of considerable size grew up to 15,000 ft. The fourth day, and fifth also, after a breakneck, and partly iceclad descent, of 3,000 ft., in ten miles, brought us to the well populated and cultivated valleys of Rapa and Erka. The sixth led us through forests of firs and cypresses on both sides of the Gö t'ö pass, and, finally, by a steep 2,500 ft., descent to a lamasery and settlement in a gulch facing the Yalung. Then turning two days up that river where the population and agricultural activities were very considerable, we arrived at Chan Hwa the capital of Chantui. No robbers were met with enroute but two unknown horsemen gave us anxiety the first night and all next day. In a general way the road, while hardly first class, presented no serious difficulties to our pack animals apart from occasional iceslopes.

From Chan Hwa to Tawo the road is East with a southward trend. The distance is probably 80 miles, and from the Aka lamasery seven miles from Chan Hwa, apart from a large lamasery and two farm houses at Cha Sa K'a, it is through nomadic grounds. The first pass is high, 15,000 ft., but not difficult. Then a day's journey down an ideal valley of meadows and pasture lands with many affluents of a similar kind, takes us to the nomad Lamasery of Draazu (12,000 ft.). We then turn up another valley at right angles, cross a high, easy pass (15,200 ft.) and turn down through cedar and fir forests to the lamasery and settlement of Cha Sa K'a. The next day we pilot our way through ravine forests to a ferocious pass, and descending through beautiful valleys cross a large river on ice; turn sharply up a ravine and camp in good grass below beautiful forests. The next day we progress pleasantly, first through grass clad glens and meadows, and later through mountain forests to the summit of the Meng Ga La (14,600 ft.) where Tibet and China met a few years ago. Then after an hour or so on a fine plateau with exquisite scenery far away and near at hand, we descend sharply to the ferry over the Hsi Ch'u and finally enter the very oriental-looking settlement of Tawo, on the main caravan route.

Once on the main road again, six days over well known country with few difficulties brings us to Tatsienlu.

To, and including Tawo, four official centres were visited.

(1) Ya Chiang on the Yalung, at the famous ferry, is now the official centre for about 3,000 families, but the place itself has about 50 only, and some others not strikingly contiguous. Indeed, these new "Hsien" were not intended to be cities in the Chinese sense, but rather administrative centres to keep in touch with people inhabiting remote districts with more or less arbitrary boundaries. In some

cases a large lamasery, or camping grounds suitable for caravans, give such places an accidental importance, but this is not so with Ya Chiang. Since the trade route has moved north, also, even its ferry has failed to be an asset. So at present it is hard to imagine an official centre more unfavourably situated, or responding more readily to its many disadvantages. Hence only its low altitude and the productivity of its limited agricultural patches would ever make it worth consideration even as a supply station for Mission work in higher centres such as Litang.

(2) Litang, or Li Hwa Hsien, is really a fine centre as centres exist in the Marches; but (1) it is 13,800 ft., above the sea; (2) it has a proud lamasery of great size and narrow orthodoxy; (3) an excitable and turbulent population; and, (4) an insufficient Chinese control owing to, (a) its isolation and, (b) the inaccessibility and peculiar moral sanctions of many of its peoples. The population of the district is as follows, (officially)

Maoya	1200 families
Chueh Teng	500 "
Chong Hsi	300 "
Mo Ra Hsi	500 "
Tso Tsang	300 "
Lamaya	150 "
Litang	400 "
Total	3350 families; or 20,000

individuals at least. But in the summer time the plain feeds 60,000 sheep; 40,000 yak and 2,000 horses: which will mean an extra concentration of 1,000 families in the vicinity.

The Mo Ra Hsi with Tso-Tsang, Litang, and Ch'ong Hsi, to some extent, live in houses. Litang city has 120 families, the suburbs 180, and the lamasery has 3,700 on the roll books, but only 600—1,000 constantly in possession. The population is, perhaps 4,000. The town itself and a plain of 75 square miles are above the cereal limit; consequently much of its food, and all its lumber come from less elevated regions to the south. On the north 50 miles beyond, some nomad pastures are the valleys of Rapa and Erka which may have a farming population of 200 families. The civil settlement is a mass of low flat roofed houses like a mass of divided rice fields when on the roofs, and from the street resembling artificial caves divided by a deep passage; but the lamasery has fine buildings,—some of them gold plated,—reminding one of the reconstructed Assyrian palaces. The suburbs consist mostly of solid castles arranged in a semicircle in front of the town. The village is very dirty and the dwellings dark and smoke begrimed; but the trade is brisk and the streets are thronged with a variety of Tibet's wildest types. The amount of cloudless skies and the daily duration of sunshine are remarkable; hence the days are usually bright and warm and the nights clear with temperatures in winter from 12 degrees of frost to Zero F. Cow manure is the principal fuel for all purposes

(3) Chan Hwa, about 120 miles North of Litang and 80 miles west of Tawo, is situated on the right bank of the Yalung about halfway between Kanze and Yakiang. It is in the centre of what until 1911 was "entirely closed" Lhasa territory *which touched on seven of the "New Hsiens". In the old days it was a strongly fortified outpost and the wonderful castles and the 14 or 15 flat roofed towers strategically arranged indicate that Lhasa took her possession seriously. The Byi Kyab, or Lhasa agent, left in August 1911 and the Lhasa boundary was removed four weeks, instead of four days journey from Tatsienlu. At present there is a settlement population of 110 families but the Chinese official controls 4000 families, 2,500 of which live in houses situated in the Yalung and lateral valleys. As Chan Hwa is not very far from either Kanze, Lu Hoh†, Ya Kiang or Tawo it would offer splendid opportunities for certain kinds of missionary work; and it will certainly have to be considered later when missionary boards have found a method which will include Tibetan territory on their evangelistic programmes. If Tawo was strongly held Litang could be reached in ten days via this centre, or about the same time as from Tatsienlu. The Chan Tui boundary comes to within 10 miles of Tawo city and lamasery, and the Hsiens of Chan Hwa and Lu Hoh are only two days apart.

(4) Tawo, primarily as a centre for operations westward and northward, as well as some opportunities locally, (farmers, tea caravans and districts to the east) has impressed me much more than formerly. My only criticism against opening it now as a station would be if it were considered *an end* in itself instead of a *means to many ends*. It, like all other centres, —even Tatsienlu, must be considered of value as providing opportunities to reach something beyond the government Yamen. It is true the government centre becomes necessarily a magnet, but the material drawn there in the Marches is only temporarily influenced and very soon the attracting power ceases, and a contrary "pull" brings them back to remote centres it may be scores of miles away; and a mission station should be prepared to deal with the "pull" beyond as well as the "pull" in.

During our sojourn for nearly two winter months between 13,000 ft., and 16,000 ft, we had fine weather all the time. As mentioned above, we left in heavy snow at 8,000 ft., but in Litang and Chantui it had disappeared on the sunny slopes up to 17,000 ft., Indeed; we saw yak grazing about 16,000 ft., and at a camp in a tent at 15,000 ft., we slept well and comfortably. The high winds on plateaus above 15,000 ft., gave us trouble at times, and were peculiarly asphyxiating if laden with powdered cow manure, dust, and frozen snow. The dust, often many inches thick on the high passes, was perhaps the most consistently annoying feature of our journey. The air was very dry;

*Chan Tui or Nya Rong (Gnya-Grong)
†Formerly Hor Drangu

and the herbage and grass were as brittle as if dipped in liquid air. The human skin cracks, and nails are apt to break off; and sunburn at first is common and very painful. At night the temperatures range between 12 degrees and 0 F. Our lowest reading was 4 degrees F. or 36 degrees of frost,—and *this was at 12,000 ft.!* The sun temperatures run up from 32 degrees to 70 degrees F. We were in exceptionally good health all the time. The roads presented few difficulties. The snow drift on the Re Tê plateau over 16,000 ft., was an exceptional experience. However, the frozen streams across the track encountered dozens of times every day from 10,000 ft., to 16,000 ft., demanded much care to provide against accidents. The horses especially feared them; but it is my firm conviction that the yaks welcomed them with a zest similar to that of a professional skating party confronted with an unusual problem. A list of the principal altitudes of passes and centres are given below. The readings are from an aneroid which makes Tatsienlu 8,300 ft., probably rather low.

	ft.,	
Cheto pass	14,600	Cold, and approaches difficult
Kazi	15,100	Long Plateau; double crest
Rama	15,000	Treble crested plateau of 30 li
Four un-named ridges in Ch'ong Hsi	15,000	
Ta Yi La	15,200	Double pass; plateau 20 li.
Ta Si Heh Ka	15,600	Easy, but very tedious
Re T'e	16,200	Three spurs 16,000-16,200 ft.
Lo Lu	15,600	Hardly a pass on the outward journey, but serious the opposite way.
Gö T'o La	15,600	Boundary of Chan Tui & Litang
Trama La or La Dzi La	15,900	Double pass
Ngü Li La	15,400	
Ra La K'a	15,500	
Ch'ü La	15,600	A sinister feature
Meng Ga La	14,500	Boundary between Chan Tui and Tawo.

Of the above, few are really passes, but high spurs between various affluents of the same river. The Cheto is an exception. The journey from Chan Hwa to Litang would be much more formidable inwards especially from the Yalung and Rapa valleys.

The temper of the people differed little from formerly in the old Principalities of Chagla. From Ying Kwan Chiai (160 li West of Tatsienlu) as a centre 300 to 400 families could be reached easily by an itinerant missionary. No obstruction or unpleasantness would be met with; and the distribution of literature and the preaching of the Gospel would offend no one. The same statement would, it is believed, apply to Ya Chiang region as a whole.

Litang is different. The principality of Ch'ong Hsi is right across the direct road to Litang and the Prince's demand of $50 for the safe conduct of travellers not only makes mission work in his territory impossible, but closes the way to Litang. Then again, Chinese control in Litang is weakening. Indeed, the idea is to give the natives more power by removing all military garrisons. As the native population is turbulent, wild, and impressionable; and the lamas fanatically orthodox; the excitability of the people, winked at, or even encouraged by the lamas, has nothing to hold it adequately in check. Moreover, the advent of Europeans is so rare that their arrival is just now likely to foster local rowdyism and "incidents". At present Litang requires very careful and tactful dealing. Frequent and discreet visiting is necessary; but, unfortunately, owing to the Ch'ong Hsi tactics that is well nigh impossible.

In Chan Tui on the other hand a favourable change is very marked. Here there are no autocratic chiefs. The lamaseries are numerous but small; and the Chinese at Chan Hwa have more influence; and a friendly attitude to Europeans is favoured by the Tibetans. On our journey across, even in the back blocks of Litang robbers do not seem to exist. Indeed, one unarmed escort was our only protection from Chan Hwa to Tawo, five days' journey through the most sequestered parts of the district. A charm box of beautiful workmanship and enormous value was his only weapon.

Tawo and Lu Hoh, the other districts visited were entirely free from robbers; and the people, as in Ya Chiang and Minyag, pleasantly pro-foreign and everywhere anxious for literature.

To sum up—(*a*) China is "pacifying" the regions visited in a very Effective way!

(*b*) Winter conditions in high altitudes are on the whole remarkably pleasant and the obstructions to wide itineration on the highest roads to a large extent imaginary. The night temperatures range from 14 degrees to zero F; and the sun ones from 32 degrees to 70 degrees F.

(*c*) In all regions visited, except Litang, the possibilities and opportunities for missionary work are more favourable than ever. Litang as a town and district is practically closed, owing (a) to the growing independence of a powerful native prince; and (b) the policy of China to put the local power of the city, (perforce) in the hands of the Tibetans. But Tibetan power anywhere is likely to be anti-Christian if not anti-foreign.

(*d*) The country from Litang to Chan Hwa is important both as regards its nomadic and agricultural possibilities; but the most valuable populated areas are under Litang. However; much of such regions could be easily reached from Chan Hwa. Indeed; Litang might be regularly visited from, or through this centre. That is, Litang could be reached from Tawo in ten days via Chan Hwa. Apart from this; Chan Hwa, as a centre controls 2,500 house dwelling Tibetans and 1,500 nomads. As the former are mostly in the Yalung valley their needs are worth considering by mission boards.

THE FUEL AND NIGHT LIGHTS OF CERTAIN TIBETAN TRIBES

J. H. EDGAR

Fuel

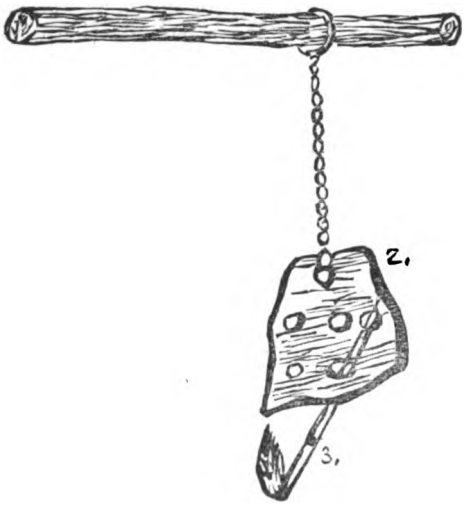
Although Tibet has often fine forests which at times creep up to 15,000 feet, and dense coverings of scrub on slopes and terraces in even higher altitudes, the greater part of the country might be described as treeless grasslands. As these latter regions are more particularly the inhabited areas the yak, which is not dependent on artificial fires, as usual solves the problem; in this case not only for the nomads' limited cooking operations, but also the more important requirements of the cold days in winter, late autumn and early spring.

At Litang the traveller may see in the lamasery piles of enormous logs which heat the gigantic tea cauldrons of that institution. Does this mean that cow manure is only a geographical adaptation poorly supplementing ordinary fuel supplies? Certainly not; for the logs come from forests ten to twenty miles away and are only requisitioned on occasions of special importance. Moreover, the fact that in Summer there may be 40,000 yak grazing on the adjacent plain indicates that supplies of manure are abundant; and the varying activities incident to gathering and drying of the deposits show how, to us, such insigificant gifts are appreciated. Indeed we might reasonably suspect that yak manure, to a very large extent, makes human habitation possible in zones of 14,000 to 16,000 feet altitude. In any case, wherever the yak feeds the herders have fuel sufficient for all their needs. The same may be said of Litang, a town and lamasery with a population of between five and seven thousand Tibetans.

But what about other temporary or permanent human concentrations on the planet's roof? It is true that the animals may roam too widely over unfenced areas to allow their deposits to be of practical value all the time. But a certain amount of concentration in the evening obviates the difficulty in nomad camps, farming areas, and even lamaseries and settlements. The populations contiguous to the main trade routes, however, have their needs supplied in a different way. Here the great tea caravans move inwards and outwards slowly, depending on the flanking hills and plains for their sustenance. But any debt incurred is amply repaid immediately. How? This is what happens: a caravan of yak numbering 300 to 1000 arrives in the vicinity about midday and camps. The tents

are pitched so as to enclose a circular area. After the animals have been unloaded and the goods stacked in regular order, they are driven to the adjacent grazing grounds. In the evening after having eaten to repletion the herd returns to the improvised enclosure where its individuals deposit freely. The next morning early the caravan files out and bevies of girls sweep down and collect their dues. But this may go on for months intermittently, and so

TIBETAN LIGHT HOLDER



1. Beam. 2. Piece of flat stone.

3. Dry bamboo torch, from 6 in. to 48 in. long.

enable the dwellers near caravan routes, with a minimum of effort nad expense, to supply themselves with an essential item in their domestic economy. Yak manure collected in such a concentration is carried home and carefully prepared for use later on. In some cases chaff, chopped straw, leaves, twigs or other suitable material may be mixed with it; but whether or no the material is first put

in moulds or flattened into thin cakes and then dried on the sunbaked sward or plastered on walls or the sides of houses.

Yak manure makes a quick hot fire. The smell, faintly suggestive of musk, is in the distance very pleasant; but its fumes near at hand sting the eyes, taint the porridge, tea and soup, and permeate clothes and bedding to such an extent that the owner is temporarily unfitted for European society.

The Tibetan bellows, or *bupa*, is usually associated with yak manure fires. This peculiar and useful instrument is made from skin taken from one of the hindquarters of a goat or sheep. An iron tube one foot long is firmly fixed to the small aperture at the lower end. The upper one remains open. When in use the manipulator sits like a Buddha in front of the fire. The tube is placed in the embers; then each end of the upper portion is grasped firmly by a hand. This tautens the opening to a slit about a foot long. The interior is then inflated by slightly relaxing the left hand downwards. A quick upward movement closes the passage again, and finally some further pressure towards the fire drives out the air with great force. A series of such movements prolonged indefinitely makes an excellent fire of the most unpromising material.

Household Lights.

The night lights of the Tibetans differ widely but are always interesting. (a) In the lamaseries and upper class families small brass cups, provided with wicks, are filled with butter and when ignited give an excellent light. (b) At ordinary times, in many regions, splinters, chips, or shavings of resinous pines are in common use. They are either held in the hand as miniature torches or blaze on iron trays which hang from the rafters. (c) Sometimes the resinous exudations from firs or spruce are formed into cakes and answer the same purpose. (d) In districts where the mountain bamboo flourishes thin rods of the same, between three and four feet long and thoroughly dried, are inserted in holes made in a slab of slate which has been attached by chains to an adjacent beam. The bamboo once alight burns like tinder and gives an excellent light. (See illustration).

THE TIBETAN NEW YEAR DANCES

M. H. DUNCAN

In Tibet the most important religious festival of the year occurs at the beginning of the Tibetan New Year which usually coincides with the Chinese New Year, although there is sometimes a day's discrepancy. This is true of the ruling sect, the Gelugba or Yellow Caps, while the older Red Caps or Nymaba New Year may vary several days. At each large lamasery the New Year festival is regularly kept unless the country is troubled by war or bandits, when the public performances are either greatly curtailed or altogether eliminated. The description given below is a harmonization of the performances given during the years 1927, 1930 and 1931 at Batang. Because of unsettled political conditions no performances were held in 1928 and 1929.

The order given below is not always the same, although the dances as pictured are always presented; I have described the dances in the order most commonly followed as I have noticed them through a period of ten years and particularly in the three years mentioned.

The general purpose of the dances is the expulsion of all the demons which cause such evils, as hail, floods, sickness, poverty, or any other kind of calamity. These demons or evil spirits are gathered under the control of the exorcists, enticed into a fearful yet beautiful figure and then expelled or destroyed. The dances on the fifteenth of the first month then secure the good will of the good spirits. The Tibetans believe in starting the New Year right by making the New Year resolution of asking only the good spirits to accompany them in the coming year's journey.

The foreigners in Batang are always invited two days before the occasion by a few red-robed priests whose palms are stretched out in invitation, not so much because they liked us but because, it is to be feared, of the liberal gifts which were always forthcoming at the end of the ceremonies. They asked us to come early.

The first day's dancing begins on the twenty eighth. On that day about ten o'clock we saunter toward the gate, knowing from experience that early means sometime about noon. Short days, cold weather and indifference to time all contribute to placing 'early' just before noon. The novice sits several hours shivering in the cold before he can properly interpret the 'come early' exhortation of the priests.

As we step inside the huge eastern gate which is lined with a curious crowd of dark brown faces peeping out from beneath shaggy

locks of greasy black hair, an escort meets us. The crowd has gathered to see the important guests who only are favored with such an escort. We know in our hearts that we ought not to feel pompous but the respect secretly pleases us even if we do have to pay for it with a few cash. The escort is composed of six gaudily dressed young monks, with leering masks on the tops of their heads: two monks lead the way while the others keep the crowd from pressing too close on flanks and rear.

For masks the escort wear huge papier mache affairs two each of yellow, grey and green. Since the mouths are not open, as is the case with most masks so that the wearers may peer out, they are tipped up with the faces toward the sky as hats rather than as masks. Their gowns are of gorgeous red, blue and yellow silks mixed in dazzling contrasts. They wear them over their own red woollen cloaks whose hems can be seen below their knees. Around their waists are ropes of bells which jingle merrily as they lash their leather thong whips to open a lane through the crowd, who stare open-mouthed at the fair-skinned children of the foreigners. "Tse, Tse, they are the children of the gods" are the exclamations on all sides.

As the grounds are spacious the crowds are not dense but thronging. We gaze carefully at the faces of the unknown country folk wondering how long since some were robbing houses or isolated villages. Of the town people we greet friends with nods and smiles occasionally answering "yes" to such honorifically stated greetings as "Has the teacher come to see the play?" We may ask the same question but not in the honorary language unless the person is one of rank and wealth.

After settling ourselves in tents provided for us older priests bring us food,—peanuts, dried pomegranates, crullers, persimmons, walnuts and buttered tea, After partaking scantily of these to satisfy the minimum requirements of courtesy we gaze over the crowd assembled around a large level plot of land. It is a democratic assembly. Silken, bejeweled women of the town are pressed by country women in red-plaided skirts and yellow-spotted waists, while greasy sheep-skin gowned nomads squeeze into any vacant spot. The men and the women lean intimately upon each other's shoulders, or twine their arms around each other's necks. Red-cloaked priests and grey padded uniforms of Chinese soldiers are seen side by side, while peasants in grey wool crowd Chinese merchants in skull cab and blue gown. Jewelry is everywhere; in the ears and on the fingers, in the hair, and among the very wealthy, in long chains of silver hanging down the back. The women are the most gorgeous with their sparkling silks or bright colored woollens, although when a country swain comes around with fourteen silver rings and a white ivory ring encircling a thick braid of hair we all stop to count the array of corals and turquoises.

The dancing ground is surrounded by the dwellings of monks and

parts of the monastery walls. The dancers dress within the upper rooms of the temple and come out to the performing grounds in proper turn. The grounds are policed by tall stalwart monks armed with long whips which they do not hesitate to use on the people when they do not respond to the cracking of the thongs in the air. Small urchins dive hither and thither through the audience and the dancers to reach better positions. When the whips tickle their calves the crowd jeer them for their slowness. If the press becomes too great sturdy lamas use long poles to force back the people.

After a long delay when even the Tibetans have about lost their patience there march out with stately stride four priests who carry the long six-jointed brass trumpets and two men who carry flutes. Each of the huge trumpets requires two men, one to bear the heavy front end and the other to blow the instrument. This band soon reaches its allotted place under an open tent upon the northwest corner of the parade grounds. Just as the novice begins to think that this is the whole show the band begins to play and children running toward the temple indicate that more is coming. In a few minutes the rest of the band comes into view. Flanked by four monitors who lash the legs of the too curious boys, two cymbalists and six drummers march slowly to the tent and group themselves around the trumpeters. All of the band, except the cymbalists who have white capes, are dressed in the conventional red gowns with yellow inner jackets and yellow arched tasselled hats.

Although yellow is the regulation color for the Gelugba or Yellow Hat sect very little is worn because of the great cost of yellow dye. The ordinary Gelugba monk wears the same red colored gown as the Nymaba or Red Capped priest. Thus they are easily confused, It is only on ceremonial occasions that the yellow hat is worn except by priests of high rank such as incarnations. Incarnations habitually wear yellow inner jackets and when journeying away from their homes they wear round yellow, metal hats.

After another delay the loud blare of trumpets, the clang of cymbals, the treble of flutes, the shrill screech of conch shells announce the approach of the first group of dancers. Eight monitors with two pilgrims (Alaka) and an incense bearer lead in the Chöjeh and his retinue of twelve masked figures. Since their hog like face masks are topped with horns and skulls, we, the foreigners, call them the Big Devils. The Chöjeh and his cohorts in their gorgeous embroidered silks of yellow, blue and red rival the sunlight. The beauty of their gowns contrasts vividly with the hideousness of their masks. Each dancer carries in his right hand a scarfed red tipped sword and in his left hand a cup made of wood called Goli (the cup is supposed to be made of the top of a human skull) with a two-ply scarf attached to it. The Chöjeh has a skull crowned standard with red tassel instead of the cup. Each scarf is different in color and design.

These dancers are divided into groups according to mask and

costume each group having a different name and costume. The fifth after the Chöjeh is Behtse the name of a goddess who when propitiated protects her devotees, while the tenth and eleventh are said to be Chuseen, representatives of a river crocodile who eats children. The number one person represents Dadreen, a deity with a man's body but having the head of a horse and which neighs fearfully to frighten beings who are mischievous to Buddhism. In India he is Tamdin. Another is Namtöseh the king of the Noijin or mountain deities who guard the northern quarters. He is also the guardian of wealth. Number three is Bedenlhamo, a goddess of terrible aspect famous for her bloody and licentious deeds, but at the same time a constant and redoubtable championess of Buddhism. She has the severed corpse of a human being in her mouth. She is the head of the wrathful deities whose main function seems to be the protection of Buddhism from its enemies. In India she is called S'rimati Devi. The fourth is Chöjong-Dribajamsing a terrible guardian female deity. Proper identification of all was not possible but all are gods or goddesses in their most awful aspects and are sure death to all opponents of the Buddhistic religion.

The chief, or Chöjeh, represents the Lord of the Dead. He receives all departed spirits and then sends them to eternal bliss, or to punishment for the proper period before they are allowed to become incarnated in the world again. Chöjeh wears a huge green mask with two enormous green horns projecting above each ear while five small yellow skulls are arranged in a row between the horns. Behind the skulls in the center of the mask is a peacock plume. Three bulging eyes, including one in the center of the forehead, and a big-holed nose add to the ugliness of the aspect.

The other twelve resemble the chief with some slight variations; numbers three, six, seven, ten and eleven have horns but each of the remainder displays merely a triangular perforated shield on a base on top of the head. The number of small skulls also vary some, numbers one, two, three, and twelve having five each and the others only three. The skulls signify identification with the dead.

The main variations in dress are in the brilliant coloring. All gowns are of embroidered silk which have been put on over the red gown of everyday wear. The huge sleeves when unrolled extend almost to the ground. Down their backs are scarfs which hang from the tops of the masks to the heels. Each gown has some predominating color such as red, blue or yellow, except that of the chief whose plaided grey and black is perhaps more in keeping with his character of Lord of the Dead, In addition the chief and number one have each an extra apron of embroidered gold with a devilish face in its center. In spite of the somber aspect of his gown the other trappings of the chief blaze out to make him the most brilliant of them all.

Chöjeh and his retinue slowly circle the grounds three times, whirling and hopping on one foot. The waving of their long-sleeved

gowns enhances the gracefulness of their simple stepping. After the third turn they hop two by two back to the monastery with the same loud crash of instruments that greeted their entrance.

Now the Alaka, two of the escort, who meanwhile have been moving among the crowd with long sheep-skin bags collecting trifling gifts of thread, walnuts, needles and copper coins for blessings and prayers for the dead, move into the circle and dance. They interpose their dancing with rough play and coarse jokes which are more enjoyable to the spectators than any of the likely stepping. The Alaka sport black and white sheepskin gowns with the woolly side out, strings of beads with small charms attached, large black bells suspended from each side of the waist and masks of red wool. From each side of the masks hang huge brass rings with long tassels. One mask has grey hair to represent an aged person and the other black to typify a youth, Bow and arrows are slung over their shoulders and huge jeweled swords are thrust into their girdles. Their dance seems to be a comic interlude between the more serious acts. Even the occasional brandishing of a sword seems to be a mock gesture,

The next act is one by the Atsara who are caricatures of the Indian Brahman priests. One is clothed in baggy red garments and the other in baggy blue. Three huge, many colored rosettes adorn each back. Their sleeves are exceptionally long almost sweeping the ground. Their dark muddy colored masks grin ludicrously toward the sky, as the masks are on the tops of their heads rather than on thir faces. They are devoid of teeth and the opened mouth is so large that the actors can use it for sight. As they come in they have in their right hands bamboo rods painted red and yellow. They place these on the ground before dancing and when they retire gather them up again.

The music of the dances is much the same, mostly the monotonous clanging of one cymbal and the beat of one drum but now and then the whole band of drums, flutes and cymbals swells into one grand crescendo only to die away again into the tap of a single drum and the lone quivering cymbal. The dancing is of like character, being quiet and gentle until the crash of all instruments when the dancers whirl furiously.

Again a red monitor escorts in another group. These are the two Bebo who typify the people of Nepal. They also carry striped bamboo rods upright in their right hands as did the Atsara whom they much resemble. Each flashes three brilliant rosettes on a grey and yellow striped gown. Their masks are a muddy, greenish yellow with dirty, grey hair. The expression is more pleasant than the Atsara. They dance in stately fashion with the bamboo rods in their right hands and with their left hands on their hips. When they retire the entire band departs to escort in a new group.

Soon the pleasing notes of flutes, the shrill screech of thigh bone trumpets and the grumbling blare of the big brass trumpets announce

the advent of a new procession. Behind the advancing band and the four gaily dressed whip monitors are seen the thirteen whirling Black Hats. There are supposed to be thirty-two of them but lack of equipment has reduced the number to thirteen. All are dressed practically alike with black gowns trimmed with red and yellow striped black sleeves, and sash of yellow and black silk. Each wears a cape; some red, some yellow and the rest green. Long scarfs hang down their backs suspended from the blue-black crowns of wide-brimmed blue hats to below the waist. The pumpkin-shaped crowns have the fronts painted with hideous three-eyed faces and other eyes glare out from the the back and the sides of the crown. Topping the crown is a rainbow colored rosette supporting from its center a white skull, which in turn upholds a blue bulb in which is stuck a triangular shaped shield; all these increase the height of the dancer to gigantic proportions. In fact, the dancers are chosen from among the tallest monks, rarely is one of them less than six feet tall and the hat increases the stature to nearly eight. The hat is further decorated by two long black braids, representing hair, which dangle from either side. The face is painted with a black dot on each cheek and one in the middle of the forehead. The most brilliant touch is the huge red satin apron with a bony face embroidered in white in the center.

The black hats are violent in their dancing, twirling in a huge circle from which they now and then hop to the center in unison. When they meet in the center they stand with one foot extended in front and resting on the heel, but only for an instant before they whirl and hop back into their immense circle again. Their hands are very expressive now furiously waving, now pointing menacingly toward an imaginary enemy. A three sided ceremonial dagger in the right hand, with black scarf attached, and a skull cup or Goli in the left hand have exorcising power in the mystic meaning of the dance. The dance is a long one but they finally hop away in groups of two after three slow circlings of the entire grounds. They retire to the same blare and screech of the band which introduced them.

The Black Hat is a reminiscence of an assasination of a Tibetan king called Langdarma who lived in the ninth century A. D. The Tibetans have the legend that a king before Langdarma, whose name was Rabajen, in his devotion to Buddhism caused a fine chorden or relic shrine to be built, before which all of the animals prostrated themselves in worship except the ox and the sheep. The ox in enmity said he would be incarnated into a king that would destroy the relic shrine, whereupon the sheep desiring to help religion said he would be incarnated into a priest who would destroy the king. In due course of time the ox was reborn as Langdarma, the first part of whose name means ox. He persecuted the Tibetan religionists and destroyed the chorden. The sheep was reborn as a priest and one day he donned the black hat costume, hiding a bow and arrow in his long wide sleeves. In the course of the dance he approached the

king and pulling out the bow and arrow shot the king. The priests in honor of that event have danced to this day using the same costume, only increasing the number of dancers. In fact, the dances of every kind centering around the Lord of the Dead have grown through the centuries until they have assumed the present proportions. Many of them have no particular meaning or if they did have in the beginning the significance has been forgotten in the intervening centuries.

Following the Black Hats come the four Masters of the Grave (Cering Sheba) escorted by the four guards. These parts are played by youthful monks about sixteen years of age. They are dressed in skin tight white cloth painted to resemble skeletons. False tiger skin aprons and long blackish finger and toe nails add to the gruesomeness of the whole. Each death head mask is topped by a row of five imitation skulls, and draped by a rosette supporting a peacock feather. Many-colored scarfs stream down from the back and the whole gives us a picture of a hideous corpse lined with satin.

This skeleton dance in more formal and dignified than any of the others. The main movement consists is a flexing of one knee in the air while the dancer stands on one leg with the arms extended, one to the front and one to the rear; then suddenly he puts the other leg down and sweeping the ground in a circle with his long bony fingers whirls to face in the opposite direction. They repeat this performance almost endlessly until driven off by the monitors.

During the dances, but particularly during the skeleton dance, the Alaka are busy telling the crowd that they will say prayers for the dead. As they move around the circle here a son, giving a few walnuts, asks prayers for a brother, there a woman gives a needle for a child, and in another spot a girl gives a bit of thread for a departed mother. As the Alaka receives the trifling gifts he murmurs the six syllable prayer, "Om Mani Padme Hum". Chanting this prayer during the dance of the skeletons is more efficacious than during other dances so the Alaka reap an abundant harvest.

Then rush out in wild disorder the four Denmoh, two carrying black wooden hands and two red cloth objects resembling a person's entrails.. They wear loose black coats and baggy pants trimmed with red. From the tops of their white inner waistcoats protrude long, white, cloth breasts. They personify sin. They are the goddesses of immorality especially of sex life. Two have green masks and two have yellow from which stream long straggly strings of hair. One has a white cloth on top to indicate age. The fronts and backs of their dresses are crossed by red and yellow sashes. Each has a string of bells thrown over his shoulder to and tempo and flashiness to the dancing.

Their dance is fitful and ragged. At times they make sudden jumps assuming sprawling positions; at times they push at the air with opened palms. They rush off with great speed and the Deer Dancer or Shawa whirls out to the arena. With a green cow-face mask and yellow gown trimmed in red and blue he is more inhuman than

most of the others, if that is possible. The mask has four tusks two upper and two lower with teeth in the lower jaw. From the top project two horns with a net-work between holding a mottled cloth. A red edged cape with a blue center and striped golden sash down the back set off the lemon gown. A decorated sword having a bloody tip with a pink streamer hanging from the handle is carried in his right hand, and a small, brown, patterned skull cup is in his left hand.

After some preliminary dancing the Deer approaches the north where are laid the paraphernalia for the ceremony. Here is a dorje tied to a bell before a rug. Facing the north the Deer kneels on the rug, placing his sword and Goli on the left. To slow music he passes his hands back and forth from the east to the west. He bows to the east and to the west, and weaves his body with a circular motion toward the same directions. He dips his finger in an imaginary liquid and snaps it toward the north and south. The Deer after much swaying rises only to kneel again for three times in all. During the third kneeling he takes the sword and draws a figure on the ground before him. Then he grabs his sword and cup to dance back to the temple.

The whole crowd now adjourns to the front of the temple. Here the eight monitors with maces precede the two Alaka who stand before the temple to chant poetically for the sake of a good harvest. Later they crack a few jokes at each other's expense. Then the priests vanish into the temple to groan and chant, to pound drums and cymbals, to blow horns and to drink huge bowls of steaming tea topped by a feast of rice. The immense crowd slowly melts away to come again on the morrow.

The second day the preliminaries are the same except shorter. First the thirteen big devils—the Chöjeh and his retinue, then the Asara followed by the Bebo who give place to the twelve Black Hats. This day the Black Hats have a more elaborate escort being preceded by six gorgeous monitors, and four little princes in yellow gowns and red tasselled conical hats, and two golden gowned bearers of censors besides the whole band. Following this dance the Alaka again crack their jokes and scare the urchins with gunshots. Likewise, the skeleton ghosts and the wild women repeat their dance of yesterday.

The Deer in due course escorted by the whole band appears in a ceremonial dance more elaborate and meaningful than the day before. On the north side of the circle has been laid an old flattened yak skin covering a molded figure of barley flour and butter, supposed to be the corpse of a devil. Beside the skin is a red pyramid of barley meal some two inches high called a dorma.

After a few rounds of whirling the Deer rushes to the yak skin and with his brandished sword hurls it to some distance. Continuing the prancing and brandishing of his sword he next rolls back his bowl right sleeve to indicate that he has work to do. He kneels before

the figure. He places his sword to the right of it and his bowl to the left. He makes many passes of his hands. Suddenly to the crashing music of the band he seizes the sword and stabs the barley devil. He rises and dances some more only to kneel again. Now after some more motions he yanks out the intestines of the devil (long pieces of raw meat). Once more rising the Deer dances and a third time stoops to seize the dummys' black hair and a little later his hands, each time tossing the part to one side of the circle. In this dismemberment ceremony the Deer eliminates the Namshe or the soul of the demon spirit. Now nothing being left except the mutilated torso the Deer whirls a few more times, is handed his sword and bowl, then dances to retirement.

The whole band rises and proceeds to the temple.

In a short time there is brought out an ugly pyramidal figure fifteen feet tall. The first ten feet is a three planed structure of wood and paper plastered with buttered barley. Upon this rests an imitation half skeleton of the same material. The skeleton is frightful to behold. Bulging eyes quiver in a bony head. Heart and lungs attached to fine wires tremble in the opened front of the ribs. The whole called a Dorchen or Great Barley offering is built upon an iron plate affording means to grasp with the hands. The priests carry it, frequently resting by placing the iron plate upon a stand.

Arriving outside before the temple door the skeleton figure is placed upon the stand and offerings are lined upon a table before it. These offerings consist of nine brown barley cubes, a copper vessel of water, another vessel of liquor and a lotus-flowered pyramid of varicolored butter two feet high.

The basic framework is wood with the paper glued to it. The paper is very stiff and painted red in serrated curves surrounding skeleton heads in white. Each skull is a demon and the demons are coaxed into this figure on the twenty-fifth of the twelfth month by the assembled monks is an exorcising ceremony. Barley flour kneaded with butter is used to thicken and decorate the wooden framework. The intense red and the bleached white may be a survival of the ancient days when human beings may have furnished the ceremonial figure.

In a long imposing procession preceded by the trumpeters the pyramid figure is carried out by twenty priests to the dancing ground. Then there follow four monitors with bamboo rods, four princes, four censors, four grain bearers, (two grain and two tea) and lastly a group of four consisting of a yellow-cloaked, black-masked priest—the Abbot of the monastery, ringing a bell; with an attendant on each side and one behind carrying a rug. In the third section is the Chöjeh with two followers, one holding an immense umbrella for his majesty and the other a stool. The Chöjeh rushes out with quivering shakes as if he had a fit sitting down on the stool from time to time as if exhausted from his trembling. Behind him come the Deer followed

by the twelve devil attendants of the Chöjeh all whirling around the skeleton as it advances. In the last section is a large corps of eighteen drummers, twenty-five white cloaked cymbalists and a hundred and eighty-one priests. The chief cymbalist has a figured placard on his back while the two Bebo attend him. On the parade ground the whole array surround the Chöjeh in an immense semi-circle.

