

THE VEGETATION MAP OF THE HIMALAYAS 1957. A QUARTER OF A CENTURY AFTER.

U. SCHWEINFURTH (HEIDELBERG)

INTRODUCTION AND GUIDING PRINCIPLES

In the years 1952 - 1955 a thesis was compiled with the title: "The horizontal and vertical distribution of the vegetation in the Himalaya". The idea was, if at all possible, to try to compile a vegetation map of the Himalayas presenting the results of research work in a concentrated form. The map was originally designed on the scale 1 : 1 000 000. Difficulties were considerable owing to the varying degree of accuracy of the basic maps available (some having been drawn in metres, others in feet, for instance). For publication the map was reduced to the scale 1 : 2 000 000 and subsequently published in two sheets (in colour), together with the thesis (SCHWEINFURTH, 1957).

Owing to the research possibilities prevailing a quarter of a century ago, the thesis was meant right from the beginning to be based on literature, i.e. to use published records plus, of course, all other reliable sources available: unpublished diaries, personal communications, photographs, etc... The thesis contains a comprehensive bibliography of the vegetation of the Himalayas up to and including 1956.

The guiding principle applied, was to include into the map only what had been reliably reported, i.e. : not to fill in any gaps by way of analogy. This was, in a way, a courageous decision right in the beginning, when it was not altogether predictable, to what extent "colour" could be applied at all, respectively, to what extent the available records would actually be helpful to compile a map. However, from the author's point of view, this early decision was the only acceptable approach to the problem. In course of discussions he used to point to the example of Nepal : west of the river Kali, representing the western boundary of the country, a distinct

set of colours, i.e. vegetation, prevailed, whereas on the Singalilah Range, carrying the eastern boundary of Nepal, quite another range of colours had to be used - and in between, the central part of Nepal and at the same time of the Himalayas, presented itself more or less "white", i.e. botanically unknown. This example usually convinced even the most ardent "map painter", that there was no way of presenting the complete vegetation of Nepal - i.e. of the central part of the Himalayas - on the map until there were reliable reports forthcoming. Today, we know that the striking difference of colours on the map to the west and to the east of the country indicates the tremendous change taking place within the boundaries of Nepal, from western Himalayan types of vegetation to eastern Himalayan types of vegetation.

With this convincing point in mind, the author's principle was accepted - so much so, that later on it could, in a way, be said: "the most important achievement of the map are the white patches!" Indeed, the "white patches", were not only meant to prove careful evaluation of the available reports, they were also intended to serve as the dynamic principle for further research, to attract attention and to focus it on the botanically unexplored parts of the mountains.

"WHITE AREAS"

When the map was published, in 1957, the following "white areas" represented this principle :

1. in the northwest: the gorge of the Indus, from Nanga Parbat downwards;
2. in the centre : Nepal;
3. in the east : Bhutan;
4. the Assam Himalaya;
5. the river gorges of the Salween, Mekong, Yangtsekiang.

1. *Indus Gorge* : one of the "pillars" of the vegetation map of the Himalayas in the northwest was C.TROLL's excellent map of the vegetation of the Nanga Parbat Massif (1/50 000), 1939. It is somewhat ironic that immediately adjacent to this for a long time the only detailed map existing for the entire Himalayan system, unexplored country begins. This is, nevertheless, easy to explain as the country both sides of the Indus -from the Nanga Parbat downward- was, and still is, so-called "tribal area", left out of administration during the days of British reign. Only an intrepid, well-connected explorer like Sir Aurel STEIN could venture to penetrate into certain parts of it and perhaps, one or the other daring sportsman. So it was not possible to trace any reliable reports with reference to the vegetation. Obviously, even after independence the state of affairs did not change to a noticeable degree and no useful material to fill the gaps in our knowledge of the vegetation of this area has come forth so far.

