No. XVI –

'PHYSICAL POWERS'

he ride in one day? 6. What *distance* can he run in one day? 7. In what time can he *run* an *English* mile of 1760 yards, or 2112 paces of 30 inches, on a level road or grass? 8. In what time can he walk *ten* or *twenty* miles on a fairly level road or grass? 9. In all *trials* of speed or endurance the temperature and the manner in which the individual is shod and clothed should be recorded, as also a general description of the ground traversed. 10. What weight can a man raise one foot from the ground, the handle being properly adjusted? 11. How far can he shoot an arrow or hurl a spear? 12. How long can he abstain from food or drink, without inconvenience, when in exercise? 13. Ditto when not in exercise? 14. Have they any drugs, or practices of any kind whereby they conserve their energy during labour, or believe that they conserve it.

J. B.

Further Notes on the same Subject.

Valuable data on the above points, as well as those treated of in *The Senses*, p. 41, in the note to *Heredity*, p. 48, and in *Psychology*, p. 53, are easily obtained by recording the number of persons out of any rather large number of them (say of more than 50) who succeed in achieving two or better, three) definite tests of different degrees of severity. Thus—

How many succeeded and how many failed to lift the specified weights A, B, C, respectively?

How many succeeded and how many failed to run the specified distance D in *k*, *l*, and *m*, seconds; or else, how many succeeded and how many failed in running the specified distances E, F, G, in *n* seconds?

How many dropped out, and how many marched on after eating no food for *r*, *s*, *t* hours respectively? and so on.

The magnitude of the tasks or tests selected should be such that, very roughly speaking, a quarter of the whole number of persons observed may be expected to fail in the first, one-half in the second, and three-quarters in the third. The method

of drawing conclusions from these data is indicated in the paragraph on Statistics, p. 226. They afford a *complete* and approximately correct picture of the distribution of the qualities tested, and not merely general averages.

F. G.

No. XVII.—THE SENSES.

Sight and hearing are generally supposed to be more acute in persons belonging to tribes who have long dwelt in open countries and led a nomadic or insecure life. *Myopia* (short sight) is thought to be extremely rare among savages, who exercise the eye very little on minute objects, while their smell is more acute than fastidious. But exact data on these subjects are wanting.

(a.) *Sight.*

For testing clearness of vision, the test-dots employed for testing the sight of recruits in the British Army (*see* Pl. V), and the directions for using them by Prof. Longmore, may be useful:—

Each test-dot is $\frac{1}{5}$-inch square, and corresponds at a distance of 15 feet with a bull's-eye 2 feet square at 600 yards, which must be distinctly seen by every acceptable recruit.

With *perfectly* acute vision these test-dots ought to be clearly visible in full daylight at 19 yards.

Directions for using the Test-dots.

1. Measure off 15 feet with precision.
2. Hold the test-dot card or paper perfectly upright in front of the man, and *let it face the light so as to be fully illuminated.*

The following questions may also be answered (but due allowance must be made for the state of the atmosphere, colour of object and background; and too much reliance must not be placed on the answers as a means of comparison with similar observations made in distant countries):—1. At what distance can he distinguish the form of a human figure moving? 2. At what distance can he distinguish a man on horseback?

The existence of *Myopia*, where suspected, may be ascertained by the improvement gained by the use of biconcave (short-sighted) spectacles.

J. B.

Further Notes on Testing Sight.

Perhaps the simplest and the surest measure of keenness of eyesight is the greatest distance at which a square of known size that has two of its sides vertical as in Fig. 1, can be

Fig. 1.

Fig. 2.

distinguished from another of the same size that has one of its diagonals vertical as in Fig. 2. These two figures represent the opposite faces of the same card (or of painted zinc, which would be more durable), which is intended to be hung against a rather dark background. Procure three such pieces of card with squares on them of $1\frac{1}{4}$, 1, and $\frac{3}{4}$-inch in the side, respectively. An assistant displays and changes them, you stand

by the person who is being tested, and using an opera glass, note the greatest distance at which he can distinguish with certainty the two positions of the 1-inch square. The object of the larger and of the smaller card is partly to discover that distance quickly, and partly to serve as a check against the man's apparent power of distinguishing the positions being due to lucky guesses. The cards must hang truly, and this will be the more easily ensured if weights are attached to holes in their lower ends.

The testing must be performed when the light is perfectly good, but not dazzling. Always test yourself when you are testing others, because if your own efficiency comes up to its normal standard, it is fair evidence that the conditions of light, &c., are normal also, otherwise very probably they are not.