The Black-masked priests accompanied by his attendants, takes a position in front of the Chojeh, rings his bells and mutters incantations to keep the demons in the skeleton figure propitiated. From time to time the attendants carrying grain and water give him their offerings which the abbot takes and throws on the ground after he has pronounced the proper spell. The Deer and big devils dance; the cymbals clang; the drums boom; but at intervals the band ceases, to allow the dancers to groan and growl in dismal tones. After a considerable period the flutes and thigh bone trumpets send out shrill blasts. Again the dancers whirl wildly but they soon cease while the band begins another serenade in the midst of which the skeleton is carried out ide the west gate followed by the whole procession who move to the north where a pile of brush and straw has been prepared.

Once outside the preceding ritual is continued the devils and Deer dancing to the playing of the band, the abbot's left hand ringing a bell and his right hand shaking a dorje or thunderbolt as he chants his spells. In a short time the dancers arrange themselves on one side and with swaying bodies waft their skull cups toward the north. The pile of brush and straw is set afire. The din of the band increases. With a fearful blast the pyramid figure is cast before the fire on a rug. Boys pelt the head with stones. The paper parts containing the demons are cast into the fire and the demons burnt up. The substantial sections are saved while the barley and butter parts go into the stomachs of beggars whose living is always so meager that they do not hesitate to devour devils. Theoretically the whole of the figure is supposed to be destroyed but the instinct against the the waste of food is too strong so they compromise on the matter.

Now the procession moves to the front of the temple where a huge picture of a copulating god and goddess, Dorjegejeh a fearful guise of the Lord of Death, hangs in front of the outer court. Before the picture are three pyramided butter offerings in red, yellow and green. Here worship follows with blare and incantation. The Big Devils and the Deer line around the picture on the northern end while the Abbot on the south side chants. When the Abbot casts grain before the Dorjegejeh the Big Devils take grain from their bowls with the tips of their swords and toss it toward the north.

The evil spirits are driven out toward the north. The Red Cap sect drive them toward the south. As there is a Red Cap monastery about a days journey to the north of this one who hold their services a little later it is possible that the devils are chased back and forth seeking whom they may devour. After much chanting by the priests

the offerings are taken inside. Soon the picture is rolled up and taken within the temple; but the black priests continue chanting for a while before they too retire within the gloomy precincts of the godhouse. Their retirement completes the performance of the second day.

On the third day the regular band parades out followed by a new musical group consisting of two flutes and a drum corps of three youths each wearing a pancake hat of wool. A blue-gowned man carries a kettle drum on his back while a yellow-gowned boy beats this drum. The other yellow-gowned person pounds two small gongs suspended in a rectangular frame. These three men station themselves on the north side of the circle.

Soon the Gatruk appear; eight youths dressed in the usual gaudy silks, flat hats, a huge rosette on the left shoulder, a white cloth in the left hand and a small scarfed axe in the right hand. The leader is distinguished by an extra rosette on his back. They dance in unison in a straight line with great formality, the dance closely resembling that of the skeletons.

The Gatruk dance for an interminable time and while they are still on the field the Jebalaje enter. The Gatruk whose dance is given for the purpose of pleasing the good spirits as well as the resident spirits of the valley must now leave to permit the Jabalaje dance for the purpose of driving the evil demons away. In the van of the Jebalaje are the two Alaka preceding three monitors followed by two cymbalists, a gong beater, six men with drums strapped on their back, two more monitors, two yellow-hatted censor bearers, two Bebo, two Atsara, four Gebalojeh, four Denmoh, four Black Hats, and last of all the Chojong with his immediate assistants composed of two golden metal hatted trident bearers and three red gowned priests to carry a stool and assist the unwieldy Chöjong to sit down.

The real figure of the Jebalaje is the Chöjong who wears a mottled yellow gown and a red-nosed, red-faced mask surmounted by five small skulls, a small shield aud a few white rooster feathers in the center. Two large flags with two small ones and one cylinder banner flutter from the back base of the mask. In his left hand is a bow and in his right hand a scarfed blood tipped sword and over his shoulder is suspended a quiver of arrows.

As the procession moves forward in stately fashion Chöjong, quivering violently, advances by sudden rushes so that the attendants have a hard time bringing up the chair. He sits down suddenly as if utterly exhausted. The crowd are terrified when he approaches close to them and they scurry away like frightened rabbits.

The trident bearers carry three-pronged spears in their right hands and round cloth-covered skull drums in their left hands. The Gatruk are chased off the grounds by the monitors, and the Chöjong whose role is that of Defender of Buddhism rushes out in a violent and menacing dance which soon exhausts him. He rests while the four Denmoh stage another licentious dance.

Following the Denmoh comes the dance of the four Gebalojeh or the eight year old youths whose dress and equipment caused us to designate them the little devils, although they have no such function. They are part of the Chöjong's retinue and they share his work of defending Buddhism. Each carries a red scarfed blood tipped sword in his right hand and a scarfed shield in his left. Their blood red masks have banners sticking out of the tops. Boys about fourteen years old instead of eight play the parts. As they dance small bells sewed on the front of their boots increase the animation of their lively jumping. They thrust out their swords and shields in graceful curves. This is the last dance of the day, but so rarely are brilliant sights seen by the people that they linger until the last little devil has vanished within the dark temple doors.

The above three day's dances are known as the Gudochang or the Twenty-ninth Day Dances since they take place on the last three days or the twelfth month of the old year. The devils of the old year who have tormented the people are expelled or destroyed or propitiated so that the people can enter the New Year unhampered by the burden of appeasing demons. However, they do not wait very long with a clean slate for the final festivities take place on the fifteenth of the first month. This is known as the Melamchang or the Prayer Dance. It is featured by a procession, while the dances seem as much for the purpose of pleasing the multitude as for the securing of the good will of the spirits necessary for a successful year in all the phases of life. The Melamchang is considered to be of greater importance than the Gudochang.

The procession consists of all of the monks attached to the monastery who can get back from their various duties in the surrounding country. A monastery may have a thousand monks registered on its books but only on festival occasions are there any more than a strong minority present at one time. Dressed in red clothes of their every day wear and with the addition of a half-moon yellow fringed hat almost every priest carries an idol, an offering of grain or fruit, a picture of a god or goddess, or a musical instrument, or he acts the part of one of the dancers who performed fifteen days before.

In Batang there are two monasteries, the smaller one to the east being built after the destruction of the large one by the Chinese about 1903. In recent years, since 1924 the Tibetans have been permitted to rebuild the large monastery to the west of the town. Before this large monastery was reconstructed the number of priests was about two hundred but now an additional hundred and fifty will be found in the stately, slow moving procession which leaves through the west gate and circles the monastery clockwise to reenter the west gate again.

The procession is not in the same order every year there being considerable variation. However there are a few stable elements—almost the same articles and dancers appear every year. After a few bearers of articles there always comes the picture of the Guardians

of the Four Directions. Farther along comes the picture of Drŏma who is the goddess that saves the soul from transmigration. Still farther along will be one or two pictures of some deity, the actual one carried depending upon which deity is especially honored for that year. This year (1931) the likeness of Tsongkapa was carried as this year is particularly favored by him. Near the end of the whole will be the sedan chair containing the God of Love or Shamba who is worshipped in the dances which follow later. At the end of the whole array comes the Chŏjong, the Defender of Buddhism, surrounded by representatives of all of the dancers who performed on the twenty-ninth of last year. The order of the rest of the procession depends largely upon the fancy of those who hand out the drum, the idol, the sword, the bowl or the banner.

After reentering the monastic grounds the procession forms a three-quarter circle on the dancing grounds. The sedan chair idol Shamba is placed on the north side of the court and facing the south with a table of offerings before it. The offerings are seven cups of clean water and butter-barley pyramids.

Soon two priests walk slowly from the circle stopping some fifty feet in front of the idol and prepare to worship Shamba—the God of Love. All of their movements are performed at a snail's pace and in a very mechanical manner. Long yellow gowns cover their red ones. Arriving in position they place their yellow hats some six feet in front of them, stepping as if they were treading on eggs. Unfastening their golden cloaks they grasp them by the hems and stretch their hands to full length above their heads. Then touching their palms together they bring their hands down, touching their foreheads, lips and hearts (mind, speech and soul). Kneeling, they flatten themselves out face down upon the ground gradually stretching their arms full length before their heads with palms down. After lying for a half minute they slowly bring their arms back to their chests and inch by inch rise up. They prostrate three times. Then folding their gowns they place one foot forward and pick up their hats; in time they get them on their heads and in slow crawling time rejoin their comrade's ranks. This whole performance is repeated in its exactitude by a second group of three monks except more quickly.

After the obeisances the greater part of the procession retires to the monastery leaving the idol and the dancers to continue the show. Soon two Alaka appear one leading a cow and the other carrying a pail. Their approach is the cause of much laughter and the crowd surges into a more compact mass. The Alaka fuss around to place the cow and finally settle in front of the idol. The pail carrier pretends to wash his hands and then begins to milk on the wrong (left) side. When he has finished he pours milk out into two cups which they offer to the members of the band who one by one dip their fingers into the milk and snap a droplet into the air as an oblation to the gods after which they present the Alaka with a scarf. First, however the Alaka had presented the offering to Shamba and

snapped their fingers three times after dipping them in the milk. After the band has presented its scarfs the Alaka come around to all of the prominent spectators and present the milk. If the spectators do not snap droplets of milk into the air, they do it for them. In return for this presentation the spectator give a small gift or a scarf. We along with the Chinese officials give copper cash.

Before the cow stunt is finished there comes out in lemon gown a saint Janohhashang who is reputed to have preached Buddhism in China many years ago. He is figured with an extremely large yellow mask with a bald head. He is accompanied by two boys and two girls (played by monks) masked with pleasant almost silly yellow faces and dressed in golden silks. The children carry strings of bells and immediately tease the cow men who drive them away with thongs.

When the Janohhashang and his children sit down the cowmen finish their milking stunt with mock worship. One faces the idol and the other faces his comrade standing between him and the idol. The one facing the idol pretends to wash his hands, then bows to the idol. Taking a long white scarf he measures it to show Shamba how much he is getting but he does it falsely letting it slip in his hands as he stretches it out to arm's length so that he counts three measures when there are only two. As he walks up to present it to Shamba the other intercepts him and returns the scarf to the worshipper by wrapping it around his neck. Then the two reverse positions and repeat the worship. The false measuring is largely for the purpose of out doing each other in presenting larger offerings to the idol.

The Alaka having been driven off, the Janohhashang stands in front of Shamba and bows three times. Each time as he bows down the children rush up to help him regain his upright position. Then they form in a line north to south with the Janohhashang on the north end. They dance in stately measures for a short time when the priest retires to his chair leaving the children to form a square and dance for a while longer. Then the children retire to present themselves before the upper class spectators dancing for a present, while six men with drums strapped to their backs hop out with long strides to do a circle dance to a clanging cymbal tune, played by an old man with a cockade hat and grey gown. At pausing steps of the dance the drummers pound their own drums with alternate strokes of the drumsticks in each hand. The drummers are dressed in red or green cockade hats, in blue brocaded silk cloaks trimmed in red or yellow and the ordinary Tibetan boots. Scarfs flutter in the wind from their drums and drumsticks.

After the drum dance which has no particular meaning except that of entertainment the Gatruk dance again. In the course of this dance the Gatruk face the west, stoop down and place their maple leaf-shaped axes on the ground and touch their foreheads thrice with their right finger-tips.

When the Gatruk have finished their dance the Chöjong followed

by the Atsara, Debo, Denmoh, Black Hats and Gebalojeh in the order named stage short dances. Their dances are the same as before except that the Demnoh push their hands at imaginary images in the air as signals to be silent and then put their hands in their bosoms.

During these dances the mood of the spectators is more bouyant and joyous than during the Gudochang, when was heard the mournful rumbling voices of the people as they sang blessings for the dead. We enjoyed the happy spirit of the people although we felt that the sameness of the dancing should call for the pleasing yet monotonous cadences of the Blessing songs fifteen days before. The people lingered as if loath to go but finally the last Gebalojeh rushed off the field and the crowd slowly wended its way homeward satisfied that peace and prosperity would be their lot during the present year.

On the twenty-ninth a sort of aftermath of the dances is featured by the bringing out of another skeleton figure like the first only smaller. This figure is accompanied by the Abbot and his retinue with nine Black Hats. The destruction of the figure is similar to the previous one except that a Black Hat sets fire to butter and alcohol in a pot after the black masked Abbot has enticed the evil spirits into it. When they return to the monastery the picture of Dorjegejeh hangs down in front of the doorway, The Black Masked Abbot performs the same incantation ceremony that he did here on the twenty-ninth of the last month of the old year except that the Black Hats take the part of the Deer and the big devils who are the followers of the Chöjeh or Lord of the Dead. When this ceremony is finished the relatively small crowd disperses.

On the nineteenth of the second month the Red Cap Monastery, the Nymaba Sect, hold their Devil Casting out ceremony and chase the spirits back to Batang, for they drive them toward the south. What the Batang priests chased up to them they drive back again. There is but little love lost between the Yellow and the Red Cap Sects. Wars between them frequently break out, and are promoted with the same fury which existed between Catholic and Protestant in the middle ages. Not having attended a Nymaba ceremony I am unable to say what differences exist between them and the Gelugba which I have just described in detail.

The Prayer Dance or Melham Chang for three years in Procession
The number indicates the number of priests carrying the object listed.

1927

1 sword	3 drummers
1 picture of Chosung	1 picture of Shamba
4 cylinder banner silk	2 incense
2 Atsara	2 flower
4 cylinder banner silk	4 small flags
1 trident	1 cylinder banner silk

1 spear
2 conch
2 kettle drummers
4 on two big trumpets
2 flutes
2 cymbalists
2 cup of water
1 chopstick
6 bowl of grain
1 flower
2 Dorma offering
2 kettle drummers
2 banjo
1 empty handed
1 flower
1 scarf
2 candelabra
1 picture Dröma
1 conch shell
1 incense
1 conch shell
3 bowl of food grain
2 cylinder banner silk
5 conch shell
4 Denmoh
2 conch shell
2 drummers
1 bowl of food grain
1 staff
1 horn
3 empty-handed
6 bowl of barley
1 conch shell
1 cymbalist gaudily dressed
1 Hashang
4 children with Hashang
7 Princes
2 flutes
3 drummers
8 Gatruk
4 on two big trumpets
8 emptyhanded
2 incense
2 candelabra
1 empty-handed
1 black veiled priest, the Kenbo
1 umbrella for above priest
1 chair and rug for above priests
7 on sedan chair of Shamba
1 cylinder banner silk
1 cymbalist
1 drummer
1 kettle drum
4 Geba
4 Black Hats
2 candelabra
1 sword
1 Chöjong (Defender of Buddhism)
1 chair for above
2 leading cow and carrying pail
1 fully clad warrior for horse
2 leading horse for above
6 with drums strapped to back
79 empty-handed priests scattered among above
Total 265

1930

1 bamboo rod, striped
1 mace
1 empty-handed
1 Dorma offering
1 picture of Chosung
4 emptyhanded
1 cylinder banner silk
2 conch shell
1 porcelain idol of Hashang
2 bowls of water
2 bowls of barley
1 bowl of butter
1 conch shell
1 drummer
1 gong
1 drummer
1 picture
1 picture of idols
1 green umbrella for above
1 flower
1 feathers in pot
1 gong
2 conch shells
30 empty-handed boy priests

2 bowls of barley
1 butter-barley idol
3 cymbalists
4 drummers
2 golden chained censors
1 picture of Dröma
1 blue umbrella for above
27 skull drums and bells
3 colored barley balls
4 drummers
2 horns
3 cymbalists
2 drummers
1 conch shell
3 incense
4 cylinder banners silk
8 rectangular banners
1 gong
1 dorje and idol
2 flutes
2 white porcelain roosters
2 flower
1 picture of Shamba
1 incense
1 dorje
1 scarf
1 picture of (?)
1 scarfed Dorma
3 small brass idols
1 incense
1 porcelain elephant
1 conch shell
1 leading saddled horse
1 warrior rider for horse
4 old, empty-handed
5 cylinder banner silk
9 umbrella banners (closed.)
4 brass bowls of water
1 flower
1 lotus flowered Dorma
2 flutes
1 empty-handed
1 conch shell
1 Dorma
1 cymbalist
1 empty-handed priest
1 cymbalist
1 cloth covered idol
1 bowl of barley
20 empty-handed boy priests
1 brass idol
1 bowl of water
1 bowl of barley
1 triangle Dorma
1 conch shell
1 empty-handed priest
1 incense
1 conch shell
1 Dorma offering
3 one leading cow and one pail
6 empty-handed priests
1 Hashang
4 children with Hashang
2 flutes
4 snare drums with two drums
1 small gong
8 Gatruk
1 cymbalist
6 with drums strapped to back
1 Atsara
1 cymbalist
3 drummers
2 brass censors
1 mace
1 incense
2 empty-handed priest
8 incense attendants
1 black veiled priest-Kenbo
3 attendants of above
1 yellow unbrella for above
2 Atsara
2 flutes
12 on sedan chair with Shamba
1 cymbalist
2 drummers
2 yellow bowled censors
3 one Atsara and two Bebo
4 Black Hats
4 Denmoh
3 Geba
2 tridents
1 Chöjong or Defender of Buddhism
2 attendants with stool for above

Total 304

1931

1 bamboo rod, striped
2 cylinder banners silk
2 Dorma
1 picture of Chosung
2 conch shell
1 water-brass bowl
1 round shield silk banner
3 bowl of barley
1 silk rosette stuffed bowl
9 incense
1 bowl barley
1 cymbalist
1 drummer
1 cymbalist
1 drummer
1 cymbalist
2 censor, large brass ones
1 brass chorden
27 skull drums and bells
1 picture of Tsongkhapa
1 mirror glass
4 on two big trumpets
2 flower
2 flute
1 cymbalist
1 drummer
1 flower
1 empty-handed
1 incense
1 empty-handed
2 drummers
1 bowl of grain
1 picture of TsoSzhen
2 Dorma [banners
7 (3) cylinder (4) rectangular
1 gong
2 flute
3 rectangular banners silk
2 porcelain parrots on bowls
1 glass mirror and long life
2 silk rosette [picture
1 flower
1 pocelain idol of Hashang
1 flower
2 conch shell
5 incense
1 drummer
1 cymbalist
2 drummers
1 scarf
1 gong
1 incense
1 flower plaques
2 lotus flowered rhomboid plaques
1 blue silk scarf
1 bowl water
4 conch and incense
4 cylinder banner silk
2 colored Dorma
1 gong
1 silk clothed picture Dalai-Lama
1 silk clothed picture Potala
1 brass mirror
1 flower
1 cone Dorma in bowl
1 brass idol
2 huge brass censors
2 incense
2 leading horse
1 warrior for above horse
53 empty-handed
2 leading cow and with pail
1 cymbalist
6 drummers-drums on back
1 Hashang
1 carrying stool for above
4 children with Hashang
3 drummers
8 Gatruk
2 golden chained censors
10 attendants with incense
1 Black veiled priest-Kenbo
1 umbrella for above
12 on sedan chair with Shamba
1 cymbalist
3 drummer
4 Black Hats
4 Denmoh
2 Atsara
2 Bebo
5 Geba
2 golden hatted attendants

5 rectangular banner silk
3 bowls of water
3 incense
2 barley bowls
2 flutes
2 cymbalist
2 golden chained censors
1 Chöjong
1 attendant with stool for above.

Total 293

Notes on the Prayer Dance Procession.

1 Chosung picture is that of the guardian kings of the four quarters. The literary pronunciation is Chojong Jebo

2 Dróma is the goddess who saves from transmigratory existence and is much worshipped in Tibet. She has twenty-one manifestations

3 The cylinder banners of silk are much like large closed umbrellas, except that the tips are conical.

4 Tsongkhapa it the fourteenth century reformer who founded the Gelugba sect and hence held as a god by that sect.

5 The horse is the perfect horse who brings wealth to its possessor.

6 The censors may be a relic of Roman Catholic influence, (not the only suoh relic).

7 The Tso Szhen is a picture showing Tsongkhapa in the center surrounded by assembled priests.

8 The Princes mentioned have bell in right hand and small skull drum in left hand which they shake continually in the procession. They have five-pointed hats and red silk capes. They are boys around ten and twelve years.

9 The photographs of Dalai Lama and castle are a modern touch first seen in 1931. One was cut out of a magazine I gave the chief priest.

10 In 1926 there were only a hundred and eighty monks but the next year near the completion of the new monastery even though they had not moved in they had increased to 265. In 1930 there were 304 and in 1931 there were 293.

11 A Dorma is a triangular figure or pyramid of barley and butter molded to stand upright and having lotus flowers painted on it in several colors.

SACRED STONES AND ASSOCIATED TRAITS IN EASTERN TIBET AND CONTIGUOUS REGIONS

J. H. EDGAR

Stones have often been a marked feature in ancient religions systems and even now are retained as gods, fetishes, talismans and charms by many peoples who, judged by their advanced social organizations, are well up the cultural ladder. An examination of authors like Frazer, Robertson-Smith, Cumont and others will confirm my statement. For instance, we learn that a cone was the emblem of Astarte and her sanctuary contained a tall stone or pillar. The cone at times was flanked with grapes. Again we are told that the Aphrodite of Paphos was a white cone or pyramid; and in the same region representing similar deities we read of such stones flanked by columns, pillars standing on horns and so on. Asterah, so often mentioned in the Old Testement, according to Orr was symbolized by the cone as well as the trunk of a tree. Male deities like the sun god Heliogabalus, the Tyrian Baal, and Hercules were also worshipped as cones and untrimmed stones. In a general way sacred stones or monoliths were regular features of Canaanite and Hebrew sanctuaries. Among the Semites the sacred pillar was universal, and Cumont marvels at its power and persistency. Moreover, the Greeks worshipped unwrought stones; in Arabia rude pillars and heaps of stones were smeared with blood; and even today the most sacred fetish of the Arabs is the famous black stone of Mecca. Stone worship was perpetuated in Manicheism and we have evidence of litholatry in Melanesia, Torres Straits, North India, and among the Nagas in Assam and Karems in Burma.

This introductory matter should suffice to emphasize the antiquity and wide distribution of sacred stones as well as the litholatrous trend of many religions. Tibet and certain contiguous regions have not been mentioned by the well known authorities but nevertheless important survivals of stone worship and associated traits are common in Kham and among contiguous peoples never included in the in the Bod Yul confederacy. We may mention more particularly the Min Valley Kiarung and Chiang; the same people (?) in Ge Hsi and Ba'aam states in the Ta Kin Ch'wan; the former principality of Minyang; the Horpa regions of Luho and Kantse, as well as Chantui and Litang. Definite survivals of litholatry may

be assumed, apart from the ubiquitous mani ramparts, in all the remaining centres of Kham but my note books have not the necessary references for categoric statements. To those interested in more intensive studies we would suggest the valleys of the Min T'o; regions in the Ta and Hsiao Kin Ch'wan, and the plains of T'ai Ning and Kanze. A most interesting expression of the complex may be studied west of the Cheto on the Batang road, and the settlements on the Lichu (Mi Nyang) aud in the Yü Lung Hsi valley on the main road to Yunnan.

Sacred stones exist practically wherever the works of man or the expressions of nature admit. The following list by no means exhausts the local possibilities of the ingenious Tibetan or his frontier cousins:

Works of man:— Houses; corners, doorways, incense stoves, bases for prayer flags, walls, designs in masonry, gateways, and cakes of cow manure on the walls. As whitewash we find this influence around windows and doors, as magical splashings on walls or kitchens, and in the form of yaks, conch shells, urns and other revered objects real or mythical.

They are represented on the person by conch shell discs and cowries; they are seen on graves, manure heaps, and walls.

Connected with religious structures we find them as: gods in temples and on altars, and charms of many kinds in or on the same institutions. Then they are capping stones for mani piles; are pivots for praying machinery; and their influence probably explains the definite prominence given to white in religious architecture.

As regards natural objects we find the white stones in groves, forests, on eminences, mountain peaks, passes, hill sides, fields and near springs and any other spot that for any reason has become sacred or malignant. *Om mani pad me hum* is often seen on the hill sides the lettering being artistically produced by deftly arranged quartz fragments.

The attitude of the Tibetans and cognate peoples towards the stones is one of reverence, and according to the locality they are gods, fetishes, talismans, charms or ornaments. Some questions arise at the beginning. Were they, for instance, originally ornaments and a strong beauty complex made them charms, talismans or gods? Or were they originally gods with the other phases representing a serial deterioration? Again, in the case of gods or fetishes is the deity identified with the material or merely inhabiting it? Moreover, are we sure that personality is only to be assumed in the god; power and energy without personality in the fetish and talisman; and a lingering persistence of the divine element influence in the ornaments? In every case we hesitate to dogmatize. However,

with the vexed question of inhabitation or identification in abeyance, we find them as gods among non-lamaistic Chiang generally, and sporadically so in regions where lamaism is virile and militant. For instance, on the hills around Weichow and those facing the Min and T'o rivers there are numerous altars in prominent positions, each surmounted by a white cone or pillar. They are called gods of the mountains or the lords of heaven, and similar altars with associated traits are sacrificed to at stated times. But in two cases at least the litholatry assumes a more specific form. On a mountain 6000 feet above T'ung Hwa there is a peculiar temple called the Peh K'ong Sze or "Pure Vacancy." Here we find three large quartz cones revered as gods. In case there may be any doubt above their apotheosis Chinese counterparts in the form of idols have a prominent place assigned to them. A fourth cone is the equivalent of the Chinese god of fire. The temple is interesting if not unique, and although in some details suggesting Lama influence gives definite expression to religious ideas entirely foreign to Lamaism or any modern Chinese cult. Some miles higher up the river, also, and still on the left bank is a pure litholatrous temple with the simple primitive associated traits. It belongs to the quasi-independent Chiang colony of Chiutze. Here a large large blood smeared cone of quartz reposes under a rude shed in the midst of a sacred grove. The fetish is adored at stated times with prescribed ritual. Inside the grove are altars on which the heads of animals of the Bos family are placed. In other regions where Lamaism holds sway divine personality is not always claimed. But now and again there is no doubt. On the streets of Kanze for instance, a rough cone of dark grey color is the tutelary god. It is supposed to have mysterious powers and energies and it is appeased or cajoled with incense and genuflexions. The adoration comes from both Chinese and Tibetans who live or move under the shadow of the most powerful lamasery in Kham. At O Lung Shi, also, 20 miles from Hokow a fragment of stone naturally shaped like the lingam is placed on an altar and receives homage from the settlement. It is so greatly revered that our curious observations were resented, and the exhibit was soon removed beyond our prying eyes. One other example will be sufficient. In Basi near the Ta Kin, we purchased a small black pyramid of stone which had been on duty in a shrine of a Kiarung family. It was of white quartz but had been purposely blackened for reasons not divulged. The name of the god associated with it was given, but has been forgotten.

If our observations are not seriously at a fault the stones range from gods to ornaments with qualities not entirely explained by a beauty complex. As mentioned previously we could easily assume either a serial deterioration from god through fetish, talisman and charm to ornament, or an evolution demanding a reversal of the process. But as the central three seem to defy an attempt at separate grouping we shall treat them as one because they all possess magical

powers without definitely assigned personality. It seems certain that the fetish, talisman and charm phase is preponderatingly the more common and includes practically everything given in the above lists under works of man and natural objects, with the exception of gods and ornaments. But the stones, although rarely revered as gods in the lamaist regions are assumed to exert a very beneficent influence on the individual family settlement and district. Indeed, they function similarly to the praying flags, mani ramparts, carved stones, holy phrases and other Tibetan expedients. But in the case of the latter the potency is a magical endowment. The stones, however, are supposed to possess these qualities naturally and diffuse their beneficial energies gratuitously. A reference once more to the above mentioned lists will show how ingeniously and completely the Tibetans have exploited their opportunities.

We frankly admit our failure to delimit the god-talisman boundary in a satisfactory manner, and the talisman-ornament problem is beset with similar difficulties, and our inability to choose between evolution and degeneracy as a working hypothesis again complicates the investigation. However, we imagine quartz to be an intrinsically beautiful material, it also might symbolize the grand realms of eternal snow. Hence we may find here a starting point towards divine inhabitation or indentification. On the other hand it may have been considered from very early times as the natural home of a domesticated mountain god, and the more primitive associations have finally sanctified the ornament. This may explain why the white stone even where it is professedly ornamental still retains a suspicion of the charm influence. A reference to the first issue of this Journal (1922-1923) will show the trend of an artistic development; and the free use of whitewash where quartz fragments are unsuitable hints at an effort to retain the power when the actual material is absent. This expedient may also have been of value to the Bönş, who controlled by a law of reversed effort, delight to give prominence to black in similar cases. The whole question of ornamentation among primitive peoples is of great interest and especially the phases nearly related to nomadic peoples. But at present limited by an apparent "whiteness" complex we must content ourselves by suggesting that any material capable of being a god, or the abode, or dress of a god would be possessed of qualities likely to give it value as an ornament and stimulate the ingenuity of craftsmen in finding adequate means for its display. Hence, as implied earliers the quartz is exhibited in divers ways wherever it will strike the eye, of humanity or deity: and where the real material is absent, or unsuitable for any particular purpose whitewash seems to supply the need equally well.

The stone reverence of West China has certain definite associated traits that may be of value later to both the historian and the ethnologist. Readers by this time will realize that here whiteness is well nigh essential. This may be only a local peculiarity; but so far

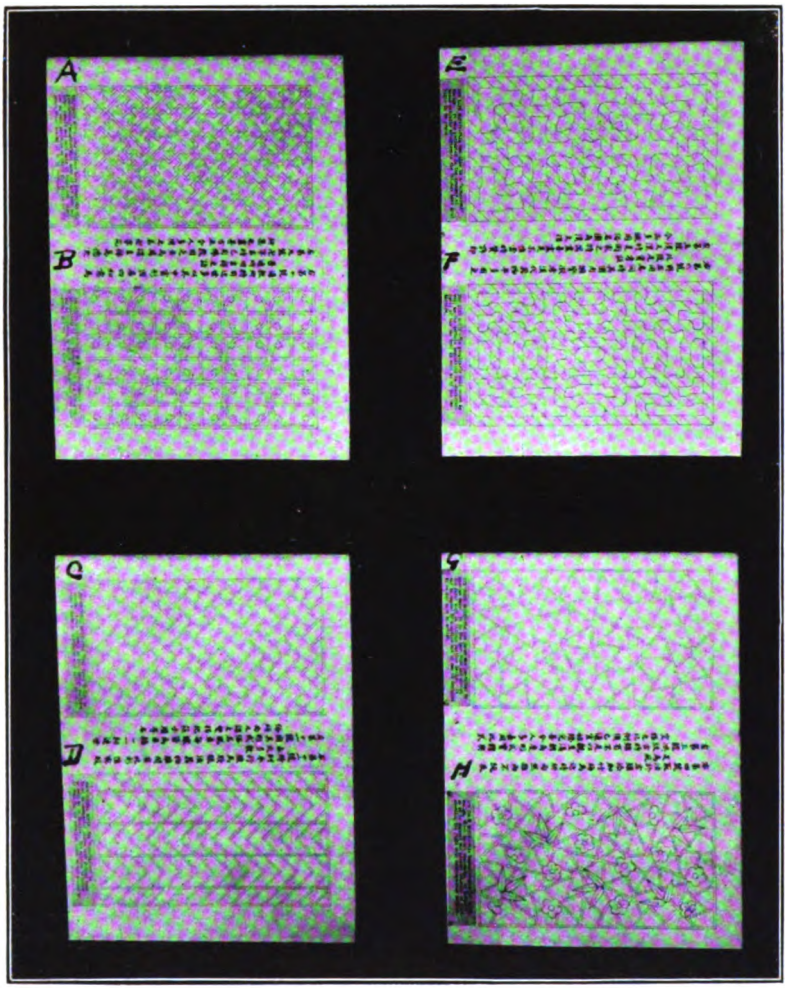
the only exceptions noted are where unusual forms, geographical anomalies, or a religious perversion are strongly marked. The fact that the Aphrodite of Paphos was a white cone may be of interest to some; but others have noted the fact that where the grand snow peaks tower over the tablelands, quartz capped mani ramparts and a more abundant use of white material follow as a corollary. On the other hand bleached skulls of yaks and even other animals often take the place of stones as talismans and ornaments. Hence we prefer not to dogmatize.

Horns are frequently here, as in the Bible, associated with the houses, altars and sanctuaries. This is especially the case in the Min valleys, but in the Lamaist regions also, horns often protrude from the masonry and are found on mani ramparts and other suitable places. There is also no doubt that many of the crescentic designs in white quartz are conventionalized horns. The horns are purposely retained on the bleached skulls, and sometimes real horns are made to turn out from a cone of quartz in the wall of a dwelling. It would be interesting to trace the connection, if any, between the turned up eaves of a Chinese house with the horn trait. Certainly horns played an important part in ancient religions as the emblem of fertility because the bull represented a generative force. A god identical with the Baal of Tarsus had a horned cap surmounted by a disc; and the sanctuary of the Aphrodite of old Paphos "had a pillar standing on a pair of horns." Heads and horns were common symbols on Greek altars; the same was true of the Semitic counterparts; and references in the Old Testament show how a similar influence affected the Hebrew worship. Finally, we can see how the temptation of idolatry was never far away, for according to Rawlinson, Ashtoreth "bore the head of a heifer with the horns curving in a crescent form."

We come now to another, and for this investigation, the last associated trait. I refer to spruce saplings which are common to the houses of Litang, on mani ramparts in many places, on passes, and at times on sacred spots of various kinds. The branches may have wool, cotton, feathers or flags attached to them and the pole is often inserted in a base of quartz fragments. Of course these symbols may be only a local coincindence, but they may be also an influence from Persia, Babylon or other lands. So again we express our ignorance by the questions: are they survivals of the Asterah and Semitic groves? or do the Lamaistic "prayer flags" represent the remains of an ancient worship in which moss clad trees had an important part? We do not know but it is allowable to again affirm that the trunk of a tree with branches did symbolize Asterah and some such fetish is probably referred to in Judges 6, 28, where we are told "the altar of Baal was broken down and the Asterah was cut down that was by it."

It may be assumed that many will see in the stones, horns, trees and groves of Tibetans, Kiarung and Chiang sure signs of a far Western influence. They may be right but it will be no easy matter

to prove the connection. Some might say the Chiang were influenced long ago by protrusions of Semitic or cognate Western cultures. But would it not be equally convenient to view the proto or pre-historic Chinese as the recipients of this primitive nature worship and they sharing the heritage with a truly indigenous stock, in the course of time outgrew influences of infancy which in varying degrees affect the others even to the present time? Our plain duty just now, however, is to suggest not to affirm.



CHINESE LATTICE OF CHENGTU, circum 1900

(*Dye*)

(A) One of the fifty odd variations of the Buddhistic "cross."
(B) Ru I Scepter of Taoist significance.
(C) Windwheel design. Much affected in Peking also.
(D) Wave design. Note optical illusion, in parallels.
(E) Han Wen in interlocking "squares."
(F) Han Wen of superimposed cross patterns.
(G) Icecrack which is difficult to successfully design.
(H) Bamboo-Prunus-Icecrack design of winter significance.

A STUDY OF CHINESE LATTICE (AS OF 1899)

A CONTINUATION OF THE STUDY IN CHINESE ARCHITECTURE, PUBLISHED IN VOL. III OF THIS JOURNAL.

D. S. Dye

"For at the window of my house I looked forth through my lattice; and I beheld." *Proverbs 7, 6.*

These notes, classification, inductions, and statements of principles are based on observations of unnumbered thousands of specimens in situ and of a collection of more than five hundred examples of the best lattice, as found in the "Eighteen Provinces" and beyond in space, and as found in the last two millenia and beyond in time. These statements are a much too brief resume of sixteen years of study. The plates *presented* herewith are too few to serve as adequate data for the conclusions.

General Remarks on the Ventilation-Natural-Lighting Problem.

A. On the General Problem of Protection, Ventilation, Lighting.

Civilization and Control synonymous.

The development of the regulation of light and darkness and ventilation, as well as of our methods of protection from the elements, enemies, and inquisitive friends, has been an evolutionary process, in which necessity has been the stimulator of development, while materials, climate, and culture have been the factors determining the line of that development. Thus the European cathedral with its austere or spiritual lesson and thus the Oriental temple with its sinuous or elaborated suggestion have been developed; thus the low patriarchal houses (spreading, inward-looking, *mansioned* dwellings) of fear-inhibited China and thus the storied, individual homes (upstanding, outward-looking residences) of free-breathing America have come to be.

B. On the Occidental Solution of the Problem.

Expand Vertically and surround with Glass.

The use of glass has functioned materially in determining lines and forms of architecture in the West, while a limited population, coordinate position of woman, and a sense of consideration for the rights of others have determined the choice of circumferential lighting and ventilation. Even in the reversion to bungalow models, privacy has been made possible by the use of translucent glass where needed and thus outward-opening vents still serve to give ventilation and illumination. Moreover artistic effect and intent in these exterior vents is retained or obtained by glass colors and tones as well as by proportioned framing.

C. On the Oriental Solution of the Problem.

Contract Horizontally about a "Heavenly Well."