2. *Nepal* was virtually closed to foreigners until the early 1950s. When the vegetation map was in its infancy, the author had the good chance to meet L.H. J. WILLIAMS and O. POLUNIN in London (1953), just back from their first expedition to Nepal; they helped with their first-hand experience and later on added more observations from the field. This means, botanical exploration in Nepal had barely started when the vegetation map of the Himalayas was compiled. So it was one of the real highlights of the work, when in 1954, in response to a very hesitant inquiry, NAKAO's pre-printing account of his botanical traverse of the Kali Gandaki Valley resp. Gorge arrived, where, botanically "West and East meet" in the Himalayas. This resulted in the exhilarating experience of receiving proof from the field, that the author's western and eastern types were, obviously, a sensible concept, as everything fell into place, presenting a first, but most important and encouraging link between the "two parts of the map" - "west" and "east". But this was only the beginning of the botanical exploration of Nepal, as is well known. Further botanical exploration of the central parts of the Himalayas became essentially a French undertaking, which shall be heard about in more detail in the course of this symposium.

3. *Bhutan* it is, perhaps, not fitting for a research worker to develop certain preferences, but the author confesses : fascinating as the pursuit of the vegetation map along all the Himalayas was and still is, he has always been particularly intrigued with Bhutan and used every possible means to get as much information about the country as possible

in those days -but there was little to trace. The guideline, an east-west transect through the heart of the country, had been established based upon the reports of GRIFFITH (1838). After GRIFFITH there was no one, until LUDLOW appeared on the scene, nearly a century later, well-equipped with his excellent relations to the ruling people in Tibet and Bhutan, who opened doors or rather passes and frontiers to him. The author had the privilege of meeting the grand old man in London; LUDLOW was, first of all, an ornithologist, but with a keen eye for the country. His observations were priceless; he was unfortunately not to be moved to revise his remaining diaries for publication.

4. *Assam Himalaya* more precisely: the southern flanks of the main Himalayan range east of Bhutan, is an area of mystery -still. There has only been BOR's first class -"synecological"- work on the Aka Hills (1938), one of the foothill areas. The importance of BOR's work lies in the fact that he supplies for the comparatively small area of his study the basic principle to keep in mind when dealing with other parts of the Assam Himalaya: i.e; that already behind the first foothill range there may open up an entirely different world. Once this is learned with the help of BOR's study in the Aka Hills for the Tenga Valley, a wide spectrum of possibilities for the rest of the Assam Himalaya opens. BOR's outstanding and detailed work helped to evaluate more fully F.K. WARD's travel reports from neighbouring areas and FÜRER-HAIMENDORF's -mainly anthropological- accounts of the Apa Tani Valley further east. The conclusion was gained that any idea of "progress with the map by analogy" would be entirely misleading; we have to wait to fill the gaps until we have absolutely reliable evidence from the spot.

5. *River gorges of Salween, Mekong, Yangtsekiang* : the delimitation of the "Himalayas" for the purpose of the vegetation map was arrived at only while work was in progress and for specific reasons. In the west, the map was extended roughly to the western limit of the forests on the southern slopes of the Hindukush, about as far west as Kabul (70°E). Towards east, other considerations prevailed : there are dry river valleys all along the Himalayan system with, obviously, intricate local wind systems; the speculation was, that if anywhere, then in the great river gorges in the east it might be possible to find more evidence about the mechanism involved. This led to extending the map to include a section of the river gorges of Salween, Mekong and Yangtsekiang -this extension served the purpose well. Temptation to extend the map even further

was thwarted by the lack of any reliable data in all three river gorges to the south of 28°N and to the north of 30°N- as well as by the all apparent change in the floristic composition of the vegetation types.