F. G.

(b.) *Hearing.*

Hearing may be roughly tested by the ability to hear words spoken or the ticking of a watch.

Test by words in speaking.—The subject should hold his head straight and have his mouth closed. The observer places himself first behind then at either side of the subject, taking care that his face is not seen by the latter, who should repeat the words spoken. The hearing should be tested first with both ears open, the observer being behind. The subject then stops up one ear with his finger and listens to the observer, who now places himself opposite and rather behind the clear ear, which he proceeds to test. The same plan is followed for the other ear. The observer should begin by testing the subject with single words such as "tip," "fish," &c., containing soft vowels and little emphasized consonants, such words being the most difficult to hear. The test words should be spoken in a loud whisper and the distance from which they are heard with both ears, and then by each ear alternately, should be recorded. The observer should stand

No. XIX - HEREDITY

beauty, descend in the families of the chiefs. 2. How far intellectual ability or cunning in those of the priests and wizards. 3 Whether albinism, erythrism, or other abnormalities (*see* p. 60) are thus transmitted, and to what proportion of the children in a family, or if not to children, whether they are ever transmitted to grandchildren. 4. Whether instances occur in which a tribal mark or something like it appears naturally in a child. 5. Whether a natural aptitude for a particular art appears in the children of a caste who practise that art. 6. Whether there is any power of resistance to malarial poison transmitted from parent to child in certain tribes or clans.

J. B.

Further Notes on the same Subject.

The nature of man appears to be as plastic as that of any domestic animal, and equally to admit of differentiation. The inquiries of a traveller might often show the directions in which the tendency to a spontaneous establishment of new breeds is most common ; but he must distinguish with all the care he can between *natural* and *acquired* gifts, by seeking appropriate cases and investigating them thoroughly. Children of savage races educated in the houses of missionaries, quite away from their own people, deserve close study, to see how far the natural character, apart from the traditions, &c., of their race, persists in showing itself. Also the children of foreign slaves who are bred up by barbarians. The large families of polygamatous parentage afford good studies for heredity. Among the hereditary characteristics of a race which admit of precise testing (*see* note by myself on Sight, p. 43) are :—Acuteness of sight. Delicacy of hearing. Aptitude to music. Neatness in handicrafts, and taste in design. Love of pursuits connected with the water : thus the South-Sea Islanders swim well early in childhood ; is this really a natural or is it wholly an acquired faculty ? Power of path-finding : the stories told of this

gift are mostly gross exaggerations, but the subject deserves careful measurement; an ingenious traveller having a theodolite and skilled in its use could make many experiments, which would give trustworthy results. Power of sustaining hunger and thirst. Craving for particular kinds of narcotics and drinks. Recuperative power after accidents, and strength to withstand severe shocks and mutilations. Immunity from, or liability to, particular diseases. Psychological peculiarities, as :—the inherent gifts of ruling races; the early check of the development of the mind; excessive powers of imagination, as shown in hearing unreal voices, seeing fancied apparitions; also the convulsionary habits of wizards, and their hereditary nature. Half-castes deserve careful study. It is not easy to suggest beforehand what inquiries should be made. The traveller should be ever on the watch, and when an appropriate case presents itself to his notice, he should investigate it with great care. Those who confuse the effects of nature and of nurture, give information that is of very little use. The appearance of any natural peculiarity among the brothers or sisters of a large family, and the proportion of its members who show it in varying degrees, is an indirect datum for estimating heredity that is often more valuable than direct data.

F. G.

No. XX.—CROSSES.

The principal moot points on this subject have reference to either :—

(*a*) the fecundity of mongrels, or
(*b*) the physical or mental improvement or deterioration produced by crossing, or
(*c*) the points, if any, derived preferentially from either race or sex.

The following is M. Broca's method of indicating the racial position of mongrels or mestizos :—

No. LV.—TREATMENT OF WIDOWS.

1. How are widows treated? 2. Are they, or any of them, sacrificed at the husband's grave? or is this custom known to have existed in times past? 3. If not, do they pass to the husband's brother, or to any one else? 4. Are they allowed to marry again? 5. Do they retain any portion of the husband's property? 6. Is any special dress worn by widows? and for how long? 7. Do they observe any time of mourning? 8. Do they carry any memento of the deceased? 9. How are posthumous children regarded?

J. L.

No. LVI.—INFANTICIDE.