In a congested population where woman holds a subordinate position and the rights of others are not an item of first consideration, privacy can be obtained in a unique way by building around an open court and enclosing all within a *compound* wall. Thus within a great and populous city, a minute Arabion Nights Tales' garden can be found within one minute of a winding, unpromising street, back of a heavy, portered gate. Here loathesome diseases, noisome odours, and harassing sounds can at least be screened out from ear and nose and eye. One organizing feature of such an enclosure is the *heavenly well*, that skyward opening court which is so uniquely and happily named. The perfect heavenly well contains a pool or small stone basin of water, as well as shrubbery, which reflects and diffuses light into the one-storied rooms, opening onto this central court. This feature is not peculiar to Chinese architecture any more than it was peculiar to Moorish of Granada, the Pompeiian, or Roman where the atrium, compluvium, and impluvium featured and functioned; it is oriental and peculiar to a mediaeval civilization. Sometimes brass or silvered globes in the latticed windows add by reflection to the interior illumination effected by the pools and court shrubbery. The latticed windows covered with translucent white or pictured paper give a dim religious light interiorly when all is closed on dark days but quite sufficient under a tropical sun. Even the occidental can visualize the scene at night as the *lord of the household* looks into the "well of the sky" aloft or horizontally around to the latticed rooms translucent in their patterns all aglow (not ablaze) from the oiled or unoiled paper and the unseen colza-oil-light-source, all so **oriental.**

D. On Chinese Architecture.

Materials and Climate Factor.

The omnipresent deltoid alluvium and inland loess (which are so casually related to Chinese life) as well as the bamboo in the central-south latitudes have been largely determinative of Chinese architecture, while the absence of extensive and convenient quarries and forests has more or less stabilized this type. Great overhanging roofs on all sides are necessitated by the rainfall and excessive sunshine, while the upward curve to the eves, corners and ridges is demonded by practical considerations in lighting as well as by artistic dicta *and the cantilever construction.* (This last consideration effectively demolishes the tent-rope-catenary-origin-of-Chinese-roof theory.) These lines and curves and proportions of the outstanding features so seemingly distinct are neither subordinated by nor antagonized to but are correlated with the details of lattice lines. Each constituent is part and parcel of the perfected whole, just as the minutiae and the framework are all integral parts of the artistically-written Chinese character.

E. On Framing of Chinese Windows.

Bamboo, Wood and Paper Materials Prolific of Forms.

The framing of Chinese buildings of upright timbers filled in with interwoven bamboo and plaster lends itself to square or rectangular vents rather than to circular or arched. The openings so easily filled with bamboo woven into varied patterns or with wood carved and mortised into strange forms, present a most numerous progeny of patterns. After the holocaust in 1917, wherein the city of Chengtu was razed by one-seventh of its buildings, the rebuilding and reversion to type, which showed windows in all stages of development from the cave man up to today, was most interesting and instructive. The elements of time, cost, and materials cooperated to produce the jerry-built and more elemental types at that time. In localities where bamboo is lacking, there is a smaller number of types of lattice, due to excessive use of wood in the construction of buildings as well as to less of inspiration from bamboo weave possibly. In localities where wood is scarce and expensive, the apprentice carpenter is not allowed such free rein, so that the certain and approved lines of the standard patterns are more continuously reproduced.

F. On Artistry of Chinese Windows.

The Lattice of Pleasing Proportions, Spacings Rhythms Curves and Angles.

That which gives pleasure is more easliy identified than analyzed and synthesized. It would appear that that rhythm which the Moor

found semi-petrified in the harmonic motion of the desert sand in its great waves and proportioned and spaced detail of ripple, and then transported and transfused with life in Spain; that that relation of part to part which the Grecians embodied in such perfection in strong dignity; and that that feeling after variations which the Indian from Asia brought forth from his indistinctions—that these are all embodied in such a way as to produce something different and unique in China. Chinese lattice has the lines of the desert or the ocean wave, the proportions of bamboo or of the symmetrical in nature, together with the spacings of the grass of the meadow field or of the crees of the wooded forest: its lines, proportions, spacings, rhythms, turves, and angles are nature's own.

G. On Chinese Artists.

Every Chinese an Artist.

A workman is known by his tools as well as by his chips. The Chinese tool is the finest of hair brushes. The nation has been peculiarly at school with the brush, working and studying in black and white for centuries. The geometry of writing has never been taught consciously save by the few. but the unconscious feeling for proportions and spacings and lines and angles and curves in copy-study has produced that touch which makes Chinese character-writing unique. Chinese calligraphy is far more than a peer of Greek writing, which is the product of a nation acknowledged to be preeminent in artistry. A shop-street is not conspicuous for its blazon of color—at least to other than the newcomer—but it is notable for its display of artistically written shop signs in paired colors. This artistic education transfers. Some of the workers in wood pass beyond the artizan stage into the artificer class and thence into the aritst guild as it were.

H. On Cultures of Chinese Lattice.

Chinese Lattice Primitive, Developed, Borrowed, Hybridized, Nationalized.

To trace the historical evolution of Chinese lattice and its lore is absorbing, but it would lead into too many blind alleys and uncertainties. The study would lead over mountain passes and across desert sands of nomad wanderings, it would take one over caravan-trails almost obliterated by drifting sand or blown snow, it would take one back into centuries far remote from most of our thinking. Certain closely analagous patterns are found today among primitive peoples in South America, a cousin of the older "lightning streak" is found in what was until quite recently prehistoric Mexico, others are

similar to Indian pottery designs of Colorado, still others are found in present-day Algiers or Constantinople. Then the swastica in its various variations is associated with Buddhism, and a few designs are associated with ancient Chinese cosmogany. Some cultures suggest the steady impact of outside influence. Tribute and social and official customs are reflected in the dissemination of new cultures, yet in the the main the old-line, well-tested inherited art and patterns prevail. Chinese lattice speaks of and suggests cultures and influences of dynasties rather than of centuries, in a land where A. D. and B. C. have not been differentiated until of late. Dynamic dynasties have been marked in lattice by stressed patterns and variations in line and proportions. There is a connection and relation in Chinese lattice and its cultures that is not merely unconscious but one that is historico-genetic and actual.

Fundamental Factors That Predate and Predetermine The Lines of Lattice Evolution. Prerequisite to Aprreciative Understanding.

A. Physical Factors:

I. Function. Man needs light to see and air to breathe as well as protection.

a. Light transmission. Adjustable to day or night.

b. Air transference. Variable with day and season.

II. Environment. Protection in amount and kind depends upon weather, animals and man.

a. Climatic. Rain, wind, cold.

b. Societal. Man, culture, animals.

III. Materials. Available materials as well as needs determine solutions.

a. Structural. Wood, bamboo.

b. Translucent and, or transparent. Paper, cloth, mica, shell.

IV. Stability. Material strength must be provided according to mechanical principles.

a. Thrust, in-and-out in x-z plane. Expanse; depth, bede, thickness.

b. Gravitation, up-down in x-y plane. Vertical levitation, nonfalling, non-rotating: material, bar strength.

V. Plane-Geometry Division. Limitation of possibilities.

a. All-over. Simple all-over designs are not unlimited.

b. Concentered, nucleated patterns. Unique methods limited.

B. Psychological Factors.

I. Vision. Images limited in area and direction. See in units and parts.

a. Spot. Eye may be stayed by spots of certain shapes.

b. Line. Eye tends to follow line.

II. Reception by Brain. Distance and sizes only proximate with wide margins in judgement.

a. Absolute measures. Very undependable.

b. Relative sizes. More easily estimated.

III. Mind Reaction. Patterns of choice educable and fashionable

a. Symbolic patterned. Philosophic meaning desired.

b. Milieu Moulded. Dynastic fashions affected.

IV. Fixity Principle. Psychological stability as well as mechanical (desired.)

a. Stationary. Apparent stationary stability satisfying.

b. Mobile. Counter-motion gives change and equilibrium.

V. Desideratum of Correspondence. Penchant for unity.

a. Similarity. Sameness and repetition restful.

b. Contrast. Variety if not antagonistic, is intriguing.

Note: These several factors do not function equally in the production of lattice. The end-result, the resulting lattice is the give-and-take resultant of these fundamental factors acting and interacting through the centuries of Chinese Lattice history.

Classification of Chinese Lattice Windows.

A scientific classification involves chronology, genetic trans-mission of structure, and cleancut differentiations; but when the life-blood of evolution is somewhat like that in an ingrown village or like the stream-flow in a much-braided river it is not always simple to obtain. The major groupings are fairly satisfactory and mutually exclusive, but actually many of the individual examples may be classified in two or even more subgroups.

I. Field Division.	—	All-Over.	A. Square and Rectangle.
			B. Octogon and Quadrangle
			C. Hexagon and Triangle
			D. Polygon
	二	Frame.	E. Monofocal.
			F. Bifocal.
			G. Trifocal.
			H. Quinque-focal.
			I. Nonfocal.
II. Locking Systems.	三	Knuckled.	J. Simple Kunckled.
			K. Line Join
	四	Interlocked.	L. Double Hand.
			M. Interal-external Lock.
III. Harmonic Lines.	五	Wave.	N. Simple, Parallel.
			O. Framing Waves
			P. Recurvent—Greek Fret.
			Q. Looped.
	六	Swastica.	R. Cursive: Single, paired.
			S. Individual.
IV. Line Endings.	七	Ru I Scepter.	T. Distributed.
			U. Centered.
	八	Thunderscroll.	V. Inlooped—Cloud.
			W. Sigmoid—Thunder.
V. Straight Elements and Circles.			
	九	Icecrack.	X. Regular: Parallel, bilateral, rotational.
			Y. Irregular.
	十	Circles.	Z. Circle and Bar.
			&. Circle and Circle.

The Canons of Chinese Lattice: With definitive comment.

The ten commandments of Chinese lattice windows may be stated as follows: Let there be, there must be, in various permutations combination, and proportions the following—

I. Centrality.
II. Balance.
III. Enframement.
IV. Symbolism.
V. Line.
VI. Rhythm.

VII. Proportion.
VIII. Color.
IX. Size.
X. Spacing.

I. CENTRALITY is that to which all else is contributory. It is partly cardinal (in the compass sense), it is partly geometrical it is partly magnitude, it is partly quality, it is partly mechanical (equal-armed balance), it is partly psychological, it is partly social, it is partly philosophical, it is partly spiritual, but it is central focus.

II. SYMMETRCAL BALANCE is almost foreordained for a people sensitive to the fear of and to the use of gravity, which both alike call for the use of the equal-armed balance as architecturally affected in China. It is self-evident and satisfying. Triangular bracing may be effective and economical mechanically, but it is not so effective psychologically—to the non-engineer. Unequal-armed balance is used in supporting the cantilever of the upturned corners of building, but it is not obtrusively featured. It is the double and equal-armed Han Bracket that has been featured these centuries. This modified or compounded heaven-balance is self-evident and assured. It is not mere equal-moment balance, but it is equal-armed and equal-mass balance that produces satisfying—to the Chinese—symmetric balance.

III. ENFRAMEMENT is any effective method of hedging in and concentering eye and thought on the item enframed and of shutting out that which is extraneous. The frame is the foil, or almost the neutral side, of the enframed. Centrality endeavours to hold the attention by centripetal force of attraction, enframement endeavours to augment this force by towards-center compression and by separating and excluding extraneous and outside attractions. Enframement, especially a multiplied enframement is effective, even if it does smack of a weak centrality that must needs be "cabined, cribbed, confined". The Imperial City has its wall and moat within Peking. Peking has its wall and moat within the Middle Kingdom. The Middle Kingdom has its Great Wall of China. The Imperial City has its Forbidden City. The Forbidden City has its Great Central Audience Hall. The Audience Hall has its central Dragon Throne. The central Dragon Throne seats the Son of Heaven. The Great Pure Emperor sits enthroned in embroidered garments of state with central five-toed dragon placque over his judicial "central heart" as he sits in "heaven-balance"--the epitome of centrality embroidered and enframed. The Ruler of China as he sits facing south, multiply-embroidered and enframed in the center of the Central Kingdom ruling "under heaven" is concise comment on centrality.--symmetrical balance-enframement.

IV. SYMBOLISM is adopted when mere breathed or written words are too frail to be freighted with the weight of content. Ritual and designed forms are evolved and freighted with beauty and with meaning. The shapes evolved can usually stand forth in naked

beauty of form, or they may be gilded and bejewelled and chased precious metals or more-precious stone. The symbol is usually a sign of an attitude, an association, a loyalty, a philosophy, or an ideal of life and relation. It may have magical associations, it may have personal-relation connotation, it may have life-loyalty significance, it may have intellectual stimulus, it may have a restraining influence, it may have a challenge. A symbol is as meaningful as the users make it, for it is compact with the culture-ideals of the person or peoples who use it as symbol.

V. LINE is that which enrails the attention and leads the eye with gentleness or with urgency along a prescribed path to ports of call or and to the center of interest. This urgency of line depends upon thickness of line, upon curvature, upon spots of light and their attitudes, upon cross-bars and side lines with their distances and attitudes. Satisfaction in line depends not only upon the appropriateness of tempo, but upon a worth while goal--which is possibly symbol--that entrains thought in fit keeping with a philosophy of life.

VI. RHYTHM is brought about by a periodic change in the urgency of line. The entrained eye may be braked or speeded up mechanically or psychologically—by variation in line or by distribution of symbols. A regular, periodic change in line and tempo gives the effect of rhythm to the observer.

VII. PROPORTION between magnitude of line and magnitude of light spot is essential to the effect of the two upon the retina of the eye. The overlapping of images and the twilight zone of irradiation modifies this proportion. The geometric image on the retina of the eye and the physiologic and hence psychologic effect do not necessarily coincide or strictly correspond, as observation, at a distance of 500 feet of a two-inch strip of red placed next to a two-inch strip of blue reveals (in unpleasing purple), and as the practice of pointillation confirms. The Chinese calligraphist exploits this phenomenon of irradiation by varying proportions between black strokes and white spaces for different sizes of characters. It is not fair to the artistry of a calligraphist to optically enlarge his characters. The writer trims his brush to the absolute size in order to give the *effective* relative proportions. It may be empirical, rule-of-thumb, transmitted from of old, but it is done, Proportions and styles and time have changed in calligraphy, just as in lattice. Han and Tang and Sung bring up more or less definite types of characters to Chinese literati. The interplay of the arts and artcrafts to the production of culture milieu, peculiar to dynasties, is but natural and to be expected.

VIII. COLOR. is an accessory of line and enframement when properly adjoined in fitting and appropriate prime colors. Theories of color and their combining effect may not be definite, but the practice in China is nevertheless effective. Color makes line and spot visible that might not otherwise gain deserved attention and be virtually

lost. To be sure, colors are not often visible at night in Chinese courtyards-(when the black-white contrast is most effective), but colors do function by day in the best lattice.

IX. Size and distance and illumination determine the *magnitude* of impression and it determines that indefinite item called "Line". Thickness slows down that quality of urgency while thinness speeds it up. Size also affects the virtual value of curvature. The eye is slowed down by thickness as well as by intensity of curvature, and it is speeded up by straightness and thinness.

X. Spacing is wisdom exemplified in adjustment between size, proportion, line, colour, and distance—which wisdom has differed in dynasties and places –to insure the effective attainment of each and all of the above desiderata in the ensemble. In fact each and all—in just proportion—must mutually cooperate to give meaningful and beautiful design with illumination and possibly ventilation.

Golden Text: Light and ventilation must be arranged with *informed centrality*. Centrality and symbolism may, probably do, coalesce; and all else is subordinate and contributory. The lesser items of the law may mutually contribute to each other, but their major combined function is to subserve the central, focal idea.

General Considerations for Lattice Windows.

I. Windows must be designed for close-up and for further-removed observation.

II. Windows in themselves and in their grouping must reveal nucleation and so rhythm.

III. Windows must have major and minor features and so subordination.

IV. Windows must have symbols or meanings consonant with the purpose and use of the structure.

V. Windows must be wisely selected and combined as to period and style.

VI. Windows must be homogeneous or at least consonant in symbol and in classification with each other.

VII. Windows and their parts must be colored so as to bring out the window as a window and as a part of the ensemble.

VIII. Windows must have elaborate or simple ornamentation in harmony with the building and buildings.

IX. Windows must be proportioned with respect to the buildings as individuals and as a group or groups.

X. Windows must be arranged to set off the building as a whole, as well as its parts, and they must be contributory to the building.

General Principles for Individual Windows.

I. The individual window must be centered.

II. The individual window must be balanced right-and-left.

III. The individual window must be framed and "finished".

IV. The individual window must be supported by contributory surroundings.

V. The individual window must be balanced up-and-down.

VI. The individual window must have pleasing proportions.

VII. The individual window must have intriguing lines.

VIII. The individual window must have the pulse of rhythm.

IX. The individual window must have the sense of moderated movement, in parts.

X. The individual window must have the quiet of balanced poise.

General Principles for Suites of Windows.

I. Windows must be centered around the center-front of the main building.

II. Windows (often in threes) in each bent must be centered on the center of that bent.

III. Windows in side buildings must be vis-a-vis leading up to the main building.

IV. Windows in design and in ornament must be relatively enriched with due respect to the absolute importance and the position-importance of the building.

V. Windows must be unified and proportioned in respect to the layout of the buildings as a whole and in respect to the courtyard units.

VI. Windows on either side of the major-axis must be the mirror image of their vis-a-vis, even as the building layout must be foldable and superimposable along the same axis.

VII. Windows from the near and from directly in front must give the sense of verticality.

VIII. Windows from the side must give the impression of horizontality.

IX. Windows from the main entrance and way must give the sense of convergement upon the center-of importance.

X. Windows from the center of the, or a, court on "heavenly well" must give enframement.

Five Observations re Chinese Lattice.

First Observation: The Main Lines of Chinese Lattice had emerged by early Han times and were availiale for later use.

By Han and Pre-Han attainments the main lines of Chinese lattice were sketched out, but since that time these have been developed spottedly in time and in place, depending among other things upon commerce in thought as well as in things.

A. *Bases of Types:*

a. The critical factors that determine lattice evolution are two-fold; viz. mechanical and psychological. (For some purposes of study the division could be: physical, physiological, and psychological.)

b. The fundamental types of lattice are limited (circumscribed and few) by the very limitations of the critical factors themselves.

B. *Implicit and Explicit Types:*

a. The main phyla were early represented in lattice evolution but some remained or became for a time dormant.

b. The various phyla emerged comet-like, suddenly and dominatly in particular, appropriate times and places, and then some of them waned or were eclipsed for a time.

C. *Geography of Evolution and Retention:*

a. The trunk lines of commercial, intellectual, social and political contacts are the terrain of introduction and, or of stimulation and of emphasis of phyla and of species and of type flux, with proximate perfection as the end result. Compare and contrast the Hanchong-Chengtu-Yachow-Tachienlu culture and the Hankow-Ichang-Chungking culture.

b. Defunct trade lines, isolated side-lines, off-lines, and out-provinces are the locale for the further development and retention of type and of individual perfection for a century or many centuries beyond the date of "universal" vogue. Compare and contrast Omei-Kiating, Wen Chwan, and Heh Oh Tsi—Si Wen Chang—Chin Kang Lin, cultures.

SECOND OBSERVATION: The Styles and Vogues in Chinese Lattice are accented and become dominant cyclicly and or dynastically.

Dynastic lattice has come to be when this or that factor has come into the ascendant, often due to the patronage of the reigning house, at particular times, impressing its stamp upon trunk and limbs and branches to the timely production of a result of more or less of one piece.

A. *Dynastic Styles:*

a. Dormant phyla have emerged and reemerged with the force of discovery (So much so as to simulate a mutation or evolutionary jump of major dimensions) upon the advent of new contacts, vigorous trade, and puissant dynasties.

b. Erstwhile preponderating phyla have been repeatedly submerged and wellnigh suppressed by the revivifying of former phyla and the affectation of other fashions.

B. *Evolution within Families:*

a. There have been evolutionary saltations of minor dimensions within the temporarily dominant phylum, due to and according to the limitations and strength of the critical factors that have been regnant in the evolution of the phyla themselves—divergent evolution if you will.

b. There is a transfer of characteristics from phylum to phylum, when the major feature of one phylum functions as a minor feature in another genus—it may be in another phylum even.

C. *Homologous Evolution:*

a. During each dynasty, there has been convergent evolution in spacing and in proportion with varying and various characteristic lines in phyla and vice versa.

b. There have been convergent evolution in spacing and in proportion with varying and various lines in genera and individuals, and vice versa, peculiar to the particular times.

THIRD OBSERVATION: The Essential Mechanical Structure of Chinese Lattice and its Artistic Construction both function in determining relations and classification.

The classification of Chinese Lattice like that of any other organic growth is based upon major structure differences and minor feature variations—in this case artistic symbolism—which root back to choice (willed or forced) of prime factor and its implications.

A. *Classification:*

a. The emphasized major factor or and feature determines the phylum.

b. The emphasis may be such that the clasification may be double of even triple, and the same representative may find its place and way in several lattice combinations and arrangements.

B. *Factors and Specimens:*

a. Factors in major function give phyla of great contrasts and distinct distinctions.

b. The same factors in minor function within the phylum give, gentle gradations and slight contrasts.

C. *Multum in Parvo:*

a. The simple, pure, unadorned representatives of phyla are due to the emphasis of one factor and to the suppression of other factors and are of necessity limited to a few individuals.

b. The complex and various emphasis on two or more factore multiply subdivisions and individuals ad finitum. out of all consciencs and produce a museum of history.

FOURTH OBSERVATION: The Evolution of Chinese Lattice has been a selection from choices which have been "spontaneously" produced by the incidence of sundry complex causes.

Individuals perish, race persists in Chinese lattice. Evolution depends upon the successive, graded changes and the simultaneous elimination or decimation of past generations, and it implies the synchronous production of good and indifferent and or better specimens which must be mechanically or psychologically marked for survival or no.

A. *Life and Death*:

a. The phyla for the most part have persisted and interacted usually with wholesome restraining and constraining effect through the centuries.

b. The individuals and even types have been born, have grown, have developed, and some, even many, have died in every generation.

B. *Time and Progress:*

a. Time and numbers, or and concentrated study are essential to the production and the perfection of phyla and genera and representatives. "Live and learn" is scarcely more than drifting chronology, temporal, almost passive, interesting duration.

b. Time and decay as well as a discriminating eye are serviceable in the choice and, or elimination of the fit and the unfit. "Learn and live" is active, causal and relates to man himself and man's work. This attitude projects a race, a phylum, a type of liveable lattice as well as of other usefuls.

C. *Salvage and Discard*:

a. New lattice is always slightly different (of higher, equal, or of lower rank) and a quantity production with a quality differential is of major importance in allowing choice, selection, preservation of design. This selection period for any particular example seldom extends beyond one century and this is in sheltered and favored spots.

b. There is a constant and a continuous loss of the fit and of the unfit, the artistic and the otherwise, and the quality-differential loss or gain is of great importance. Very many examples go to the discard within twenty years, thanks to poor workmanship, poor designing, poor materials, inclement weather and or termites. These speed up the evolutionary process—be it advance or retrograde projection.

FIFTH OBSERVATION: Aside from the philosophical feature, the peculiar and characteristic Character of Chinese Lattice inheres in the ensemble of qualities (in various permutations and combinations) of line, spot, shapes, absolute sizes, relative proportions of line and space, balance and rhythm.

Chinese Lattice is that unique and peculiar compound of line-spot-proportion-size-rhythm-balance in wood and paper which the Chinese have evolved as part of their physical-social-artistic-religious-philosophical comple.

A. *Artistic Milieu*:

a. Lattice styles are acted upon by other arts and crafts.

b. Lattice styles react upon other arts and crafts.

B. Psychological versus Mechanical:

a. There is a psychological penchant for isolating, concentering, centripetal framing about a center of interest, that is intellectual, artistic, religious, and, or philosophical.

b. There is a mechanical tendency to revert to centrifugal dissipation in an all-over division of the field.

C. Chinese Lattice Peculiarities:

a. It is the line-spot-size-proportion-balance-rhythm, organic re-

lation that marks and remarks and demarks Chinese Lattice with respect to all others.

b. It is the terrain-history-physical-physiological-psychological complex that subtends this line-space-proportion combination and makes it, creates it unique.

The Philosophy of Chinese Lattice.

The writer has endeavored to write this as though he were living and thinking in terms of the late nineteenth century in China. As a matter of fact much of the best lattice has already gone, and the psychological background has faded and dimmed as well. Some may object to this frank statement, even though it be written as of date 1899.

The key to an understanding of Chinese Lattice is a sense of the overwhelming importance of the basic, subtending philosophy. This does not take second place to line-proportion-*et al*, but it is fundamental, basic, predominant. And by the same token Chinese Lattice as such is doomed, not merely because of the coming of the machine age, technicological revolution, and glass, but because of the changing mental framework, new categories, and revolutionary philosophies.

The writer is not doing a post mortem for academic interest, and the inductions and deductions are brought about for the sake of synthesis, and transfer, and new creations. The writer has used the principles and designs for lattice and designs in the spirit of Chinese Lattice; but he would suggest as merely basic the appreciative use of the philosophy *principle* in creative work.

A. Basic Beliefs and Considerations.

a. Cosmogony: The Tai Chi or cosmic circle which is divided into two equal parts by an S passing through the center—producing the light male and the dark female—and from this and these come all things. The eight or sixty-four kua—combinations and permutations of the male and the female element taken three at a time or six at a time give all things. Heaven is more than half personalized and is symbolized by a circle. Earth is somewhat similar and is represented by the square. Colors and cardinal points have basic signification. South, facing towards the male sun, is determinative of chief direction. The five cardinal points enter into much lattice.

b. The Spirit World: Ancestors are give the cardinal place in the home and so centralize and focus all. The gods and idols focalize the temple construction. The devils must be obstructed and turned aside.

c. The Religious Symbols: The pre-historical swastica is the most common symbol in lattice for it represents the sacred heart of Buddha. Then there are many other symbols from this same religion that are found in carvings but they are not so distinctively religious. The Ru I Scepter is more often found in Taoist temples but it is not exclusively used there. The instruments used in Confucian worship at the annual sacrifices are often used.

d. Learning: Characters are almost sacrosanct. Quotations well written take the central position. Scholarly accomplishment symbols rank high. Birds and flowers of conventional meaning do well decorate.

B. Constructive of Architecture.

"It (philosophy) builds cathedrals before the workman have moved a stone, and it destroys them before the elements have worn down their arches. It is the architect of the buildings of the spirit, and it is also their solvent:—and the spiritual precedes the material. Philosophy works slowly. Thoughts lie dormant for ages, and then, almost suddenly as it were, mankind finds that they have been embodied in institutions. Whitehead in "Science and the Modern World."

C. *Integral in Beauty.*

Man and especially the Chinese builder has adjusted his instinctive reaction and reasoning to a gravity world and has produced symmetrical and central balance. He also thinks in terms of other desiderata—which may or may not be true—of which *he* is assuredly certain. Beauty to a particular man is that which is in pleasing and suitable adjustment, in right relationship, according to his instinctive mental frame-work, and is more than symmetry and line and color and proportion, it is more than mechanical geometry and rhythmic sound, but it is psychological and spiritual as well.

Beauty is apperceived rightness—fitness, finish, quality; be it of matter-force-motion, or be it of personality-motivation-conduct. Beauty is perceived right-relations through informed sense. The intensity of "the pain of beauty" is in proportion to the acuteness of the senses, the pertinancy and extent of the information, the degree of rightness of the relation, and the relative or absolute import of that relation. Beauty is a subjective-objective preposition—even as sound requires a sounding body and a receiving ear—which is conditioned by the instinctive or conscious categories which environ them.

The beauty of symmetrical balance in a gravity-world would be something else in a surface-tension-world; the beauty of law could not be accredited in an accident-world; and the beauty of the wholeness of an integrated personality could not be seen in demoniacal

categories. The verdict "beautiful" may not be *consciously* based upon law, order, causality, time, space, love, purpose, justice, but this does not negate the truth that the substrate of beauty is the accepted categories—be they consciously or be they unconsciously realized, be they formulated or be they left in the indefiniteness of the subconscious, just below the threshold of statement. Beauty and its realization are enmeshed in a space-time-cause-personality-world.

There is a beauty of the heaven-balance, there is another beauty of the balanced stress of molecular forces, there is moreover a beauty of the forceful wedge in the midst of equal and opposing forces, there is further a beauty of radiant movement; there is still further a beauty of pulse and rhythm in elastic media; and there is then at long last a beauty in the realm of life and personality and motivation. Man lives in these categories and finds beauty in perfection of adjustment therein.

The several beauties of regnant motives, purposes, mentation, feelings, ideas, ideals, springs of action! The sublime beauty of universal law! But what have these to do with the mechanical and the physical in Chinese Lattice! Much everyway. The categories of gravity, molecular forces, resolution of forces in general, wave motion, life hopes and life fears, wealth and prosperity, life powers and life relations, life and its entails, heaven and earth, and primal, forces all break through and express themselves in lattice, informing it with meaning, giving it centerability worthy to be circumferenced, framed and dwelt upon - in realized beauty. In the very laws of lattice themselves stand forth the spirit of man and his fit and appropriate response and relation to his world. Herein is revealed beauty.

"All and a Word"

This study has been a revelation to the writer as it has continued —as a hobby—step by step, stage by stage, year by year.

1st. Stage: A discovery of isolated unexpected placer gold, isolated crystallized, lattice art. This first discovery gives the discoverer the right to use and to repeat isolated beauty.

2nd. Stage: A discovery of a "natural history" that paralleled the cultural history of a people. This second discovery permits the selective use of period patterns and gives an historical perspective.

3rd. Stage: A discovery of fundamental grammar that relates to fundamental mechanical, physical, biological, physiological, and psychological principles and laws. This third discovery grants designing in ones own right.

4th. Stage: A discovery of a philosophy that had expressed itself in architecture as well as in letters and life of a people. This fourth

discovery gives intellectual ownership of large estates that are farmed by "hands" (in America) and that are worked by "feet" (in China).

5th. Stage: A discovery of the philosophy principle. This fifth discovery gives more than a king's patent to the 20th. century and beyond to "head" and "heart" and "hands" that can conquer and can hold that time-continent in a philosophy that is true, inclusive, and conclusive.

China's philosophy first said and then her builders echoed: Meet my ancestors." America's religious fraternity—political equality and economic exchange philosophy in fortunate conjunction with rise in science and mechanics was transmuted and gave corporate objectification in airdromes, union stations, palaces of the silver screen, singing towers, auditoriums, and skyscraper built around express elevators,—all of which are vocal with "Meet our contemporaries". But there are philosophies and philosophers of penetrating and courageous insight who seem to suggest. Meet us and, or our ascendants tomorrow, here and, or hereafter." It is quite possible that Darwin and Einstein and Dewey and Millikan and Eddington and Rufus Jones and Jane Addams are the prophets and determiners of the architecture and its lattice that is to be —tomorrow. This study began with angles and lines and it ends with Confucius and the see-ers of tomorrow.

Note: The illustrated lecture included examples of the twenty-seven classifications, as well as practically all of the seemingly far-fetched and abstract ideas presented in the next to the last section, but these must perforce be omitted from the journal.

August 1, 1931.

Notes on Illustrations

Rather than select six illustration at random it seems wise to select all of them from one group and from one class in that group. These are not lattice windows proper but they are lattice borders. The illustrations all belong to the Catenary-Frame Borders.

By placing a steel mirror at the point indicated by the arrow, so that it stands vertical and at right angles to the length of the wood-cut, the pattern will be doubled. Thus the observer may obtain the border effect.

Lattice windows are sometimes arranged in a series of concentered frames, one within the other in "nest" form. These are border-counterpart of this idea. The series of frames are tied together by various devices so that the eye is led from frame to frame.

A. This is a series of frames almost enclosed by near-frames or especial lines which run from end to end of the border, so that the eye is led from end to end of the design.

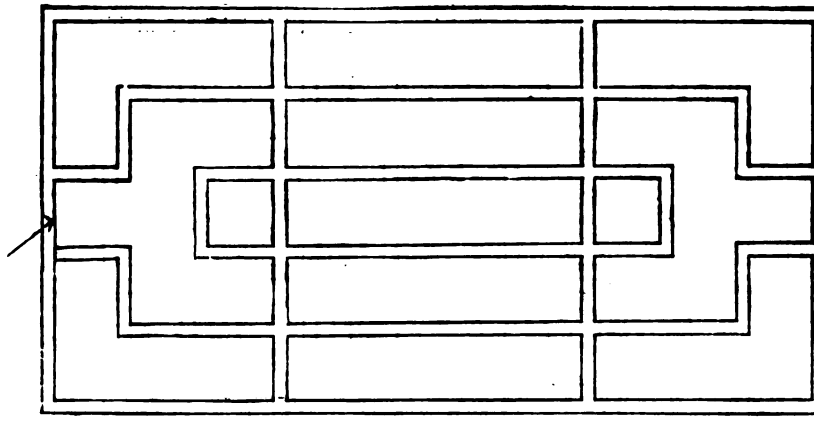
B. This is a series of concentered frames, repeated in a simple, rich, and dignified way.

C. This is a series of small oblong rectangles supported by the "double-embrace." Each pair of arms is tied to its neighbor in such a way that the eye is entrained and travels slowly along the length of the border.

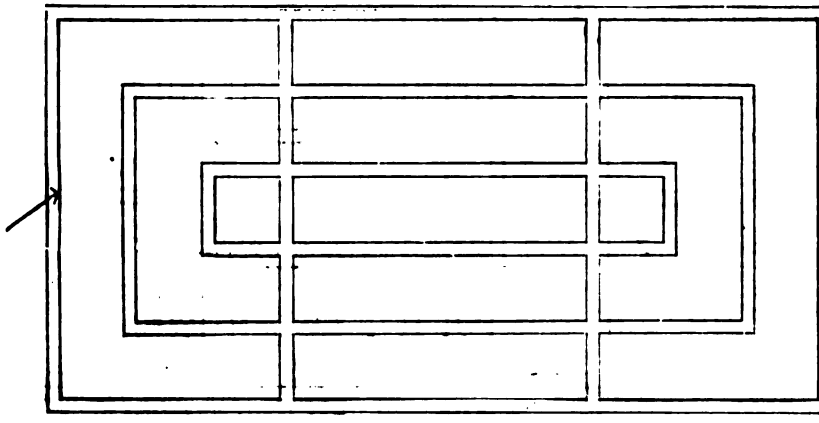
D. This is a series of rectangles supported by the knuckled cloud bands. This design was affected a century ago in lattice, but the cloud band has come down from the Cheo Dynasty when it was so wide-spread in bronze designs.

E. This is a simple variation with the cloud band turned over.

F. This is a series of frames removed from angularity by a curve. The squares are connected by four-petal prunus, and knuckled by Ts, alias "priest-heads."



