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We have already decided to restrict our use of the word ‘Himalaya’ to that portion of the great mountain girdle which lies between the bend of the Indus on the west and the unexplored gorge of the Brahmaputra on the east. Hodgson, in 1849, estimated the length of this range at 1,800 miles with a mean breadth of about 90 miles, a maximum breadth of 110 miles, and minimum breadth of about 70 miles. In fixing the breath of Himalaya, however, as in determining its length, we have similar diffienlties to contend with. For, as we have seen that the popular estimate as to the boundaries of the range may possibly be correctly extended both on the east and on the west, so on the north, the channels of the Indus an ‘the Brahmaputra, which are commonly assigned as the northern limit, are found in a plateau, but little lower than the passes by which the traveler crosses the first line of snowy mountains into Tibet. On the south, we have a well-marked descent to the plains of India, but on the north there is no immediate descent to a lower country beyond. On the country, range after range is met with to the north, many of which may compete in altitude with the snowy mountains seen from the plains of northern India.

River-basins.

Before proceeding to a closer examination of the form of that portion of the Himalaya lying within the province of Kumaon, it will be convenient briefly to describe the river-basins throughout the Himalaya and

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Endeavor to trace the general law underlying their arrangement. For as this depends in the main on the direction of the great ranges and the position of the great peaks, a consideration of it will conduce to a clearer apprehension of the entire mountain system itself as well as of the relations of its various parts. We find that from a water-parting about longitude 81o east and almost immediately due north of Kumaon, the drainage of the southern part of the Tibetan plateau flows north-west in the Indus and south-east in the Brahmaputra. These two rivers maintain a course along the length of the table-land, and receive as they proceed the drainage of a large part of its breadth; the exceptions being, first, the eastern border, which apparently is drained by the Lu-tse, the Lan-tsang, and the Murui-ussu, one of the sources of the Yang-tse-kiang;1 second, an occasional strip along the southern edge from which the water passes off2 more or less directly to the south through the Himalaya; and third, the north-western part from which the water has no escape, but is collected in lakes at the lowest level it can reach3. The water thus accumulated in the two great streams are at length discharged by two openings in the Himalayan slope through the plains of India into the Indian Ocean. No great portion of the drainage of the table-land, so far as we know, passes in the opposite direction through the northern slope and the area that discharges itself southward at points intermediate between the debouches of the Indus and the Brahmaputra is with one exception, that of the Satlaj, comparatively small. The waters of the northern slope with a small area of the table-land adjoining flow down to the plains of eastern Turkistan: while, in like manner, those of the southern slope with the drainage of the exceptional area along the southern border of the table-land which passes through the line of water-parting from the north, give rise to such rivers as the Jhilam, Chinab, Ravi Jumna,

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Ganges, Kali, Gandak, Kosi, and Tista. We thus see that the northern crest of the table-land or the summit of its northern slope practically forms the water-parting between the rivers that flow southwards and those that lose themselves in the plain of Gobi. In the southern crest we have a subordinate water-parting separating the rivers that fall into the India Ocean into two classes; first, those that rise on that slope and flow directly down it to the plains of Hindustan; and secondly, those that are collected along the table-land and are finally discharged also through the southern slope, chiefly by two concentrated channel at distant points towards the ends of the range. Captain Henry Strachey1 has called the northern crest of the table-land the Turkish, and the southern the Indian water-parting.

Indus basin.

If we examine the river-systems having their source in the Himalaya. We find a regularity of plan and arrangement which at first sight would not be expected. Taking the Indus basin and its system we see that the satlaj and all the rivers that join the Indus on its left bank have a south-westerly direction towards the Arabian Sea. On the east this system is bounded by the small inland basin of the Kaggar, which receives the drainage from an inconsiderable portion of the outer hills between the Satlaj and the Jumna, and finally loses its waters in the Indian desert. The eastern water-parting of the Indus system is found in the elevated range extending from the main Himalayan mass along the left bank of the Satlaj to Rupur, and is continued thence in the uplands bordering the khadir of that river until it meets the Arvali (Aravali) range which constitutes the north-western abutment of the table-land of Central India. The character of the slope towards the south-west will be best understood from the following table of heights taken along the course of the Satlaj to Ludhiana, and thence by the Grand Trunk Road to the Jumna:- Taru, about two miles below the junction of the of the Panjnad and Indus, 337 feet above the level of the sea; Bahawalpur, 375 feet; Nur Shah, 481 feet; Pir Khalis, seven miles north-east of Bahawalgarh, 548 feet; Fazilka, 588 feet; Firozpur cantonment, 645 feet; Jagraon, 765 feet; Ludhiana, 806 feet; Amballa Chaurch, 899 feet; and Madalpur, on the bank of the Jumna Khadir, 906