A QUARTER OF A CENTURY LATER

What has been the progress in the knowledge of the vegetation in the "white patches" of the 1957 map during all these years ? First of all : the basic principle to leave botanically unknown areas "white" prevented; obviously, any misinterpretation; it is gratifying to be able to state that no criticism has been raised against the principles of the map nor against the details. What the map aimed at, first of all, has been achieved : "an attempt to order". It is, perhaps, now that one is so used to see the Himalaya in the order of the vegetation map, worthwhile to recall the situation as it had been before the map was published : where there was, a quarter of a century ago, a maze of ranges, valleys, peaks, the map has established "order at one glance". Vegetation as the most concentrated, visible information about a particular part of the globe -in this case about the highest mountain ranges of the world- was used as the means to get to know the intricate system of changes from west to east (or vice versa) according to humidity and from south to north and at the same time from practically sea level up to the upper limit of vegetation according to temperature and growing continentality. All this has to be seen in a three-dimensional framework plus the additional effect of a certain shift to the west of the wetter types at higher altitudes- resulting, for instance, in humid forest above dry valleys (see Nanga Parbat)- or, on the other hand, the unexpected dry valleys in the east in an area of wet vegetation types, as, for instance, the Lohit valley in Zayul. In short, this vegetation map of the Himalayas in 1/2 000 000 offers since a quarter of a century, an overall concept with reference to "Landschaftsaufbau", to natural regions, to the ecological set-up of the highest mountain system in the world. The framework stood the test of a quarter of a century, which is a gratifying experience.

And what happened to the desiderata ? To the "white patches" ? The "dynamic principle" was confronted, as could have been expected already 25 years ago, with the political situation or, rather, political considerations.

1. Indus : the white area on the map, part of Pakistan since independence (1947), has not yielded any data; there is nothing that can be added to the map.

2. Nepal : is the part of the Himalayas where the dynamic principle of the "white patches" worked to full satisfaction. A most out-standing contribution as from an individual traveller and collector, is owed, no doubt, to J.D.A. STAINTON, resulting in his book : "The forests of Nepal" (1972). STAINTON's descriptions are illustrated by excellent photographs, but there is no attempt at a vegetation or forest map in his book. A map attached shows his routes (1954-1969), displaying the extent of ground covered. Subsequent French efforts in compiling vegetation maps for all Nepal will be specifically referred to during this symposium; therefore it may suffice at this juncture to point to the work of DOBREMEZ (1976), and, in particular, to the map series 1/250 000 and 1/50 000, published or due to be published. It is, of course, easy to say the "white patches" are meant to attract interest -and Nepal on the 1957 map represented the biggest, most extensive white area within the map- but unless full cooperation with the authorities in power is established, no progress is possible : one has to be most grateful to the Nepalese authorities for having opened their country to scientific investigation.

3. Bhutan : presents a regrettable contrast to the achievements in Nepal. NAKAO, the Japanese botanist, published a travel account on his sojourn in Bhutan, in Japanese; he stayed for a limited time in the country as agricultural adviser and did not have the opportunity to travel to the extent he would have wished. NAKAO, privately, produced a number of photographs, giving information, but not sufficient yet, to add anything new to the map.

After the death of LUDLOW, FLETCHER of the Royal Botanical Gardens, Edinburgh, was asked to publish LUDLOW's and SHERIFF's diaries of their exploits in the Eastern Himalayas; these are of particular interest as for this part of the Himalayas, LUDLOW and SHERIFF have been the only persons known of keeping relevant information in their diaries. The volume -"A quest for flowers"- is a first class travel account, even though the references to the distribution of the vegetation types are comparatively few and not easy to localize with sufficient accuracy ; maps included in the book are rather sketchy. It is, no doubt, a great help to have the LUDLOW-SHERIFF account for reference, but it did not help any further to fill the white areas on the map in Bhutan.

4. Assam Himalaya : LUDLOW's and SHERIFF's account concerns the Assam Himalaya as well and the above statement with reference to its usefulness for the particular purpose of the maps applies there just the same.

