

such rivers as the Po and the Rhone, and many had no doubt heard of the system of hydrographic stations recently established by the Italian Government in the basin of the Tiber. Why should we not endeavour to learn something definite and precise about the character of our own rivers? The investigation was only the natural complement, on the one hand, of the physical structure of the country, and, on the other hand, of its meteorology. Our Scottish Meteorological Society had now succeeded in establishing meteorological stations throughout the country; let hydrographic stations bear them company along our principal rivers. Rainfall and river discharge were mutually illustrative.

On Overland Expeditions to the Arctic Coast of America, by John Rae, M.D., F.R.S.—The following table shows the approximate amount of geographical work done by the expeditions under—

		G. M.	G. M.	G. M.
1821.	Franklin & Richardson ...	on foot ...	35 in canoes	415 450
1826.	" "	" "	90 in boats	955 1045
			Total ...	1495
1834.	Back ...	{ in boat } ...	{ in boat } ...	105 225
		{ on river } ...	{ on coast } ...	
1837.	Dease & Simpson (H. B. Co.)	on foot ...	95 in boats	722 817
1838.				
1839.				
1847.	Rae (H. B. Co.)	{ sledging } ...	1123 in boats	369 1492
1851.		{ on foot } ...		
1853-4.				
	Grand total ...			4029

A Word or Two on the Best and Safest Route by which to attain a High Northern Latitude, by John Rae, M.D., LL.D., F.R.S., F.R.G.S., &c.—The plan proposed is that the route by the west shore of Spitzbergen should be taken by one, or perhaps two, steamers similar to the fine vessels used in sealing and whaling at the present time. That after forcing the ice "pack" at the north-west end of Spitzbergen, a north-east course towards Franz-Josef Land should be followed. That a depôt of coals should be placed at a convenient harbour in North Spitzbergen. Extracts are given from Parry's "Narrative," 1827, pp. 101 and 148, showing how open and small the ice was in latitude 82° 45' N. The southern drift of the ice that so obstructed the advance of Parry's boats will be no great impediment to a powerful steamer, whilst if she gets helplessly fixed in the pack she will drift homewards with it. No well-equipped and powerful steamer has tried this route.

JAPANESE TATTOOING

THE last number (Heft 32, May, 1885) of the *Mittheilungen der deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens* is almost wholly occupied by a paper of a most exhaustive character by Dr. Baelz, a physician in the service of the Japanese Government, on the physical qualities of the Japanese. A previous paper by the same writer gave the results of his investigations into Japanese skeletons. For the purposes of the present paper he obtained numerous anthropometrical measurements—about 2500—based on a scheme which included seventy-nine measurements in the case of each individual. It is noticeable that Broca confined himself to little more than a third of this number, Virchow's scheme contemplated thirteen, and at the most thirty-eight, Weissbach sixty-seven, and Quetelet, in his anthropometry, gives eighty-two measurements. The skeleton plan of the paper is as follows: 1. Skin and hair: the colour of the skin and its cause, artificial colouring, including tattooing, the characteristics and nature of the hair; 2. The *physique* in general, including the carriage and gait of both sexes, weight, size, and growth; 3. Measurements of the body and limbs. In the discussion of the results set forth in this section the author expresses the opinion, based on his own investigations, that in general the value of these anthropometrical measurements is much exaggerated by anthropologists and ethnographers.

The tattooing of the skin by Japanese, generally those of the lower classes, has attracted much observation from Europeans, due partly to the extraordinary elaboration and artistic skill displayed, partly to the fact that the occupations and customs of the class in which tattooing is most practised are such as to render it necessary frequently to wear none but the most

¹ Actually two expeditions—one east, the other west.

² Dease and Simpson had to pass over about 500 miles of previously traced coast before getting to new ground, but Franklin and Richardson were on new ground at once on reaching the coast.