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Feet. Form Sodiwala in the Firozpur district southwards on the 75th meridian we have Sodiwala, 718 feet; Ahmadwala, 705 feet; Sirsa, on a mound 737 feet; level of Sambhar lake, 1,184 feet1. These observations show a slight depression towards the south in addition to that towards the south-west, and would make us include the Kaggar inland basin in the Indus system. The sotra or Hakra, the ancient river of the Indian desert, seems, however, to have once had its debouche in the Run of Kachh2, and would therefore be still entitled to be considered separate. To the west the Ravi and the Chinab run lines almost parallel to the Satlaj, as well as the Jhilam, from the town of that name, until it takes a bend to the south to its junction with the Chinab. To the west, the water-parting of the Indus commences at Cape Monze on the Arabian to the Sea, and advances nearly northwards along the Hala Mountains to the east of Soharb, Kalat, and Quettah (Kwatah). It thence continues in the same direction along the western Sulaiman range to the Safed-Koh, at the head of the Kurram valley. Thence it follows the crest of the Safedkoh westwards to the hills north of Ghazni, where it separates the southern affluents’ of the Kabul river from the waters of the small inland basin of lake Abistida, the direction is them continued north-westerly to the ridge separating the head-waters of the Argand-ab from those of the Kabul river, and again in the range that separates the waters of the Halmand basin from the most westerly affluents of the Kabul river, whence a transverse ridge near the pass to Bamian connects the line of wate-parting with the Hindu-kush. For 300 miles the line follows the Hindu-kush to its junction with the great Taghdambash Pamir near the Baroghil pass.it them follows the Muztagh range3, but cuts through it around by the Karakoram pass to the north, so as to include the tributaries of the Shayok, and proceeds in a south-easterly direction by the Aling Gang-ri to its junction with the Gang-ri at Kailas, where a transverse ridge separates the headwaters of the Indus, the Brahmaputra, and the trans-Himalayan feeder of the Ganges system. The Indus has a length of 1,800 miles, and according to Mr. Saunders, its basin has an area of 372,000 square miles.

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Subordinate systems of the Indus basin.

The Hala mountains to the south of the Mula pass are better Known as the Khirthar hills and as the Pubh hills, and the drainage from them loses itself in the plains before it can reach the Indus. The same may be said of the drainage through the Mula and Bolan passes, and that by the Thal valley. To the north, the Luni, Gomal, Kurram, and Kabul rivers, each possessing a perennial stream, have an easterly course more or less parallel to each other, and break through the range bordering the right bank of the Indus by deep and narrow gorges which form the passes into the upper country. The Kabul River itself is the drainage channel for the very elevated country from the hills north of Ghazni to the Baroghil pass north of Chitral, and from Naushera to the pass leading to Bamian, and thus forms a compact subordinate system well deserving of separate study1. The upper waters of the Jhilam drain the Tile and Kashmir valleys, and have a general direction between west and north to Muzaffarabad, where they unite, and, meeting a meridional ridge, take a bend southwards to the plains. The Chinab, in the upper portion of its course known as the Chandra, has a similar direction between west and north until it meets the spurs from the range which forms the water-parting between it and the Jhilam, whence it seeks an outlet southwards towards the plain, The Ravi runs in a valley parallel to that of the Chinab and south of it until it meets the outliers of the range that forms the water-parting between it and the Chinab, when it also turns suddenly southwards towards the plains. Next comes the Bias, which has also a westerly direction until it meets the ridge between it and the Ravi, when it takes a bend to the south through the outer hills. The upper until it meets the great obstruction culminating in the Leo Porgyul peak, after which the direction is between west and south until it enters the plains. A range runs between the Satlaj and the southern branch of the Indus from the meridian of Tirthapuri by Gar to where it is joined by the ridge connecting it with Leo Porgyul, and thence into Rupshu to the north of the Tso Moriri lake, and constitutes the subordinate water-parting between the Satlaj itself and the