1. Does infanticide prevail to any extent? or is it known to have been practised in times past? 2. If so, is it clandestine, or is it recognized by the law? 3. Is any difference made between male and female children? 4. Are any, and if so, what reasons given for it? 5. Are there any special peculiarities which lead to the destruction of the infant? 6. Are there any special customs with reference to twins? 7. Is the father consulted as to the fate of the infant?

J. L.

No. LVII.—CAUSES THAT LIMIT POPULATION.

If men or any other kind of animals were invariably mated early, and if their issue were always reared with care, the produce would increase geometrically, and in no large number

of generations would occupy every habitable space. But, as a fact, the number of inhabitants of most countries is very stationary; what, then, are the causes which so exactly neutralize the tendency to increase?

These are best learnt by exhaustively working out the history of 20 or 30 families, finding out how many of their members married, and at what ages, what was their issue, how many of the children died, owing to what causes, and so forth, as stated more fully below. Such an inquiry will necessarily lead to a far more accurate knowledge of the social condition of the people than could otherwise be obtained, and is sure to yield indirectly, as well as directly, a valuable harvest of results.

1. *Conditions of Marriage.*—At what ages do they marry? how many do not marry at all? What are the restrictions which hinder persons from marrying as soon as they are inclined? how as regards the frequency of polygamy or polyandry and the number of wives, &c.? What is the proportion of male and female adults?

2.—*Separation of husband and wife.*—Customs dependent on the institution of polygamy; other circumstances which separate them periodically, or for long periods.

3. *Influences restrictive of fertility.*—How long does the mother suckle her child? At what ages does she begin and end child-bearing? Is any diet adopted by women or other practice followed, as a check on fertility? What is the proportion of children to a marriage? What is the frequency of sterile women? Are drugs, or physical means, used to induce abortion? Is any operation performed on either men or women to induce sterility?

4. *Loss of infant life.*—Still-births, infanticide, and of what sex? Death of child due to severe exertion of mother too soon after childbirth? Do more children die at one time of the year than another? and of what do they die—epidemics, other diseases, want, accidents, war? What is the mortality at different ages, as shown by the sizes of families whose parents are of different ages? What is the proportion of aged men to aged women?

It is not sufficient to collect disjointed facts here and there; the information ought to be full on every point, the materials well put together, and the conclusions fairly worked out.

F. G.

No. LVIII.—BURIALS.

(See also XLVI. § *Tumuli*.)

1. Is the cause of death recognized (wounds, disease, &c.), or is it assigned to some act of commission or of omission of the defunct? 2. Do the friends or relations attend upon the sick man until his death? or is it considered unlucky to be present at the supreme moment? 3. What is done with the body immediately after death? are the limbs straightened or bent up? 4. Is the ordinary clothing left upon the body? or is any special dress used? 5. Is the body left in the house, or removed to any other locality, before burial? 6. Is embalming practised, and what preservatives are used? or portions of the body treated in any way? 7. Is there any funeral procession, and who composes it? 8. Are hired mourners known? 9. Are signs of mourning worn, such as shaving the head, wearing clothes of unusual colours, &c.? 10. Is self-mutilation practised by the mourners? 11. Are speeches (eulogies of the deceased, &c.) made at the grave? and are these pronounced by public orators, or by friends of the defunct? 12. What is the mode of burial? in trees, on platforms, in the earth? 13. Is any coffin used? 14. Are the remains left undisturbed or are the bones removed when decay is complete? 15. What is buried with the body? any implements, weapons, food, or eating utensils, and why? 16. Are wives, servants, slaves, or favourite animals buried with the body, and what reason is assigned for this practice? 17. Are any images of wood or pottery buried with the body? 18. What is the posture of the body in the grave? 18*a*. Is it regarded as of importance whether the head is

No. LIX.—ASTRONOMY.

Divisions of the Year.—There are two celestial phenomena by which they may be affected :—(1) The solar method, by noting the group of stars which rise just before the sun, or set just after him and in his immediate neighbourhood ; this suffices to fix the time within 10 days ; (2) the lunar method, by counting the number of new moons and reckoning the odd parts of the first and last lunation ; this may suffice to fix the time even to a day ; but a lunar year of 13 complete months is not of the same length as the solar year, to which the seasons conform ; and therefore each method has an advantage and a disadvantage, and the two cannot be used together except by some clumsy compromise. 1. Inquire into the plan used for dividing the year as regards (*a*) seasons and crops, (*b*) sun, (*c*) moon. 2. Is the difficulty of combining solar and lunar years recognized ? 3. If so, is it met or avoided, and how ? 4. Are there names for the phases of each lunation ? and for how many phases ?