Since publication of the vegetation map, the Assam Himalaya has even been an area of strife when in October 1962 the world seemed to be heading towards a major confrontation in Asia: all of a sudden, tracks unknown outside the area itself seemed to be well-known to the soldiers from the north, when they appeared at the foot of the hills north and east of the Assam Plains. But all this martial activity in the odd corners of the Assam Himalaya did not bring information to fill the "white patches" on the map. The confrontation of 1962 revealed what a sensitive area the mountain world to the north and east of Assam still was, where the hill tribes of old always lived in strained relationship with the plain's people, and where after the "benevolent neglect" of British administration of the hills the situation changed with independence, but did not yet lead to an opening of the areas concerned for visitors from outside.

5. River Gorges : for more than 30 years the river gorge country of Southeastern Tibet has been off-limits for foreigners. The last exploration by an outsider was F.K. WARD's exploit in Zayul, the Lohit Valley in 1950, where he had the unique chance of witnessing the Great Assam Earthquake of August 15th 1950, right on the epicentre- and the good luck to be able to escape and to report about it; after that trip even F.K. WARD saw no chance to enter the country again, over which by then China had extended its administrative authority.

In order to achieve some theoretical progress at least, as until then no contacts with the Chinese could be established, the present author decided to compile a bibliography of F.K. WARD in the meantime (1975): firstly, there was not the slightest possible chance of a permit to enter the area; secondly, F.K. WARD died without having written the overall account of the river gorge country he would have been so outstandingly fitted to do; thirdly, F.K. WARD never kept account of what he published or even kept a set of his publications, so in fact, nobody knew what there was (WARD, 1960); fourthly, there was no map ever attempted to show where F.K. WARD had actually been. The F.K. WARD bibliography, published in 1975, lists 25 books and 709 individual papers published in journals etc... (deliberately leaving aside all contributions to news-papers etc.); the map, designed in 1/1 000 000, is based on F.K. WARD's route maps in his numerous publications and tries to show at a glance for the first time the extent of the area he covered during his many expeditions. It was not expected to find new material for the area inclu-

ded in the vegetation map of the Himalayas; the bibliography was rather meant to be a step towards another worthwhile goal: a reliable vegetation map of the river gorge country of Southeastern and Eastern Tibet as far north as to include the gorges of the Hoangho: altogether an area of outstanding importance, representing the transition from Central resp. High Asia to the east. There is no need to go into any more detail here; it is obvious that the concept of Asia, High Asia, the mountains of the world, would gain, if there were the same kind of reliable vegetation map as for the southern fringe of High Asia, for the area to the east as well to understand more fully the fascinating transition between Central and Peripheral Asia, accentuated by the various river gorges.

It may be expedient in this context to add here: there have been a number of outstanding French explorers in the field traversing those areas during the last century - it would be most helpful, if someone would turn his interest to a similar bibliographical and cartographical compilation of their pursuits as a useful step to gain a better idea about this fascinating part of the globe as has been done recently for F.K. WARD.

The symposium on Qinghai - Xizang (Tibet) Plateau, held in Peking May 25 to June 1, 1980, under the auspices of Academia Sinica, provided a very welcome chance to learn about Chinese botanical achievements during recent decades. Chinese botanists presented a vegetation map of China in 1/4 000 000 (1979) (also 1/10 000 000) (1979). Interest in the context discussed here, concentrates on the representation of the Assam Himalaya and the river gorge country: the areas concerned are fully coloured as accurately as the scales would permit. In the course of discussions during and after the symposium it was, however, not possible to find out, what had served as the actual basis for the maps - field work, air photography etc...; this evidence may well lay hidden in literature written in Chinese - but without access to this information it is difficult, if not impossible, to evaluate the maps within the given context. A comparison of the vegetation map of China 1/4 000 000 (1979); similarly 1/10 000 000, 1979) with the vegetation map of the Himalayas under discussion for the particular area of the Aka Hills - Tenga Valley (Assam Himalaya, BOR, 1938) leads to suppose that some sort of general analogy has been applied, when recourse to the vegetation map of the Himalayas of 1957 would have gained more accurate results. Beyond these more specific considerations the Chinese maps are, of course, welcome as outlining, according to the scales applied, the distribution of the vegetation at least in general terms.