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Indus. Thus we see that the great feeders of the Indus system from the west have a similar character, and that those from the east, from the Himalaya proper, have a general westerly direction, in the upper portions of their courses in the hills, until they turn southwards towards the plains, where the direction is south-west to their Junction with the Indus,

Next we have the Ganges basin with its subordinate systems. To the north, the water-parting, as a rule, follows the ghat-line of the Himalaya and on the extreme west separates of the Jadh-Ganga, one of the head-water of the Bhagirathi, from the Hop-gadh, an affluent of the Satlaj. North of Kumaon, however, we have a phenomenon similar to that observed near the Karakoram1 pass, where the waters of the Shayok, Yarkand, and Karakash rivers have a common origin in that elevated platenu at no great distance from each other. We find that to the east of the Unta-dhura pass, north of Milam in Kumaon, the water-parting of the Ganges basin crosses to the north of the ghat-line to a place called Tara, where the sources of the Satlaj and the Karuali lie close together, “divided by an almost level plain, across which a man might walk from one river to the other in an hour or two, without a vertical ascent or descent of 500 feet,” yet the, waters of one stream seek the sea at Karachi, and of the other by Goal undo. Further east the water-parting is continued in the Ghat-line to the Arun rivers river, which has its sources to the north and forces for itself a way through the Himalaya to the plains. The water-parting then follows the eastern boundary of Nepal to the plains, where an intricate system of drainage is met with, throwing off feeders sometime to the Brahmaputra and sometime to the Ganges down to their junction at Goal undo. Following the line on the west from east longitude 79o 11o and north latitude 25o we

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Find in the extreme north-west that the water-parting keeps to the crest of the range running along the left bank of the Baspa, an affluent of the Satlaj, and is continued by Hattu to the ridge on which Simla is built. Thence it proceeds southwards, and then eastwards along the right bank of the Giri to the Junction of that stream with the Jumna near Rajghat. Here the water-parting urns southwards along the line separating the drainage area of the Kaggar system from that of the Jumna, and continuing along the Arvali range and the edge of the Malwa plateau, passes through the Jabalpur and Mandla districts, separating the sources of the Nerbudda from those of the Son, and then along the range connecting the Satpuras with the Rajmahal hills to the plains, where it follows a course along the left bank of the Sabanreka to the sea. Mr. Saundrs has given the length of the main stream of the Ganges as 1,514 miles, and the area of its basin at 391,000 square miles.

Subordinate system of the Ganges basin.

The Ganges basin, like that of the Indus, possesses several subordinate systems that may be called in their order from west to east, the Jumna-Ganges, Karnali, Gandak, and Kosi systems. The alpine basin of the Jumna-Ganges system is bounded on the west by the well-defined range which descends from the Jamnotri group of peaks to the Satlaj River, and on the east by a similar ridge descending from the Nanda Devi group of peaks and separating the waters of the Pindar from those of the Himalayan Sarju. To the north, the ghat-line separates it from the source of the Karnali on the east, and the source of the Satlaj on the west. Although the upper waters of both the Jumna and the Alaknanda, or principal source of the Ganges, have at first a westerly direction, they soon take a bend to the south, and form the main channels to which are directed their affuents from either side. It is remarkable that, with the exception of the Ramganga, which unites with the Ganges in the Farukhabad district, neither the Jumna nor the Ganges before their junction receives any considerable affluent of Himalayan origin during its course through the plains. The western boundary of the alpine basin of the Karnali is marked by the ridge extending from the Nanda Devi group between the Pindar and Sarju rivers, already noticed. The eastern boundary