Division of the Day.—There is a difficulty in using the height of the sun as a means to divide the day, because at the same hour it stands at different heights at different periods of the year, whether the hour be reckoned from midday or from sunrise or sunset. The difference of its bearing at sunset and sunrise is always considerable, but greatest within the polar circles, where it varies the whole way from N. to S. Near midsummer it momentarily dips below the horizon toward the pole, and near midwinter it momentarily emerges above the horizon, opposite to the pole. 5. Is the fact of the variation of the sun's position at the same hour known and regarded when using it to divide time or to steer courses ? 6. Is the property of the sundial known ? viz., that the shadow of a fixed rod sloping towards the pole, always falls in the same direction at the same hour all the year through ? 7. How is the day divided, by the position of sun or the length or direction of its shadow ? 8. How as regards other means of

— 'NAVIGATION' NOT BY F. G.

division of the day? 9. Of short periods of time, as a walk two "pipes" (tobacco-smoking) long? 10. Are there names for any of the points of the compass? are these derived from prevalent winds, or from what?

Steering Courses by Sun and Stars.—For sun *see* last Par. The same star (not planet) has always the same bearing at the same altitude; but the bearing of the star, unless it be near one of the poles of the sky, changes considerably during the night, and its position in the sky differs at the same hour on different nights. To a traveller in equatorial regions, the equatorial stars, as Orion, are always either E. or W. of him unless exactly over his head. 11. When courses are steered by the stars, are these facts recognized? and how are they met? (*See* also No. V, NAVIGATION.)

F. G.

No. LX.—ARITHMETIC.

(*See* also No. LXIV, MEASURES, ETC.)

The use of fingers and toes in counting, as well as of pebbles, sticks, &c., should be carefully noticed; also cases in which the numerals of the language only extend to a very low limit—for instance, not beyond 3 or 5. All examples which illustrate the formation of numerals by words describing the act of counting fingers and toes should be carefully sought; for example, the appearance of words meaning "hand" for 5, "man" for 20. Compound numerals capable of being analyzed into the constituent numbers should be sought for, such as a word for 7, meaning five-two. The numeration should be examined to show how it turns on reckoning by fives, tens, and twenties, which are the almost universal systems of the world, derived from the primitive practice of counting on the fingers. It should be ascertained how far the numeral words now used are borrowed from other people. In the further development of arithmetic, it should be noticed how far the four simplest rules are understood, and by what mental or written processes they are actually worked out. The system

25. Describe any foot-races that are run, horse-races, boat races, &c., with the distances and prizes. 26. Feats of agility, climbing, boxing, and wrestling. 27. Describe any games of stone-throwing, weapon-throwing, and arrow-shooting, with the distances and the size of the mark aimed at. 28. Describe any weapons used on these occasions, and state whether they are used for amusement only, or for war as well. 29. Are rats, birds, or other animals shot for amusement? 30. Aquatic sports, such as swimming-matches, shooting rapids, jumping from heights, diving, &c. 31. Equestrian feats, jumping on and off, standing up, shooting, jumping through hoops, &c.

32. Note any of the foregoing sports that are unknown amongst the people. 33. What sites are selected for the sports—natural rocks, hollows, hill-tops, &c.?

A. L. F.

No. LXVIII.—COMMUNICATIONS.

The actual weights transported and the greatest work to be got out of man and beast week after week deserve accurate measurement, also the food they do it on (*see* XXV.). Marks like those made by gipsies or by scoring trees to show the road or to give hints to followers are worth inquiring into. Savages are accredited with an almost instinctive power of finding their way; but many of the cases quoted are found to be less extraordinary than stated. It would be a matter of extreme interest to rigidly test the power of several renowned path-finders, by leading them in a circular path in a new forest and seeing how directly they are able to find their ways back in a straight line.

1. Are there roads of any kind? how made and preserved? 2. Does the roadway through bush and forest consist of a network of paths running in and out of each other.

3. *Swamps.*—How are they passed? Is anything sunk to preserve the roadway?

4. *Fords.*—Are any measures taken to preserve or improve them? Do the natives understand the natural line of fords from salient to salient banks?

5. *Ferries.*—Are any boats kept for the purpose? how maintained? what payment is made? any understanding with neighbouring tribes respecting them?

