the back of the neck brown edged with white and with dark shaft-stripes; the feathers of the breast and abdomen much less conspicuously edged with chestnut.

Length about 13½ inches, wing 6·8 inches, tail 3 inches, tarsus 1·9 inches.

PTERNISTES BOEHMI

Pternistes boehmi, REICHENOW.

'Ogilvie-Grant's Cat. Birds Brit. Mus.,' Vol. XXII, page 179. 'Sharpe's Hand-List,' Vol. I, page 26. 'Shelley's Birds of Africa,' Vol. I, page 129. 'Reichenow's Vögel Afrikas,' Vol. I, page 458.

On the authority of Professor Reichenow this bird was found on the Tana River by the late Dr. Fischer, and at Lake Elmenteita by Mr. Oscar Neumann.

Male and Female.—Similar to *P. cranchi*, but with the upper breast-feathers white, vermiculated with black, and with black shaft-stripes; those of the abdomen white with black shaft-stripes and wide reddish brown margins with small sub-marginal black bands. Iris brown; naked skin of the face red, of the chin and throat yellow.

NATURE STUDY

By C. W. HOBLEY.

There may be many members who are anxious to do some work in this field, and who are at the same time rather doubtful as to what they can do and where to begin; one may compare such to a child placed in a room full of toys and standing wondering and confused, doubtful as to which it should select to amuse itself with.

Most men, if they live long in a country like this, cannot help falling to some extent a victim to the spells of nature; the wealth of the mammalian fauna and its attendant sport awakens a thrill in nearly all: some find the birds a fascinating attraction, others succumb to the charms of the varied insect life, a few are attracted by the flora, and savage man again absorbs the attention of others. The scenery of the more rugged parts of the country appeals to the artistic eye, but it is feared that

only a few try to read the riddle and go back to the geological causes of which the scenery is but the answer.

Among such a bewildering range of subjects, the choice must, of course, rest to a great extent with the would-be student's natural aptitude, or his liking for any particular branch, and also to some extent upon the locality in which he chances to live; the flora are everywhere, mammals large or small are found everywhere, insects and birds are everywhere, but one could not study fish if one lived in the Taro plains, and there are many places where one's chances of studying ethnology are limited.

There is always a tendency too among neophytes to assume that such and such a thing has been done by some one else, and that everything is known and worked out; as a friend said a little time since, 'Oh, what is the use of collecting birds? Mr. X. has done all that,' whereas the greatest man of science know that for eyes that see and brains that seek, the field for research was never so wide as it is at present, and that the eternal 'why' can never be fully answered.

The writer will now venture to call attention to a few things to which would-be students and observers may quite usefully direct their attention.

First of these is a nature calendar. Over a hundred years ago an old-world country parson named Gilbert White set himself down to compile such a thing, and he accomplished this in such a delightful fashion that White of Selborne's name is now among the immortals. He was not a highly trained scientist, but had the natural gift of careful observation, accompanied, needless to say, by boundless patience. Many men possess in a greater or less degree similar gifts, and the observer's eye is capable of infinite development: the results are worth the pains. Go for a walk with a trained observer and you will marvel why you were so blind. The faculty of observation is not however learnt in a day, and, like most good things in this world, can only be won by great patience and application. At this stage one seems to hear the neophyte inquire what he shall observe. Well, let us try to make a few suggestions. Take a limited area—your garden, or maybe your farm—try to identify as many of the birds, animals,

insects, trees, and flowers as you find there. This can be done to a great extent through the medium of this Society, and a helping hand will be afforded to all who desire to learn.

Then note down in a journal facts about these tenants of your realm: note the dates when the better-known plants come into flower, note when the birds nest and the number of eggs they lay, note when the caterpillars appear to eat your vegetables and identify them, note when the Cetonia beetles first appear to eat your roses; keep a record of the first appearance of the swallows and other European birds, and their date of departure. When do the snipe flight, and note the species; when do the quail and the sand-grouse appear—notice, too, if their numbers vary from year to year; when do the great flights of European storks appear, the locust-birds as they are generally called. Try to find out whether all the migrants come from the North, as is often alleged; try to discover if any come from the South during the period of the southern winter, say June to August. On what date did you see a cloud of locusts, and from which direction did they come? If you live near the plains, when did you see the first young gazelles or antelopes? When did you observe the first swarm of bees, and on what date did the white ants fly out in myriads? The white ant, although so common, has been very incompletely studied, and there are many species still undescribed. Here is a field for investigation. When do the armies of soldier-ants, 'siafu,' begin to march, and where do they retire to in the dry season? When do the swarms of black and green caterpillars appear, and when do the clouds of the marbled white butterfly (*Beleneis severina*, the imagined form of the above-mentioned caterpillar) appear? When does the standard winged nightjar put on its breeding plumage? When do the elephants leave the high forests and come down into the lower country? When do the fresh-water medusae appear in Lake Victoria, and how are they propagated? These are a few points upon which accurate information is required; there are, of course, thousands of others, and simultaneous observations made by members in different parts of the country will, when collected, prove of the greatest interest to science. Here is work for every one and much of it at your very doors.