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Is formed by a similar ridge descending from the Dhaulagiri group of peaks. To the west the Sarju, eastern Ramganga, Gori, and Kali enter the plains in one stream as the Sarda. Then the Swetaganga Karnali, and Bheri from the Karnali, and further east we have the Jhingrak or Rapti and its affluents. All unite in the Ghazipur district. But this unitizing law is better exemplified in the alpine basin of the Gosain-then group of peaks. We have here seven rivers named in order from west to east, the Barigar, Narayani, Swetigandaki, Marsyangdi, Daramdi, Burhiya-Gandaki, and Trisul-Gandaki. These are called the seven Gandaki by the Nepalese, and unite their waters at Tribeni within the hills to from the Gandak Rivers of the plains. Here we have what Hodgson1 terms an admirable defined natural division lying between two great groups of peaks. In the same manner as the Karnali basin is bounded on the west by the spur descending from the Nanda-Devi group, of peaks, and on the east by the ridge from the Dhaulagiri group, so the Barigar of the Gandak system does not receive a single streamlet from the westward of the Dhaulagiri ridge, nor does the Trisul of the same system receive any water from the east of the ridge descending from Gosain-then. The alpine basin of the Kosi lies between the Gosain-then group and the Kanchinjinga group of peaks, and, like the Gandak system, consists of seven rivers, known as the seven Kosis. These, named in their order from west to east, are the Milamchi or Indrawati, the Bhotiya-Kosi, Tamba-Kosi, Likhu-Kosi, Dud-Kosi, Arun, and Tamra or Tamor. The Arun has one of its sources to the north of the line of snowy peaks seen from the plains, and the Tamor is also said to have trans-nivean affluents, but all the others rise on the southern slope of the Himalaya, and unite within the hills at Varah-Kshetra above Nathpur. The subordinate systems of the Ganges basin thus apper to be strongly characterized by a common origin within an area bounded on the north by the ghat-line and on the west and east by well-marked groups of culminating peaks, whence ridges descend and form the water–parting between successive systems.

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The Brahmaputra basin in its full extent has not been explored, but sufficient evidence has been collected by recent travellers to show that from the water-parting between the former river continues in a range of lofty peaks on its left bank to the bend towards the south, by which it reaches the plains of India. Thus range has a direction south-east, and to the west of the 86th Meridian is sufficiently distant from the Brahmaputra to allow of such affluents as the Chachu and the Charta rivers, about the 86th meridian, a line of peaks culminating in the Targot La stretch in a north-easterly direction to the Gyakharma group of peaks, south-east of the Kyaring –cho or Kyaring lake, one of the sources of the Nak-chu-kha. The drainage of the southern slope of the range is sent by the Dumphu-chu into the Kyaring Lake, so that the northern water-parting of the Brahmaputra must here approach much closer to the river and run in a south-easterly direction. On the 89th meridian, it descends as low as the 30th parallel in the Shiang Lahu range, which appears to be connected with the great Ninjin-thangla range of snowy peaks to the south of the Jang Namcho or Tengri-Nor lake with a trend to the north-east, for it gives the head-waters of the Ki-chu or Lhasa river from its southern slope, as well as other important streams further east, regarding which our information is still very imperfect. To the north-east we find the Nak-chu-kha or Hota Sanpo, a large river that issues from the chargut lake about north latitude 32o and east longitude 89o, sand flows eastwards, having its drainage area on the south, bounded by the water-parting between it and the Brahmaputra basin. This great river takes a bend to the south, and according to one of the Pandit explorers, flows by Tsiamdo on the road from Lhasa to Bathang, and these through Amdu to the China, under the names Machu and Konkong. These names would connect it with the Yangtse, but if it flows by Tsiamdo it should be one of the branches of the Lan-Tsang, the name of the upper portion of the Mekong or Kambodia River. Des Godins notes that the Nu-Tse is known