6. *Bridges.*—Are any of the following kinds used?—*a*, bridges of single trees, or trees from opposite sides crossed and fastened in the middle; *b*, bridges of piles and beams; *c*, trestle bridges; *d*, lattice bridges; *e*, bridges of upright jambs and lintels of large stones; *f*, sloping jambs united at top; *g*, arches of horizontal slabs overlapping and converging, and closed by a large slab at the apex; *h*, bridges of radiating arches; *i*, boat bridges; *k*, raft bridges; *l*, flying boat bridges; *m*, swing bridges; *n*, rope bridges; *o*, suspension bridges.

7. Are corduroy roads known? 8. What points are attended to in selecting the halting-places? 9. Any kind of inn or public house? and how maintained? 10. How are travellers accommodated in villages? 11. Are wheeled vehicles used? if so, describe them? 12. Poles fastened to horses and trailed behind. 13. Are palanquins known, and carried by men or horses? 14. Describe pack-saddles, and all modes of carrying burdens on animals' backs. 15. Are cradles or knapsacks used on the backs of the men? 16. Any public conveyances or horses? 17. What ceremonies or salutes are made by passers on a journey, or on entering houses or villages? 18. What permissions have to be obtained by travellers? 19. Any passes or complimentary introductions to neighbouring tribes? 20. In transporting great weights by large numbers of men is the principle of pulling simultaneously by sound of music or voice practised, as with the ancient Egyptians and Assyrians? 21. Are great weights suspended by crossed beams on the shoulders of a number of men, as with the Chinese? what is the name for this? 22. Anything of the nature of milestones? 23. Drawings of signposts,

roadway marks? 24. Ditto of telegraphic signals? 25. Are any public wells dug? and any regulations established for the use of them?

F. G.

No. LXIX.—TRIBAL MARKS.

(*See* also III. Painting and Tattooing; XL. Totemism; XLVII. War.)

Many people mark their bodies in various ways, either by painting, tattooing, scarification or deformation, or wear peculiar and distinctive clothes, ornaments, or badges. It is important to discriminate between those body or dress decorations which are purely individual and those which have a social significance. Care must be taken not to mistake mourning scarifications, cuts made for sickness or pain, and marks indicating age or sex for tribal marks. It is possible that the people of a particular district may have a local method, or even a transient fashion, for certain scarifications, mode of dressing the hair, or other form of marking or decoration which might mislead a visitor into describing it as a tribal custom. Neither must the different styles of the art of neighbouring districts be mistaken for different tribal marks. Difference in technique or artistic feeling may characterise different tribes without their being in the least intentional. The same remarks apply to clothes and ornaments.

Very little is known about tribal marks in the true sense of the term. It is probable that such marks occur in countries like Australia, where there are clan restrictions as to marriage, the marks in these cases being to warn from incest. It would be interesting to see whether these marks can in any way be associated with the clan totem. In Torres Straits, for example, some women, at least, had their animal totem

No. LXXII.—STATISTICS.

The topics suitable to statistics are too numerous to specify, they include every thing to which such phrases as "usually," "seldom," "very often," and the like are applicable, which vex the intelligent reader by their vagueness and make him impatient at the absence of more precise data.

The principal things to be borne in mind in making statistical enquiries are :—

1. That the groups with which they deal should be homogeneous. *Ex.* It would be correct to inquire into the average height, and the frequency of different degrees of deviation from it, of greyhounds, and similarly as regards the speed of racehorses ; but it would be absurd to talk of these averages as regards dogs or horses generally, because there are many varieties of them differing greatly and irregularly in height and speed (see further remarks in par. 5).

2. When the homogeneous groups are largely governed by the variation of a dominant influence, it is necessary to split them up into subdivisions, each referring to a short phase of the variation. *Ex.* It is correct to seek the average height of boys between 11 and 12, 12 and 13, and so on, but it would be absurd to seek that of boys generally.

3. To select cases on a system wholly independent of the quality about which the inquiry is made. *Ex.* It would be correct to estimate the stature of the male adults of a nation by measuring individuals selected by lot ; but it would be incorrect to take townsmen alone, and still worse those who lived in an unhealthy suburb of a town. It requires keen observation and much wariness to avoid errors due to a neglect of this caution, because phenomena that appear independent are often linked together in indirect and subtle ways. *Ex.* If we were to select the upper classes of Londoners according to the initial letter of their names, as printed in the Court Guide and were to choose the letter Z for the purpose,

we should be led utterly astray, as nearly all those names are foreign.