A



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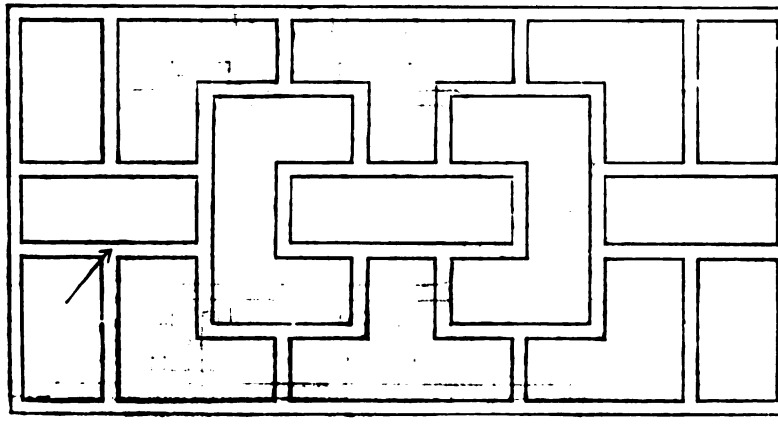

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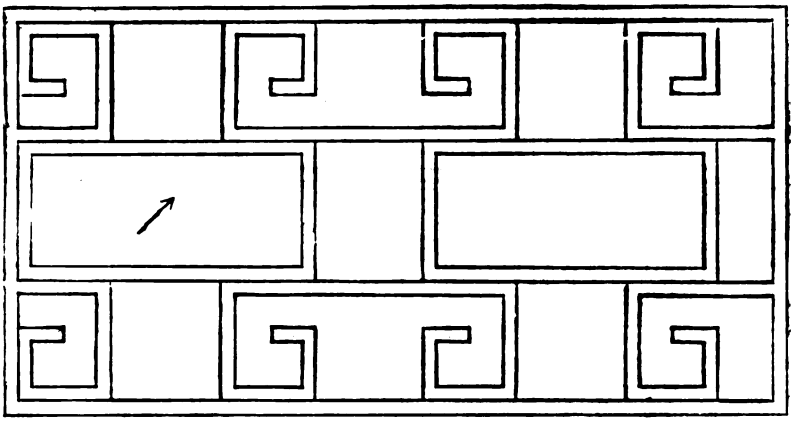

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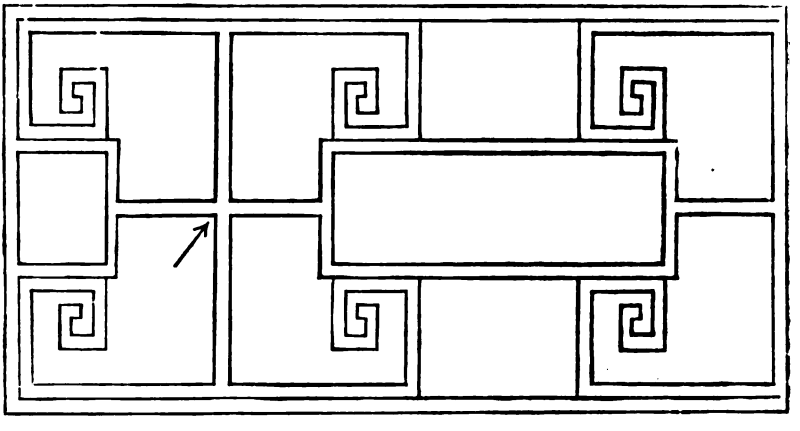

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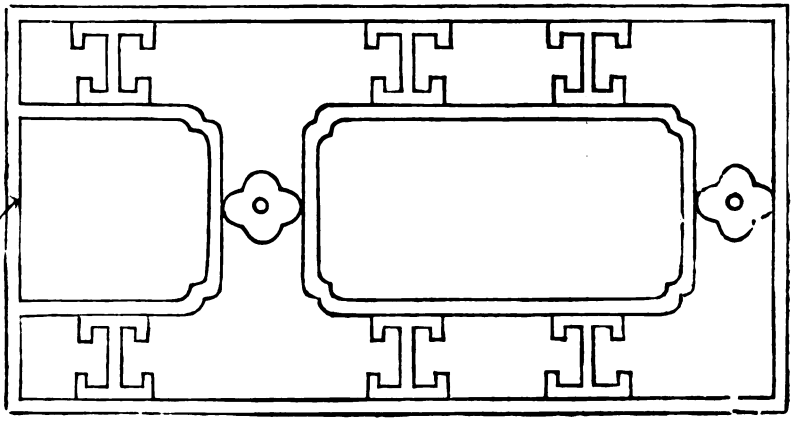
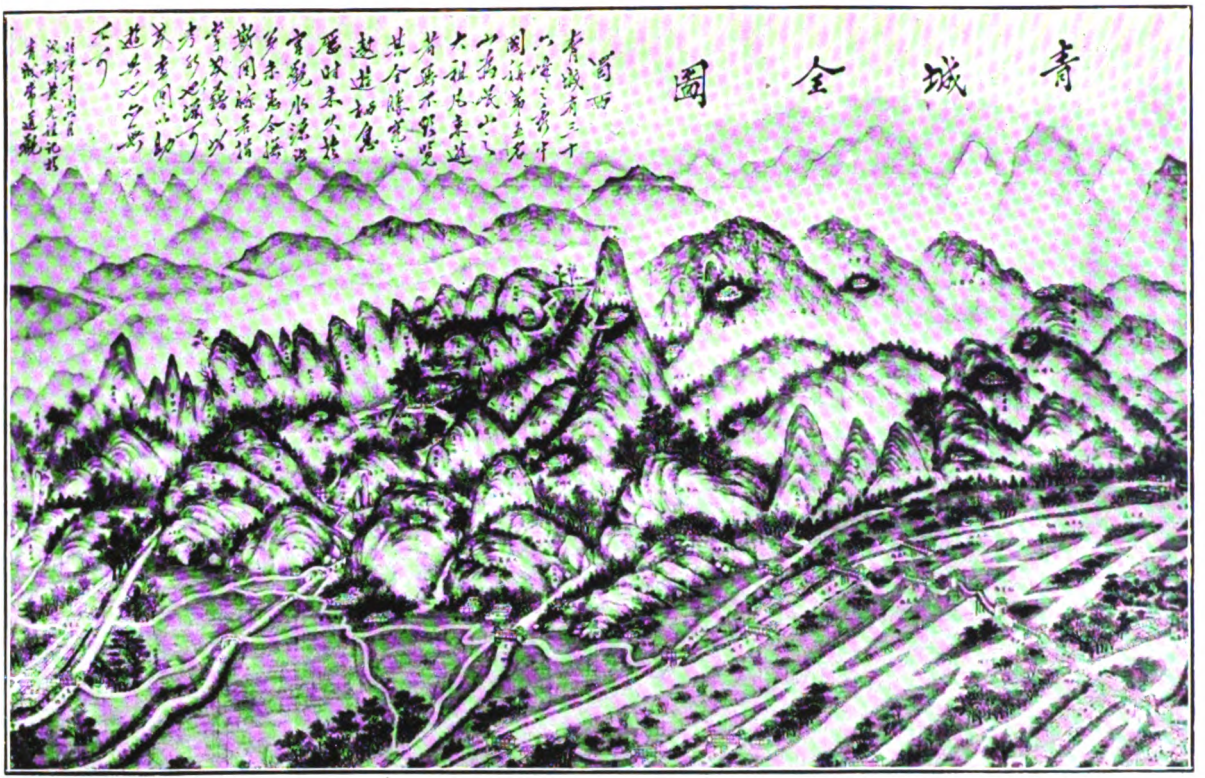


Turning to the south, Kuei Ch'eng Shan 鬼城山 Ghost City Mountain looms up. It is commonly called Yüen Ch'eng 月城 the Moon City. In the Lu I Chi 錄異記 Strange Chronicles it says: "In the time of Jen-Tzu, the seventh month, Ghost City Mountain collapsed on account of the rains. Floods came suddenly. The Temple of the Elders was about to be carried away. Unexpectedly, the cliff wall hurled itself down and became a protecting bank turning the floods away from the temple. Thus the temple was saved. Formerly it had been difficult for the monks to find drinking water. Now a stream came to the kitchen door even during the winter time. From this spot the paths gradually reach the level plain. Leaving the first peak and turning towards the east, there is Huen Yüan Ting 混元頂 Muddy Roundtop. Those triple peaks are like a roasting-pan turned upside down. At the bottom of the third one is Hsüan Yüan T'ai 軒轅台 Hüan Yüan's Stage. (In olden days he is said to have invented the compass and used it in battle; his wife developed the silkworm and made cloth. He was a king.) Now, we call the place T'ien Shih Tung 天師洞 Heavenly Teacher's Cavern. (Chang T'ien Shih is a famous Taoist patriarch.) The cave is in the face of a steep cliff. Looking down from the temple one trembles with fear because of its height. To the east of the T'ien Shih Tung is Lung Chü Shan 龍居山 Mount Dragon Nest. Its other name is the P'ai Fang 牌坊 Memorial Arch. During the Han Feng 咸豐 Period (A. D. 1851-1861) in the Ch'ing Dynasty a man named Hsü K'ai lung 徐開龍 from Kuanhsien fought the robber Lan. Unfortunately he met death. A memorial arch was erected for him. At some little distance from this spot one sees T'ai P'ing Shan 太平山 Peace Mountain, also called Yoh Wang Shan 藥王山 Medicine King Mountain. South of the cavern there was a rope-bridge. In comparison with the towering cliffs it was as tiny as a thread supported by a single stick of wood. Like ants the travellers go in procession. One looks down from a dizzy height. But now the bridge is built of stone with railings so that one crosses it with ease. Passing over this bridge and going some three *li* one finds the Tsu Shih Tien 祖師殿 Temple of the Patriarchs, also known as Hsüan Yüan Ting 軒轅頂 Wagon Crest (because "Hsüan Yüan" also invented, it is said, the wagon). In the old days, it is related, Huang Ti 黃帝 the Yellow Emperor prayed to the Immortals at that place. To the south is Chih Pi Ts'ao 擲筆槽 Rejected Pen Channel, some fathoms deep. About a *li* from the bridge one may find Chang T'ien Shih's Warning to the Ghosts. At the side of the bridge which is in the middle of this mountain between two others one beholds "True Pictures of the Five Lofty Mountains". The bridge is some fifteen feet long. Careening precipices overhang each end. It is dangerous to look down from the bridge. Beside it is Shih Kuei Shih 契鬼石 the Stone of the Ghostly Compact. For it was here that Chang T'ien Shih made a vow with the spirits. At the centre of this mountain one may find

a fissure about twenty feet wide, and some sixty or seventy feet deep. It has a reddish colour. In the opening the tree leaves and the flowers are speckled with black spots. What is the explanation of this? The opposite side of the fissure is called Chin So Ai 金鎖崖 Golden Lock Cliff. The tiny path resembles a long rainbow hanging down. It is said that at the bottom of the cliff were the Fuh Yung Hsi 芙蓉溪 Hibiscus Stream and Ch'ing Feng Fuh 清風瀑 Pure Breeze Lake. Turning first to the south and then towards the east Pai Yün Hsi 白雲溪 White Cloud Torrent may be seen. A little farther from this cliff rises San Shih Shan 三獅山 the Mountain of the Three Lions which resembles three couchant lions. In short, the Great Face Mountain dominates all the mountains of the Azure City. In their very midst is the T'ien Shih Tung, surrounded by all these ranges like a city wall. From the beginning of the world it has been a celebrated spot.



DIAGRAMMATIC PICTURE-MAP OF CHIN CHEN, or GREEN CITY. (*Phelps*)

Note the city wall of crenulate mountains in the left center and the Kwanhsien-Chengtu Irrigation System in the right foreground.

RECORDS OF CH'ING CH'ENG SHAN REVISED BY HSIANG HSUEH IN 1930

TRANSLATED BY CHANG FANG-CH'IAO AND
DRYDEN LINSLEY PHELPS

(Translator's Note: Ch'ing Ch'êng Shan 青城山, Azure City Mountain, is a group of picturesque hills bordering the Chengtu Plain some 50 *li* Southwest of Kwanhsien. Among the precipitous crags overlooking deep-cut ravines were built in other days gorgeous terraces of Taoist temples. Many of these remain, chiefly clustered about a sacred cavern, the T'ien Shih Tung 天師洞. Recently, other large temple-like edifices have arisen to serve as summer hotels rather than as retreats for meditation and sequestered worship. The following pages contain excerpts drawn from the first two chapters of Hsiang Hsueh's volume. I have been able to see but one copy of this book, of which I have had a manuscript copy made.)

PREFACE. Tu Kuang-ch'êng 杜廣成 began the *History of the Azure City Mountain*. Fan Chung-li 范仲立, Li Shang 李常 and Chang K'ai 張開 continued it. During the reign of Kuang Hsü of the Ch'ing Dynasty, a certain man named P'ên of Kwanhsien, desiring to add to the future lustre of the mountain, continued and completed the annals. His materials, however, were not of the highest excellence. I felt this more poignantly each time I ascended the hills for the view. The mood came upon me to rewrite it all. But worldly affairs delayed me. In the first month of mao ch'ên 戊辰 (? 1898) the weather being fine, the buds of the apricots green, the blossoms of the peaches red, I was filled with happiness. Taking P'ên's history in my hand I scrutinized its good points as well as its errors.

It was Wang Yên who erected the Upper Limpid Pavilion 上清官, constructed a clay image of Wang Tzü-p'u 王子晉, and painted murals on the temple walls of twenty-one T'ang Dynasty kings. Literati and the common herd, fine ladies and the wealthy, thronged the roads to worship. But as a matter of fact, this is not the "Limpid Pavilion" of the Azure City Mount. For that one was built by the brother of T'ang Tao-hsi 唐道襲 of Szechwan. Pi Fêng 薛逢, a Mienchow magistrate, dreamed of entering the Heaven's Granary Cavern 天倉洞. He sent men to inspect it. By studying the environment, and entering to a depth of ten *li* they admitted that it was the "Heaven's Cavern" of Tou Shui Shan 竇水山, not the

"Heaven's Granary" of Ch'ing Ch'êng Shan. This was the first error.

K'ung Ming 孔明 frequently cleared away the soil to examine the seal characters of the tablets Chin Yung Fang 金容坊 (The Arch of the Golden Facade) and Shih Sun 石筍 (Stone Bamboo-shoot). Thus he recognized them as the memorial stones of a man named Ts'an Ts'ung 蚕叢氏 who had these carved in memory of his kingdom When Li Hsiung 李雄 occupied Szechwan, again he dug them out for examination and asked Yüan Hsien 袁賢 about them. The *Shu T'u Ching* 蜀圖經 *Szechwan Illustrated Classics* describes them in detail. It is not to be supposed that K'ung Ming learned about them by enquiring of Yüan Hsien. Pung Ch'êng-kung 容成公 was the teacher of Huang Ti 黃帝 the Yellow Emperor (the first emperor of China), but he was described as a man of the Chin Dynasty, 晋朝 He spoke jestingly with Li Yao-fu 李堯夫 who was really Li Hao 李昊. How could this Li be proved the Li Hsiung who lived with Yuan Hsien! This is error number two.

The daughter of Jui Tsung 睿宗 (a king's name of the T'ang Dynasty) of the T'ang Dynasty entered the Buddhist priesthood. Yü-chên Chin-Hsien 玉眞金仙 the True Golden Jade Fairy, was the only title of honour which could be given her. In the *History of the Wei* 魏 *Kingdom*, Chang Ling 張陵 (the famous patriarch of Taoism) came to Szechwan and dwelt in Ku Ming Shan 鵠鳴山, the Mountain of the Wailing Heron, not in Hao Ming Shan 鶴鳴山, the Mountain of the Crying Crane. This mountain is different from that of Ta Ih 大邑 (General Liu Wên-huei's birthplace) which also bears the same name. This is the third error.

In the *Tzu Hua-li* 紫花梨 *Purple Blossoming Pear Records* composed by Hsü Mei 許獃 of the T'ang Dynasty, it was Mr. Hsing 刑 who sent medicine to the emperor Wu Ti 武帝 not Yuan Hsing-shêng 元刑生. The priest's name was Liu Yüin 劉雲, not Yüin Yüin 雲雲. Yuin Shêng Kung 雲昇宮, the Rising Cloud Pavilion, was the Ch'i Hsia Kuan 棲霞觀 Perching Cloud Temple at Yüin-yang 雲陽. Ch'u Fa-yen 瞿法言 of the T'ang Donasty ascended to heaven from that spot. Hsü Mei described himself as a guest of the Rising Cloud Pavilion. But the writer did not know his real name. This is the fourth mistake.

At the end of the Ming Dynasty, Chengtu was beseiged by Shê Ts'ung-ming 奢崇明 for one hundred and two days, not five days. "A monkey with a cap" "沐猴而冠" refers to the people of Ch'u, 楚 but the writer is not clear. In the *Biography of T'ao P'ing-chung* 姚平仲 there is an expression, "Supposing the collector of medicine cannot reach that place." But the passage cannot be explained by the omission of 'the collector of medicine'. This is the fifth error.

Li I 李意 an historian who however does not appear in the *History of the Immortals* lived at Ch'ing Ch'êng. Fêng Ta-liang 馮大亮 met with a priest on T'zu Mu Shan 慈母山 the Benevolent

Mother Mountain which is far from Ch'ing Ch'êng. Wang Hsien-ko 王仙柯 retired from the world and dwelt in Ts'ui Wei Shan 翠圍山 the Mountain of the Turquoise Kingfisher which was at Yung-k'ang 永康, not Ch'ing Ch'êng. This is the sixth blunder.

Lu I Chi 錄異記 *The Annals of Strange Event* states: "To the south of the Sphere of Heaven Mountain 乾元山 stood the East Pillar and the West Pillar," (the "pillars" are mountains). The same volume says that formerly it was said that these pillars were north of Chinchou 金州 the Golden District. It is obvious that they do not belong to Ch'ing Ch'êng. Chang Chüin-hsiang 張君相 and Ma Tuan-ling, 馬端臨 commentators on Lao Tzu, describe the priest of Min Shan 岷山道士 in unreliable words. It is apparant that Min Mountain is not Cning Ch'eng. In the *Shên Mu Tz'u Chi* 聖母祠記 *Sacred Mother Temple Records* by Su Yün 蘇惲 the preface describes Ling Ch'uan Hsien 靈泉縣. The was the Sacred Mother Mountain of the Ling Ch'üan district, not the Holy Mother Mountain described in *Huan Yu Ti Chi* 寰宇地記 *Annals of the Whole Universe.*

The writer's material was too condensed. I therefore widen its range from eight to eleven divisions:

I. History; II. The Celebrated Mountains; III. The Temples; IV Landmarks; V. The Immortals; VI. Taoists and Buddhists; VII. Hermits; VIII. Native Products; IX. Mineralogy; X. Miscellaneous Events (poems, tales, etc.); XI. Appendices.

I. The History of Ch'ing Cheng

The Azure City, fifty *li* southwest of Kwanhsien, is one of the famous mountains of Szechwan. According to *Yü Kuei Ching* 玉匱經 the *Jade Chest Classic*: "Azure City is fifth among the great and precious heavenly caverns, also called Ch'ih Ch'êng 赤城 Ochre City. It is in the northwest of Szechwan, to the south of Min Mountain. The Yellow Emperor travelled all over the world, and he dedicated Azure City as premier among the Five Lofty Mountains. Within a month all the mountains came to visit him. The Yellow Emperor engraved an inscription to show his reverence. The seal characters are still visible." The *Mao Chun Chüan* 茅君傳 *Biography of Mr. Mao* states: "Azure City is the fifth Heaven Cave, one of the greatest of the celestial caverns." The *Ch'ing Ch'êng Chi* 青城記 *Azure City Annals* affirms: "Mount Min is some thousand *li* long in an unbroken succession of ranges but Ch'ing Ch'eng is the first peak of all. The front is termed Ch'ing Ch'eng. The rear is known as the Mountain of the Great Face. As a matter of fact, the two are but one mountain. It contains seventy-two caves of which eight are very large. Of the Mountains of the Celestial Granaries, the Immortals have made thirty-six peaks their abiding places. Marvellous tales are related. Those immortals who have not received their assignments or who have wandered about the globe put up in these caverns. Clouds frequently

clothe the highest peak of these hills. Every day fine weather does not exceed six or seven degrees. The *Ming ShanChi* 名山記 *Book of Celebrated Mountains* avers: "Ch'ing Ch'êng is situated in the southwest of I Chou 益州. It is also known as the Ch'ing Ch'eng Tu 青城都 Azure City District. It resembles a city. On the mountain are 'Cliff Houses' and 'Ochre Walls', the very places indeed where Chang T'ien Shih 張天師 dwelt! The south end connects with Mount Omei. In the middle lie the Celestial Caverns where the spiritual classics were stored. Chang T'ien Shih (i. e., Chang Ling 張陵 came to Szechwan and dwelt in Ming Ku Shan 鳴鵠山 the Mountain of the Wailing Heron, which is really Ch'ing Ch'êng Shan." As the *Sui Shu* 隋書 *History of the Sui Dynasty* states: "There is Ch'ing Ch'êng Shan and Ming Ku Shan in the Ch'ing Ch'êng Shan district." (Tr. note: Ming Ku Shan or Ku Ming Shan; it is written both ways.) But the *Wei Chih* 魏志 *Records of the Wei Dynasty* differs slightly. It states 'Hao Ming. 鶴鳴 Crying Crane in place of 'Ku Ming'. The T'ang Dynasty *Liu Tien* 六典 *Sixth Digest* also claims that it (Ming Ku Shan) is one of the famed mountains in northern Szechwan. The *Wu Yoh Chên Chün Tien Chi* 五岳眞君殿記 *Temple Annals of the Five Lofty Mountains* by P'én Ch'éng 彭乘 of the Sung Dynasty says: "The Ch'ih Ch'êng Tung T'ien 赤城洞天 Ochre City Celestial Cavern was constructed by Mr. Ning 甯 a pottery official who lived in intimate touch with the spirits. This Mr. Ning moved hither and yon by means of smoke vapour. On a favouring breeze the Yellow Emperor came to pay him his respects, and to present him with the *Lung Ch'iao Ching* 龍蹻經 *Leading Dragon Classic* whereby he learned to soar aloft. Having been awarded the Seal of the Three Pavilions, he received the title Wu Yoh Chang Jên 五岳丈人 Elder of the Five Lofty Mountains. During the reign of Chung Ho 中和 he was again honoured as the Hsi Chin Chên Chün 希壹眞君 Rare True Prince. Although the world is large, yet Ch'ing Ch'êng is the most exalted in marks of honour." The *Hsu Po Wu Chih* 續博物志 *Universal History—Continued* states: "Every year the Ch'ing Ch'êng district magistrate did reverence to the Azure City with gifts of plants. The T'ang Dynasty emperor Hsüan Tsung 玄宗 (712-754 A. D.) had dreamed of a man clad in scarlet escorted by Immortals who came to visit him. Hsüan Tsung summoned Ssü Ma Ch'êng Chên 司馬承禎 to find the man. Ch'êng Chên said: 'You have bowed down before the Five Lofty Mountains for the sake of their power and blessing. But Ch'ing Ch'êng predominates over the Five Lofty Mountains, has the authority of the Three Heavens, and can bring charges against all the gods. Therefore the Azure City Temple should be built for worship.' Tu Kuang-t'ing 杜光庭 remarked, 'It is the divinities which protect the kingdom from calamities. Therefore a place of worship to them should be established as an expression of gratitude. The jade tablets and the gilded dragons are thrown into all the famous caves of the world. So the records can still be found in

the Azure City Cavern. Most of the caves communicate with one another.'" The *Hsien Chuan Shih I* 仙傳拾遺 *Collected Fairy Tales* relates: "An old man of Mount Sung (one of the Five Lofty Mountains of China) during the Chin Dynasty fell into a mountain cave. For a half a year he rambled along until he came out at the Azure City." The *Nü Hsien Chuan* 女仙傳 *Narrative of the Nymphs* tells: "The wife of Chang Ling ascended to heaven from Yang P'ing Hua 陽平化 in P'ên Chou 彭州. Yang P'ing Hua has a cave called the Teng Chen Tung 昇眞洞 Cave of Ascendent Truth. It communicates with Ch'ing Ch'êng. The Chengtu Yü Chü Tung 玉局洞 Jade Chess Cave connects with the Celestial Cavern at Ch'ing Ch'êng." The *Hsuan Chung Chi* 玄中記 *Mysterious Records* says: "The Ch'ing Ch'êng caverns have three subterranean tunnels. The northwestern one leads to the K'uen Lun Shan 崑崙山 K'uen Lun Mountains, source of the Long River. The Tou Shan Kuan 斗山觀 Bushel Mountain Temple communicates with the Great Face Mountain." The *Tung T'ien Fuh Ti Chi* 洞天福地記 *Annals of the Celestial Cavern and Blessed Earth* states: "Ch'ing Ch'êng is some two thousand *li* large. Ten heavenly caves communicate with each other. This is actually true! It is related that the city of Chengtu where we now live was once situated on the Azure City Mountain." But this statement is unreliable. When one comes upon such material it is not necessary to believe it.

II. The Celebrated Mountains.

The highest peak of the Ch'ing Ch'eng group is Ta Mien Shan 大面山 Great Face Mountain, also called Chao Kung 趙公 Duke Chao because Chao Yü 趙昱 of the Sui 隋 Dynasty (A. D. 590-617) dwelt there after his retirement from mundane affairs. The *Chia Chi* 甲記 *Chia Records* state: "The summit of the Great Face Mountain is about seventy-two *li* distant from the level ground. Great Face Peak is chief of this range. The average person cannot attain its heights. Rare birds and strange beasts, unusual flowers and plants are found there. On the summit are fairy habitations, abiding places for the immortals, golden palaces and halls of jade. Those who possess leanings towards the Taoist religion visit there and may be seen. Common folks are not allowed to gaze thereon." The *Fang Yü Sheng Lan* 方輿勝覽 *A Glance at the World's Wonders* explains: "The left side of the Azure City Mountain connects with the Great Face Peak. The right side joins the Mountain of the Wailing Heron. In front rises Lion Mountain." The *Ch'ien Ch'ueh Lei Shu* 潛確類書 *Miscellany of Hidden Truth* records: "Great Face Peak is one of the seventy-two spots of special sanctity. Lo Chen Jen 羅眞人 the patriarch Lo dwelt there." The *Yu Ti Sheng Chi* 輿地勝記 *Annals of the World's Wonders* says: "Ch'ing Ch'eng is to the north of the San Hsi 三溪 Triple Torrents. The mountain

is precipitous. Occasionally the sky is clear. The foothills at the base of the Azure City Mountain resemble children kneeling down in the presence of their ancestor. Even in the springtime they are decked with snow. People rarely go there, except during sultry day when travellers frequent the place. At such times the weather will be very fine and balmy. A few days of effort bring them to the heights. Beyond that point it is impossible for any one to climb!" The lower range situated on the north side of Great Face Peak is Ta P'ing Shan 大坪山 Great Plateau Mountain. Those who ascend Great Face Peak must traverse Ta P'ing Shan. Lao Chüin Ai 老君崖 Lao Tzu's Precipice is to the east. A temple in honour of Lao Tzu crowns the mountain's crest.. Next to Lao Tzu's Precipice rises San T'ai Shan 三台山 the Three Altars; and next is Wa Tuan Shan 窪斷山 Broken Cavern Mountain. During the *Wan Li* 萬曆 Period (A. D. 1573-1620) of the Ming Dynasty the magicians proclaimed the presence on the mountain of a royal omen in the form of vapour: *wang ch'i* 王氣. To the south of this mountain lie O Niu Shan 臥牛山 the Mountain of the Reclining Heifer, and Chi Sheng Shan 紀勝山 Mount of the Famous Chronicle, which were also known as Shih Ti Shan 石梯山 Stone Staircase Mountain and Fuh Niu Shan 伏牛山 Mount of the Prostrate Cow, on which bloom rare flowers and fairy plants. Long life is bestowed on him who partakes of them. Ta Niu Hsin Shan 大牛心山 Great Cow-heart Mountain lies to the east of Chi Sheng Shan; Hsiao Niu Hsin Shan 小牛心山 Little Cow-heart Mountain rises to its north. Chi Sheng Shan separated from other summits stands solitary. On its crest is a stone pool in which, it is claimed, the swords of the Immortals were stored. Teng Lung Shan 登龍山 Mount of the Ascending Dragon is the very Lung Men Shan 龍門山 Dragon Gate Mountain which in other days was known as Shih Feng 石峯 Stony Peak and Kan Hua 看花 Flower View. A single bridge faced like a door. Flowers crowded the path edges, hence its name Flower View. Feng Huang Shan 鳳凰山 Mountain of the Phoenixes which produces gold dust lies to the north. The inhabitants collect the ore. Pa Kua Shan 八卦山 Mountain of the Eight Diagrams, the same as Ya Yüeh Shan 壓月山 Mount of the Conquering Moon, is directly east of Ta Mien Shan. Chi Sheng Shan is west of Ch'ing Ch'eng. During the Chin 晉 Dynasty, the Shang Huang Kuan 上皇觀 Upper Great Temple was erected on the summit of this mountain. An immortal named Li A 李阿 often visited here. In the *Shu Shan K'ao* 蜀山考 *Treatise on Szechwan Mountains* penned by Wang Hsiang 王象 it is said, "The finest of the Azure City Taoist temples are the Chang Jen Kuan 丈人觀 Temple of the Elders and the Shang Ch'ing Kung 上清宮 Upper Limpid Palace. The rest lie at the mountain's base. The Shang Ch'ing Kung is about five *li* away, Chengtu Mountain is approximately half the journey, and Ta Mien Shan crowns the summit of the range." In the *Chi Sheng* 紀勝 *Records of Wonders* it is related: "Ma Ku Tung 麻姑洞

the Elf Cave is in front of Chengtu Mountain. The cavern is so deep that it cannot be measured. It is uncertain whether the Pa Kua T'ai 八卦台 Altar of the Eight Diagrams is in Chengtu Mountain or not. The Wang P'o Yen 王婆岩 Dame Wang Cliff where the Lung Tung Shih 龍洞石 Dragon Cave Stone is lies farther from the east. A river flows into this Dragon Cave reverberating loudly. To the east of the cliff one comes upon the Dragon Cave where the river again emerges. Traversing these places one glimpses the plain once more.

On the south slope of Ta Mien Shan extends a gulch called T'ou Yüin 偷營 Barrack Theft. For at the close of the Ming Dynasty Chang Hsienchung 張献忠 (a robber chief who massacred hordes in Szechwan and abetted the fall of the Ming Dynasty) secretly passed through this defile and overcame the monks in the Ta An Ssu 大安寺 Temple of the Great Peace. Chi Sheng Shan is beyond Wei Chiang 味江 Savoury River. Once upon a time Tu Yü 杜宇 (a Chin Dynasty official in Szechwan) and his people dwelt there to escape the flood. The remains of the city may still be seen. By means of wistaria vines one may ascend Sheng Lan Shan 勝覽山 Famed View Mountain and Ch'ang P'ing Shan 長坪山 Distant Plain Mountain. A winding narrow path leads for about thirty *li* to Meng Tan P'ing 牡丹洞 Peony Plain and Sha P'ing Shan 沙坪山 Sandy Plain Mountain, which is the very Pao T'ang Shan 寶唐山 Mountain of the Precious T'ang whence comes excellent tea. Ma Huang Kang 馬蝗岡 Leech Hill is on the left side of T'ung Ling Kou 通靈溝 Penetrating Spirit Gulch. At the bottom of this hill there is a ch'i p'an shih 某盤石 chessboard stone. It is said that in days of yore the Immortals played chess there. Turning the corner to the north one finds the Chiao Tzu Shan 鉸子山 Spade Mountain. The peak is commonly called Lao Hsiao Ting 老霄頂 Old Cloud Crest. A small temple stands there. Turning towards the south, and then to the east one sees Liang Feng Ting 凉風頂 Cool Wind Mountain and Shan Shih Ai 禪師崖 Patriarch's Precipice. The latter forms the entrance to this mountain. At the close of the Ming Dynasty, a monk of the Temple of the Great Peace named Liao-k'ung Chien-sui 了空鑑隨 ("He who follows the empty mirror") led the people to resist the robber chief Chang Hsien-chung. Unfortunately, the monk slipped from the cliff and was killed. The country people painted his picture on the cliff wall, and worshipped him. Even today, when a funeral procession passes that way, every one must halt to pay reverence to him because of his martyrdom. Pi Chia Shan 筆架山 Penrack Mountain, Chi Hsiang Shan 積香山 Incense Mountain and Chi Sheng Shan are all to the east of this mountain. A waterfall drops down before it. Chi Ku Shan-shih 雞骨禪師 the "Chicken-bone Patriarch" (so named because he loved to eat chickens) is there interred. The mountain-top is called Ku Hao 孤鶴 Solitary Crane. It is far away from the city and the plants are vivid green. It seems as if it were the kingdom of heaven!

Turning to the south, Kuei Ch'eng Shan 鬼城山 Ghost City Mountain looms up. It is commonly called Yüeh Ch'eng 月城 the Moon City. In the Lu I Chi 錄異記 Strange Chronicles it says: "In the time of Jen-Tzu, the seventh month, Ghost City Mountain collapsed on account of the rains. Floods came suddenly. The Temple of the Elders was about to be carried away. Unexpectedly, the cliff wall hurled itself down and became a protecting bank turning the floods away from the temple. Thus the temple was saved. Formerly it had been difficult for the monks to find drinking water. Now a stream came to the kitchen door even during the winter time. From this spot the paths gradually reach the level plain. Leaving the first peak and turning towards the east, there is Huen Yüan Ting 混元頂 Muddy Roundtop. Those triple peaks are like a roasting-pan turned upside down. At the bottom of the third one is Hsüan Yüan T'ai 軒轅台 Hüan Yüan's Stage. (In olden days he is said to have invented the compass and used it in battle; his wife developed the silkworm and made cloth. He was a king.) Now, we call the place T'ien Shih Tung 天師洞 Heavenly Teacher's Cavern. (Chang T'ien Shih is a famous Taoist patriarch.) The cave is in the face of a steep cliff. Looking down from the temple one trembles with fear because of its height. To the east of the T'ien Shih Tung is Lung Chü Shan 龍居山 Mount Dragon Nest. Its other name is the P'ai Fang 牌坊 Memorial Arch. During the Han Feng 咸豐 Period (A. D. 1851-1861) in the Ch'ing Dynasty a man named Hsü K'ai lung 徐開龍 from Kuanhsien fought the robber Lan. Unfortunately he met death. A memorial arch was erected for him. At some little distance from this spot one sees T'ai P'ing Shan 太平山 Peace Mountain, also called Yoh Wang Shan 藥王山 Medicine King Mountain. South of the cavern there was a rope-bridge. In comparison with the towering cliffs it was as tiny as a thread supported by a single stick of wood. Like ants the travellers go in procession. One looks down from a dizzy height. But now the bridge is built of stone with railings so that one crosses it with ease. Passing over this bridge and going some three *li* one finds the Tsu Shih Tien 祖師殿 Temple of the Patriarchs, also known as Hsüan Yüan Ting 軒轅頂 Wagon Crest (because "Hsüan Yüan" also invented, it is said, the wagon). In the old days, it is related, Huang Ti 黃帝 the Yellow Emperor prayed to the Immortals at that place. To the south is Chih Pi Ts'ao 擲筆槽 Rejected Pen Channel, some fathoms deep. About a *li* from the bridge one may find Chang T'ien Shih's Warning to the Ghosts. At the side of the bridge which is in the middle of this mountain between two others one beholds "True Pictures of the Five Lofty Mountains". The bridge is some fifteen feet long. Careening precipices overhang each end. It is dangerous to look down from the bridge. Beside it is Shih Kuei Shih 誓鬼石 the Stone of the Ghostly Compact. For it was here that Chang T'ien Shih made a vow with the spirits. At the centre of this mountain one may find

a fissure about twenty feet wide, and some sixty or seventy feet deep. It has a reddish colour. In the opening the tree leaves and the flowers are speckled with black spots. What is the explanation of this? The opposite side of the fissure is called Chin So Ai 金鎖崖 Golden Lock Cliff. The tiny path resembles a long rainbow hanging down. It is said that at the bottom of the cliff were the Fuh Yung Hsi 芙蓉溪 Hibiscus Stream and Ch'ing Feng Fuh 清風瀑 Pure Breeze Lake. Turning first to the south and then towards the east Pai Yün Hsi 白雲溪 White Cloud Torrent may be seen. A little farther from this cliff rises San Shih Shan 三獅山 the Mountain of the Three Lions which resembles three couchant lions. In short, the Great Face Mountain dominates all the mountains of the Azure City. In their very midst is the T'ien Shih Tung, surrounded by all these ranges like a city wall. From the beginning of the world it has been a celebrated spot.

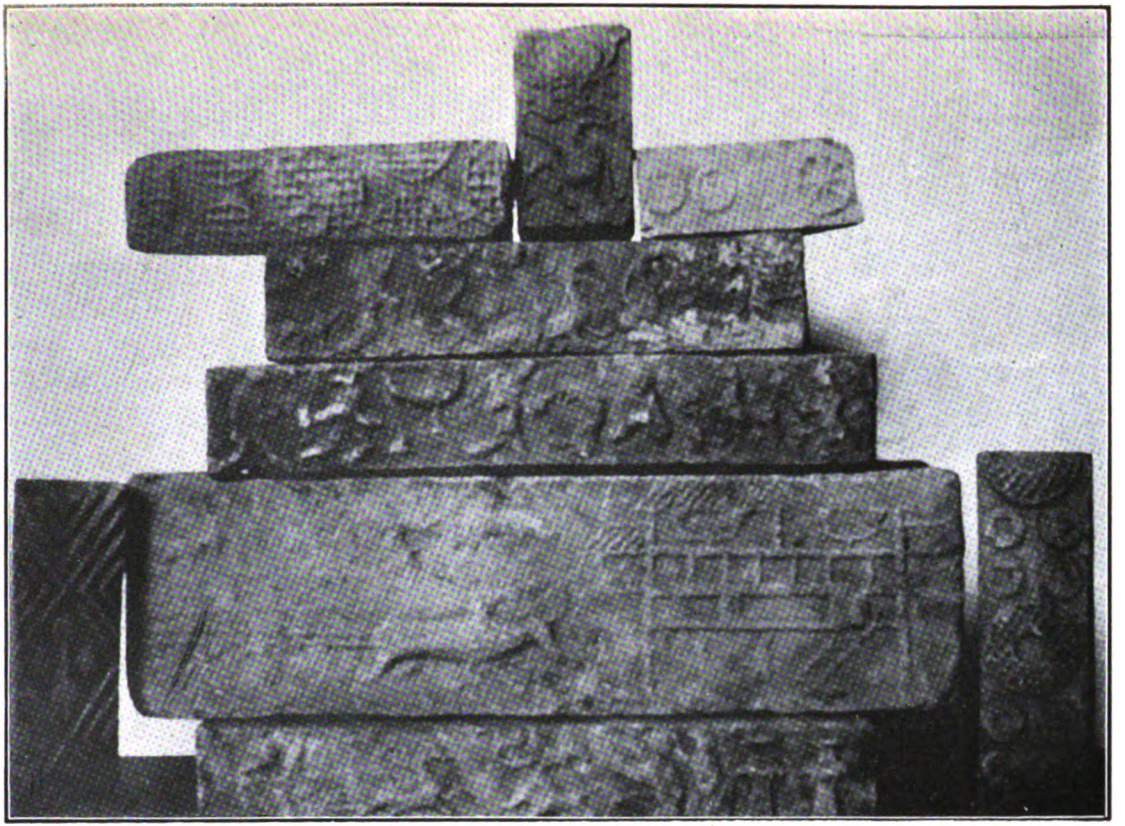
NOTES ON THE CAVE TOMBS AND ANCIENT BURIAL MOUNDS OF WESTERN SZECHWAN.

T. TORRANCE

The different races who once inhabited the lands now known as China certainly left many evidences behind them of their belief in a future existence. Everywhere, we might say, great care was taken over the interment of the dead. Coffins were made of wood, hard earthenware or stone, even of brass; tombs built, excavated or perched high-up on the face of a precipice; and these were often elaborately furnished with money, ornaments, household utensils, weapons and figures of servants, attendants, animals, etc., for the use of the dead in Hades. The ancient Kingdoms of Pa and Shuh were no exception. To-day on the Chengtu plain and elsewhere old mounds remain which cover vaulted burials of these pre-historic peoples. The Chinese who absorbed these nations, or mingled their blood freely with theirs had similar customs of their own. Doubtless each race had special features peculiar to itself in these burial customs, though now it is hard to specify minutely what they were. What strikes the investigator who has compared the interments of widely separated regions is not the differences but the astonishing general sameness of the customs which once prevailed everywhere.

One outstanding difference, however, in West China was the frequent cutting of caves in the solid rock for tombs. Along the Yangtse River from the Hupeh border to Suifu and far up the Min River banks can be seen square mouthed cave-tombs on the hillsides and rocks. Along other rivers they also abound as for instance at Neikiang and Tzechow. But they are most numerous at Kiating, Pengshan and Sintsing. Here also they are larger, more ornate and as a rule far better laid out than elsewhere.