As the Ngen-kio in Tibet, a name which may perhaps be referred to

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The Nak-chu, and it would then be the head-waters of the Salween, whilst others claim it as the source of the Irawadi. All that can, therefore, be said that is that there is a great river in eastern Tibet, between which and the Brahmaputra is an unexplored tract of country, and within it will be found the eastern water-parting of the Brahmaputra. So far as we may conjecture from the imperfect materials at our command, the range that forms the northern water-parting of the Brahmaputra takes a sudden bend southwards between the 96th and 97th meridians along the right bank of the Lu-Tse. These one branch proceeds westwards in the Patkoi range, and another southwards, between the Irawadi and Salween. To the south, the water-parting follows the crest of the Patkoi range, and is continued westwards in the Manipur, Lushai, and Chittagong hills, where it separates the southern affuents of the Brahmaputra from those of the Barmese systems. To the west, the water-parting is conterminous with that of the Ganges basin. Mr. Saunders estimates the course of the Brahmaputra at 1,800 miles, and the area of its basin at 361,000 square miles.

Subordinate systems of the Brahmaputra basin.

Following the systems that carry off the drainage from the southern slopes of the Himalaya and join the Brahmaputra in its course through the plains, we trace much the same regularity found in the subordinate systems of the Ganges basin further west. The Tista systems of Sikkim is Bounded on the west by a ridge descending from the Kanchinjinga group of peaks and on the east by a similar ridge from the Chumalari group that also forms the eastern boundary of Sikkim. The alpine rivers of this system in order from west to east are the Bari Rajjit, Ratong, Lachen, Lachung, and Rang-chu, and all unite within the hills above Kalingpong to the east of Darjiling. The Chumalari group on the Tarsa- Gangadhar system extends from the Chumalari group on the west to the ridge descending some fifteen miles east of the 90th meridian in the 28th parallel, and which separates the waters of the affluents of the Tarsa from those of the Manas system. The rivers of this alpine basin from west to east are the Ammo, Dor, par Wang, Ma, Pachu, and Tanchu, which unite within the hills to from the Tarsa and the Gangadhar tributaries of the Brahmaputra. Further east comes the Manas system, of which the western water-

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Parting is conterminous with that of the Tarsa-Gangadhar system. On the east, it is bounded by a ridge descending from the group of snowy peaks to the west of the Karkang pass crossed by the Pandit on the Tawang route in 1873, and for its alpine feeders has the mati, Manas, Kuru, Lhopra, and Tawang streams, which apparently also unite within the verge of the mountains to form the Manas. Eastwards lies the Subansiri system between the Manas and the Dihong. The Sikang-chu, which rises to the south of the Karkang pass, probably forms one of its sources but the remainder lie within the wild country of the Abors and have not yet been explored. The southern affuents of the Brahmaputra during its course through the valley of Asam are not so important, and may be divided into two classes-those which carry the Drainage of the northern slope of the hills inhabited by the Singpho, Aror, and Naga tribes, sand fill directly into the Brahmaputra, and those which carry the drainage of the northern slope of the hills of the Lushai country and hill Tipura and of the southern slopes of the Jaintiya, Khasiya, and Garo hills to the Megna, which joins the Brahmaputra below Dakka. To the former class belong the Dihing, Disung, Southern Dhansiri and Kopili, and to the latter the Barak, Surma, and dhani1. To the extreme east of the Asam valley is a snowy range from which issues the Lohit or Brahmakund rivers that gives its name to the brahmaputra; but geographers have applied the same name to the great river flowing by Lhasa, and which the best authorities identity with the Dihong that joins the Lohit in the upper valley of Asam. The more name of the Brahmaputra in the upper portion of its course, seems to be ‘Tsanpo’ or ‘Sanpo,’ meaning ‘the river’ or ‘the great river,’ used like ‘Ganga’ in the plains and ‘Kiang’ in China. In Asam, the name varies with the tribe inhabiting its banks or those its tributaries, so that the designation ‘Brahmaputra, to express the entire course of the river from its source to the north of Kumaon to its junction with the Ganges, must be considered convenient of geographers, and not a term based received usage. We have seen that at its junction with

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The Lohit, the Brahmaputra is called the Dihong1. East of this junction, the Lohit receives a tributary from the north, called the Dibong, and on the south another called the dihing, and again one called the Disung. Much confusion has resulted in names refer to different rivers2.