A great deal of collecting has been done, desultory and otherwise, but comparatively little observing; much of this collecting has been done by travellers, who just captured and passed on. What is now needed are facts, and that goal, with the organisation afforded by the Society, should be within our grasp. Be field naturalists first, the technical description of species and the scientific co-ordination of the facts will come later; the details of the life-history of the fauna and flora, great and small, are very imperfectly known, and cannot be learnt until an army of observers has been patiently working for some time.

Do not think that the 'spade work' will prove dull or dissatisfying, such is not the case; the habit once acquired, it is amazing with what speed the ladder of knowledge can be climbed.

There is no freemasonry more complete than that conferred by a common interest in nature, and the greatest scientist bows with respect to the accurate observations of the man in the field; so do not think that the work of a tyro is likely to be scorned, send in your notes, and as long as they are accurate and accompanied by details of place and date, they are bound to be of value, for remember that the success and status of the Society depend upon the quality of the information published in its bulletin or journal, and that solely depends upon the zealous co-operation of the members. The thing to realise is that in this country there is work to do at your very door; it is so different in places like England, where men have to go train journeys of many miles to find collecting grounds, and there are many other obstacles to research, such as the law of trespass and what-not.

One of the great obstacles to nature study in this country, both at present and for years to come, is the scattered state of the students and the consequent difficulty of frequently meeting and discussing questions, but this has not prevented success being attained in other similar countries, and we must not be discouraged on that account; advice will always be freely given by members of the Committee and others, and every year matters will improve in this respect.

A few words with regard to collecting: The prime factor in success in this branch is not to become too diffuse; if a

man decides to collect birds then let him stick to birds, if he prefers insects let him stick to insects and preferably confine himself to one or two orders of insects; he will then learn by experience where they are to be found, how to catch them, &c., and will quickly acquire a working knowledge of the different genera. As the white population increases and as the Society grows, each district will then contain a man who is more or less an expert on each particular branch of the zoology of that district, and the results will be more complete.

Special stress must be laid upon the importance of photography. The interest of a paper accompanied by pictures is doubled; as an aid to accurate observations it is of particular value. Compare the plates in an old book of birds with the modern work in this branch: the old plates were drawn from specimens stuffed as the taxidermist thought fit, modern work is based on photographs of the live birds taken in a state of nature, and it will be readily acknowledged that the debt which both the author and the taxidermist owe to photography is incalculable.

Members are invited to contribute photographs of animals, birds and their nests, insects, native types, &c., for the use of the Society. A named collection of photos of the forest trees of the country, for instance, would be a thing of great interest and quite unique.

Photographs of native ceremonies and ceremonial adornments are greatly needed, as many of these functions will, with the advent of civilisation, speedily become things of the past.

Great care should be taken to label all photographs carefully, giving place and date as well as subject, and it would also be advisable to state where the negatives are available, in case duplicates are required. Great care should also be taken thoroughly to wash all prints in order to remove all traces of the fixing medium, hyposulphite of soda, to obviate fading of the prints.

With regard to the photographs for reproduction in the bulletin clear contrast should be aimed at; if the prints are done by the ordinary silver process a purple tone should be obtained. Some bromide prints reproduce well, but carbon or platinotype prints produce better results.

Micro-photography is a most fascinating branch, but one that is not likely to be undertaken by the student in an out-station. There are, however, special facilities for such work in the Government laboratories, and therefore no opportunity of making slides of scientific interest should be neglected.

Thanks to the pioneer work of Schilling, Kearton and others, the time is within sight when it will be considered a far more meritorious thing to photograph a wild animal than to have killed it for the sake of the trophy, and there are definite signs that the photography of live game and birds is gaining a very wide vogue.