When we first discovered the nature of these caves and brought to light their coffins and interment articles we were puzzled whether to assign them a Chinese or an aboriginal origin. The tradition was that they were *man-tong* or aboriginal caves. But it was plain from their contents that this was too sweeping a classification. The majority were Han or Tsin. The Pan-liang, Wu chuh or Wang Mang coins proved the date. Then the goods were very similar to those in purely Chinese burials of the same period. The Chinese by the time of the Han dynasty were in undisputed possession of Szechwan. They came in B. C. 316 near the close of the Chou dynasty. The

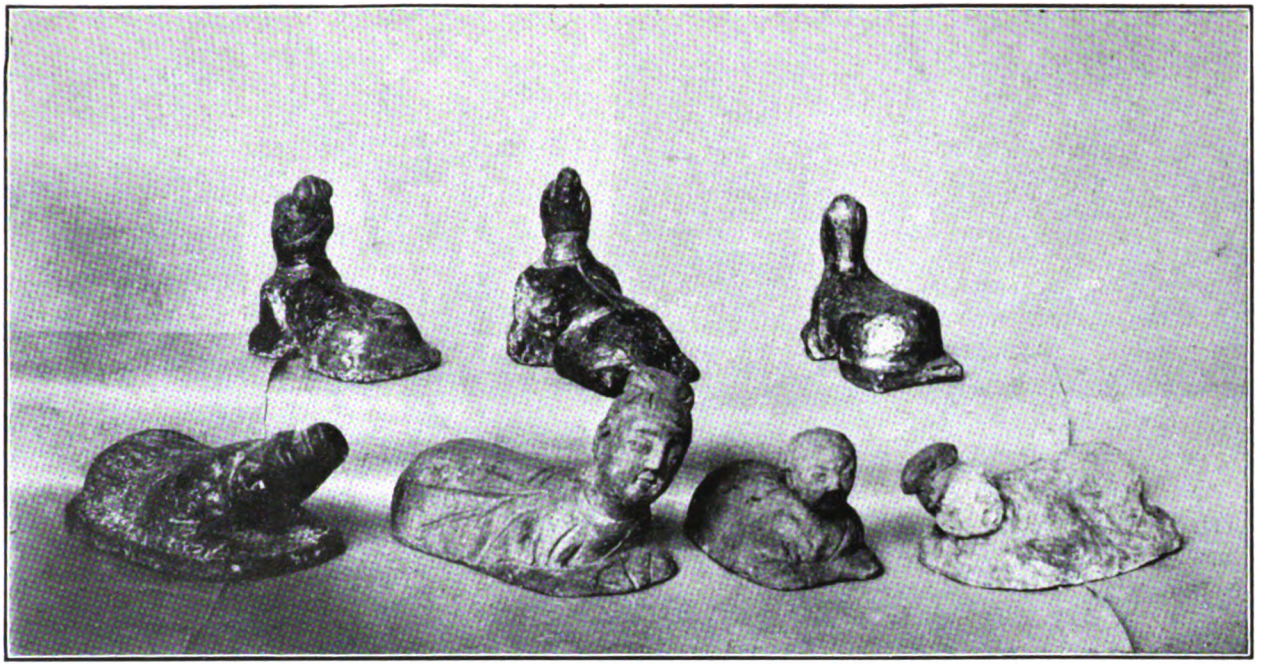


HAN BRICKS FROM CAVE-TOMBS. (*Torrance*) U. U. Museum.

Note the mythological figures, horse in harness, rectangularly-framed building, "Han Brackets," cash patterns and diaper patterns on bricks.

MING GOODS FROM TOMBS OF SZECHUAN. (*Torrance*)

Fire basket with " gold coin " design perforations for draught, of Emperor Wan Li date.
Dragon jar of unusual design.



SPHINX FROM HAN CAVE-TOMBS OF SZECHUAN. (*Torrance*) U. U. Muesum.

Thirteen sphinx have been collected in the Museum of Union University. Some are exceedingly graceful. Most are females. One has a snake's body and a man's head. Another has a man's body and a pig's head. The origin and the significance of these sphinx are intriguing. It is easy to propose theories, but it is less easy to prove. Data is presented.

cuttings of caves continued 400 years after they came. On the other hand surface or mound burials of ancient Shuh were so close in type that they could not be told apart. Certain cave finds indicated an art or workmanship foreign to that of China proper. The facial features of the images of men and women revealed non-Chinese facial lines—at least that of a race that could not be classified as distinctly Chinese. Caution was, therefore, required before rushing into definite conclusions.

While the Chinese did rule the West, a process of assimilation also took place. If many were content to own themselves subjects of the new Power, others more conservative held aloof. The latter were known as Seo—apparently another pronunciation of Shuh. But the two races did finally mingle, though that did not mean the extinction of the old civilization. Kings may pass on and yet the influence of old families continue. So it was here. The arts and learning of the native race persisted. When the mingling was over the old stock if changed in name, in letters and other ways was yet predominant. One is apt at first to assume that since the Chinese were superior in arms they were also superior in civilization to these conquered races, but with investigation the conviction deepens that the old natives were perhaps equal in many ways if not superior to their conquerors. Why did the "Szechwanese" continue to call themselves the people of Shuh? Was it not because they felt proud of their ancestry and of a long line of kings and progress behind them? Personally we have come slowly to the conclusion that while the West China caves cannot strictly be classified as other than Chinese they were yet the work of this mixed race of Shuh-Chinese, especially as we have said that some of the goods found therein bear characteristics that suggest a non-Chinese origin.

We know well the inference that since locally they are called *man-tong* they were, therefore, once dwelling places. Those who cling to the notion suggest that originally they were made as such though later were used as tombs. But their structure wholly belies the assertion. We know too that there is a slight reference in one local history which lends colour to the tradition and we have heard of one man who clutches at it like a drowning man to a straw to save his theory, but unfortunately for him he does not know that the Liao barbarians referred to and who are alleged to have lived in the caves were not brought into Szechwan until the Tsin dynasty. By that date the caves had all been made. Probably they did live in those exposed ones that had been robbed and stood empty, like as the demoniacs lived in tombs at Gadara and Chinese beggars occasionally do still here, but that in no way warrants the conclusion that they were originally aboriginal dwellings.

During the Song dynasty the portico of a set of caves at Kiating was used as a cool or excursion retreat in summer by scholars who left a written record of this on the walls. It is open to anyone to go and witness here what excellent caligraphists the Song men were.

Buddhist priests in one or two places have appropriated caves for themselves. One goes by the name of "the cave of the ancient Buddha" and has given its nomenclature to the whole village. Wild animals too make them their haunt but don't advertise the fact so much. The writer has seen bats by the score hanging from the roofs.

The caves vary greatly in size. Some are only mere holes in the rock for the storing of a coffin or two, others are cut as long as a hundred feet with multiple recesses and side apartments. There is often one long gallery from which these branch off. If empty, one can usually stand erect in them. A number, however, show no gallery. There may be one large compartment with stone pillars left intact.

A whole hillside is sometimes riddled with caves. At other places one only is found here and there. Many face the river, but all do not. Large numbers in places are well back from the water front and even a good distance away from it. Others again are found in sequestered valleys, the openings facing in the opposite direction to the river. The open caves have been robbed ages ago, little beyond the plan of construction can be learned from them ; it is to the partly open or half silted up caves one has to go for profitable exploration.

Opposite Kiating caves are to be seen with fine verandahs or porticos with elaborate carvings. Above the Suifu gorge there is one such well known to travellers because it is conspicuous from the river. The stone carving frequently is representative of the eaves and roof-edging of houses, when the ends of beams, rafters, brackets and fancy wood work are clearly portrayed. The general design is Han, and corresponds to carvings on Han arches and the remains of Han buildings. On the upper Min while the cave frontages are often executed tastefully it is the exception to find such elaborate decorations. But when we do and while we know that the stone carvings correspond to those on Han arches there is sometimes such a marked resemblance between the doorway of a cave and that of some Man-tze house that the one might be said to be a replica of the other. How comes that. Here again the jumper at conclusions is apt to fall and say "why, seeing is believing, what further evidence do we need? They are indeed *man-tong.*" But a little history will once more save the sincere investigator. We must remember that the border then was not where it is now but at the very doors of the Chengtu plain, and it was a mere political border. We have no evidence that the customs differed drastically on either side of it ; the evidence is rather the other way that this region in arts and civilization was then practically one. Even up to the time of the T'ang dynasty the Chengtu plain was liable to be invaded by hosts of people from beyond the West of the Nan River. Then who will say that the Mantze, if any copying is supposed to have been done, and this argument be advanced, did not copy from the Han rather than that the Han copied from them? It might even be that the Shuh-Chinese employed border stone masons to make these caves because they were more proficient in that line. It will be seen, therefore, that this resemblance

KITCHEN UTENSILS IN EARTHENWARE FROM HAN CAVE-TOMBS. (*Torrance*) U. U. Museum.

Note the bold, robust curve of the several pieces so typical of Han. Note the side handle on the second "frying pan" on top and the similarity in shape of the first piece which has the handle broken off. Notice the collander shape in the center, and the flower pot (?) or leaching basin below.

HAN LARDER VESSELS FROM CAVE-TOMBS.

(*Torrance*) U. U. Museum.

These vessel designs came down from the Cheo but they have the Han touch too. There is a sturdiness that is unique, and the stability is assured. The mouth " belongs " and there is a real finish in shape and in proportion notwithstanding the fact that these are the forerunners of the present day cheap paper analogues which are burned on the graves.

HAN LAMPS, FEET, SERVICE MEN AND MUSICIANS FROM CAVE-TOMBS. (*Torrance*) U. U. Museum.

Note the "pagoda" lamp for colza oil. Probably the pith wicks were lighted in at least three stories, but this is conjecture. Certain stories seem to be to catch oil. One storey has been ground off as it was broken by the finder. It is a prize piece notwithstanding. The gateman-gardener (?) at the door of the tomb seems to have an iron spade tool. (Iron spears have been found of this date, but the extant grave goods are mostly of clay models like these pictured. The bust on the lower shelf has a broom whisk and a bamboo "dustpan" like those used to-day. The drummer is not so common. The feet and the sandals hardly vary by knot or straw from those of to-day. The shoes like the other two types were used less than twenty years ago.

in frontal appearance does not warrant any hasty off-hand conclusion that the caves were not Shuh-Chinese. The general rule was to conceal the entrances after the cave was full, yet here caves as deep as those on the lower Min are found.

The mouths or openings are invariably square or very nearly so. Any cave with a different opening, one may be confident, is of later date and made for another purpose. There is usually a slight incline in the floor for the purpose of dryness. In the Pengshan region the larger caves have drain pipes leading out into the surface soil. A specimen pipe can be seen in the West China Union University Museum.

The sealing and concealment were carefully done. In the smaller caves, the unhewn stone collected in the making was often built up in the entrance; in the larger ones, hewn masonry or stone slabs set up in position as doors blocked the mouth, when earth being filled in, the restored natural slope of the hill hid all. On the face of a precipice, however, concealment could not be so well made. Consequently it is exceedingly rare to find a cave there that has not been opened and pilfered.

However carefully sealed it was seldom possible to prevent a certain amount of silting. With lapse of time this deepened until in many cases the grave goods became covered and the coffins half buried. Nevertheless this helped against spoliation. Vandals, if a cave was discovered, had to pause and ask if the removal of so much soil was worth while. Consequently it is often possible now-a-days with care and labour to secure objects from these caves. Certain Chinese at Sintsing led by a native preacher hit upon the plan some years ago of probing for articles and made good success of it.

Cave coffins are of two kinds, stone and earthenware. The sarcophagi are not always cut free. A portion of one side may remain intact with the wall of the cave. But many are entirely separated from the cave wall. Occasionally peculiar symbolical carvings are seen on them. The lids are in two or three grooved fitting sections. Where removal is feasible they are taken sometimes to houses to be used as courtyard cisterns.

The tile-ware coffins which greatly exceed in number the sarcophagi always command admiration for their quality. The body is in one piece, as is also the lid. How the makers managed to fire such a ponderous object without fault in shape, crack or brittleness is a mystery. A small specimen can be examined in the West China Union University Museum. Others larger though from a mound tomb are in the museum in the public park, Chengtu. The lid in all fits over a lip or edging on the rim to give security of position and symmetry in appearance. In the bottom several necessary small round holes were left.

In the medium sized caves the earthenware coffins do not vary much. Apparently they were produced in standard measurements. In large caves, occasional very large specimens may be seen. One

near Sintsing was approximately 7½ feet long and 3½ feet high. There is small doubt that it was the outer shell of a wooden casket. A common size is, length 6½ feet, height including lid 2 feet 4 inches, breadth 1 foot 9 inches. The one in the University Museum is 6 feet 3¾ inches long by 22 inches high without the lid, 18 inches broad at the base and 17½ inches at the top. The largest in the Public Park Museum is 6 feet 10½ inches long and 2 feet 7 inches high without lid.

Unbroken lids are hard to secure. Our endeavours to get one have so far failed, the reason being that though efforts have frequently been made through the owners of caves no unopened one has yet been discovered. Where the soil has been removed with this hope it has been found that they had been opened centuries before! The lids, of course, got broken in the rush to see what was inside. That no whole lids remain in opened caves is fairly good proof of articles having been found in coffins. One farmer told us that he once found a "string" of cash in a coffin which judging by its position had been around the neck of the corpse and down the breast. We know from other ancient burials that it was the practice to insert a jade stopper into or place a covering over every aperture of the body; these jade pieces are often found in the hands of curio-dealers. A jade cicada, the symbol of immortality, was placed in the mouth. If this practice was in vogue among these cave makers, these jade pieces would then be part of what was found in the coffins. Yet it is only right to add that so far we have not been able to secure a jade cicada of which it could be definitely said that it was found in a cave. Pieces of tomb jade are occasionally offered for sale by curio dealers, and the writer has bought several of these jade cicadas from them.

Now-a-days wealthy Chinese instead of using this token of their hope of immortality place a piece of silver on the tongue of the deceased. For what purpose they do this no one can say. One might have surmised that as this metal was pure and indestructible even so followed the wish that the soul of the departed might be likewise, but nowhere to our knowledge has such an idea been suggested or even thought of. The custom is followed simply because they say it is an old one.

The coins found in the tombs are often in jars. Sometimes they are scattered around but in such instances the caves have been rifled and the surmise is that these have simply been spilt in the removal. Pan-Liang coins are the oldest found. Then come the Wu-Chu coins, such as were minted in the Han dynasty at Yuin Kin basin and had an empire wide reputation for the fineness of their quality. Wang-Mang coins are fairly common and the later Wu-Chu cash also may be found. With regard to these last we have in our possession a string of Wu-Chu "mao" or spurious small cash from a tomb, but, having been bought from a dealer, these came minus a definite history. Still they make one smile to think how this joke was played on the dead. No doubt the friend who substituted the

Those Who People the After Life A La Cave-Tombs

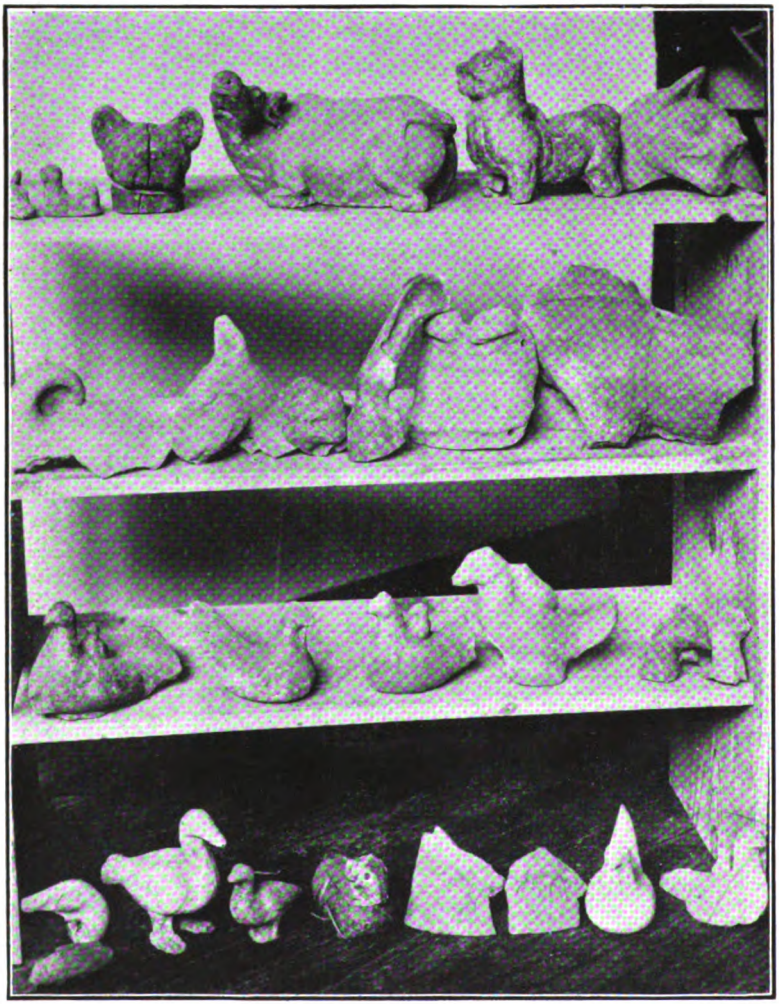
(*Torrance*) U. U. **Museum.**

The lute player is splendid. The long cuffs on the gentlemen and on some of the ladies are artistically effective, but they must leave something to be desired from standpoint of convenience and economy. The hairdress and the headress are interesting. The kneeling figure is graceful. The servants in the lower row are varied from dustboy to baby tender and stone mason.

HAN ARCHITECTURE FROM SZECHUAN GRAVE-TOMBS

(*Torrance*) U. U. Museum.

Note the city gate, the straw-thatch summer house with student (with book not visible from end view), colonnade (?), broad flat tile with crimped edge now unknown in Szechuan. Note the ice-crack lattice etched on base of end of straw-thatch building.



HAN " BARNYARD " FROM SZECHUAN CAVE-TOMBS

(*Torrance*) U. U. Museum.

The water buffalo—wet rice—Chinese culture triangle of the alluvial river deltas is suggested by this specimen. The dog has more of a Tibetan dog muzzle than does the dog of Chengtu to-day. The saddle is still found among nomads. The chicken is nearer the wild pheasants than are those of to-day. The duck and the sheep are not so different. The sheep on the two shards might have stepped off of a Greek frieze of even date of design, or vice versa shall we say ?

less expensive quality had a shrewd surmise that since each cash only lay eternally in a tomb the one kind was as useful as the other. He saved his face by putting in this string and he saved a useful sum to himself when he did so. His family could use that better than the departed. It is the exception to find caves with inscriptions. And so far we have found only one cave with a definite date viz., the 26th. day of the 3rd. moon of the 14th. year of the Emperor Yuin-Yuen of the second Han dynasty. His reign began in A. D. 89. Another cave half a mile away has an inscription in seal character which would suggest that it had been made before the use of the square style of characters. The Pan-Liang cash were in use 200—300 B. C. Since these are found in caves we may be fairly certain that some caves date back this far. In the Hwa Yang Kueh Chi, our oldest provincial history, it is stated that at this time the use of tile-ware coffins was in vogue; there is no need, therefore, for guess work as to their age; while we cannot assign either a definite date as to when men began to make the caves or when they ceased doing so we can be perfectly certain of the general period.

The list of cave-tomb furniture is a long and varied one. The majority of the articles are of hard pottery, now mostly grey or reddish. Originally they were painted and traces of the pigment are often seen, though owing to the dampness of the caves the distinctive colours have disappeared. In the Weichow region the writer once saw a small tomb figure retaining vividly its various paints but here the caves are dry and of a different order to those at Kiating. At Panchiaochow near Weichow a cave which became exposed about 15 years ago contained two wooden coffins in each of which the corpse lay entire but as hard and dry as a mummy. From inquiries made, the date was at least that of the Sui dynasty. We believe that Mr. C. H. Coates took a photograph of one or both of the "mummies." When the writer examined them they were already mutilated badly by passing coolies and now scarcely a vestige remains of either.

From these Weichow caves we have seen Pan-Liang and early Wu-Chu coins, various bronze weapons and articles of pottery ware. While the shapes of some of the articles vary the type of ware in shape and material is practically the same as in the Kiating-Sintsing caves.

In all caves culinary and cooking vessels were placed, with figures of domestic animals and fowls, servants and attendants, and sometimes weapons and ornaments, mirrors and other articles. Metal ware, however, was the exception, burnt clay imitations took its place. But in the West China Union University Museum an iron spear and fragments of an iron cooking pot may be seen. We know of more than one iron sword having been found in the caves, and have heard of silver also having been found. This last had perhaps been hidden at a later date for safety and its whereabouts lost owing to the death or forced departure of the owner.

An interesting feature is to see a false fire place in the far end

of a cave upon which had once been placed a cooking pot. Imitation charcoal stoves of burnt clay are common; also fragments of house models.

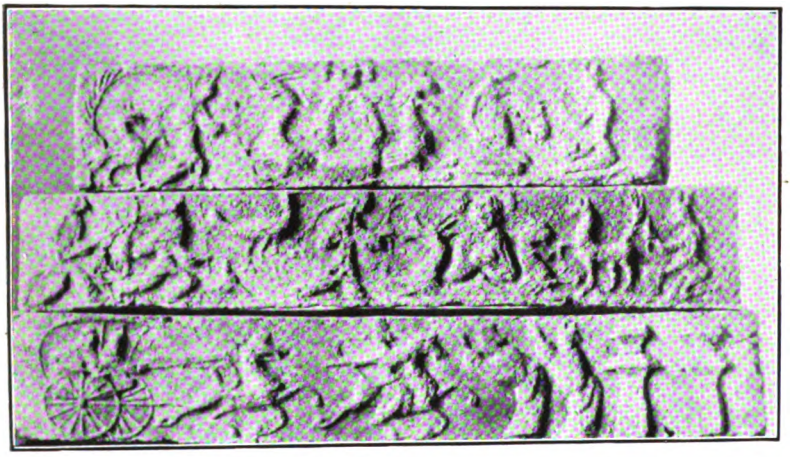
But while these articles are interesting and thoroughly deserving of study in investigating the habits of the ancient natives of West China, the chief interest lies in the figures of the menials interred with their lords. The types of faces show a liveliness and intelligence of feature that speaks much for the standing of the race. Certain fragments too of art tell that they could copy nature with a truly lifelike touch and were much ahead of their descendants of today.

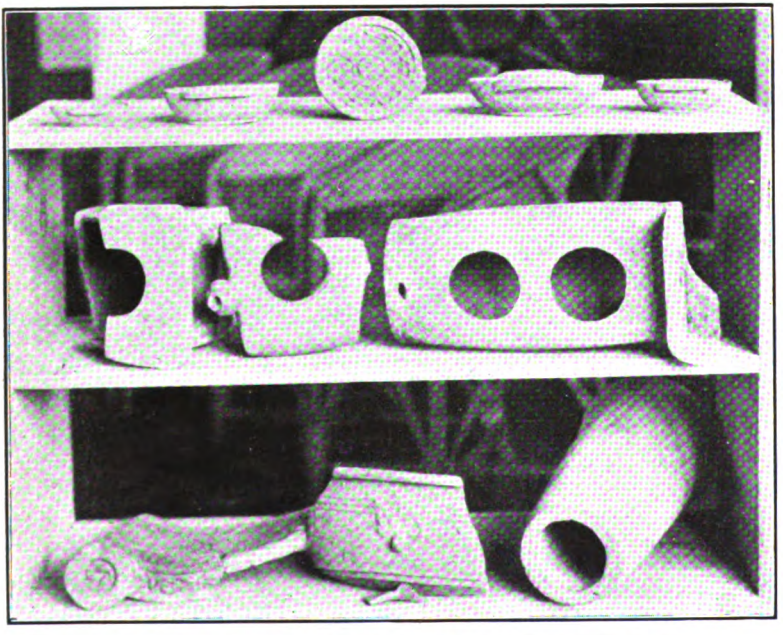
One mirror found in a cave which the writer had the opportunity of examining revealed a fineness of workmanship and perfection of finish that made us marvel. This article alone spoke volumes in praise of the skill and art of the Shuh-Han workmen.

In the University Museum a goodly array of cave goods has been gathered. These with others from tombs of the same period provide a wealth of study material for the archeologist. They show us the style of house the Shuh people lived in; tell us that the dogs were a mastif breed and were leashed with a strap around the chest and neck; exhibit to us the style of the people's dresses and head gear; surprise us by letting us see that the sandals worn 2000 years ago were exactly the same as those worn today; they let us know that men and women bowed to each other as they do now; and they make it plain that the saddle they used for riding resembles closely the kind used by the Lolos of today.

The pottery found in these caves went far at the time to enlarge our knowledge of Chinese ceramic history. While it was rough it was well burnt; though it had lain for nearly 2000 years in damp caves it was not at all brittle. Much of it indicated that they then knew how to make finer wares because those placed underground were often of a non-expensive class. The writer has more than once been able to examine glazed coffins of the date of Liang Wu-Ti, whereas heretofore no Chinese glaze had been known by foreigners to be earlier than the Sui dynasty.

Some years ago a large tomb mound was demolished two or three miles from the West gate of Chengtu when building the new road to Kwanhsien. It consisted of a number of vaults in which the workmen found tileware coffins and many articles of an identical nature to those found in the caves. These were scattered mostly among the workmen, though some were brought for display to the Public Park Museum. Among the latter was a damaged bell-shaped piece of pottery which carried back with a jump of several hundred years our knowledge of Chinese glaze. Once the writer showed to an expert a Han glazed bowl which had been unearthed while cutting a trench to see how far our Chengtu streets had risen above the level of the old virgin soil. The shape was exactly the same as that of a cave bowl, and the depth from which it was brought up made its age very certain yet because it had not been found in a tomb there was





HAN BRICKS AND STOVES FROM CAVE-TOMBS.

(*Torrance*) U. U. Museum.

Three bricks with mythical figures, formal postures, chariots and spirited horses. Tile mirror, four dishes of unknown use but with rim outline that has been affected in framing since Han times, three parts of charcoal stoves, crimped tile with end design not known in Szechuan but used to-day in Japan, imitation Cheo bronze vessel, drainage tile for cave-tombs.

"STYLES IN HEADS" IN HAN DAYS

(*Torrance*) U. U. Museum.

This is a rare study in hair dress and head dress. Sex and social status is suggested in many. The features are not all according to what one visualizes a the type Chinese. The cross-breast fold of garment has come down to date. The lute player is good. The short figure with dustpan is one of many. Note the folded hand curtsey that has come down at least two thousand years. All of these have saved their heads from the vandal because of the low price on their heads, while things of monetary value have long since disappeared.

supposed to be a certain amount of doubt about it. But this glazed "bell" was dated by the B. C. coins found with it, and by the general class of the tomb furniture. There was no doubt whatever of its great age, and an analysis of a fragment of this pottery from the mound by an eminent London scientist completed the proof.

On this bell shaped piece very realistic figures of elephants stood out in relief, the art being so good that it virtually proved the existence then in West China of elephants. Two or three years later Mr. D. C. Graham found in a cave at Kiating a burnt clay elephant's foot which was that of the Indian elephant and not of the African.

Quite a variety of bricks can be collected from the caves and other ancient tombs. Each has its own design. One found over twenty years ago at Sintsing restored to us the long lost picture of the West China chariot. Others revealed mythical figures doubtless of a religious significance which so far no one has been able to explain. In an imitation cave tomb built on the summit of a hill but concealed originally by a covering of earth we once saw a brick pillar with a beautiful spiral disign. The effect was made by bricks with cork-screw lines which matched into each other when built in the column.

Tomb bricks are of different shapes and sizes according to their use. When built around and over a coffin in a cave some were for corners, some for the sides and others to bridge over the top. In the long niches in the cave walls where bodies were laid, a brick of common design was used to face up the level of the wall. Fragments of these Han bricks can be seen built into many house walls in Chengtu.

Near the North Parade Ground of Chengtu two royal grave mounds still stand. They are known as Wu-tan-shan. The one covers the tomb of Kai-Ming an old Shuh king who lived and reigned here before the Chinese conquered Shuh. The other is the grave of a royal consort who came from the Ch'iang kingdom of Wutu in the North. On one rests a great circular slab of white rock the significance of which can now only be surmised. It appears to have been known as a stone mirror, a feature which once characterised several other ancient mounds. Wu-tan-shan is said to have been opened once by a ruler over a thousand years ago. The corpse was then well proserved, a fact which so frightened this ruler that he merely took out a large jewel and had the soil hastily restored.

Near P'ihsien are other royal Shuh tombs well worth visiting. Large mounds of this class are found elsewhere on the Chengtu plain though the one near the West gate is the only one known to have been demolished in recent times.

The official tomb of Liu Pi the Shuh-Han emperor who reigned here during the times of the Three Kingdoms is, as is well known, near the South gate suburb, and his real tomb is near Kueifu close to the upper end of the Windbox Gorge.

There are numberless other smaller mounds yet larger than the common sort which mark them as ancient but without outward clue to indentify or date. Occasionally one of these is opened by a curious farmer who owns the land, but of course he keeps the thing secret, especially if goods are found in it. Continually old tombs are discovered when foundations are being dug for buildings and always articles are found in them. One could fill a volume with lists and descriptions. Down to the end of the Ming dynasty in Szechwan the practice continued of stocking tombs with "Hades" goods. Ming tombs of the rich had often a small stone slab put inside giving the name and position of the interred, date of death and burial. Among the Ming grave articles were generally two jars of hard brown glazed earthenware showing dragons or other designs. On one occasion we purchased a stone slab and an earthenware fire basket. Apparently the deceased expected a winter season there as well as here!

In the Ch'iang country where cremation is common and few tombs or graves are seen in comparison with other parts of the province cave tombs are found as we having already mentioned and a number are on the faces of precipices facing the river. Other burials were made in banks of clay and others yet again underground when stone slabs took the place of a coffin. An old Ming style tomb is also seen. Doubtless the burials were according to the nationality of the persons interred, while a few of the Ch'iang may have preferred to dispose of their dead after the fashion of their neighbors and not after their own.

In some ancient tombs the coffins appear to have been suspended in the tomb by irons. On different occasions the writer has been assured of the truth of this. Even at Maochow we heard of a discovery of this kind. But despite diligent inquiry we have so far not been able to see this for ourselves. In the sides of many caves are holes opposite to each other which are a puzzle to understand unless on this hypothesis. Perhaps they were for partial and temporary closure. There is certainly great room for further research. Naturally our own time has been limited and our investigations spasmodic and curtailed but these few notes may serve as an introduction to some one who can give more time to the work of archeological investigation in West China. For further information the reader is referred to the article on Burial Customs in Sze-Chwan in Volume 41 of the Journal of the North China Branch of the Royal Asiatic Society for 1910.

SOME ANCIENT CIRCLES, SQUARES, ANGLES AND CURVES IN EARTH AND IN STONE IN SZECHWAN, CHINA

D. S. Dye

Introduction

(A) Continental Distribution of Earth and Stone Work in Square and in Circle

(*a*) *Stonehenge in England* has its circular arrangement of monoliths with sun-pointers for sunrise at equinox and, or at solstice. Note that it is located on a plain, rather than on an eminence, that there is an east-west orientation, and that it belongs to Europe.

(*b*) *Chichen Itza, Mexico*, "The Mecca of the Maya World", has its circle on square and its truncated pyramid surmountod by a square. Uaxactun has its three-fold, truncated pyramids surmounted by squares and all three located on a three-layer terrace in rectangular form. (See the National Geographic Magazine for July 1931. Unearthing America's Most Ancient History", by S. G. Morely in particular, and articles in previous numbers on Peru and Mexico in general.) Note that these structures are usually located on plains, that they rise out of the plan, or are raised to a single, a triple or an old-numbered construction, that there is an east-west orientation related to sun-rise and equinoxes, and that they belong to Central ann South America.

(*c*) *Mound Cemetery, Marietta, Ohio, U.S.A.* is an ancient mound that has not been violated by the settlers in the Northwest territory or their descendents. So far as the writer knows this mound has never been given more than a very general publicity in common with hundreds of others in Ohio State. The dimensions are estimates from *memory* of high school days, and *quantitatively* cannot be accepted as data. It is a circular cone of earth, at the angle of repose, covered with grass and (at that time) some magnificent oaks. It is surrounded by a circular ditch outside of which is a dyke that stands ten feet above the bottom of the ditch. The total height of the mound is perhaps sixty ieet above the bottom of the ditch and from outside of dyke to outside of dyke on the opposite side is possibly one hundred and eighty feet. There is a subterranean passageway to the west to the Muskingum River. Note that it is located on a plain albeit not an extensive river-terrace plain, that

it is a single cone, that it has an east-west orientation, and that it belongs to North America.

(*d*) *The Great Pyramid of Egypt* is rectangular and has an ancient pole-star "orientation". Note that it rises out of the plain, that it is rectangular, that it has a north-south alignment, and that it belongs to America.

(*e*) *The Altar of Heaven, Peiping*, is of marble, rises out of the plain, has a rectangular enclosing wall, is of three terraces, has a north-south alignment, and belongs to Asia. Peiping's Altar of Earth is square and it has a north-south axis.

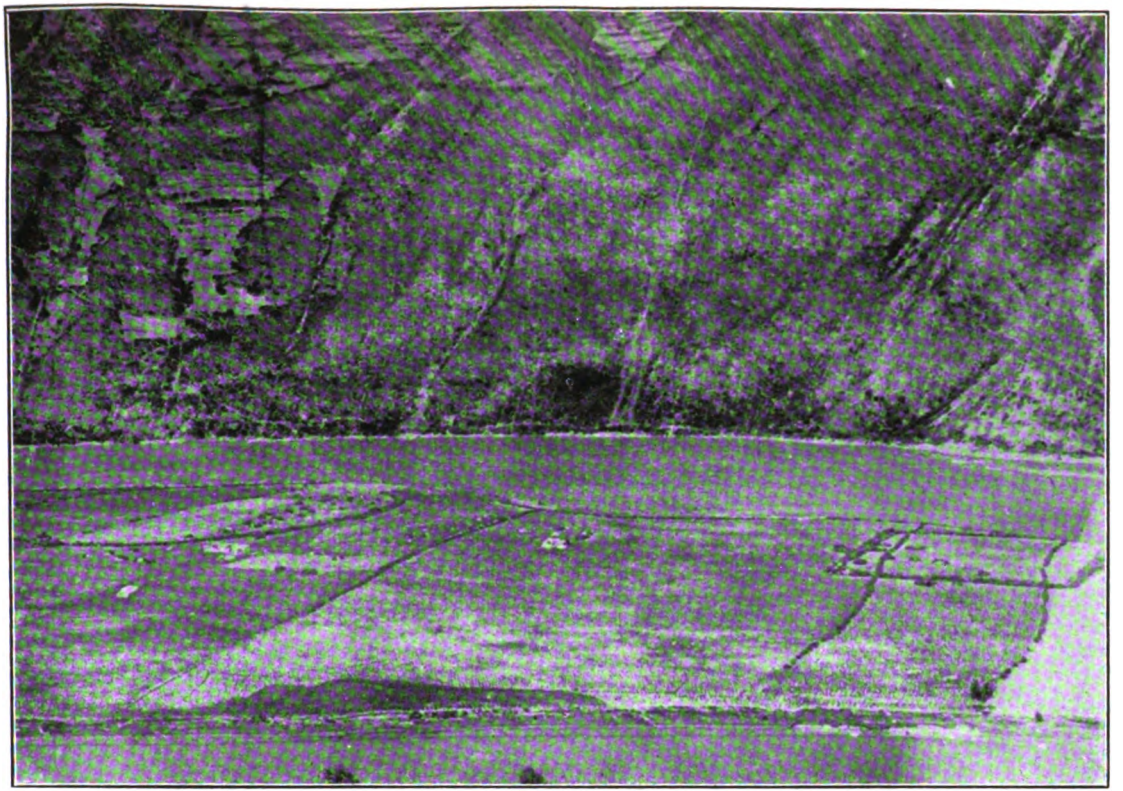
To summarize; every continent, unless it be Australia, has preserved from perceeding millenia, works in stone and in earth of circle and, or of square with compass orientation. For the most part they seem to relate to the sun and to the seasons, expecially to the solstices and the equinoxes. Many are bordered and pointed by markers. Many have an odd number of doors, terraces, or borders.

(B) Some Universal (or World) Factors Which Function to Determine Fundamental Shapes.

(*a*) *Astronomical Considerations.* Even if the angle and altitude of the sun are not recognized by early man as causal items in the alternation of heat and cold, growing-season and freezing-season, they are early seen to hold a temporal relation to the favorable and the unfavorable conditions of life, and so the solstices and the equinoxes are located in direction and in time. The round, solar-disk is a suggestive norm and form for the dwelling place of the controlling god or spirit, even if the sun itself is not deemed to be that god. The *circular* mound or temple or *shape* is the most natural shape to symbolize the controlling god or spirit. The sun-side and the shade-side most logically are the important and suggestive directions. Thus a square orientated along the sun-shade and the sunrise-sunset lines is most natural.

(*b*) *Structural Considerations.* The circle is one of the most easily drawn figures. It is most easily built of dressed or of undressed stone. It is one of the simplest to pile in dirt. Moreover, structurally it is one of the strongest shapes. The square in monumental sizes comes second in ease of construction and in strength for endurance. The cone or pyramid is stronger and more stable than the tubular or square tower. The cone or pyramid from the structural strength standpoint is the most naturally suggested form for monumental tumuli. However, it is not herein suggested that these arose without trial and error predecessors.