Tibet.

We have already noticed the division of Tibet into the eastern, western, and central provinces. It is called Si-tsang by the Chinese, and Mu-tu, or Upper and lower Tibet. From the accounts of the eastern province in the writings of Klaproth, Huc, Blakeston, Cooper, des Godins, and Gill, we may assume that the drainage to the east of the 96th meridian has a southerly direction , and that the general condition’s resemble much those further west. Pengshan on the yang-tse in western sz-chuen is 1,500 feet above the level of the sea.at Ching-tu, some seventy miles due north of Pengshan, Cooper, in March, found the fields in the neighbourhood occupied by luxuriant crops of wheat, barley, sugarcane, and opium, the latter of which demands a climate similar to that of the plains below the Kumaon Himalaya. The some traveller crossed the Yalung and Kinsha branches of the Yang-tse between Chingtu and Bathang, and beyond Tastsien-lu entered Eastern Tibet, where yaks are used in the carrying trade and a more alpine climate is met with. Bathang on the west has much the same position with respect to the elevated highland to the north that Chingtu has on the on the east, but lies a degree of latitude more to the south than Chingtu; so that from the meridian of Bathang, the range dividing the Tibetan plateau from the plains of China seems to take a north-easterly direction. The feeders of the Yang-tse and other rivers find their way through this range by a series of gorges similar to that of the Dihong further west. Between the Yang-tse and the Dihong, we have two

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Great rivers, the Lantsang identified with the Mekong or rivers of Kambodin, and the Lu-tse the Lu-tse or upper course of the Salween. Further Des Godins informs us that the Mekong has its origin in about 33o to 34o north latitude in the mountains south of Koko-Nor, and the Lu-tse further wet is known as the Ngen-kio in Tibet; but whether this name is to be regarded as one with the Nak-chu-kha of the Pandit explorer is left to future travellers to decide.

Turning now to the upper portions of central and western Tibet, we find from the Pandit explorations that the drainage to the north of the northern water-parting of the upper portions of both the Indus and the Brahmaputra flows into a number of lakes. East of the 84th meridian, those lakes appear to be connected the one with the other, and eventually with the great river Nak-chu-kha, which has an easterly direction in the upper part of its course and finds a southern outlet in one of the great rivers to the east of the Dihong. From the Pan Gong Lake on the ewst the Lonkor Cho between the 83rd and 84th meridians on the east, the drainage is collected in a series of depressions without any outlet, each of which is the Centre of a subordinate minor system of its own. We do not know of any considerable stream proceeding northwards or westwards from this tract. This lake-system is a characteristic feature of the orography of north-western Tibet. The waters of those lakes are generally brackish and the margins exhibit expanses of salt-marsh. Streams of fresh water are found, but in their course towards the lakes these rapidly become brackish, and in the end little influence the quality of the lake-water itself. According to the Pandit, the country to the north of Garge and Garchethol is a great uninhabited plain1. It was formerly customary to travel in a north-north-westerly directions from Thok daurakpa2 for some twenty days to the range overlooking the Gobi plain in which the commercial entrepot Nari tharu lay3. Atwo months’ journey from Thok Daurakpa to the

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North-east brought the traveller to Ajan, also a commercial Centre. This road lay throughout over an extensive plain; no large mountains were seen and no streams were crossed. Drinking-water was obtained from a number of fresh-water lakes mostly dependent on the rainfall for their supply. From these reports we learn that northern Tibet is a plateau of great elevation without inhabitants and possessed of few streams.

Lob-Nor basin.