³ Of the coast, &c., traced by Rae, 1123 miles were done by sledging, believed to be the most laborious of Arctic work.

indispensable garments. This subject has never, so far as we are aware, been examined with so much thoroughness and care as by Dr. Baelz. He says that among the various peoples which have, in the course of centuries, reached a high standard of culture the Japanese are probably the only race which have retained generally the practice of tattooing and have brought it to a state of highly artistic development. Up to a few years ago the practice was so widespread that in Tokio alone there are estimated to have been, possibly still are, 30,000 men who were tattooed. This decoration is not confined, as in Western countries, to a small part of the body, but it covers the whole back and a considerable part of the limbs. The head, neck, hands, and feet are never tattooed, a circumstance of importance in explaining the practice. It was confined to the lower classes; amongst the better classes it was considered unworthy to disfigure the body in this way. It was widely spread amongst the workmen in great towns and coolies, and even to-day it is exceptional to find an old man of either of these occupations who is not tattooed. The objects illustrated were various: amongst the most common were large dragons, lions, battle scenes, beautiful women, historical occurrences, flowers, &c. Dr. Baelz states that he never saw obscene pictures tattooed. The colours employed are black, which appear blue, and various shades of red. The first is obtained from Indian ink, the usual Japanese writing material, the red from cinnabar. When a man wishes to undergo the process he looks out in a popular picture-book some illustration which takes his fancy, or he evolves something from his own imagination, and goes with it to the artist. The latter makes his arrangements, and sketches the picture on the skin. If he is skillful at his calling he sketches the merest outline, and straightway introduces all the details; but if he is not so confident in himself he first draws the whole picture on the skin. There is no special ceremony attending the work as in some of the South Sea Islands, nor is there any religious signification whatever in the process. The artist uses for the purpose exceedingly fine, sharp sewing needles, fixed firmly, four, eight, twelve, twenty, or forty together, in a piece of wood. They are arranged in several rows; when there are forty they stand in four rows of ten each. The points are quite even, except when it is desired to produce a light or dark shading, when the needles are arranged in corresponding lengths. This combination is said to be especially painful. The skin, at the place where the puncturing is going on, is stretched between the thumb and first finger of the operator, who holds between the third and fourth fingers of the same hand a writing brush with ink or cinnabar, as may be required, on it. He holds the wood containing the needles in his right hand, and, having put the colour on them, he rests the hand on the thumb of his left hand, and then proceeds with extraordinary rapidity to puncture the skin, stopping every now and again to put on the fluid anew. Dr. Baelz counted on one occasion ten punctures per second, and as there were ten needles the person being tattooed received one hundred punctures per second. The wonder is that with such speed excellent pictures, with various degrees of shading, can be produced, but such is the fact. A skillful operator can in this way puncture the back or breast and stomach of a grown man in a day. A few hundred thousand punctures are necessary for this purpose. The patient, if he may be so styled, does not suffer so much pain as might be expected. The punctures are not very painful, they tickle rather than hurt. No blood is drawn; a circumstance which shows that the needles do not reach the cuticle, and which also explains the slight pain of the operation, and the possibility of enduring it. This, however, is not the case always, for in many parts of the body where the skin is tender, or where a deeper shade is required, some clammy blood comes slowly to the surface, and the operation becomes painful. This occurs most frequently at the knees and elbows. To be well tattooed, therefore, is taken as a sign of manly vigour and endurance. As soon as the sitting is over the punctured parts are bathed with warm water, which produces a slight pain. The colour then comes out more clearly than before, and the patient can do as he likes. No special diet is ordered. A few hours after the operation he often has a slight feverish feeling, but this soon leaves him. After about three days the skin scales off like bran, but the tattooed parts are never irritable or sensitive, and the man goes about his work as usual. There are cases in which women have been tattooed, but these are very rare. The women are mostly dissolute who allow this to be done; but it is said that the colours come out with great clearness and beauty on the comparatively fair skins of women. Recently tattooing has been prohibited by law under the impression

that it is a barbarous custom unworthy of a civilised people. But Japanese tattooing is so superior to that of all other nations that European sailors are said to look forward to it as the principal advantage in a visit to the land of the Rising Sun.