(*c*) *Artistic Considerations.* There are other considerations which may be adduced for the circle and square being preeminently fitted for early symbolism, or for later symbolism for that matter. i. To concenter and localize attention there is nothing comparable to the *circle*, providing it is not too large or too small. The eye is led



Photograph by W.C.U.U. Museum

CIRCLE OF HEAVEN AND SQUARE OF EARTH BETWEEN LU DIN CHIAO AND WA SI KEO

(*Dye*)

around the circle until it returns to its starting point in poise and restfulness. If the angle of vision, not the absolute size, is too great or too small, the complete effect is lost. If a second circle is drawn concentric with the first even if the first is large the attention is still localized and focalized. ii. The *square* next to the circle is the best frame to localize attention. It is especially good in case it is bordered or multiple bordered, even with concentered circles. The oblong rectangle may not always lead the eye back but may allow it to stray, if size and distance and angle of observation are not appropriate. iii. The *right-angle* in itself is almost neutral in eye-lead, but the acute angle might be called positive as it leads the eye toward and beyond the acute angle and the obtuse angle might be termed negative as it leads the eye away and inward from the angle point. In other words, the lozenge leads the eye away and beyond the lozenge along the major axis, while the eye is not allowed to wander along the minor axis but is restrained within the flattened sides of the lozenge. Contrast in colors heightens or weakens this effect. iv. The *straight line* and the *curved line* lead the eye along their length but at different rates. In this phenomen irradiation and persistence of vision function. Speaking in general terms the eye is led along at a rate that is directly proportional to the radius of curvature of the line. The eye speeds along the straight line, slows up on the gently curved line, and halts more or less abruptly on the sharply curved line. This curved line gives poise and emphasis when it is equally and symmetrically curled at either end, as it is and was in the thunderscroll and cloudband of both early and present times. It is a convention probably based upon the cumulus cloud which stands poised in midair with the bulge upward and the incurls underneath. This was perfected in the Cheo period and is preserved in Chinese bronzes. v. The *triangle* when placed with a flat side downward and level, leads the eye upward. When one side is vertical, then the eye is definitely led toward and beyond the acute-angled point on the horizontal. This tendency is due to the musculature of the eye. It is easier to move the eyes up and down or right and left than diagonally. English printing exploits one set of muscles and Chinese utilizes another set. By curving and, or by elongating one or two corners of the triangle, partial poising and partial directing or leading of the eye and attention are secured. vi. *A vertical stability* sense is something that does not demand books and a plumbob. It really is a sixth sense that develops with walking and every-day experience. The cone or the pyramid is obviously stable but the stepped cone or pyramid is more satisfying. vii. *Centrality in the horizontal* is obtained by the single or triple or odd in number. The most satisfying architecture has this quality whether it be obtained in such an obviously numerical way or in a less obviously quantitative way. viii. *Centrality in the vertical* is yet another thing. It may be obtained by odd storeys, but it is often secured by a descending series of an odd number of storeys as in the pagoda. In other words, the central storey of a

Chinese pagoda is above the half height of the structure, where the half height is decidedly above the center of gravity of the pagoda so that the whole structure is without question stable. Such conditions allow of no sense of a lack of stability, no matter how poorly the semicircular canals of the observer function or his brain correlates due to lack of formal training. The pagoda or other analogous structure appears stable. These considerations are not merely structural, mechanical, but physiological and psychological so that the net result is artistic.

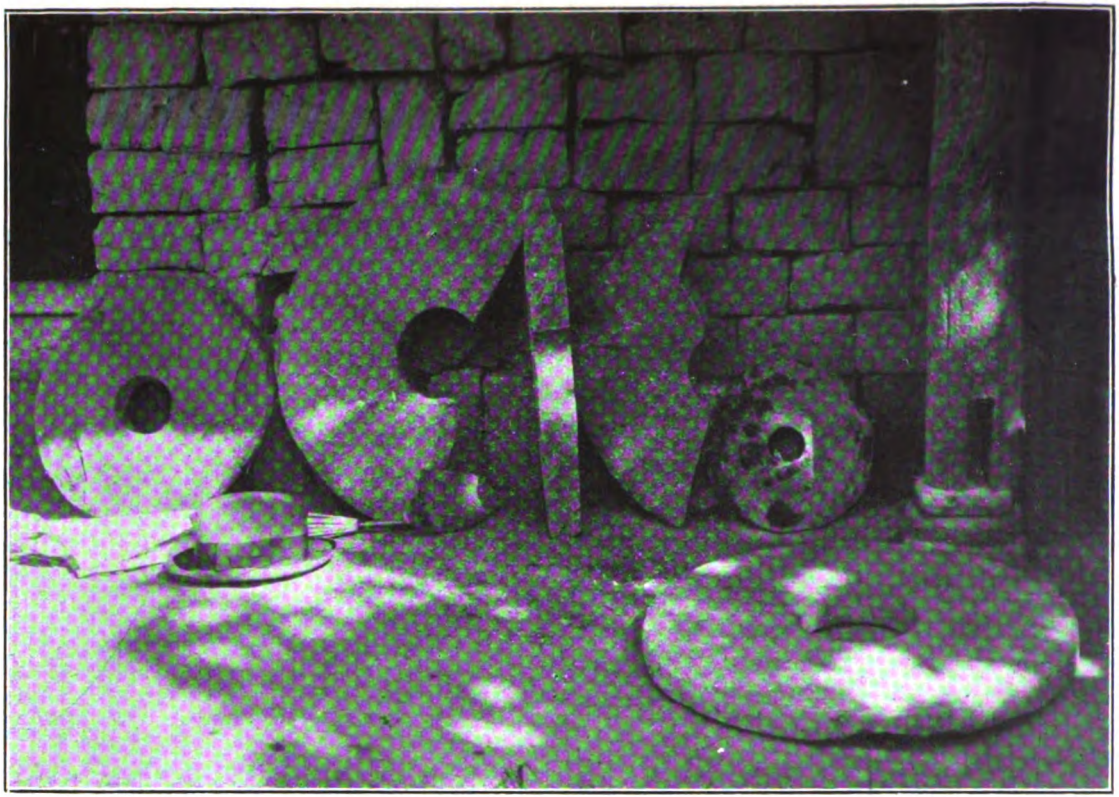
Some of the above "wisdom" has been transferred by analogy to the realm of morals and social amenities. The Chinese query and challenge: "Don't you have any compasses and square!" might be paraphrased: "have you no means of truing up with the circle of heaven and squaring with the square of earth?"

These "artistic considerations" have been read out of (not into, the writer trusts) the classics and the bronzes and much of the coinage and designs that have come down from the Cheo Dynasty of China. They were not actually formalized but they were largely and generally practiced, certainly by the end of the Cheo Dynasty. This practical wisdom is not necessarily racial, but it should be universal in its application in a world where the law of gravity holds true.

I. Circles of Heaven and Squares of Earth in Szechwan Tumuli

During the last eight years the writer has been rediscovering altars of heaven and of earth in Szechwan. These are so old that modern Chinese accept the tradition that they are review-stands for generals of the Han Dynasty or flower stands of the same date. Local topographies for the most part ignore them. This last year the writer has looked up the "t'u shu chi ch'en"—that source used by western investigators for at least three decades, and has found that Szechwan has several altars of heaven. They were built at the setting up of new dynasties for the worship of heaven by the new line of rulers. The dating of these must depend, so far as the writer is aware, upon internal evidence. Their location is not even hinted at.

A. Between Lu Din Chiao and Wa Si Keo some thirty miles before Tachienlu is reached on the Peking-Chengtu-Yachow-Tachienlu-Lahssa Embassy Route of earlier days there is an island in the swift-flowing steam of the Tung River that can only be reached in a coracle today. Yet this island has an altar of heaven and an altar of earth marked out in river shingle and boulders piled in a "fence" five feet high. (See illustration.) These have the north-south orientation. The altar of earth today has a small altar on which incense sticks sometimes burn. The writer did not read any geological data that would help to date the time of this "pile-up". The dessicated land seen in the picture, with the alluvial cones and the dry-farming above are controlled by tribal people, who live in flat-topped houses.



LARGE COLLARS OF STRATIFIED SANDSTONE

(Dye)

The hat and umbrella give an indication of size.

Chinese control is but nominal on that side of the river. The hither-side of the river, whence this picture was taken, is on the Chinese trade route between Yachow and Tachienlu. Query: Did this mark the site of some "False Emperor's" revolt, like that on the Kwanhsien-Tsakaolao Road during the early years of the Republic? Local tradition mentions the God of War as responsible for these altars.

B. Chiongchow on the Chengtu-side of the city on the Chengtu-Yachow road has typical and symmetricl altars of heaven and of earth. The pattern brick are dated by Rev. T. Torrance and a Chinese ex-official as of about 300 A. D.

C. Chengtu has an altar of heaven that is south of present city. (No one knows definitely the location of the ancient city.) It is built of earth. The radii of the three tiers at their bases are from top to bottom as follow:—32.5 ft., 52.5 ft., and 75 ft. The vertical heights are as follows:—5.9 ft., 7.1 ft., and 5.8 ft. For symmetry the bottom terrace is too low. It should be at the very least 2 feet higher. Alluviation around the base has taken place by 2 ft since about 200 B. C., judging by cash which were stratified at that level. The additional two feet would make the altar symmetrical. The writer would, therefore, date this altar of heaven as of about that time. More research might unearth some ruler that would bring the worship of heaven to this place in those times. Local tradition has it that it is a reviewing stand for troops of earlier times.

D. Hanchong, Shensi, (Formerly in Szechwan) outside its south gate has the largest altar of heaven that the writer knows of. A windlass and man-power well on one side and cultivation have marred the symmetry of the altar. Local opinion is that it was a flower stand during the Han Dynasty.

The writer has heard of an altar to earth in Meichow, Szechwan, but he has not seen it. He also knows of three earth squares that he can more or less assuredly identify. But the only altars of heaven that the writer knows about are on this Peking-Hanchong-Yachow-Tachienlu Big Road. The altar known as THE ALTAR OF HEAVEN is at Peking, now Peiping, but it no longer stands as unique and alone. This was built by Yung Loh in 1420 A. D. and it was put into condition again some three hundred and fifty years later by Chien Long. The writer believes that none of these Szechwan altars are older than the Han Dynasty. The shape, size and proportions are most satisfying. It seems impossible to conceive of perfection more perfect. *They were probably all built in Han times and afterwards, but they had their rise in preceeding times.*

II. PALEOLITHS AND EARLY NEOLITHS IN SZECHWAN.

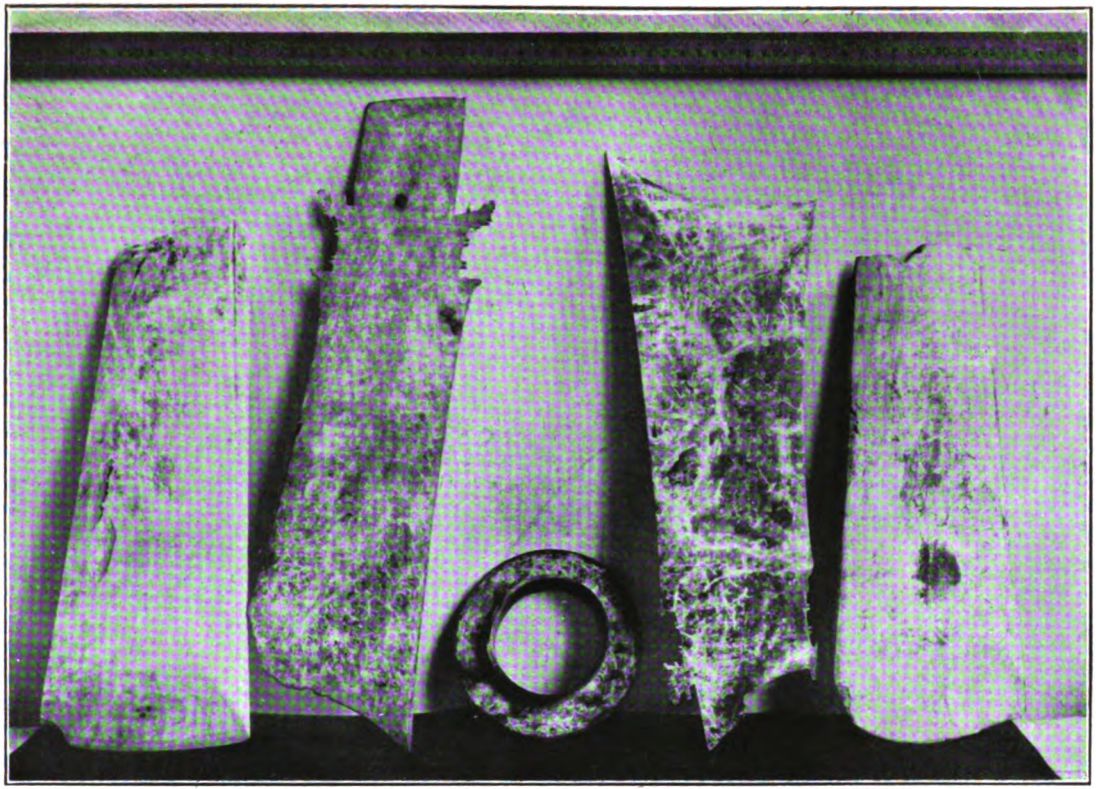
J. Huston Edgar, F.R.G.S. has been finding artifacts—knives, scrapers, hoes, whetstones, spalls, for something like twenty-five years in Szechwan:—from Kweifu to Kiating, from Kwanhsien to Tsakaolao, from Yachow to Tachienlu, and beyond. Some are of a most

primitive culture; some are the polished work of later people. Mr. Edgar was probably the first to find and to report the finding of artifacts in situ in China. He has been followed by a number of others in West China; T. Cook, the writer, C. L. Foster, the children of Dr. D. S. Barter and finally Gordon Bowles. These have been found along the Yangtse, on the Chengtu Plain, on Shin Kai Si Mountain at Omei and even up to 14,000 feet beyond Tachienlu. These are of at least three if not of five cultures. (See this Journal Vol. II.) (The Bowles-Edgar finds should be reported by Mr. Bowles in the near future under other auspices.) Many of these finds show balance, points, curves; some show something akin to the the boomerang shape and sickel curves, but none show circles and squares nor art of any high order. Some reveal filing work by by right-handed men, but there is no indication of the use of metal.

III. Neoliths of Metal Users From the Chengtu Plain.

A progressive official in 1931 brought some stone implements to V. H. Donnithorne of Hanchow and the latter brought them to the writer. Later the three of us visited the site of the finds together, photographed, studied and measured them The official presented the finds to the West China Union University Museum. These are illustrated in the plates. During the Ming Dynasty the people put through a contour irrigation project from Kwanhsien that caused the water to hug the hills and water the higher levels. The stream was cut through old topography at one point. (See "Chengtu County Irrigation Project" by Dye, Lingnam University Science Journal.) At this point Han graves were unearthed and the bricks are to be now seen in a bridge at the site of the find. But the lower strata have successfully hidden their contents these many years. It was about four years ago that a progressive farmer desired to put in a cow-power waterwheel and he dug down below the bottom of the Ming ditch into lower strata of old topography where he uncovered great circles or collars of sandstone, with chisels and axes and spear blades of harder stone. These were scattered and little attention was paid to them until recognized by Mr. Donnithorne to be of historic value.

i. The large collars of stratified sandstone seemed to have been placed on a level in a line that did not coincide with east-west or north-south. These were of various sizes, some of them being more than two feet in diameter. The inner holes were turned out to a diameter of as much as six inches. One showed oxidation to a depth of 1/8 inch, but most were unaffected. Some of the stones were 2 inches in thickness. All of the central holes were poorly turned with different diameters on the two sides. In fact all holes, whether in the large stones or in the small ones, seem to have been turned with a blunt tool. Then there were small, thin collars with diameters as low as three inches that were indiscriminately (apparently) distributed. Some of these had the red so often associated with burial.



STONE IMPLEMENTS FROM CHENGTU PLAIN *(Dye)* W.C.U.U. MUSEUM

Right and left are two adzes evidently cut from larger pieces of stone with a wire saw. The two spear-knives show remarkably fine workmanship. The ring fits snugly over the shank of one of the knives. These were probably fitted onto spear handles and carried as ceremonial weapons

These seem to indicate a relation to the circular money with circular holes of the Cheo Dynasty. There seems to be no correlation between the diameter of the inner hole and the diameter of the stone collar. The ratios varied erratically for different sizes. The variations of twelve of them were not at all consistent so far as the writer could discover.

ii. There were small greenstone beads associated with the cache of implements and symbols. These showed grinding or "filing" but not enough were seen to draw conclusions of value. None of these was presented to the museum.

iii. The chisels or adzes were of splendid workmanship. These were evidently worked out of larger pieces by sawing on both sides of a slab with a metal wire. One groove above and to one side of the first provided for a diagonal break of the slab so as to give a beveled tool. The wire was under great tension as the groove or wire-saw mark is almost straight. Then the bit was ground under at least three bevels. It has an adz or chisel edge and was beveled from one side only. The workmanship is very well executed. The specific gravity of the three pieces averages 3.06. The hardness is between 3 and 4, nearer 4 than 3. The white stone shows some trace of etching by water or possibly humic acid. The writer could find no local stone that answered to this description, although the material of the large circular stones is not so dissimilar to the stones used locally for millstones today.

iv. The spear-knives are of a dark material mottled over with venation as though caused by humic acid from roots. Possibly these were buried too deep for this. The surface venation was white although for the most part the color is black. There is a thin patina of a whitish substance in places. The grinding or sawing and polishing is very accurately done. The knives seemed to have been sawed out into slabs and then the contour worked out later. From haft to point along one edge the thickness runs as follows:—0.484, 0.486, 0.484, 0.485, 0.486, 0.487, 0.490, 0.490, 0.491, 0.492, 0.493, 0.494, 0.495, 0.496, 0.495, 0.491, 0.484, 0 477, 0.460, cm. This shows workmanship of a rare order for stone age tools! The hardness is 5. The average S. G. is 2.93. The imps on the hafted end are most interesting, and seem to be the forebears of certain imps of the Han Dynasty done in bronze. The hole in the handle is beveled and poorly made. The artistic lines and the balance of the knife are exquisite. The ring described in the next paragraph fits snugly over the shank down to the imps. Apparently these knives were fitted onto spear handles and carried as ceremonial weapons, before an official possibly. At all events a study of the cutting edge and the angle of haft and the angles which point the weapon (if such it was) shows a splendid balance with practically no tendency to break off the handle. It is a "balanced" tool! Although no metal was found with the implements, there seemed to have existed metal tools at the same date. It should be added that the edge is a chisel edge.

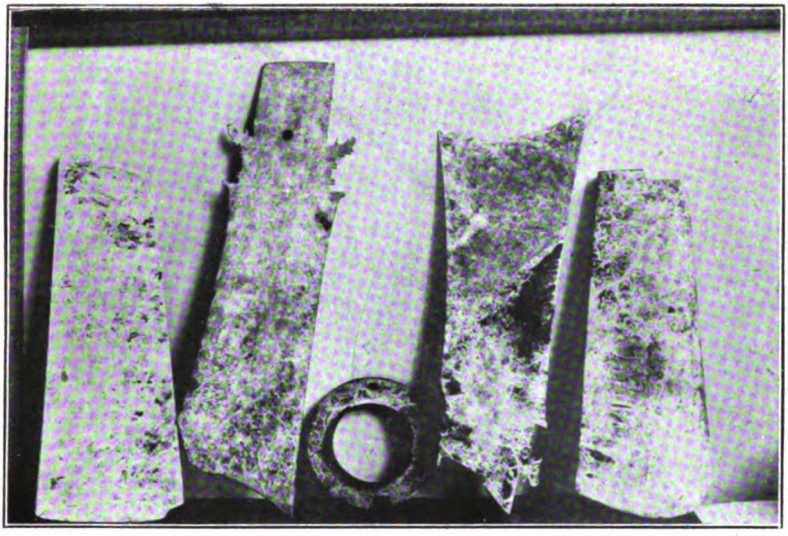
v. The collar is only fairly well turned, with a flaw on one side. It is turned to a surprising thinness. Its color is almost transparent, brownish, horn like. Its S. G. is 2.84 and its hardness is 4—.

vi. A rounded hollow axle with rounded ends and a rectangular center of hard stone may seem surprising. Such are often found on Chengtu streets purporting to be of Han Dynasty date, but this one is probably a precursor.

The dating of such a rare find is not easy, but judging from the superb artistry of the knives in particular and the workmanship of the chisel-adz-ax tools in general, they were produced about 1000 B.C. ± 300 years. Stone tools had reached their culmination, and metal was used at the same time. (Iron spears and swords were used near Chengtu in 200 B. C. (Specimens may be seen in the University Museum). Artistry as revealed in Bronzes of Cheo times was not greatly in advance of this. The culture was possibly that of the Shuh who preceded the Chinese on the Chengtu Plain. These stone implements were probably ceremonial. They were probably buried with on important man or men. The stone "collars" were probably religious, and related to heaven-worship. They seem much more closely related to the Chinese heaven-wership than to any other stone implement finds up to date in West China. They do not appear to show genetic relationship to other finds in Szechwan, save the altars of heaven and altars of earth and the cash of later days.

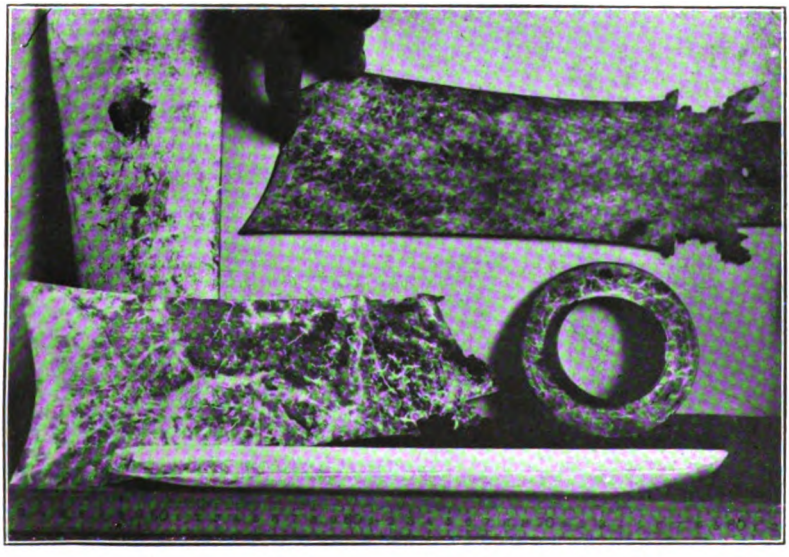
The discovery of other such buried implements depends largely upon the intelligent recognition of the historical importance of such in the study of the very early history of this province. These are most likely to be found inviolate when preserved under the alluvium of the Chengtu Plain, at depths of from six to twenty feet. The alluviation at the University has been from two to fourteen feet, depending upon the locality, during the last two milennia. Where such implements have been buried in old topography still subject to erosion, practically all have been found upon the surface. These have been scattered century ofter century without serving any useful purpose, and no longer have local associations of historical importance attached to them. As the land has eroded, most have come to light after heavy rains. As a boy I found this also to be the case with American Indian artifacts. Dashing rains are often associated with thunder and lightning. It is but natural, therefore, that the Chinese should call these "thunder stones". Han Dynasty finds are still occasionally made by Chinese farmers, in old topography under erosion. Archaeology in West China is still much dependent upon the farmer. The farmer who found the implements here described was an old gentleman of an exceedingly high grade of intelligence, a scholar of the old school. If he had been other than what he was these finds might never have come to any educational institution. The above is merely a suggestion of what is necessary for the addition of data along these same lines.

This last paragraph is written with some diffidence, because the



Reverse Side of Implements Shown in Previous Plate

(*Dye*)

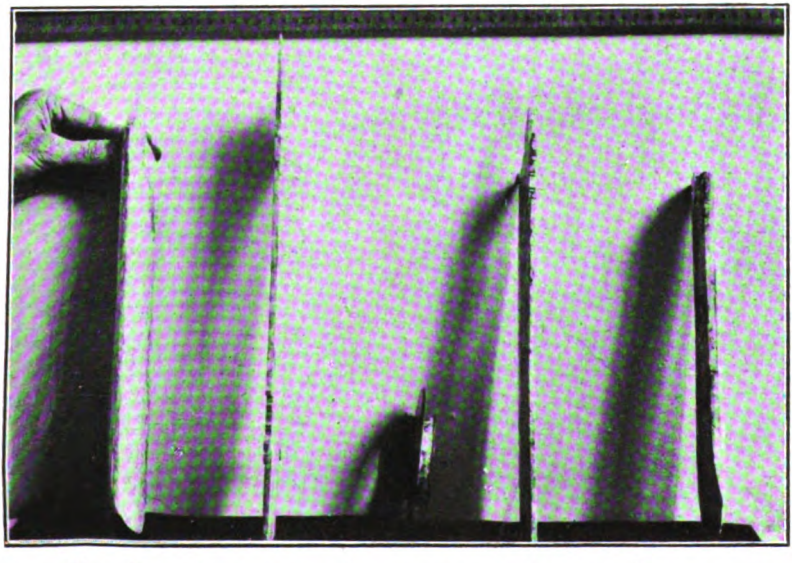


Stone Implements, Adzes and Spear-Knives, of Han or Pre-Han Culture from the Chengtu Plain.

(*Dye*)

AXLE END FOUND WITH OTHER STONE IMPLEMENTS

(Dye)



THE SAME IMPLEMENTS SHOWN IN THE PREVIOUS PLATES,

BUT SEEN FROM THE EDGE.

writer knows it may not be accepted, and it may therefore cast reflection upon the validity and integrity of his article on Chinese Lattice. There is apparently some genetic relationship between the curves and lines, workmanship and artistry, and especially the imps of the haft of the knife-spears and those of the Han times. Especially is this evident in the copper ornaments, and Han period "Trees of Life" (?) (in the University Museum) with "gold-coin" (with heaven and earth symbols as an integral part) incorporated. But there seems to be closer kinship to the Mayan designs on stone in Mexico. Although the writer has been seeing touches in Mayan line and design and endings that seem to relate to ancient Chinese line and design and especially to line endings, these recent finds came with surprise to give visible support to a "hunch" received over ten years ago. The writer can only refer the reader to that museum in Philadelphia which is so rich in Mayan glyphs, to the National Geographic Magazine, to a copy of the Geographical Magazine of the Royal Geographical Society published in 1931, and to a copy of the Science News-Letter of 1932. This last brings out a thunderscroll with more force than usual, and the former give a close analogue of such a hafted knifespear. It seems far afield, but the study of Chinese Lattice for over sixteen years has made the correlation possible and meaningful, to the writer at least. The line endings or "enclitics," the rectangularized scrolls, imps and ogre-like suggestions of Mayan glyphs are certainly artistically, if not genetically, related to the most ancient Chinese artistic culture or its sources. What is the relationship? Can such similar designs have independent origins! How came the relation to be, if genetic relation does exist? These are some of the fascinating questions that await solution.

Written on Yangtse River without access to the magazines referred to above. In addition to these references the reader is referred to Laufer's "Jade" for descriptions of related but unlocated stone implements.

WANHSIEN, SZECHWAN.

SOME NOTES ON THE SKETCH MAP BY J. HUSTON EDGAR OF THE WEST CHINA BORDER.

DANIEL SHEETS DYE.

Mr. Edgar would be the last one to insist that this map is accurate in all of its details, even if it is a revision after repeated journeys extending over more than twenty years into the heart of this region, but it is one of the best up to date. (The Chinese Government through its Geological Survey in 1930 and 1931 collected data for a map of the south eastern portion of this map. This map may be published in 1932.) The writer has added slightly to the eastern edge of Mr. Edgar's map. The limits of the map are 26° N. latitude, and 41°30' N.; and 95° E. longitude and 105°30' E.

A. LEGEND.

Rivers:

1. Brahmaputra.
2. Irrawady.
3. Salween.
4. Mekong.
5. Kinsha.
6. Litang.
7. Yalung.
8. Tung.
9. Min.
10. Yangtse.
11. Yellow.
12. T'oh.

Cities

a. Chengtu
b. Tachienlu
c. Rima
d. Mekong
e. Hsiangchen
f. Batang
g. Litang
h. Chan Hwa
i. Dawo
j. Derge
k. Kanze
l. Meokung
m. Lifan
n. Sungp'an
o. Manchow
p. Kwannsien

B. THE RIVERS AND DIASTROPHISM.

This Land of the Great Corrasions is corrugated by a series of north-to-south-flowing rivers. In crossing from east to west through the center of this region the traveller must *cross at right angles* some

sixteen rivers or large streams. This imaginary east-west line appears to have been one line of thrust in the diastrophism of this region. However the exterpolation of this line bends downward at either end just off this map.

Distinct earthquake shocks are felt in Chengtu at least once in four years. Since most of the earthquakes apparently came from the direction of Tachienlu, the U. U. clock was set to vibrate in the north-south plane, but in 1927 the surprise shock came from the north "when the earth walked" in Kansu, and stopped the clock. One shock in 1917 came from a place sixty miles south of Suifu. The house walls in Tachienlu are so cracked as to point to earthquake disturbances along the line joining Kanze and Tachienlu. The 1926 earthquakes at Kanze were doubtless responsible for some of these. The north and northwest portions of this map indicate another line of thrust in the northeast-southwest direction. There is a real need of seismograph records in Szechwan. Mountain-building forces as well as degrading forces are still active in this region.

It is of interest that so many of the main rivers of Asia take their rise within a stone's thow as it were of each other, flow south paralleling each other, and then radiate thence to the "Four Seas". Mountain-valley-building-force-thrusts and etching-rivers corrugate this terrain into great, difficult ridges and more difficult V or vertical north-south gorges. The altitude of these rivers varies from 1500 feet (save the rivers to the southeast of Chengtu which are lower) to 15,900 feet above the sea. (See Hardy: Some Upper Yangtse River Elevations, Journal of the West China Border Research Society, Vol. II).

The interesting case of river piracy in the southeast corner is part and parcel of this map. The Chengtu Plain has been surfaced over by the alluvium of the vigorous, erosive, upper Min River. This process has been accelerated somewhat by man and his irrigation works. The Min River below Kwanhsien has been bifurcated a thousand times. This is merely suggested by the one bifurcation and one confluence. This subdivided stream has surfaced over the Chengtu Plain so as to spill the water over and across the ancient divide between the Min and the T'oh Rivers. This divide was a line joining points somewhat north of Chengtu and of Kwanhsien. The knolls are almost covered over by alluvium save those like Feng Whang Shan outside the North Gate of Chengtu. The Min sends its waters by the Inner and the Outer Rivers around Chengtu to join and empty into the Yangtse at Suifu. It also sends another stream from Kwanhsien via Hanchow and Luchow's T'oh River to empty into the Yangtse at the city of Luchow. It is not a case of river piracy, but a case of going over into the camp of the enemy and taking charge in part. The facts of this paragraph constituted, as it were, an invitation to the present inhabitants to come in and occupy this land of Shuh in late B. C. times. (See paragraph D.)

C. Topography and Communications.

The land is thrown into great, high, parallel ridges separated by torrential, erosive rivers. These ridges run north-south in general, which is something else again from east-west orientation. Many of these are upwards of 15,000 feet in altitude with certain something over 27,000 feet, with numerous passes over 14,000 feet. (See Helde: Four Passes Over Fourteen Thousand Feet, Journal of the West China Border Research Society, Vol. I.) The vertical stratification of temperature and moisture makes for a varied, difficult, extreme, and interesting floral and faunal life. The crests are moist and cold and the valleys are dry and hot in summer, especially behind the rainscreen mountains. The colder and moister tops and the drier and warmer riversides give wide variety in conditions for life. This is an ideal stage setting for the production of "The Dance of Life," for the development of or the retention of forms and more forms until *there are between six and seven times as many kinds of plants* in this region as there are in all of Europe. (Authority: Prof. Smith of the University of Upsala.) Thanks for such multiplicity of forms are due in part to the diastrophism and erosion vicissitudes of this part of Asia. The rivers and, or the mountain barriers tend to give pockets and islands of life and local variations. The lower river-side pockets may be suited for grazing, the midmountian ridge-sides may favor dry-farming, and the subalpine heights may nourish wild, medicinal herbs. The rivers and the heights are almost impassable and prohibitive of contacts, for many forms of life at least in certain seasons. This is the ideal locale of persistent, retentive life, occasionally bizarre forms of life and sometimes stunted and scrubby life, islanded and marooned by life barriers with topographical extremes in juxtaposition. Communications in such a region are not conducive to the production of common all-conquering life forms, but rather the reverse. The emergence of new and divergent forms is favored as well as the retention of the old, and anything reasonable or possible is likely to occur.

D. The "Between Lands" and the Present Day Peoples.

Between the upper and the nether millstones are the "between peoples" of the Tibetan Marches. The free and ready nomadic yak-barley-Tibetan culture of the Tibetan or Trans-Himalaya massif constitutes the upper millstone which presses from above. The persistent intensive settled agriculture, the water-buffalo-rice-Chinese culture, which presses in from below with hydrostatic pressure constitutes the nether millstone. The gorge and V-shaped corrasions tend to forbid combination, or to obviate the necessity of union against forces which are already baulked by natural forces in the way of climate and hostile slopes and lack of water on the one hand (the lower) or lack of grazing on the other (the upper). Rope bridges

slung across for slip-saddle crossing over torrential streams allow of peaceful barter movements but they are not conducive to forays and conquest expeditions. Over smaller streams the cantilever bridge may be flung across, for they have found their way around the Tibetan massif from the Caucasus mountain streams to the Min River, or vice versa--Who knows? Man has come under forces which have impressed the lower forms of life, and he has persisted and survived through the years. No one knows how many and what tribes there be in these regions. A hand-full of people know in part and some can piece together many scraps of information and misinformation, and some bits of personal observation and study. Whence came these peoples? Under what attractive forces? Under what expulsive forces? Under what uniting forces? Under what divisive forces? Whence? When? Who? Why? How? Wither? These are vital questions still. Have these peoples come by wave upon wave from outside? Or have they emerged by divisions and by separations, developed by isolation and lack of contacts? Today the Black Water people on the upper Min are making life almost untenable both to themselves and to their neighbors. How long can they persist is a question. What cultures have failed to retain the charter of life in these Between Lands? What really are these cultures that have retained the "mandate of heaven"?

E. The Migrating Border.

Previous to the Chinese Revolution of 1911, there seemed to be a definite ethnic thrust into Tibet on the part of the Chinese when there was an attempt to colonize and make Batang instead Tachienlu the port of call for the "ships of the high plateaux—the yak caravans of Tibet. But the Revolution demanded the recall of most of the troops, and Batang is left high and dry. Recently Batang has been reduced to something like an island, and the Chinese troops have retired on Tachienlu from Kanze. The Lolos make it almost impossible to go from Fulin to Ningyuen without heavy escort. It is along the river valleys and the trade routes, which are held and controlled by the Chinese, that there is the most rapid admixture of blood, and of culture. As Tachienlu is the piedmont town for Anterior Tibet or *Kam*, so Kwanhsien is the foothill town for the upper Min Valley. Many of the people inside have heard of these places, some have visited them, but Yachow and Chengtu are almost as foreign and unheard of to them as is Shanghai. A realization of the shifting border today helps one to visualize and to appreciate the problems in time past.

F. Peoples and Cultures of the Past.

Mr. Edgar has been collecting artifacts since 1914 in these regions. His first collectings sorted out into a Suifu-Kiating-Omei culture. (See Data on West China Artifacts by the Editor, Journ. West China Bord. Res. Soc. Vol. II.) These finds were reinforced by those of several other people coming after. Then there were one or possibly two cultures in the Kwanhsien-Weichow-Lifan regions.

Later he collected a very different culture from Tachienlu and beyond at high altitudes. In 1931 summer Messrs. Edgar and Gordon Bowles collected some five hundred specimens of stone and pottery of very primitive lines --far anterior to the Kiating culture—from altitudes as high as 15000 feet in loess pockets beyond Tachienlu. (These specimens are all deposited in the West China Union University Museum.) These intriguing finds await the careful scientific report of Mr. Bowles.

Then a high official presented the Museum with a few artifacts of splendid lines of B. C. 700 plus-minus 300 years, found at an altitude of 1500 feet, covered under the alluvium washed down from the highlands of the Min and so preserved up to today. (See photographs in this Journal.)

This sketch map of the West China Border is replete with suggestions and questions. It suggests the physiographic background of the peoples and cultures of the past and of the present. It is covered with question marks. Now question marks add zest to life, and questions lead to insight when intelligently followed.

THE MELTING OF TIBETAN SNOWS AS A YANGTSE FLOODING AGENT

J. H. EDGAR

The idea persists in China that the high summer levels of the Yangtse Kiang are the result of certain melting snow deposits in Tibet. But if the advocates of this "simple story" ever deign to furnish us with explanations we are left as a rule in a deeper muddle than ever; or where the reasoning is of a more logical kind we find such wrong conceptions of frontier meteorology that the opinions are of no value. For instance, "Tibetan snows" must be defined. The term may mean (a) that heavy precipitations during the winter months pile up large quantities of snow on table lands which are melted off during the summer; or (b) it may be that Tibet is conceived as a land of glaciers and snowfields which are powerfully affected by intermittent heat waves; then finally, (c) a very few may think of heavy snow storms in spring and summer rapidly melted by an almost tropical sun.

But as regards (a) the claims made conflict with our experience. Journeys from Batang to Litang in December 1910, and from the same town to Tachienlu in January and March of 1911, first forced us to abandon the theory for although we travelled in altitudes between 14,000 and 18,000 feet there was snow only on the Cheto Pass, and that was melting in a temperature of 36° F.! November 22nd., 1930, also, we left Tachienlu in deep snow but although we were in the highest altitudes of Eastern Tibet until January 10th., 1931, precipitation of any kind was confined to a slight scurry of snow on one occasion! Moreover, yak were seen grazing above 16,000 feet, forests reached 15,000 feet, and dust was everywhere, even on the highest passes. Such condition s explain why the caravan is so obtrusive during winter, and why the couriers between Tachienlu and Lhasa, who travelled night and day the year round, were rarely, if ever, hindered by snow deposits. It seems clear then, that Eastern Tibetan winters are not seasons of heavy precipitation, and that the meagre accumulations then are either thawed at once by a warm sun or removed to some extent by the blustering winds.