As we approach the west, the boundary ranges that support the Tibetan plateau between them on the north and south gradually incline towards each other, so that westwards of the Pangong lake they are little more than fifty miles apart2. Here we find the water-parting of the Indus and Lob-Nor systems in the elevated Dipsang plain, which attains a height of 18,000 feet above the level of the sea near the Karakoram pass (18,550 feet). From the Karakoram pass on the north flows a feeder of the Yarkand river, and from the east, an affluent of the Karakoram river both of which belong to the Lob-Nor system. On the south-east, only eleven miles from the pass, the Daulat-beguldi encamping ground is close to one of the feeders of the Nubra branch of the Shayok River that belongs to the Indus system. In one case the waters lose themselves in the Gobi desert, and in the other they reach the Indian Ocean at Karachi. If the statements of Kostenko and Severtsof be accepted, we have here in the west an analogue of the arrangement that has been described as characteristic of all the river-systems along the southern face of the Himalaya between the Jumna and the Brahmaputra. The alpine basin of the Yamanyar lies between two great groups of peaks, some thirty miles apart. On the south-east of the Yamanyar is the Tagharma group, of which the Muztagh-Ata3 peak attains an elevation of 25,350 feet above the level of the sea. On the north-west there is a similar group, of which the Tash-balik peaks reaches an elevation of 22,500 feet. The Yamanyar collects its waters in an elevated valleys

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Between these groups and the water-parting range on the west, which is known variously as the Tagharma plain or plain of the Kichik Kara-kul1. The groups themselves are in advance of the water-parting range and are connected with it by transverse ridges. That on the south connects the Muztagh-Ata group near the Kok Mainak pass. While that on the north has not yet been accurately defined.

Spurs from the groups descend northwards towards the plain and effectually divide the waters of the Yamanyar from those the Kashgar-darya on the west and from those of the Yarkand River on the east. It has generally been supposed 2 that these two groups of peaks belonged to a great meridional range; but Severtsof, who has had recently exceptional means for obtaining an accurate estimate of its character, distinctly states that “these two peaks were supposed to be connected by a continuous range, while the real fact is that each is respectively the highest point of separate small high mountain knots capped with eternal snow.” We have, therefore, in the west also an apparent snowy chain of mountains as seen from the plains, but which on closer examination resolves itself into groups of snowy peaks in advance of the water-parting range from which they are divided by an elevated valley. This valley gives rise to a river that makes a way for itself between the boundary groups the plains below, while the groups themselves are connected by transverse ridges with the line of water-parting. A ridge from Muztagh-Ata to Yangi Hissar separates the drainage of the northern slope from that of the Kinkol river on the east, and a second ridge follows at some distance the left bank of the Yamanvar which shortly after its issue from the mountains is absorbed in artificial branches or canals for irrigation purposes. The whole system is a remarkable illustration of Hodgson’s formula for the river-system of the eastern Himalaya.

Oxus basin.

The alpine affluents of the Yarkand River known as the Sarikol and Zarafshan rivers also illustrate the unitizing principle observed elsewhere. They

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Are separated from each other by the Kandar range, which descends in a north-easterly direction from the water-parting range to the south, and terminates where the Sarikol and Zarafshan unite their waters within the outer range of hills to the north. The Oxus system further gives an example of another of the characteristic features of the Himalaya River-systems. The water-parting follows the line of the Hindu Kush from the pass near Bamian to the Baroghil pass, and thence follows the Pamir range to the greater Kara-Kul. The height of the water-parting on the Baroghil plain has been estimated by Captain Biddulph at about 12,000 feet. The Mullah states that in traversing it for a distance of five miles there was no appreciable rise or fall, and further it is said that from a point one-and-a-half miles short of the crest, the difference in height did not appear to be more than two hundred feet. The Sarhad head of the Panjab branch of the Oxus is not more than two miles distant from the Gez-kul or Oi-kul, the longest sources of the Aksu branch of the same river known as the Murghab. The principal source of the western head of the Panjab branch of the Oxus in Wood’s Victoria Lake is but twelve miles distant from the water-parting between it and another branch of the Aksu. So little is his water-parting marked by any defined physical feature that it was only after some difficulty that Trotter discovered it at a height of 420 feet above the level of Lake Victoria. There is also reason to believe that the greater Kara-kul once gave off at one end a feeder to the Kashgar-darya of the Lob-Nor system, and at the other a feeder Oxus. We have already seen that it is but a little difference in perpendicular height that determines the drainage between the Satlaj and Karnali snd between the Nubra branch of the Shayok and the Karakash, so that where rivers have their sources in these elevated areas it may be generally stated that a slight inequality in the surface, such as it is not possible to delineate on any ordinary map, is sufficient to determine the course of springs into channels that have a very remote debouche one from the other in the plains. The terms trough, channel, basin are in such cases often misleading. Nor are the bounding ranges in these elevated regions marked with such well-defined character asare met with elsewhere. The great Pamir is divided from the Alichur Pamir on the west by a range having an average elevation of only 3,000 feet above the level of the