This being the method in which the practice is carried out, Dr. Baelz comes to discuss its origin and meaning. The oldest reference we have to tattooing in Eastern Asia states that a Chinese prince, about three thousand years ago, who was nominated heir to the throne against his will, had himself tattooed in order to render his succession impossible. But at the present day the practice in China and Korea has fallen into desuetude, while in Burmah it still appears to be in vogue. In 1872, a man was exhibited in Europe who had been a prisoner amongst the Burmese, and who was tattooed from the crown of the head to the sole of the foot. The practice is still prevalent amongst the South Sea Islanders and the American Indians. In his work on the origin of writing, Wuttke seeks to show that tattooing is a kind of writing; but however correct this theory may be in the case of the tattooed peoples known to him, it certainly does not hold good in the case of the Japanese. The signification of the practice, says Dr. Baelz, amongst the latter is quite distinct from that which it has amongst other peoples. In the first place, amongst the South Sea Islanders and the Indians, tattooing has a religious, a symbolical meaning; it is a ceremonial, frequently a sacred process. There is nothing of this in Japan—neither ceremony, nor other peculiar meaning; it is done for cosmetic purposes and for no other. Again, amongst other peoples tattooing was a species of distinction; it marked the heroes, leaders, chiefs, of the tribe. In Japan it marks a man of the lower classes. Elsewhere, also, the uncovered parts of the body, such as the face, neck, hands, &c., are the favourite spots for tattooing; in Japan it is only the portions usually clothed which are tattooed. It is noticeable that amongst the Ainos the tattooing takes place on the exposed parts of the body, and that it is largely practised by women, two circumstances which distinguish it from the practice amongst the Japanese, and in which the Ainos resemble other northern peoples such as the Esquimaux, the Ostiaks, and others. In answer to the question, What meaning has the practice amongst the Japanese, as distinct from other races? the author replies that in Japan tattooing is a garment, a decoration. Various proofs of this statement are advanced, amongst them being the following: only those parts of the body are tattooed which are usually covered; all workmen do not tattoo themselves, but exclusively those whose work causes excessive perspiration, and who can, therefore, work best in a semi-nude state, such as runners, grooms, bearers, &c., and amongst these the practice prevails only with those who have connection with large towns, where nudity would be objectionable. Their garments are tattooed on their bodies, and they appear clothed without clothes before the public. The peasants are never tattooed. Again, the colours of the tattooing corresponds with that of the dress; it is the same dirty, dark blue. This theory never suggested itself to the Japanese: they thought that it must have come from China, and that it was a species of punishment. It was, it is true, at one time the custom to tattoo marks into criminals, but this was confined to a ring on the elbow. It would not explain the spread of the practice amongst certain classes in certain directions. Dr. Baelz's theory that it is merely a substitute for dress, and as the wearing of clothes is now compulsory, tattooing has lost its meaning. As for its origin, the peoples around the Japanese, the Ainos and the Loochooans, have practised it; and the Japanese navigators who travelled far and wide in the Eastern seas in the sixteenth century might well have seen it elsewhere. The Japanese discovered, says Dr. Baelz, that man can paint a figure on his skin which the rain cannot wash away, the sun wither, or even all-devouring Time destroy, and with their instinctive artistic skill they gradually developed and perfected the original rude figures in idea and execution. At first few only wore this blue skin-dress, but these few appeared to their companions decorated and clothed (a tattooed person does not appear actually naked), and as such a garment was cheap and lasting, and every man could have it according to his own fancy, tattooing became the fashion.