As regards (b) we must be equally emphatic. Eastern Tibet is not a land of snows, but of rich pastures for grass eating yaks and marmots. Grain, also, ripens at 13,000 feet, conifers reach 15,000 feet, and grass anp flowers may reach a point 3000 feet higher. We have been pitilessly drenched with rain also, on plateaus at 15,000 feet, and it is a matter of experience that when thunderstorms sprinkle the higher zones with snow in July and August it will vanish in a few hours. But what about the snow clad peaks and great snowfields ever moving down to the melting zones and causing myriads of streams to flush with supplies for the great Yangtse? As rhetoric

this may be allowed to pass, but the truth resembles something else. In fact the areas covered with perpetual snow in Eastern Tibet make a poor comparison in square miles with those below them. Behind Tachienlu, it is true, is a grand arc of mountains often exceeding the snow limit. But in spite of its grandeur it is really a strictly contracted rim of microscopic dimensions when compared with the snow-free areas to the West. Indeed, after crossing the Cheto Pass the country consists of broken plateaus composed of softly rounded hills and relatively low ranges, well watered and grass or forest clad according to altitude. And such conditions are not local by any means, for on a journey to Batang 300 miles due West, in spite of thirteen passes from 15,000 to 17,000 feet, the peak above Sanpa is the only perpetual snow visible; and on the Northwest road the Kanze range and a peak in Nyarung alone furnish exceptions to the prevailing grasslands and forests. Far South in Litang, and further West near Likiang, there are limited areas robed in snow and ice; and in the Mekong-Salwin Divide are some grand peaks above 18,000 feet. But even in this abruptly elevated locality the higher projections are as exceptions in extensive areas below the snow-line. We have been far South of these features, also, and can say that even in the awful gridiron country fringing Assam and Upper Burma, where many startling impressions are printed on the mind a "land of snows" will not be one of them.

As for (c), of course no one would deny that snow does fall in Tibet. But our point is: the bulk of the Tibetan precipitation is a depleted warm monsoon rain, and as snow its melting is not an important river flooding agent. My friend H. Stevens informs me that on the Northeast frontier of India the "little rains" begin early in March and continue well into April. Then come the heavy rains which continue from June to September, but from October to March there is relatively only a small precipitation. Anyone interested in the meteorology of Tibet will not fail to see the influence of such cycles on the climate of Kham. This Southern origin of the Tibetan rains is probably the solution of many Tibetan problems. A glance at a skeleton map of the region under discussion will show an enormous area of almost snow free country grooved by scores of deep valleys running as a rule North and South. We have the Min, Tung, Yalung, Kin-sha, Mekong and Salwin, and the climate in all such regions is for both altitudes and latitudes exceptionally warm. Now the tropic rains from the South first deluge the main Yangtse valley, later work up the sun baked, steep sided tributaries, and finally reach the grasslands with their volumes considerably depleted. It is evident then that the precipitation as rain pours into the Yangtse with a minmum of delay and considerable changes in the level are the result. But precipitation deposited as snow is limited, both as regards area as well as volume, and much evaporation and some infiltration must be assumed if not actually proved. Hence if the "snows of Tibet" have any marked effect on the Yangtse levels we cannot view them as direct flooding agents even if we admit that to some extent they may delay subsidence during certain months of the year.

THE KIATING JELLYFISH

L. A. LOVEGREN

As a boy, the writer spent some three years close to the salt water on an inlet from Puget Sound, between Seattle and Tacoma, Washington. There I made the aquaintance of various forms of marine life, such as various kinds of crabs, clams, shrimps, and jellyfish, to mention only a few. We never had just the same forms in the salt water and also in the various creeks which flowed into the bays there.

Here in Szechwan I have seen shrimps, crabs, and jellyfish—all very similar in form to the kinds that we have in Puget Sound, but all smaller in size. Practically all of our West China people have eaten the local shrimps, and many have seen the crabs in the streams. Once I met a crab on the road near a stream when I was climbing from Omeihsien to our bungalows at Mt. Omei. This was during a rainstorm (or just after one), and I suppose that the crab had made a mistake as to where the stream was.

Our house here in Kiating is very close to the city wall, on the other side of which is the Tung River, which furnishes most of the water which flows from Kiating to Suifu as the Min River. The section of the river bed which lies just beyond the city wall becomes during the low water season a large pool, but there is quite a strong stream there during the high water in the summer. The strange thing is that each year there appears in this pool a variety of jellyfish. which is very similar to our Puget Sound variety. I have not heard that it occurs anywhere else, but it would be strange if it did not also occur in other pools left by the receding waters. Our Puget Sound jellyfish had no threads below the body of the animal till it was about two inches or more in diameter. The full grown Puget Sound jellyfish is colored red, and has poisonous threads dangling in the water below the body. The young jellyfish are colorless. Here the threads begin to appear when the jellyfish is less than an inch in diameter, and the color begins to appear when the animal is only about half the diameter of the jellyfish of Puget Sound in the same stage of life. The jellyfish here turn to a sort of light golden yellow when they are less than two inches in diameter, and the largest ones that I have seen are not much if any larger than two inches in diameter. I have not tried to find out if the tentacles are poisonous.

Mr. Edgar told the writer that jellyfish are also found in the fresh water of Tai Hu in East China. That lake is on the coastal plain which was all once a part of the ocean. There the silting in of

the outlet to the lake has apparently caused the water to freshen very gradually so that the marine form of life was able to become adjusted to the change. That change came about in recent times, speaking geologically, but it has been a long time since we have had marine conditions here in Szechwan. Are the jellyfish, crabs, and shrimps survivals from the times when most of Szechwan was covered by salt water? In that case the change from the marine to the river conditions must have been very gradual in order to allow these forms of life to become adjusted to the fresh water. Have these forms of life become somewhat dwarfed in becoming adjusted to the fresh water? It would seem that the salt beds of Szechwan were laid down and covered before the change from the marine to present conditions occurred. Of course, no real conclusions can be drawn from the finding of three apparently landlocked forms of marine life here in Szechwan, but what are the answers to the riddles suggested by these three forms of life here?

CHENGTU MOSQUITOES.

A. E. Best.

No one can co-habit for long with the blood-sucking members of the insect family without developing at least a morbid interest in one branch at any rate of entomology, and when to the further misfortune of the human race certain insects not content with the modicum of physical discomfort they bring actually lend themselves to the spreading of disease from man to man, the matter is carried beyond the bounds of mere interest and becomes a matter of public health and safety, a matter as well of national economics. For example, the common bed-bug and body-louse transmit those dread diseases, typhus and relapsing fever, trypanosomiasis is spread by the "tse-tse" fly, and yellow fever by the mosquito "stegomyia fasciata". However, due to increased knowledge and improved sanitary measures these diseases are rapidly becoming a thing of the past. Malaria is spread also by a mosquito, or rather a group of mosquitoes, the anopheles. Mosquitoes as a pest exist at some time of the year or other in practically all quarters of the globe, but only where the anopheline group can thrive is the spread of malaria possible. Of the insects above mentioned, the mosquito is undoubtedly at present the greatest menace to human welfare and therefore its study is doubly interesting.

According to report malaria is a serious medical and economic problem throughout China. Certainly it is a serious one in Szechwan and especially on the Chengtu plain. That the incidence of malaria is wrapped up with that of the anopheles mosquito is well known. Not so well known is the fact that *not all* anopheles can spread malaria, or that certain anopheles favor certain localities, or that in a given area though there may be sesveral anopheles it is quite possible that only one group is responsible for malaria in that area. Heretofore, no serious attempt has been made to study the mosquitoes of Szechwan. The only report is that, "both culex and anopheles are found" here. Two years ago, we began in a small way to investigate the mosquitoes of our immediate vicinity with a view to discovering if possible just what species were responsible for malaria in Chengtu.

Mosquitoes move out of their winter quarters and become active during the first really warm spell of Spring, usually for us here about the forepart of April. They lay their eggs in nearby bodies of water as unless carried by wind they do not usually travel far. The securing of larvae is the most convenient if not the best way of studying mosquitoes, yielding at the same time valuable information as to the

life habits of the mosquito in question. They are usually easily obtained and perfect adult specimens may be grown from them for mounting. Accordingly, about the end of May we directed our attention to the favorite haunts of the mosquito, cisterns, rain-crocks, ditches etc., in close proximity to dwelling houses. We got plenty of larvae early in April, mostly Culex (Aedes do not appear until later in the season) *but no Anopheles.* Just about this time, one of our hospital inpatients made the remark that some years ago when Yang Sen was is Chengtu the troops he had quartered in the old temple at Tsin Yang Gung, outside the new West Gate, had suffered severely from malaria. This seemed like a clue and we at once turned our attention to that locality. Crocks, pools, reservoirs, ditches in fact every type of water receptacle in and about the temple was carefully searched. Plenty of larvae were found but as before, no anopheles. Inasmuch as there is a good deal of malaria this time of year there could be no doubt about the presence of adult anopheles, but where were their breeding places? Somewhat baffled, we turned our attention to larger bodies of water, this time for convenience sake those just outside the various city gates. The rivers, neighboring pools and ditches gave us negative results but a little before the middle of May we discovered anopheline larvae in large numbers in a little "yang-yang" paddy on the campus within a stone's throw from the library, and it is worthy of note here that this field was within a few feet of a little farm house where doubtless the parents of these larvae had passed the winter. There were plenty of Hyrcanus and Pattoni, so common in other parts of China, and possibly others as yet un-identified (the final authority is Edwardes of London who is very kind in checking over mosquitoes sent to him).

Needless to say we gathered a large number of these larvae and removed them to our laboratory, for breeding purposes. Then we learned something, though for the time being to our deep chagrin.— *Anopheline larvae need direct sunlight to develop properly.* We afterwards saw this fact mentioned in a journal but is was too late as all of ours were already dead-We hastened back for a fresh supply but during the interim the rice had been planted out and the field flooded. Diligent search was made but no larvae found. The Summer wore on and hospital duties interfered seriously with our investigations. Several visits were made to various rice paddies outside the little East gate but without success. Curiously enough each visit had been preceeded by a heavy rain or the re-flooding of the fields from the irrigation ditches. No anopheline larvae were found even in fields near dwelling houses.

The following Spring in spite of the general impression abroad that our anopheles did *not* come from rice fields, and our failures of the previous year, we decided to concentrate our attention on these same fields, knowing as we did that in India there were species of of anopheles that actually seemed to prefer rice fields for breeding purposes. We made the discovery that *all* the "yang-yang" fields in

our vicinity harbored anopheline larvae by the time the rice was a foot or more high, that is to say all we examined, and we examined a great many. Furthermore, in each case the fields were within a few yards of some farm house. Careful search after the rice had been planted out in the large fields also revealed larvae, especiall if made when the water was low, as just before flooding. The comparative difficulty in finding them was doubtless due to the enormously increased area. We noted too that in the neighborhood of the Tsin Yang Gung temple larvae were particularly easy to find, suggesting that conditions thereabouts are especially favorable to their devlopment and that there was good reason for Yang Sen's soldiers there suffering severely from malaria.

As has already been made clear, our chief interest was in the anopheles, malaria being with us such a big medical problem. However, for fellow sufferers who unwillingly provide nutriment to female mosquitoes, alas that there be more mosquitoes; a word about some of the other groups may be interesting, though for us here in Chengtu they do not figure as conveyors of disease. Fortunately for us almost all our mosquitoes confine their activities to evening and night. There is one exception, one of the Aedes a small mosquito brilliantly striped with white and black; this one makes its presence felt by about the middle of the afternoon, keeps fairly close to the ground and helps fill in the time for tennis players sitting on the bench waiting for their turn. The commonest mosquito by far is the Culex, a medium sized yellowish brown mosquito that probably most people can recognize. It is the first to make its appearance in the Spring and one of the last to go in the fall, besides being very prolific, so that in the aggregate it is doubtless responsible for most of the "punctate" misery that is ours for the Summer months. About mid summer, a very large mosquito takes the stage, and one of its chief characteristics is its ferosity. It may be recognized, partly by its size, partly by the patches of large white "scales" that dapple its thorax. These are perhaps the best known, but there are of course many other varieties. Inasmuch as Szechwan has already made large contributions to the Fauna and Flora knowledge of the world, supplying specimens hitherto unlisted and apparently found no where else, it is perhaps reasonable to assume that we have here also mosquitoes hitherto unreported. Here is a field of investigation as yet practically untouched, extremely inviting.

In conclusion there are certain points perhaps deserving of emphasis. In that we found no anopheline larvae whatever except in rice fields, it seems a reasonable conclusion that this is the breeding place of the anopheles of Chengtu, also that this is the anopheles responsible for the spread of malaria here. It is true that as late as the latter part of August adult anopheles (Pattoni) were caught at Lin Ai Si, the summer resort at Kwanhsien, but as even there small rice fields are located close to the bungalows it is not unlikely that these too were bred in rice fields. Dr. Lechler of Mienchuh reports

finding anopheline larvae in small water holes on the mountain a short distance from that city. This is interesting and it is to be hoped that people will take up the enquiry at their own Summer resorts. Another point is that the increase in malaria patients at our haspital parallels closely anopheline activity as recorded, which of course was to be expected. And finally nothing should be more clear than that the fringes of the subject have been but touched. Here is a fascinating hobby, inexpensive, does not require much time, and has a very close bearing on increasing the store of knowledge and the good of the human race. If this paper does no more than stimulate others to take up the study, its writing will have been very much worth while.

PRELIMINARY STUDY OF THE COMMON HUMAN PARASITES IN WEST CHINA

S. D. Du.

Szechwan is one of the largest and most densely populated provinces in China. It is separated from Kansu and Shensi by the Chin Ling Range which extends to the valley of the Yangste River, forming also the eastern boundary between Szechwan and Hupeh. Kweichow and Yunnan are on the South, with a mountain range intervening there also. The high table land of Tibet extends along the whole western border of Szechwan while the east is completely cut off from Hupeh except for a huge cleft, the Wu Shan Gorge, through which flows the Yangste River. Szechwan is thus surrounded by large mountains with an eastern outlet through which the Yangste River flows forming, as it were the narrow neck of a large bottle. This isolated geographical situation favours an endemicity of diseases peculiar to itself. Furthermore, the humidity and temperature being modified by mountains are also factors in favour of the development of special parasites.

There are, of course, many factors other than the meteorological that control the dissemination of parasites and the incidence of infestation in man. The following are considered to be important:

1 Night soil.

Almost everywhere people of this province use night soil as fertilizer. As a rule, fresh night soil is used more often than old which latter is usually kept in large tanks or pits. This is undoubtedly a potential factor in determining the parasitic infestation. The writer has seen two specimens of active embryoes in ascaris eggs which were kept in the laboratory for at least one year. According to Faust, the ascaris eggs can be kept viable for five or six years. Therefore the storing of human excreta for a long time does not kill all parasites.

2 Food.

Szechwanese, as a rule, like to eat their food while it is hot. This undoubtedly protects the population from the infestation of a great number of parasites. The fact that the cats of this province are often infested with clonorchis from eating raw or dried fish would

show that man would have become infested had he consumed raw or under-cooked fish. However, they are very fond of eating live shrimps dipped in alcohol and various condiments. Last year, the writer dissected about 900 shrimps and found that the shrimps which came from the rivers and streams were more or less heavily infested with trematodes. Furthermore, many of the river shrimps showed a number of ovoid bodies, the nature of which was not determined though there were reasons for suspecting them to be encystad cercaria of certain shrimp flukes. There was another type of parasite which could be found in the great majority of shrimps. These parasites looked like tiny scorpions with two rows of circular cilia in front of the head. The cilia enable the parasites to obtain food by producing a current of water. They move from one place to another by contraction and extension. At rest they assume an elliptical shape. Even hen's eggs, when consumed raw, cannot be considered absolutely safe, for eggs containing flukes have been found five times here in Chengtu. It is true that as a rule food is allowed to stand in stalls and restaurants and considerable time elapses before it is ingested. During this interval it is exposed to flies, domestic animals and the dirty hands of human beings. Morever, in the market in order to keep the fruits, sugar cane, and vegetables fresh the seller, as a rule, sprinkles them with water which is always indirectly polluted with human excreta, for the water is from wells situated near lavatories or cesspools. These fruits, sugar cane and sometimes vegetables are eaten raw.

3 WATER.

Szechwan tea shops are established in towns and cities in the proportion of about one tea shop to every five to ten street blocks so that, as a rule, most of the city dweliers drink boiled water throughout the year. However, in the Summer a good deal of cold, sweetened water is consumed and usually this is unboiled water. The water often comes from wells which are adjacent to public lavatories. The edges of these wells are frequently level with the ground and during rains the muddy rain water can easily find its way into the wells. Recently the introduction of soda water has greatly increased the consumption of unboiled water especially in the larger cities. This water is probably always polluted as we have not as yet found any public wells in Chengtu that did not give a high bacterial count. These factors are likely the main causes of the dissemination of protozoal diseases such as amebiasis.

4 MIGRATION:

Most people from down river are afraid to come up to Szechwan. This may possibly reduce the incidence of certain infections. However, the transfer of soldiers from one place to another favours the spread of such parasites as the relapsing fever spirochete.

With the above questions in mind, we have since 1928 been endeavouring to make a survey of the parasites obtained from patients admitted to our Men's Hospital. The technic used consisted of emulsifying a bit of feces in a drop of normal saline on a clean glass slide, and a second portion in a drop of Iodine-Eosin solution. The two are about 1 cm. apart and both are covered with one cover glass. The preparation is examined microscopically. In case of doubt permanent staining with iron hematoxylin is resorted to. For blood parasites Wright's and Leishman's stains are generally used.

TABLE I

Parasites Found in the Blood of Hospital Patients.

Parasites	Male Patients			Female Patients			Total		
	No. of cases.	No. of positives.	% of infestation	No. of cases.	No. of positives.	% of infestation	No. of cases.	No. of positives.	% of infestation.
Malaria	594	40	6.7	55	3	5.45	649	43	6.66
Relapsing fever spirochetes	594	34	5.7	55	0	0	649	34	5.3

Relapsing fever has been known for centuries but the spirochete was discovered by Obermeir only 58 years ago. It is a delicate spiral filament averaging 17 microns in length. There are two intermediary hosts, e. g. lice and ticks, that convey the infestation. In China lice are undoubtedly the chief conveyers of this infection. As a rule in our hospital for diagnostic purposes we examine blood smears of all patients who have a temperature of 102° F, or over. Table I shows that out of 649 fever cases there were 34 cases of relaping fever spirochetes giving a percentage of 5.3.

Table II shows the percentage infection of relapsing fever in relation to seasons, represented by the striaght line in the diagram. It shows clearly that spironema recurrentis makes its first appearance and occurs most frequently in April. It is still frequent in May. After that it gradually disappears. We have not found any spirochetes in the Spring, Autumn or Winter months as yet. This may be due to the fact that these spirochetes require a special temperature, say 74° to 78° F. for their development in the bodies of the lice and to

the fact that "Louse incidence is at its highest in the late Spring, just before the Winter inner garments have been removed. The temperature at which lice eggs hatch best is 90° F or warm Summer temperature; perhaps though lice are more active and have better appetites in the Spring and feed oftener, and so bite more people. The biting of the lice produces itching and causes their host to scratch The scratching may crush the lice and produce superficial scarefication of the skin of the host. In consequence, the infective material either from the feces of lice or from the crushed louse body itself can be easily inoculated into the host and produce a disease known as Relapsing fever. Therefore in the Summer special care should be exercised as to riding in public rickshaws for the puller often puts his clothes beneath the seat and lice may creep up to the rider. Moreover, before a new rider takes his seat the coolie usually turns the cushion over thus bringing the lice from the immediate vicinity of his clothes into more intimate relation with the rider.

Malarial Parasites.

There are three species of malarial parasites, known as Plasmodium vivax, Plasmodium malariae and Plasmodium falciparum. According to Faust, Plasmodium vivax has the widest distribution in China, Plasmodium malariae has a "spotty" distribution while Plasmodium falciparum is relatively common in the south. It is a commonly known fact that all forms of malarial parasites have two life cycles, the asexual and sexual. The former takes place in man, the latter in the mosquitoe. Infection is caused by the bite of the anopheles mosquitoes.

Here in West China, we found 43 malarial cases out of 649 fever cases (6.66%). Three of these 43 malarial cases were malignant malaria or Plasmodium falciparum, while the rest were benign tertian parasites or Plasmodium vivax. Thus we found 7% of malaria and 9% of tertian malaria in this province. Table II shows graphically the relationship of malarial parasites to the seasons. It shows that infection began to appear in March, occurred frequently in May, June and July and came down to 5.6% by August. Moreover, there was a slight rise in September and October. This curve in invariably connected with the prevalence of anopheles in the Summer months. The slight rise in September and October may be due to latent forms of malarial parasites in the body.

Amebae.

There are at least six species of intestinal ameba of man known to day, but there is only one species Entameba histolytica, pathogenic to man. Amebic dysentery is brought about by swallowing amebic cysts not the motile forms, for the latter cannot withstand the action of the gastric juices. The cysts after passing into the small intestine,

change into motile amebae when the cyst wall has been digested away by the intestinal juices. Free amebae invade the intestinal wall and give rise to dysenteric symptoms, when a sufficiently large number of them have been produced.

The incidence of ameba found in students was 9.5%, while that from the hospital patients was only 6%. This is shown in the above table V. However, the percentage of infestation, in general, is relatively low. This is possibly due to inexperienced laboratory staff and to the lack of repeated stool examination.

TABLE III

Preliminary Study of Intestinal Parasites of Students of the West China Union University.

Parasites.	Male Students			Female Students			Total		
	No. of cases.	No. positive.	% infestation.	No. of cases.	No. positive.	% infestation.	No. of cases.	No. positive.	% infestation.
Ent. histolytica.	185	10	8.65	36	4	11.1	221	20	9.5
Ent. coli.	185	27	14.6	36	4	11.1	221	31	14.0
End. nana.	185	16	8.65	36	0	0	221	16	7.25
Iod. butschlii.	185	2	1.08	36	0	0	221	2	0.9
Ascaris.	185	116	63	36	20	83.3	221	146	66.67
Trichuris trichura.	185	15	8.1	36	0	0	221	15	7.0
Hookworm.	185	6	3.24	36	7	16.6	221	13	6

Table III is a survey made amongst the students of the West China Union University last year. There were 221 students examined and 520 examinations were actually carried out. In the table the female students showed a higher percentage of certain types of parasitic infestation than that of the male students, for example, the female students showed 11.1% of Ent. histolytica while the male students 8.65%.

TABLE IV

Preliminary Study of Intestinal Parasites of Patients in the Men's Hospital of the United Church of Canada Mission, Chengtu.

Parasites.	Male Patients			Female Patients			Total.		
	No. of cases.	No. positive.	% infestation.	No. of cases.	No. positive.	infestation.	No. of cases.	No. positive.	% infestation.
Ent. histolytica.	2175	119	5.9	315	28	6	2490	147	6
Ent. coli.	2175	34	1.5	315	7	2.0	2490	41	1.7
End. nana.	2175	17	0.8	315	4	1.3	2490	21	0.9
Trichomonas	2175	4	0.2	315	2	0.6	2490	6	0.24
Giardia.	2175	9	0.4	315	5	1.5	2490	14	0.56
Ascaris.	2175	104	48	315	105	33.3	2490	1184	46.1
Trichuris trichura.	2175	169	7.7	315	24	8	2490	193	7.8
Hookworm	2175	38	1.7	315	0	0	2490	38	1.5

TABLE V

Comparision of Students and Hospital Patients.

Degree of Infestation.

Parasites.	Male Students %	Male Patients %	Female Students %	Female Patients %	Total Students %	Total Patients
Ent. histolytica.	8.65	5.9	11.1	6	9.5	6
Ent. coli.	14.6	1.5	11.1	2.3	14.02	1.6
End. nana.	8.65	0.8	0	1.3	7.25	0.9
Ascaris.	65	48	83.3	33.3	66.6	46.1
Trichuris tricura.	8.1	7.7	0	8	7.0	7.8
Hookworm	3.24	1.7	16.6	0	6	1.5

Table IV is a study made amongst the patients of the Men's Hospital of United Church of Canada since 1928. There were 2490 cases examined and practically only one examination was done per patient. In this chart the male patients showed 5.9% of Ent. histolytica, while the female patients 6%. It was pointed out by O'Connor and Wenyon that the percentage of infestation resulting from three repeated examinations yields a figure which is at least three times as great as that obtained by a single examination. The infestation of the hospital patients appears lower than that of the students. Owing to the lack of adquate staff, this presentation would indicate the number of species of ameba we found in this province rather than the actual data, that is to say it is qualitative rather than quantitative.

ASCARIS.

Ascaris is by far the most common intestinal parasite in this province. This parasite is introduced into the body by mouth. The eggs which have a very thick shell pass though the stomach without any change but when they get into the duodenum the intestinal juices stimulate the activity of the enclosed larvae which burst the shell and later penetrate the intestinal wall getting into the lympatics and mesenteric veins. By way of the thoracic duct and the inferior vena cava they pass through the right side of the heart to the lungs. Here they are filtered out of the blood stream and migrate into the alveoli. After a period of growth they pass up the bronchial tree into the pharynx then down esophagus to the stomach and on again to the small intestine. In the small intestine they develop into adult forms. When mature a female parasite is able to discharge some 200,000 eggs per day and each egg can become a worm in turn after passing through the stage outside the human body.

Table III shows that the female students gives a percentage of infestation of 83.3% while the male 63%. Table IV shows that the female patients give a figure of 33.3%, while the male patient 48%. The higher incidence of infestation of ascaris amongst the female students is probably due to the fact that female students are more fond of eating raw vegetables than are male students. The marked low infestation amongst the female patients may be attributed to the general belief amongst older fashioned Chinese, that any thing eaten raw is apt to produce abodominal pain. So they consume raw vegetables to a less degree than the female students. However the lack of repeated examinations of the stools of the hospital patients may explain in part the low infestation of ascaris.

TRICHURIS TRICHURA.

This worm is also known as whip worm. It is introduced to the body by mouth. The parasites attach themselves to the folds of the intestinal mucous membrane by transfixation of their slender

elongated necks. Consequently it is very hard to get rid of them. Fortunately these worms produce no serious pathological lesions in the hosts and the percentage here given is very small (7% amongst the students, and 7.8% amongst the hospital patients.)

HOOKWORM.

The infestation, if sufficiently heavy, causes hookworm disease no matter what the race, climate or who the individual may be. There are numerous effects from hookworm infestation but the main one is anemia which results in definite physical loss of strength of the individual and mental apathy, constituting a high economic loss in localities where the infestation is heavy. This infestation is more frequently seen among the farmers than among any other class of people. In the presence of warmth and moisture the eggs from fresh excreta rapidly develop into larvae and are able to travel a few feet. They climb upon grass and leaves near the ground from which they easily come in contact with the bare skin of passers. By boring into the skin they get access to the small intestine (their final distination) through the lymphatics and blood stream. In the above table, the students show 6% of infestation while that of the patients 1.5%.

Finally the writer is very much indebted to the kind help of Dr. T. H. Williams M. D. Head of the Pathology Department and valuable assistance rendered by Mr. Lu and Mr. Yang, both members of Pathology Department Staff here.

DENTISTRY IN CHINA.

A. W. LINDSAY

As an introduction to a paper on "Dentistry in China" it may be well first to create an atmosphere; to gain for you by a recital of some of the pupular sayings and beliefs an understanding of the cultural state of the country. Doubtless, to-day, modern-minded Chinese will deny a belief in many of the ancient sayings and old womens' tales regarding the teeth, but I am very sure that the great bulk of the people still subscribe to the statements in the following paragraphs, all of which I constantly hear repeated.

Children when their upper deciduous, or milk teeth, fall out bury them in the ground, or throw them into a well, to induce the upper permanent teeth to hurry down and find their predecessors. Likewise in the case of the lower deciduous teeth these are thrown on to the roof to attract their permanent successors upward.

A woman with child will not eat rabbit meat for in its indulgence the infant will—as a consequence—have a hare lip.

Children whose anterior permanent teeth are erupting should not be permitted to eat melon and squash seeds because the cracking of the shells will surely cause their protrusion from the arch.

Any child's tooth rubbed by a bride on her wedding day will be greatly accelerated in the speed of its eruption.

If the baby's upper centrals erupt before the lowers it is a very unlucky sign. These upper teeth are called 'to-dig-his-grave teeth,' and their earlier eruption means that probably he will very soon die.

The temporary teeth are not considered of any importance, and so, little attention is paid them. Comparatively large amounts of sugars such as candy, sweetened rice and sweet flour cakes are allowed to children and these indulgences are blamed for the decayed and stained temporary anterior teeth which are called "chiao ya", literally translated, "scorched teeth".

A sure prevention against the loss of teeth through pyorrhea and similar affections is to take the first which falls out, grind it up into a fine powder, mix it with water and drink the concoction.

As infants' mouths are not swabbed out or cleansed after feeding there is a great deal of aphthous stomatitis. The superficial ulcers are called "ma ya" horse teeth, because the ulcers simulate the eruption of teeth and come early as do horses' teeth. The remedy used for the disease is a collection of insects found under boards which have lain on the ground for some time. These are crushed into a paste and applied to the ulcers.

The older generation and more especially those who believe in Buddhism carefully preserve the teeth which have been extracted or have fallen out for burial with them in order that they may present themselves before the gods with a full complement. Believing in transmigration, they might be compelled if lacking the full number, to enter the future existence as a lower animal requiring fewer teeth. Further, Confucius said that a man would be unfilial if, when presented by his parents with a complete body, he should pass to the beyond with a damaged or incomplete one.

The packing of food between the teeth is supposed to be brought about by the eating of vegetables fried in hot oil. The heated vegetable is thought to cause the separation of the teeth.

In the West we talk about a competency slipping away between a man's fingers. But in China it escapes through the too-wide spaces found so often between the anterior teeth.

An introduction should also acquaint you with the most prevalent dental diseases which are to be found in China. Many of you I feel sure, have been informed that the teeth of the Chinese are very good, as compared with your own. I had hoped to present to you some tables showing the occurence of dental decay, and of so-called pyorrhea, but the press of work has made this impossible. You may accept as fact however that the incidence of dental caries in China is very low as compared with that of North America or Europe. But diseases of the peridontal tissues are so much more severe that they cause a much more frequent loss of teeth and a disruption of the masticatory function as serious as any we find in the West.

Because of the small incidence of tooth decay, we have comparatively less toothache than in North America or Europe. But with such a dense population this condition seems to be prevalent enough, though to be sure not amongst school girls and boys of the teen age.

The most dangerous pathological condition to be found in the mouths of the young is that of the preparatory stages of periodontoclasia (pyorrhea). This disease has a long progressive history before it is recognized by a flow of pus from about the tooth. Unfortunately there is no pain to give early warning of this condition. The result is a disastrous loss to the masticatory apparatus in early middle life, and the unsuspected cause of toxemias, bacterial infections and generally lowered vitality amongst a large number of individuals who should in the prime of life be at their best.

There has been no general consciousness regarding the care and hygiene of the teeth. Some two dozen years ago the Japanese introduced a tooth brush of very poor type. The favorite and most common cleansing agent is the facecloth wrapped round a finger and used as a swab. When travelling through the country one may see, on rising in the morning, the guests of the inn, each in turn, making use of the face-cloth provided, first for his face and then for his mouth. The one redeeming feature in this procedure is the use of very hot

water, much hotter than the ordinary Westerner could bear on his skin.

Let me quote an article published in a Chinese magazine to give you some idea of the place of oral hygiene in the country.

THE HISTORY OF THE TOOTH BRUSH—ITS MATERIALS AND MANUFACTURE

Written by Chao Tieh Chiao.

Translated by Dai Su Ku.

"It is our good fortune that we have a well-manufactured tooth brush to use nowadays. It will profit us if we try to find out when man began to brush his teeth; when he began to use a tooth brush and its many forms; how it is manufactured and also how it has changed, and through what stages it has passed. This paper gives the answers to the above questions.

I should first inform you that the ancient Chinese did not pay much attention to the tooth brush so it is not easy for me to collect material concerning it in early Chinese writings. This paper is based on some Chinese stories, some western books and partly on my own observation.

Our ancestors were of the monkey family. It was through natural evolution that their mental power and skilfulness developed. The methods of self-preservation gradually developed and man began to give attention to the cleanliness of the mouth. Therefore the methods and instruments for brushing the teeth also made great progress. It is very interesting to study how the modern tooth brush came into being.

In the early days of China, people knew nothing more than to wash their mouths and teeth with water. We often find in Chinese books these two words "wash and rinse", "wash" meaning to wash the face and hands and "rinse" meaning to rinse the mouth. In the Book of Rites it gives the explanation of the word rinse as follows. "Rinse means to cleanse the mouth." In the "Book of the Gin" Sen Chien answered Wang Gee's question saying "To rinse one's mouth with pebbles means so sharpen the teeth. To water one's pillow means to wash the ears." By this we know that even then people felt that the mouth could not be kept clean simply by washing it with water. They began to think of some kind of an instrument to supply a more efficient method.

Following this, there were people who used the wooden slip for brushing the teeth. This was a very simple device. It was made from a willow branch by hammering one end into fine fibers. After soaking it in water for some time it was ready for use. This was the

beginning of the use of an instrument to brush the teeth. Though it was not called a toothbrush, it was in truth the ancestor of the toothbrush. When this wooden slip was adopted, people of Oriental countries began to give heed to the teeth. Both the nobles and the proletariat combed their hair and cleansed their bodies after they rose. It was considered not courteous if one did not rinse his mouth or brush his teeth, and public dining halls refused his presence. Even in the poor man's pocket a white short wooden slip was kept for brushing the teeth. This wooden slip was destroyed when once used.

People in the Philippines, Africa, India, Persia and Japan also used this kind of wooden slip for a toothbrush. From this we may draw the conclusion that still other races did the same.

In European countries people showed further progress. They used those plants which had an agreeable odor. The slips were made of willow or pine, and a scent made one comfortable when one used it and it did much good to the intestines and stomach. I have a friend who has just returned from the U. S. A. He tells me that in the New York Exhibition, he saw some black people who used wooden slips for brushing their teeth; their teeth were as white as pearls; thus we know that this old type of toothbrush still remains in use in their stagnant country.

The fine fibers of this wooden brush were easily broken off and remained in the oral cavity. Because these caused disease and also injured the enamel, people made another change by wrapping the finger with linen or silk to wash the teeth.

William Vacone (1602) in his book says "If one wants to keep his teeth white and perfect, he must rinse his mouth after each meal and in the morning he must wipe the inside and outside of the teeth with linen." Even today in inland China uneducated people still use a wash cloth or the finger and salt to cleanse the teeth.

Some foreigners also used a sponge. Of course, this is better than linen. Chesterfield in his letters to his son says "Teeth are the masticatory organs and of the most vital importance in the maintenance and preservation of health. So every morning it is necessary to put a sponge in boiled water and then use it to wipe the teeth. It is bristle than a cloth. Wooden slips and other hard things should not be used."

The stages of evolution in brushing the teeth are proportionate to the progress of civilization. In modern times very few people use a sponge or linen. They use the skin of the coir-palm or the bristles of an animal to make a brush. In the Yen Dynasty the poet Kao Yu wrote a poem saying "A tooth brush sent from South-Chow! Dirt is cleansed away at a high cost". Thus we know that people of that time did use a brush; that it was well made and expensive.

The method of manufacture of this palm fibre brush is as follows: Take a bamboo card 4/10 of an inch wide and 4 inches long and bore it full of holes at one end, after this has been done fasten the palm fibers with linen thread, in many small bundles, each as large as one

of the holes. After this put these bundles into the holes and fasten them at the back and then cut the other side to suit the teeth. Some manufacturers used brass wire instead of linen thread and the bamboo slips were smoothed and polished.

Another change was made from palm fibre to the bristles of animals because the palm fibres retain water.

The forms of the tooth brush were of many different kinds and the bristles used of various kinds. Wool and horse's mane are not elastic enough for brush making; they are not even so good as the palm fibre brush.

The best tooth brush bristles are from pigs. In China, manufacturers knew how to make a brush but did not know any method of sterilization or bleaching. It was not until the 10th year of the Chinese Republic that the "Two-wheel Toothbrush Factory" in Shanghai, began to manufacture tooth brushes with modern machines.

The chief materials for making tooth brushes are buffalo bone and pigs' bristles; the processes of manufacture are more than ten.

Szechwan, Shantung and Kiangan produce a great quantity of bone. Merchants collect the shank, femur and tibia, etc, All are cut into lengths about six inches long and put in water with lime for two weeks until the blood and flesh are all gone.

The bristles of white pigs are prepared in bundles for use. The best bristles are produced in Russia and China and in the latter country the most excellent product is found in Szechwan.

The tooth brush is a very small instrument; notwithstanding this it is very difficult to manufacture a satisfactory one"

In presenting a lecture on Dentistry in China, I should perhaps have defined what I mean by Dentistry. I am sure that if I were lecturing to a Chinese audience made up of persons, other than those who were trained abroad or connected with Missions, or living in foreign concessions, they would have but the faintest idea of the scope of the subject.

The only conception that the ordinary Chinese can have, is that gained from the "dental hosps" to be seen in such increasing numbers along the thoroughfares, or, from those itinerating tooth-cleaners to be found to-day on the streets of large cities. These are the only representatives of the profession of dentistry which have so far appeared in this country in numbers that make any impression on the consciousness of the public.

Dentistry, as defined by the objective *we hope to reach* in the teaching of dental students in the West China Union University is that specialization of medicine which deals with the treatment of disease or the loss of function in any part of or in the whole mouth. That is, we are training oral specialists.