CONCLUSIONS

The "white patches" on the vegetation map of the Himalayas of 1957 are discussed;

Indus : no progress;

Bhutan, Assam Himalaya : evaluation of posthumously published diaries of LUDLOW & SHERIFF; otherwise : no progress; Assam Himalaya, in addition, being an area of confrontation in 1962;

River Gorges of, Southeastern Tibet : bibliography of F.K. WARD compiled, together with a map of the area of his expeditions; for general information : see vegetation map of China 1/4 000 000 and 1/10 000 000 (1979);

Nepal : thanks to French activities area of greatest achievement as documented by the vegetation maps of Nepal in 1/250 000 and 1/50 000.

Considering the past 25 years, it might have been expected that all "white patches" shown on the map in 1957 could have been filled meanwhile; instead : the Indus Gorge area remains closed; further northwest war conditions reign; further north -Ladakh- at some stage, 1962, confrontation was rife; no progress in Bhutan; Assam Himalaya: area of confrontation in 1962; river gorge country: closed to foreigners, but new vegetation maps of China (1979); Nepal: the only area where real progress has been achieved.

REFERENCES

- BOR (N.L.).- A sketch of the vegetation of the Aka Hills, Assam. A synecological study. Ind. For. Rec. N.S. Bot.1, 4; X, 1938, 103-221.
- CHINA.- Map of Vegetation 1/4 000 000, Peking, 1979.
- CHINA.- Map of vegetation 1/10 000 000, Peking, 1979.
- DOBREMEZ (J.F.).- Le Népal : écologie et biogéographie. Paris, 1976.
- FLETCHER (H.R.).- A quest of flowers. The plant explorations of Frank Ludlow and George Sheriff told from their diaries and other occasional writings. Edinburgh, 1975.
- FÜRER-HAIMENDORF, C.von.- Himalayan Barbary. London, 1955.
- GRIFFITH (W.).- Journals of Travels in Assam, Burma,, Bootan, Afghanistan and the neighbouring countries. Calcutta, 1847.
- NAKAÓ (S.).- Ecological notes. Fauna and Flora of Nepal Himalaya. Scient. Res. of the Jap. Exped. to Nepal Himalaya, 1952 - 1953, vol.I, Kyoto, 1955, 278 - 290.
- NAKAO (S.).- Hikyo Butan (The secret land Bhutan). Mainichi Shinbun Press, Tokyo, 1959.
- SCHWEINFURTH (U.).- Über klimatische Trockentäler im Himalaya. Erdkunde, 1956, 297-302.
- SCHWEINFURTH (U.).- Die horizontale und vertikale Verbreitung der Vegetation im Himalaya (mit mehrfarbiger Vegetationskarte 1/2 000 000). Bonner Geogr. Abh. 20, 1957.
- SCHWEINFURTH (U.).- Über kartographische Darstellungen der Vegetation im Himalaya. Erdkunde, 1958, 120-125.
- SCHWEINFURTH (U.) & SCHWEINFURTH-MARBY (H.).- Exploration in the Eastern Himalayas and the River Gorge Country of Southeastern Tibet : Francis (FRANK) Kingdon WARD (1885-1958). Geoecological Research vol.3, Wiesbaden 1975.
- STAINTON (J.D.A.).- Forests of Nepal. London, 1972.
- TROLL (C.).- Das Pflanzenkleid des Nanga Parbat. Begleitworte zur Vegetationskarte der Nanga Parbat Gruppe (NW-Himalaya) 1/50 000. Wiss.Veröff.Dtsch. Mus. f. Ldk., N.F. 7, Leipzig, 1939, 151-180.
- WARD (F.K.).- Pilgrimage for plants. London, 1960.

Südasiens Institut der Universität Heidelberg
 Institut für Geographie
 Postfach 103066
 69 HEIDELBERG (Allemagne)