4. As regards the requisite number of cases, a few that are wisely selected and accurately reported are better than very many that are not. Each error sacrifices several good observations before it is diluted until it disappears ; but if a faulty bias (as in par. 3) runs through all the observations no increase in their number will eliminate it. Otherwise, the rule is that the precision varies as the square root of the number of observations ; thus, twice the precision necessitates four times the labour. It is the best plan to proceed tentatively ; if the results fall into more harmonious sequence as you proceed, it is worth proceeding ; and if after dividing your statistics into 2, 3, or 4 groups you find the groups agree pretty well, and that their sums form a yet more regular curve than that obtained from any of the subdivisions, you may safely trust it.

5. Variability.—Mention is above made of "homogeneous" groups : this epithet is applicable when individual differences are entirely due to the *aggregate* effect of a great many small and independent variable influences. *Ex.* The stature of an English male adult is due to his being a man of English race, reared under the range of those conditions of food, temperature, clothing, disease, and the like which prevail in England. The large causes common to all are the English breed and the range of English conditions ; the small causes are differences of varieties and families, and of food, temperature, clothing, and the rest, within the range. Variability depends wholly on the fact of *multifariousness of causation*, and is subject to the well-known law of deviation, which has no more to do with the particular items of multifariousness than the rules of arithmetic have to do with the quality of the things to be added or multiplied. Two and three make five, whether the objects be pence, or peas, or bills before Parliament ; so the law of deviation holds for the stature of men and animals, and apparently, in a useful degree, for every homogeneous group of qualities or compound qualities, mental or bodily, that can be named. It is a very general

statistical law. The obvious effect of multifariousness is to make it an extremely rare event that all or nearly all the influences should be exerted in the same direction. *Ex.* It is a very rare event that all the cards in a hand at whist are found to be of the same colour. This is a simple result of the law of permutation: there are a vast and calculable number of different events each of which is equally likely to occur, and only one of these is the event in question. Proceeding on this principle and making certain rather forced suppositions to render calculation feasible, the law of deviation is mathematically deduced; and comparing fact with theory, wherever comparison is possible, it is found that they agree very fairly and in many cases surprisingly well. Reasoning backwards, we may suspect that a group is not homogeneous, or that the large influences are not sufficiently subdivided into phases (refer back to 3), when it does not conform to this law. The law shows that the frequency of small deviations must be very much greater than that of large ones, and that the larger the deviation is, whether above or below the average, so the frequency of the occurrence diminishes in an accelerating degree. It also shows, owing to the suppositions introduced, that the deviations on either side of the average are symmetrical; this is rarely strictly the case in nature.

Useful Data.—When collecting data of strength, stature, keenness of eye-sight, or of hearing, accuracy of aim in shooting, or any other variable performance, a ready and efficacious process is to use two fixed tests in each particular, and to note the number of those who fail and of those who succeed in either test. We are able to make use of the law of deviation described in the last paragraph, and thereby to calculate with fair precision from these two data, the proportion of those who would fail at any other test of the kind. Similarly, we can calculate the value of the test that would be beyond the powers of just one half of those submitted to it; in other words, we know what would be the average performance. *Example*—Suppose strength is to be tested. Select two stones and weigh them. Then offer small prizes to those who can lift both of them in succession, beginning

with the lightest. Note the number who fail and the number who succeed in each test, and that is all. But it is safer to use three test-stones as a check upon the calculation. Also, *before finally selecting the stones*, make a few preliminary trials and fix upon such as it is likely that, roughly, about a quarter of the whole number would fail with the first, half with the second, and three-quarters with the third. It is impossible, briefly, to explain how the calculations have to be made. The method is fully described in my work on "Natural Inheritance," p. 62 (Macmillan & Co., 1889).

F. G.

No. LXXIII.—POPULATION.

Count wherever you can. The contingents of fighting-men afforded by a district, as compared with that procurable from other districts, gives some idea of their relative population, and it is not difficult to make out the particulars of a small district in detail. In some countries the numbers attending a religious festival may give a clue, so may the number of marriage-feasts and burials.

F. G.

No. LXXIV.—CONTACT WITH CIVILIZED RACES.

1. Were the first civilized strangers who visited the races reported on, sailors, traders, refugees, convicts, deserters, settlers, or missionaries?

2. Did they communicate the vices rather than the virtues of civilized life?

3. What was the influence of the missionaries? Did they impart religious instruction only? Was the conversion of the