Our course is a very full one and is being made more difficult in these days of progress and research, so that it has been found necessary to divide the whole into several related specialties. To name them, we have the Odontal, Prosthodontal, Periodontal, Orthodontal, Exodontal, Pedodontal and Oral Surgeon. Then come Oral Health Specialists, Dental Hygienists, Dental Technicians and Dental Nurses.

With this mention of the requirements for the practice of modern dentistry we may now take up the subject of my paper, Dentistry in West China—past, present and future. It will not be a surprise to you that outside of a mere handful of men, in no respect does China have a group of practitioners of dentistry, who can claim to approach the requirements of practice, such as I have outlined them.

Has China ever had a dental past? Was there ever a golden era for dentistry, which though it passed left its impress or has influenced the practice of dentistry for the centuries which have followed? An answer in the negative is the only one which can be given. If perchance China has ever had any treatment for oral diseases which would be considered of value to-day, all too little of that treatment has been made known. Certain it is that there is no evidence that an organized dental profession has ever existed in this country even from the far distant age of Pan Ku until the present day. Further, it would seem, from lack of evidence to the contrary that ancient China knew not of and cared little for such dental treatments or restorations as in early times were well known in Egypt, Greece and Rome. In these civilizations, the growth of dentistry, in all its essential features ran along parallel lines with the evolution of all the healing arts. There is a large body of evidence which proves the existence of the knowledge of dental disease and treatments as early as the 37th century before Christ. There is also proof of dentistry as a specialty by the year 450 B.C. In China, for very obvious reasons known to you who are familiar with the reverence and respect, and perhaps I should say fear, in which a dead body is held, I need hardly mention that it would be difficult to unearth proofs of dental restorative practice such as we have in the West, and even to-day no one would dare to publish facts if he had discovered them. Therefore it is true that we can know little of a practice in oral restorations of the past, but we have some evidence of an attempt at such restorations in these later years. I do not refer to the output of the 'dental shops' but of the efforts of craftsmen who had never seen modern dental restorations, though they may have heard of them. The Chinese are a very practical people and it will be a wonder to me if we do not some day learn that in the early days there was not someone who made a living by fastening to remaining teeth, by wire or some other means, a lost member. This would not necessarily show that there had been a class of men who practised the art, but it would sustain the impression I have, that the Chinese are as vain as we are about appearances.

I can report several cases where I have seen attempts made to

restore a few of the anterior teeth and I am sure that there must be many more which could be unearthed. As I have said, I do not refer to the practice of the 'dental shops' who though they use vulcanite and porcelain teeth do not make a much better attempt to secure a comfortable and sanitary denture than the silver-smith whose bridge I examined some years ago. He had fashioned the labial surfaces in silver to simulate the form of the teeth and by holes drilled at the ends of the piece attached it to the remaining teeth with silk thread. True, it was often necessary to change the thread and to polish the tarnished silver, but the wearer was quite proud of it. Should this restoration have been found in Egypt or Rome in the mouth of some unearthed skull, it would have been considered a fair proof of some knowledge of dental restoration. But I repeat if such an art ever existed in China we have today no evidence of it.

In another instance, in the mouth of a priest at Dao O Si on Mount Omei I found a most remarkable attempt at the restoration of a couple of central incisors. My attention was attracted by the phenomenal width of his upper centrals. I was bold enough to ask to be allowed to examine these teeth which turned out to be made of wood. The coloring and form were good and the pieces quite stable. He said that as the restorations became loose he put in others which were slightly larger and the swelling of the wood held them for some time in perfect retention. He admitted that the aperture was becoming wider somewhat rapidly. It was at least twice the normal width when I saw him. What the final result of a continued application of a wooden wedge in this space would be, I would have been delighted to observe. I offered to replace the wood with a vulcanite and porcelain restoration if he would come to Chengtu and let me take impressions of his mouth. This he promised to do, but unfortunately he never appeared.

A continued search has not discovered to me any book or books on dental treatments other than meager references to the cure of certain pains related to the teeth which I will mention later. No evidence of an accurate knowledge of the anatomy of the mouth and teeth has been discovered. Not even their macroscopical surfaces have been differentiated. In fact, the only distinctive names are, 'big and little door teeth' for the incisors; the 'big teeth' "mo ya" for the molars, and to the discomfiture of anatomists they call the wisdom tooth the 'first tooth'. The internal anatomy of the tooth is a closed book. The pulp chamber and root canal are supposed to be present only because of the inroads of a worm which is shown to be there when the pulp is disclosed. We should not be surprised at this lack of information when we realize that no dissections of the human body have been permitted and the knowledge gained through the examination of the bones and teeth of animals such as the pig, sheep, cow or horse did not help, as comparatively, there is such a divergence of form. Again, as dental disease was not supposed to be of local origin the general practitioner was not impelled to examine the mouth. He

relied on his drugs to reach the source of the disturbance and therefore a study of the anatomy of the tooth was superfluous and a specialist in dental treatment was not at all necessary. Before the advent of dental surgeons from the West there was no term for 'dentist' in the language.

You may perhaps check me up and point out that some one must have extracted a tooth which ached past the point of endurance. I know you have been led to believe that the Chinese and Japanese extract teeth with their fingers. I learned of this operation before I came to China and expected to take lessons in the art, but I have been unable to find a teacher. I have never seen any extractor of teeth "with his board, into which pegs were driven, to be drawn out for practice till his fingers became so strong that a tooth could easily be dislodged from its socket". Like many other stories of the East, this one must have been started from an exceptional occurrence rather than from a regular practice. If it should be your good fortune to discover anyone pursuing the art I beg you to let me know. The best that I have been able to unearth is the chap with his pile of teeth or with them strung on a cord on the table before him to act as his drawing card—I was going to say, his stock in trade, for so they would seem to be until you try to buy them from him. He will not part with them at any price, for without them he could not prove his skill as an extractor, and it is not easy to collect teeth in China. I have done my best to secure them for my classes in Dental Anatomy, but have failed miserably. As far as I have been able to learn, teeth are, or I should say, in Chengtu, actually extracted by one of three methods. First, if it proved to be very loose the tooth was wrapped about by a coarse-fibred paper and with a practised thumb and finger rotated and luxated till the fibres were torn and the tooth broken loose from its socket. Secondly, when it was necessary to extract a tooth which was held more firmly in its position a string or a crude pair of pliers with plain beaks was called into use; and thirdly, if the pliers failed to produce results a short brass or iron bar was employed to give the tooth a sharp quick blow. That this method did not always succeed I have had ample evidence from the many patients who have come to me after an unsuccessful attempt to have a tooth extracted by the foregoing methods. A badly traumatized area exhibited or a broken tooth is the damaging evidence of the heroic measures employed. You can now, I am sure, well understand the deep-seated fear that the mass of people have for extraction. It is no wonder that the physician is first given every opportunity to attempt the cure of an aching tooth by the administration of drugs to control the humors of the organs which are said to be the cause of the pain, or by scarification, burning or puncture. And if all fail—to await the formation of a fistula which finally provides the drainage required and the consequent lessening of the pain. Unfortunately for many, the acute conditions do not subside before the stage is set for infection of the maxillary sinus, osteomyelitis, osteoitis or some such sequela.

It will not be necessary for me to give any details of the theory of the Yin and Yang as the causation of diseases. Others have covered the ground quite fully. The theory admits of no indecision. You either believe in it or you don't. If you do, then you will not question the fact that disease in the upper central region is referred from the heart. As the Yin and the Yang elements in an organ are maladjusted, heats and chills arise in the body, and we have corresponding effects in correlated regions.

Besides the professor of the Yin and Yang doctrine I have been able to account for some thirteen other medical specialists. Among these are several who are particularly interested in tooth troubles. As no educational standards are required this class is, to a very large extent, made up of quacks who with a smattering knowledge of physical law and with nimble fingers and tongues prey on the superstitions of the people.

As examples of the specialities, we have the smallpox vaccinator, who, in the old days, had his patients inhale the vaccine through the nostrils; the acupuncture specialist who wins confidence by pushing a needle through the limbs without the drawing of blood or the slightest pain; the chiropractor or manipulator of any sprain or stiffness, who, by pressing and pushing the affected area gives relief. These men, without doubt, have some knowledge of the anatomy of the body, and though their practice is entirely empirical, it is at times of some benefit. This, unfortunately, cannot be said of other members of the class. Magic and spells have a large share in the methods of some so-called physicians, particularly among those patients whose diseases have defied the skill of the ordinary practitioner. Of these, the "kua fu", charm writer, is of most interest to the dental profession for, amongst his varied accomplishments, he guarantees to extract teeth without pain. His method of procedure to procure the painless result, is somewhat as follows; He examines the tooth, then filling a bowl with water, lights candles and incense sticks and chants prayers to his particular deity, meanwhile writing figures on the surface of the water. This part of the ceremony being completed, he extracts the tooth, and, immediately, before the patient has time to utter a sound, has him fill his mouth full of the charmed water, which he is told he must not, on any account, spit out until he is given permission to do so. This, at least, prevents him from giving vent to his first impression; but as to whether he really has pain or not depends on several factors, his sub-consciousness may have him well under control or he may be comforted by "it might have been very much worse," or, as I suspect, the true explanation comes through my discovery that the extraction of a firm tooth is seldom, if ever, attempted, and further, because this fact is generally know, the charm writer is seldom, if ever, confronted with a patient who would cause him to lose face by the necessity of a refusal to perform a painless extraction. Many times I have been informed by patients that they have been loosening a tooth which they wish extracted for some

weeks previous to their appearance at the clinic and it is almost an invariable rule that, after the injection of the local anaesthetic, and as I am about to extract, the patient will try to dissuade me, saying, "The medicine has not yet loosened the tooth."

To us pain is understood to be but a symptom of disease, but to the great bulk of the Chinese pain is disease. It is the only thing which brings him for treatment. Of course it is true that the relief of disease usually means the relief of pain, but to trust that the relief of pain indicates the cure of the disease leads to very serious consequences. The cause remains and a chronic condition may be of much more serious portent than the spectacular flare up of the acute condition. This is very true in the case of tooth infections. I am safe in saying that no Chinese treatment for these ever clears up the cause. As I have indicated, relief from an abscessed condition may be and generally is brought about by nature's blundering form of drainage and not by the varied treatments initiated by any one of the several methods applied. For example, a tooth pulp becomes infected and putrifies causing pain, swelling and the consequent fistula from which escape pus and gas. The patient feels better and he is assured that he is cured. The last administered drug or drugs or method used is credited with the cure. The cause still remains. I give but this one example; many however could be produced to prove that in almost all pathological conditions the same holds true. I am continually being informed by my patients that the tooth which they desire to have extracted has been frequently treated with success, i. e. "has been been successively successfully *cured*," but that at last it will not further respond to any treatment.

You can readily understand from this inability to clear up the cause how the Chinese have become thoroughly imbued with the conviction that there is no permanent cure for tooth disease, and that to suffer toothache is an inescapable consequence of life and that death is no surer the end of life than is the loss of a tooth which aches. In both cases the end is staved off as long as possible. Our patient is on the horns of a dilemma. It is the common belief that to have the tooth out is very painful, but also that the tooth out will bring a worse fate, namely, the loss of the masticatory function.

The well-read man of medicine, as far as I can discover did not consider that the root-end pathology of the teeth had any bearing on any systemic disease and therefore tooth caries did not interest him. He acquiesced in the supposition that the teeth were eaten by worms but he developed no adequate technique to prevent or eradicate the worms. True, there are several unorthodox methods practised for the killing of these. Camphor is sometimes placed in the cavity. The drug "Kao Pen" is rolled between tobacco leaves and then lighted and the smoke directed into the cavity, also red pepper is heated over a lamp and the fumes led by a cone and pipe to the worm-infested carious area. In both cases it is to destroy temporarily the worms that this method is employed.

It was but natural that a group of quacks should take up the extracting of worms from aching teeth which show decay. When I repeat that worms are credited with tooth decay I wish to be understood to mean that the worms are both sizable and capable of being demonstrated; not so minute as to require a highpowered micropscope to prove their existence. On one occasion I had a controversy with a missionary brother who insisted he had a church member who made her living by extracting tooth worms, and that she as a good Christian would not deceive her pastor. "This woman must be the exception which proves the rule." To settle the case he secured for me a dozen or so of the worms he saw extracted from a case. When they were taken they were very small, but when they had been kept in a normal saline solution for a few days they grew to be quite large healthy willow-tree grubs.

The worm-extractor, or as the Chinese characters imply, "one with the gift of the gab," is usually a female who makes her living by the use of a persuasive tongue and clever fingers. She professes to remove worms from the eyes, nose and teeth thereby curing the ailments. The worm theory of disease has a very large place in Chinese thought. When need arises the extractor is called in, first bargains to remove the worms at so much apiece or so much for the job; it hardly matters which method is decided on, for if the first she will remove as many as the patient will necessarily stand for, if the second a shrewd bargain is made and a quick operation is performed but few worms being found. Should the case be a dental one, her method is, first, to wipe out the cavity in the tooth, and transfer to it by sleight-of-hand methods a number of worms, which have been proven to be the willow-tree grub or the rice grub. She then removes these before onlookers who are quite convinced that they are seeing the identical worms which have eaten the tooth. After all the grubs specified in the contract are cleaned out, the cavity is packed with lime on cotton wool, which, in the first stages of decay, will probably keep the tooth from aching for a few days. There is a belief to the effect that this woman must not be offered the customary courteous cup of tea, for should such be done, she would acquire a knowledge of the place where the family treasures are kept and later would steal them. Her supposed method of this purloining, is as follows: She places the small wooden image of a child before candles and incense; she then prays to her gods and repeats charms and spells after which a spirit enters into the image, who is then directed to secure the desired choice articles and bring them to her. One can readily understand why this "fair lady" could not indulge in the universal cup of tea if she wishes to preserve her stock in trade, which she keeps in her mouth; and surely her little scheme to avoid their loss has been astutely worked out.

Let me repeat, pain is largely the only oral condition to which the great bulk of Chinese pay any attention. Very obvious tooth decay, loose teeth, receded gums, pus flowing from about the teeth,

accumulations of tartar or any one of a number of other evidences of a diseased condition are all tolerated if they are causing no incapacitating pain; or if the person believes the pain of treatment, such as extraction will be greater than the daily discomfort. He will accept the daily nagging rather than chance an acute pain of treatment which might be only momentary.

Most of you believe that the Chinese are stoical in regard to suffering, but after I have practiced dentistry amongst them for over twenty years this belief I can assure you is but a myth, or was applicable only to a past age. The Chinese of today will not tolerate any suffering they can afford to have prevented. It is only ignorance of the fact that pain can be prevented which makes them stoical. In a dental practice painless dentistry has a very decided appeal to them. They are very closely akin to ourselves in dreading oral suffering and as a goodly proportion of our own race neglect the care of the mouth because of fear so do our brothers of the Orient, and with the same results, viz. the providing of a suitable field for the production of bacteria and their toxins, which spread from their natural incubator, thence to the whole system, and damage or cause the loss of that vital physiological function of mastication designed to prepare food for the chemical changes which must take place before it becomes a part of ourselves.

The Chinese have faced a hopeless and helpless situation when disease slowly but surely deprives them of the use of their teeth. They have accepted the condition, not because they liked it, but because they knew no remedy. When it first became known that foreigners wore arificial teeth when their own were lost there were many who sought similar restorations for themselves. Unfortunately for them and for the good name of the dental profession there was no body of dental practitioners in China prepared to cope with the demand, and so there arose a group of young men calling themselves "inlayers of teeth". Not being men of any educational training or versed in the fundamentals of surgery they could only produce results such as any amateur mechanic might. Artificial teeth and rubber could be bought in open trade, and the mere setting up of these teeth and the vulcanizing of them could be quickly learned by anyone with a grain of observation. But unfortunately the restoration of a satisfactory masticatory function by artificial means is only accomplished after a full knowledge is gained of the anatomy of the mouth, the principles of physics, the physiology of mandibular movements and occlusal surfaces, as well as other contributary sciences. The result has been that to a very large extent artificial teeth for masticatory purposes have been discredited and they are now used principally to restore or retain the aesthetic appearance of the anterior portion of the mouth, not a to-be-entirely-slighted objective and one which is universal. It will no doubt be a factor that will aid in the development of the dental profession in China. The Chinese will never be content with the present service which is being offered them by the dental

shops when they learn of better and more satisfactory results which can be given only by the adequately-trained dentist.

It may be news to you that the Chinese are concerned about their facial appearance. But those of us who serve them through restorative surgery can assure you that much thought is given to the beautifying of the countenance. Many references may be found in Chinese poetry and prose which emphasize the value placed on the pleasing effect of a well proportioned and beautiful mouth with its accompaniment of glistening and snow-white teeth.

You have heard that many of the people of wealth in India have diamonds and other jewels set in their teeth, I have never been requested to render such a service here, but one can never guess what will be demanded by woman in her search for beauty. I had a young lady in my clinic within the last two weeks who had had two open-faced crowns placed on her upper cuspids. In the one was inserted a red cement and in the other green. All I could think of was a ship with its port and starboard lights. The entrancing aesthetic effect she wished to produce was entirely wasted on me but on her less-sophisticated friends she perhaps makes a dazzling impression.

It is with difficulty at times that we are able to dissuade patients from demanding that we insert gold facings or otherwise correct slight irregularities which are deemed by them to spoil the symmetry of their teeth. We cannot honestly acquiesce to the mutilation of good teeth to gratify personal vanity; but unfortunately 'the inlayers" have no such scruples and therefore you will obesrve that it has become a frequent practice to cover the anterior teeth with facings of gold or brass according to the length of the pocketbook of the patient.

Perhaps I need not inform you that these golden ornaments are more often than not, cesspools, foci of infection and the destroyers of the tooth and its attaching tissues.

Not many of us are likely to follow Gandhi in his doctrine of self-abasement and use our teeth for masticatory purposes only, but we should all of us be educated to the fact that the physiological function of mastication is many times more important to our happiness than self beautification.

That there is an increasing consciousness of the place of the teeth in health and happiness, and a growing faith in Western methods of dental treatment is abundantly shown by the ever-multiplying number of these dental shops in which one is supposed to have oral diseases treated by so-called Western methods. These shops as I havel said are run by enterprising young men who are entirely without dental training or education, other than a few who have been assistants to a dentist in Shanghai or some other port city and who have in turn passed on their knowledge, for a price, to other dental quacks. Naturally these shops are run solely on a commerical basis and the methods used are closely guarded the one from the other. I have collected the names of thirty odd shops some of whose signs are as follows; to you they may prove both amusing and instructive.

益我齒科社
Self-profit dental shop

美化牙科社
The beautifying dental shop

允康鑲牙店
True health tooth inlaying dental shop

快樂牙館
The cheerful tooth shop

悅口醫牙館
The pleasant taste tooth-curing shop

鐘表鑲牙醫牙配眼館
Watch repairer, tooth inlayer, tooth-curing and false eye shop

康樂鑲牙館
The health and happiness dental shop

堅利鑲牙館
The exceedingly prosperous tooth-inlaying shop

美術鑲牙醫牙館
The artistic tooth inlaying and tooth-curing shop

理髮處西法洗牙
Trimming hair & cleaning teeth foreign style shop

融康鑲牙館
Harmonized health tooth-inlaying shop

强體牙醫館
A strong body by dental treatment shop

美記中國牙科醫院
China's dental beauty parlour

同德牙齒醫館
The cosmopolitan tooth-inlaying shop

崇光鑲牙醫館
The durable denture dental shop

美亞西法鑲牙館
The America-Oriental Western method denture shop

The demand for the well-trained and broad-visioned dental practitioner is here, but as with so many other requirements of present-day life in China, there are no men trained to meet the need, and still more unfortunately the needy do not know enough to demand

the training of those who should serve them. A superficial smattering of dental knowledge is as acceptable as the real thing. As in politics, industry, and other modern phases of life in China, so Dentistry will have to muddle along for many years to the great suffering of many and the unfortunate waste of life to the country.

Here, history is repeating itself; medical education in China as proposed by government regulations indicates that diseases of the mouth are not considered in its curriculum. Dental pathology, and therapeutics, restorative dental surgery, etc., have no place in the training of the medical student. There is no mention of the preparation of specialists in oral and odontal treatment. Thus the government is for the present leaving the treatment of mouth diseases to quacks. It is our hope that through our example in the West China Union University there shall come more quickly a demand for the training of oral specialists.

What is to be the future of dentistry in China.

I am not venturing to pose as a prophet of that future. So many years must pass before more than the preliminary steps can be taken to reach the goal of the ideal that one would be very unwise to commit oneself today; but I would like to tell you what I think is necessary in order to give to the country and to its people the dental health service which it should have.

I should roughly divide the whole dental problem into six requirements:

Dental Practice

1. The care and prevention of odontal defects.
2. The relief of pain.
3. The prevention and cure of oral diseases, other than those of the teeth, which originate from bacterial, chemical, mechanical or other causes.
4. The prevention and cure of dental diseases and defects originating from acquired habits or systemic disturbances, such of those caused by mouth breathing, incorrect posture, dietetic errors, irregularities in growth and development or metabolic imbalance.
5. The eradication of dental foci of infection which result in general systemic infections.
6. Oral hygiene and public dental education.

To implement these requirements of dental practice it is vitally necessary to provide for the education of dentists and their assistants. China should at once have schools of dentistry. I would also go as far as to state that there should be no school of medicine without its complement, a dental school. At best it will require many years to produce men with a sense of dental leadership.

To indicate the length of time and the personnel required let me name them, together with the number of years necessary for the training.

Dental Personnel

The Dentist	Seven	years	plus	Senior	Middle	school
The Odontal Technician	Four	"	"	"	"	"
The Oral Hygienist	Two	"	"	"	"	"
The Dental Laboratory Technician	Three	"	"	Junior	"	"
The Dental Nurse	"	"	"	Senior	"	"

Granted that the people of China are almost completely ignorant of the need or the availability of dental treatment, the Government should act as their guardians. Certainly no untrained men should be permitted to experiment with the health of the nation.

The Government should establish a Publicity Bureau whose duties should be to ;

1. Inform the public on dental health problems.
2. Explain the dangers of treatment by ignorant and incompetent so-called dentists.
3. Make widely known the need of a dental profession.
4. Prepare laws for regulating dental practice

Because of the unavoidably limited number of men of dental training as well as the high cost of treatment it will be necessary for the practice of dentistry to be controlled by the state, or co-operative dental practice to be instituted by dentists themselves. It may be that either one or both of these methods may be employed, but it certainly will be impossible to meet the needs by private practice or private initiative.

The following institutions may be used to reach those in need of dental treatment ;

1. Completely staffed Dental Clinics.
2. Travelling Rural Dental Clinics.
3. School Clinics.
4. Industrial Clinics.
5. A Dental Service in every general hospital.

To indicate the dental staff required to manage a Dental Hospital ;

1. 3 Dentists
2. 3 Odontal Technicians
3. 3 Oral Hygienists
4. 2 Dental Laboratory Technicians
5. 6 Dental Nurses

20 Total

To estimate the number of dentists required in China you may figure on the basis of 1:1000 of the population.

THE TIBETAN VULTURE OR LAMMERGEYER

(Duncan)

The Tibetans have a proverb which says that a vulture may kill a man and get away with it, but when one man kills another he is held accountable.

THE TIBETAN VULTURE OR LAMMERGEYER

M. H. DUNCAN

The Tibetans call the bird shown in the photograph a "gowo." This is defined as a vulture by Das' Dictionary. It strongly resembles a species of eagle. Yet some consider that certain eagles and vultures are not far apart.

We measured this bird, and found that its wings from tip to tip were eight feet and five inches. From the wing joint to the tip of the feathers it measured two feet, eight inches. The length from beak to tail tip was three feet, eight inches. The spread claw measured six and one half inches and the leg fifteen inches. Standing on its feet careful measurement showed that from the top of the head to the ground was two feet and one half inch. From wing joint to middle of back it measured twenty inches.

The tail contained ten long feathers. The total number of wing feathers was twenty-nine.

The eyes were very striking. The pupils were black with yellow rings around them, and these yellow rings were encircled by red rings. There were coarse black hairs above the eyes and along the nose also.

The top of the head was yellow and the throat brownish yellow. The back of the head for four inches was a golden yellow brown, below which there was a ring of black feathers around the neck. Each feather of this ringlet had lemon colored arrows at its tip. On the forehead was a white triangle fringed with black. Under the lower jaw was a coarse black hair goatee two inches long.

The back was covered with black feathers whose tips were decorated with lemon-colored arrow heads. The under parts around the breast were light yellow, and the wings underneath dark grey except the small feathers which were like the back in color.

When the mouth was opened to its fullest extent it measured five inches long by two inches wide. The distance from the point of the beak to the ear was four inches and the ears were at the base of the beak. In the tongue was a hole and opposite this hole in the roof of the mouth was another hole so formed as to operate as sucking disks.

Each foot had four claws, the longest claw finger being three and a half inches long. The longest nail was one and a fourth inches long.

We weighed this bird but I neglected to record the weight. However, if my memory is not at fault it weighed nineteen pounds.

The slope of the head would indicate a vulture but the head was well covered with feathers. Probably the bird would take either living or dead food. The Tibetans in Batang affirm that the bird will eat carrion of any kind and also kill live game for food, particularly rabbits. They also say that there are three other large birds that are relatives of this one.

It is a superstitious belief that the larynx of this vulture if cooked and eaten by man will cause meat and other food which has not been digested to become digestible.

The Tibetans have a proverb which is hard to translate:

རྒྱ་ཁོ་བོ་ཡིས་མི་བསད་ མི་ཁོ་བོ་ཡིས་སྲོང་འཕལ་

"A vulture (of this type) can kill a man, but if a man kill another man a ransom must be paid." The meaning of course is that a bird of this kind can kill a man and get away with it but a man who acts like this bird and kills another man must settle up.

I find on further research under another heading that Das' Dictionary says that this is a lammergeyer, so he evidently was not sure. I believe this to be correct as this bird eats both living and dead animals.

EASTERN TIBETAN WEATHER

M. H. DUNCAN

My observation of weather in Eastern Tibet is largely confined to the city of Batang with some trips in and out, especially along the Yangtze and Mekong valleys. Batang is a small city of less than five thousand inhabitants, and it is located on a plain one mile square surrounded by high mountains, its situation being typical of all valley plains of Eastern Tibet where the greater part of the cultivated land is found. The mountains on the east are especially high having some perpetual snow peaks not five miles away whose height must be not less than eighteen to twenty thousand feet, since there is at least two thousand feet of everlasting snow. High mountains which have snow on them all the year around in the other three directions are distant but they are high enough to have snow fall on them in any month of the year except the three summer months.

Batang is located on the thirtieth parallel at ninty-nine degrees longitude being fairly in the center of Eastern Tibet governed by the province of Szechwan. Its altitude has been measured to be anywhere from 8200 to 9400 feet depending upon who measured it and how. Naturally its weather must first be thought of in terms of its altitude for the air is only about ninety percent as dense at sea-level. However its altitude is typical of most of the valleys along the Yangtze, Mekong, and Salween and their important tributaries, hence what is true of this place is generally true of all, except that the farther south one goes the hotter and more wet it is, while the farther north the colder and dryer. Altitude of this height means more rapid changes in temperature as thin air heats and cools more rapidly than dense air. When the sun shines it is hot while in the shade it is always cold. It matters little whether the shade is inside a house, under a rock, because of clouds, before sunrise or after sunset.

The four seasons are a little earlier in the year than in the northern part of the United States but for practical purposes understanding we shall consider them the same; December, January and February as winter; March and April and May as spring; June, July and August as summer; and September, October and November as autumn. The temperature, as shown on the chart, follows this grouping fairly closely. The chart was compiled from records kept daily for a year.

As to moisture the year is divided into two main seasons the wet and the dry; the wet extends through the months of June, July, August, September and October while the rest of the year is dry.

1930 was unusual in that the spring was abnormally wet with the earlier part of the summer unusually dry.

The rainy season is so concentrated within the few summer months that crops in Eastern Tibet are rarely partial failures and famine from crop failure over an extensive area has never existed. The rain is not sufficient for the production of two crops which are grown yearly in all of the low-lying valleys (those below ten thousand feet), the deficit being met by irrigation. However the little plateaus and tiny ravines higher up must depend upon the rainfall for their annual crops of blue-black barley, small brown peas or long coarse turnips. As a rule these higher plots of land lie near a spring insufficient for irrigation purposes, or their growing season is too short for two crops because of the height.

We will consider the weather in detail by seasons.

Winter is the time of pleasant sunshiny days interspersed with southwest winds whose force brings clouds of dust from the dry fields. Such dust is so fine that the sun is obscured and homes cannot be made tight enough to keep it out. The skin dries and cracks, and this the Tibetan women try to prevent by the application of honey whose sticky surface soon gathers dust and soot until the face is marred by patches of blackness. Rain or snow rarely falls and the only snow visible is that left on the higher mountains from the autumn storms.

December is the premier month of calm, cloudless days with the southwest winds arising near the end of the month. These winds increase daily in force until about the Tibetan New year which usually occurs in February making the "Devil Dances" held about that time unpleasant by the choking dust.

February usually brings the first slight sprinkles which become more frequent until they burst out into the heavy rainstorms of summer. In the lower two-crop valleys the wheat and barley are sown in January and February, irrigation furnishing the water to sprout the grain.

Out in the sunshine in winter it is warm so that the Tibetan may slip his sheepskin off the shoulder to display a bare, brawny chest but arriving in the shade he pulls the sleeve over his shoulder again for the shade is always cold. When the wind blows he will seek a sunny spot behind a wall to keep warm. The icy winds of the mountains are so severe that even the sheepskin clad Tibetan hates to face them preferring to sit down, pull the sheepskin over his head and wait for calm weather.

The great difference which always exists between sun and shade in Tibet is much greater in winter time than in summer so that no one likes to see clouds obscure the sun during the winter months. Most Tibetan homes face the south to secure the maximum of sunshine. My temperatures were taken in a well-ventilated box situated on the north side of the house, hence, were always in the shade. As a rule on sunshiny days there were no winds or only light winds while occasional obscuring of the sun by thick clouds caused strong winds

to spring up which would cease as suddenly as they arose when the sun came out again. Sudden cold winds of this type would cause a lowered maximum temperature as compared to sunshiny days.

In winter when the southwest winds begin they usually arise about noonday and continue all afternoon until a little after dark. From this fact Tibetan caravans like to start on the road before sunrise and camp about noon. The morning is pretty sure to be clear and bright, with clouds, if any, springing out of nowhere it seems, about noon. As a general rule the greater part of the Tibetan winds all the year round seem to be due to the great difference between sun and shade. When the sun is hidden by clouds or goes down about four o'clock in winter the rapid cooling of the thin atmosphere causes fierce, cold gusts which sweeping down from the higher mountain tops displace the warmer air of the valleys. When the air has cooled to a fairly uniform temperature soon after dark, the the wind ceases but it leaves the nights cool or cold even after the hottest summer days. Naturally the nature of the clouds, whether heavy or light, has a marked effect upon the temperature. The day temperature of the winter months rises under the hot sun as a rule to over fifty degrees Fahrenheit, there being only eleven days in 1930 with the temperature below fifty degrees with an extreme low of forty-three. The nights were comparatively cold, usually below freezing with a minimum of seventeen degrees.

Ice in Batang valley never freezes over an half inch thick and this melts during the day except on northern slopes where the sun never strikes. In the shade ice accumulates to a thickness of several inches where there is stagnant water or drippings from the irrigation ditches. At higher altitudes, above ten thousand feet, even swift rivers will freeze into solid streams of ice.

Snow rarely falls in the Batang valley, and the few snow flurries that come melt before they touch the valley floor. However on December 18, 1929, snow fell in the early morning to a depth of half an inch and did not all melt until the afternoon. Old timers swore that this was the first such snow within twelve to fifteen years.

In spring the heritage of cloudy days from winter is diminished until in May we have the second most cloudless month of the year but with great heat. Rains are very light mostly sprinkles but coming more frequently as the days go by giving us a prophecy of stormy days ahead. The spring of 1930 was wetter than usual especially during March and April.

Rain in Batang during the first half of the spring usually means snow on the surrounding mountains. This snow melts rapidly but its presence causes frosts in the valley on clear nights often killing the early fruit particularly the apricots. Later frosts which kill the upper sections of the wheat and barley growing on extremely low ground are not infrequent.

Winds are fairly constant during spring usually from the southwest and are warm; but a change in wind means rain so that most

of the rains during the year are from the north, northwest, northeast and east. Our cold winds also come from the north. A notable instance of a warm southwest wind was on February 4, 1931, when a southwest wind changed the day temperature an average of twenty degrees and night temperature an average of five degrees for several days following.

In summeroccurs the greater part of the rainfall. 1930 was exceptionally dry in June causing September to be the month which was second in amount of rainfull. Crops on the mountains are planted to sprout and grow during the last days of April and early May so that they will secure the heavy rains of summer to ripen. If the heavy rains are delayed, as in 1930 the crop is short. Rarely does it rain on the mountains without producing rain in the larger valleys.

Winds and rain in summer go together so that more of the summer winds are from northern directions. Other winds lacking, it is rarely that the southwest breezes do not cool us in the late afternoon of a hot day.

Out in the sun in summer the heat is terrific but one needs only to go inside to cool off for the shade temperature rarely rises above ninety, just eleven days in 1930 with a high of ninety-six. Clouds have less effect on temperature in summer than in winter.

On the higher mountains those over 16000 feet snow may fall in midsummer although it will melt with the shining of the sun. On August 2nd, 1929 as we were coming over Tsong Ben La, 16200 feet high, two days journey east of Batang we were overtaken by a violent snowstorm with snow four inches thick. Such a storm would have been disastrous in winter but as that is the dry season it would be an unlikely occurrence. The dry winter and the wet summer make it a toss-up as to the best time to travel in Eastern Tibet.

In fall the first part of the season is quite wet but the latter half has the dry balmy days of Indian Summer. Heavy rains which are rare in May are also rare after the middle October when there is a quick tapering off in the absolute dryness of the dry season. In autumn the winds are mostly light and warm. The rain storms as usual divided with the northern directions and the southwest while the dry winds come up the valley from the southwest. The rains even in September are featured by snow on the surrounding mountains which does not completely melt until the hot days of the next spring.

The crops which are gathered in September and October must sometimes be cut during heavy rains or they may be damaged by frosts due to a heavy accumulation of snow on the mountains. Destructive frosts come as a rule about the middle of October, so that only the second crop of buckwheat sown after the removal of the wheat is threatened in the valleys, such as Batang.

We may summarize some of the general tendencies of the weather. The prevailing winds are southwest coming up out of the Yangtze valley into our smaller Batang river valley whose general course is southwest and northeast. All of the rivers in this part of western

1930 Month	Average temperature		Sun		Wind		Rain		Batang			
	High Fahrenheit	Low	Days Fair	Days Cloudy	Days Wind	Days No Wind	Days Rain	Days No Rain	Rain snow on mountains	No Rain snow on mountains	Remarks	Rainfall in inches
anuary	52.2	26.9	13	18	12	19	1	30				sprinkle
ebruary	56.5	27.7	11	17	22	6	0	28		1		
Iarch	62.8	37.3	17	14	18	13	8	23	4	2	unusually wet	$1\frac{7}{16}$
pril	72.7	45.7	18	12	29	1	12	18				$1\frac{5}{16}$
Iay	79.9	54.0	24	7	27	4	9	22				$1\frac{1}{16}$
une	80.1	58.6	16	14	27	3	12	18			unusually dry	$\frac{1}{16}$
uly	86.6	63.0	12	19	25	6	16	15		rain 1	unusually dry	$5\frac{3}{16}$
ugust	82.4	59.8	6	25	28	3	23	8			unusually wet	$12\frac{1}{16}$
eptember	73.2	54.5	12	18	19	11	16	14	2			$8\frac{5}{16}$
ctober	65.5	43.5	16	15	10	21	12	19	6	1		$1\frac{9}{16}$
November	61.6	33.6	21	9	20	10	2	23	2	2		$\frac{9}{16}$
December	53.6	26.5	29	2	3	28	1	30	1			sprinkle
otal			195	170	240	125	112	253	15	7		
verage	68.9	44.3										

Lowest Day Temperature January 27th. 43° Highest Day Temperature July 9th. 96°

" night " Feb 8th. & January 11th. 17° " night " June 5th, July 21st. 67°

China have a general north and south course so winds follow up the valleys between the high mountain ridges on either side. Rains come not only from the southwest but also from the northern directions—probably offshoots of the cloud condensations of the high peaks in those directions, some of which are close at hand. Summer and autumn are wet while winter and spring are dry. There are great variations in temperatures between sunshine and shade and likewise between night and day. The highest temperatures are always in the day and the lowest always at night. As a rule the highest recorded temperatures are perpetually found from one to five in the afternoon while the lowest occur in the morning from three to seven o'clock. May and November are probably the most pleasant months of the year being devoid of the dry dusty winds of winter and lacking the heavy cloudy days of summer.

I have tried placing the thermometer in the sun for four minutes to get what it would record. April 13th at 8:15 A. M. shade was 62 and sun 82 degrees. On March 29th at 11:30 A. M. shade was 63 and sun 95 degrees. On October 2nd at 1:00 P. M. the shade was seventy-four and sun was one hundred. During the summer when it was ninety or more in the shade I tried taking some temperatures and at that time the thermometer would run up to 120 and 130 and showed a tendency to climb still higher. I believe that the heat under the summer sun would average around a hundred and twenty-five degrees. These sun heats I cannot consider even approximately accurate and shall try more of them in the future. This I do know, that after sitting in the sun and sweating profusely, I go into the shade and cool off so quickly that more than once I have been chilled.

The rainfall shown on the chart is merely a guess from my experience checked a few times in heavy rainfalls by measuring the depth obtained in a dripping pan. Hence, the annual value of over thirty-six inches for 1930 is only a poor approximation, valuable only as it shows the variation from month to month.