It may be added here that among the Igorrotos of the mountainous districts in the north of Luzon tattooing is also exceedingly elaborate, although it consists rather of a series of lines, curves, &c., than of one large, elaborate picture. Dr. Meier, in a paper read not long since before the Anthropological Society of Berlin, described the Igorrotos as tattooing the hands, arms, breast, and also part of the legs. The back is untouched

except by one tribe. A picture of the sun, as a number of concentric circles on the back of the hand, is the commonest object represented. The process takes place at puberty, and is a long one, as the punctures (which are made with a three-pointed instrument which is clumsy in comparison with the Japanese needles) become inflamed and take a long time to heal. The tattooing of the Buriks, a tribe of Igorrotos, takes three or four months to complete.

It may not be out of place here to refer to Dr. Baelz's account of the Japanese use of moxa, which, like tattooing, comes into his section dealing with the skin. On the bodies of almost every Japanese, and sometimes on every part of the body, one sees round white spots. These are the moxa spots, produced by burning the flesh with a species of plant, with the object of curing some affection. This is a universal popular specific in Japan, which is its home, although moxa is to be found used elsewhere. It was introduced from Japan to Europe by the Portuguese and Spaniards, and the name is Japanese. In May the leaves of the *Artemisia Chinensis* are powdered and dried, and the mass cut into small blocks or pieces. One of these is laid on the body and set on fire, burning slowly away. At first it naturally produces a sore, more or less deep, according to the intensity of the heat; soon this heals, leaving the scar for ever. The belief in the efficacy of this process is universal, and, Dr. Baelz thinks, not altogether misplaced, for the moxa acts much as our blisters do. Moreover, from the accounts of those who have gone through the cure, it is by no means so painful as one would anticipate from the heroic nature of the remedy.

SCIENTIFIC SERIALS

American Journal of Science, August.—Origin of coral reefs and islands, by James D. Dana. The arguments recently raised by Dr. A. Geikie against Darwin's theory of subsidence as an explanation of the formation of *atolls*, or barrier reefs inclosing a lagoon, are discussed and shown to be largely based on misunderstandings of the facts. It is pointed out that local elevations within the sinking area are not evidence against a general subsidence, such local disturbances and faults being almost necessary concomitants of subsidence. The conclusions as to changes of level in the large Pacific groups south of the equator agree mainly with Darwin's views, and the subsidence indicated, according to him, by *atolls*, is shown to be real, not an apparent sinking due to change of water-level.—On the meteorite of Tomatlán, Jalisco, Mexico, by Charles Upham Shepard. The striking peculiarity of this stone, which fell in August 1879, is the prevalence everywhere of octahedral crystals of nickeliferous iron. The specific gravity of the two fragments examined was 3.47—4.43.—On the widespread occurrence of allanite as an accessory constituent of many rocks, by Joseph P. Iddings and Whitman Cross. From its mode of occurrence and association the authors conclude that allanite must now be added to the group of primary, accessory rock constituents, similar to zircon, sphene, and apatite, though much rarer than any of these. In some regions it appears to be quite uniformly distributed through certain types of rock, such as the porphyrites and allied porphyries of the Ten Mile District, Colorado.—Crystals of analcite from the Phoenix Mine, Lake Superior Copper Region, by Samuel L. Penfield. These crystals, which occur thickly grouped together on calcite and native copper associated with tabular crystals of apophyllite, are of all sizes from minute particles up to one centimetre in diameter. The small ones are simply tetragonal trisectahedrons of the form (211), 2 - 2; the larger ones are of the same form, but with the planes differently arranged.—On a differential resistance-thermometer, by T. C. Mendenhall. This instrument has been devised and constructed for the study of certain problems connected with meteorology, especially the observation of soil and earth temperature, and the use of which would not demand greater skill than that of the ordinary meteorological observer. It consists essentially of a mercurial thermometer, not unlike ordinary forms, except that the bulb is greatly enlarged, so that the stem may have a diameter of about a millimetre, still leaving the scale tolerably open. By its means observations may be taken in less than a minute, no time being consumed in the preparation of liquids of known temperature at the observing station, as in the use of the thermo-junction on the resistance coil.—Impact friction and faulting, by George F. Becker. The author discusses the phenomenon of "step