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Victoria lake, and from the little Pamir by a similar range averaging about 2,000 feet above the same level. The direction of the rivers depends, therefore, on the influence of much less relatively important masses of matter than are to be found at lower levels. The slight difference in level that determines the course of the head-streams of the Karakash and Yarkand rivers on the Dipsang plains, is sufficient to divert the former from their normal direction and drive them directly against the Kuen-lun range, where finding a fault in the wall, they work their way through towards the plains. The influence of the law of gravity and the mechanical and chemical changes wrought by water are the sufficient causes for every from of river channel that is met with, and it is to their ceaseless action that even the stupendous gorges of the Indus, the Satlaj, and the Brahmaputra, are due.

Plains of Hindustan.

Having concluded our review of the river-basins and their relations to each other, we shall now proceed to examine the different parts of the area under our notice is a vast flat extending with an almost unbroken surface along the foot of the Himalayan slope from the upper Indus to the Bay of Bengal. Its direction is from north-west to south-east over a distance of nearly 1,500 miles, and having an area, including its western branch along the Indus and its eastern prolongation into Asam, of about 500,000 square miles.

Indus plains.

On the west it has its greatest development stretching along the Indus from the foot of the mountains to the sea, from north-east to south-east for a length of 750 miles. Its breadth from the Arvali hills to those west of the Indus is about 400 miles. The Arvali hills run in a north-easterly direction from the peninsula of Kathiawar until they lose themselves in the plain near Dehli. From this point they run in a south-easterly direction connecting with the Vindhyas, and in both cases constitute the abutments of the elevated plateau of Central India. They thus form two sides of a triangle with its apex towards the north, where it separates the Indus plain from that of the Ganges. The general slope of the Indus plain is south-west, with, as we have seen, a slight depression towards the south, until the influence of the northern slope of the Arvalis is felt, when it gradually rises again. Taking

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A line along the Indus1, we have Sehwan, 117 feet above the level of the sea; Shikarpur, 199 feet; Dehra Ghazi Khan, 395 feet; Segra, on the eastern bank of the Indus, opposite Dehra Ismail Khan, 606 feet; and Khairabad, opposite Kalabagh, 750 feet. Following the 32nd parallel from west to east, we have Sandi on the left bank of the Indus, 29 feet above the level of the sea; Lodri, on the left bank of the Chinab, 657 feet; and Ramdas,on the left bank of the Ravi, 796 feet, further east, we enter the hill. Following the 30th parallel we find Mare on the 71st meridian, with an elevation of 386 feet; Nur Shah on the 73rd meridian 482 feet; and Pakka Sarawa, on the 75th meridian,698 feet. The perfect uniformity of the surface is broken in the north-west by the small table-land between the Indus and the Jhilam, of which the salt range2 forms the abutment. These hills at the Sakesir station of the survey in the Jhilam District rise to a height of 4,994 feet above the level of the sea. They extend from Khairabad on the Indus to the Jhilam turn abruptly north-east and connect with the outer ranges of the Himalaya near Bhimbar (1,200 feet). The table-land itself is seldom more than two or three hundred feet above the general level of the plain, and presents an undulating though tolerably even surface broken occasionally by ridges which attain a height of from two to three thousand feet.

Indian desert. The Indus plain along the foot of the hills is sufficiently watered, but to the east and south at any distance from the rivers cultivation on an extended scale is only possible when the scanty rainfall can be aided by artificial. The latter tract known as the great Indus desert stretches through Bhatiana, Bikanir, and Bahawalpur into Sind. Tradition tells us that in former time it was a fertile and populous country studded with numerous civilized tribes.