A fair test of this is the number of reproductions of this class of work one sees in the illustrated paper or magazine, and these are undoubtedly increasing, and moreover improving in quality.

A great field, too, has been opened up by the application of the cinematograph to this branch of work, and animated pictures showing the processes of the metamorphoses of insects and similar phenomena cannot fail to bring man into closer touch with the realm of nature, and year by year, owing to improvements in apparatus, work of this character is becoming more and more within reach of the amateur.

A skeleton programme of lines of research under the various headings is now given; this is only intended as a kind of *aide-mémoire*, and as a list of suggestions for study. It will, however, give some idea of the vast choice of research that lies before every observer.

Mammals.

1. Complete index of species.
2. Facts *re* geographical distribution of species throughout the Protectorates.
3. Information on the migration of species.
4. Breeding places and breeding dates of various species, number at a birth. Small mammals, bats, nocturnal animals. Melanism and albinism, its range; observations on habits, mimicry, variation due to altitude.

Birds.

1. Complete index of species.

2. Geographical distribution of species indigenous to the country.

3. Migrants, lists of; dates of arrival and departure; list of migrants breeding here.

4. Breeding places and nesting time of various species, number of eggs in a clutch.

5. Collections of eggs and nests as well as the birds themselves.

Reptiles, Amphibia and Fish.

1. Complete index of species.
2. Geographical distribution.
3. Poisonous and non-poisonous species.
4. Definite places where particular species are to be obtained.
5. Breeding places and times.
6. Marine and fresh-water fishes, collections of.

Invertebrates.

1. Owing to the enormous size of this group a complete list of species will be an impossibility for many years to come.

2. Geographical distribution.

3. Localities where the various species can be caught, and dates.

4. Food plants of various species of Lepidoptera, Coleoptera, &c.

5. Migrations of Lepidoptera, Locusts, &c.

6. Results of experiments on hatching out certain species from the egg, and variations recorded.

7. Observations on enemies of insects.

8. Mimicry in insects.

9. Disease-bearing insects, flies, ticks, &c.

10. Mollusca, land shells: very little is known about these in British East Africa. Collections are also desired of the Mollusca of the fresh-water lakes and the Indian Ocean.

11. Fresh-water Medusae of Lake Victoria; do they have the hydroid or polyp form of propagation? This is an important point to investigate.

12. Observations on the formation and growth of the

coral reefs along the coast and collections of the corals and other invertebrate marine fauna.

Botany.

1. Complete list of species; this will take a long time to accomplish, and many new species still remain to be described.
2. Geographical distribution.
3. Seasonal changes of plants.
4. Exact localities in which species of special interest can be obtained.
5. Introduced plants.
6. Botany of economic products.
7. Classified reference collection.

Geology.

1. Information on structural geology of country.
2. Reference collections of rock and mineral specimens.
3. Research into the palaeontology of the country, with special attention to the recent fossil mammals, ancestors of elephant and horse, fossil mollusca.
4. Economic geology of the Protectorate.
5. Evidences of palaeolithic man.

Anthropology and Ethnology.

Researches should be divided into different heads.

1. Physical characteristics: this includes measurements of the live subjects and collections of crania.
2. Physiological characteristics: this includes observations on the senses, physical powers, psychology, heredity, and may also be well extended to diseases, medicine, surgery, deformities, &c.
3. Material life such as clothing, ornamentations, dwellings, industries, art, food.
4. Social life, which includes birth, marriage and death customs, initiatory customs, war, hunting, crimes, morals, laws, government, trade, cultivation, &c.
5. Religion, mythology and magic, also totemism, covenants, oaths, ordeals.
6. Representative collections of the implements, arms and

ornaments of the various tribes in the country would prove of the widest interest, and this is a matter of urgency, as many objects are disappearing.

A list of books is here appended for the information of members taking up various branches of study.

Author.	Title of Book.	Price.	Publisher.
	ZOOLOGY.		
	GENERAL.		
	Royal Natural History. 6 vols.	£2 14*s.*	Warne.
	Cambridge Natural History. 10 vols.	17*s.* per vol.	
Shipley (A. E.) .	Zoology.	10*s.*	Cambridge Press.
Thomson (J. A.) .	Zoology.		
Headley. . .	Life and Evolution.		Duckworth.
	Concise Natural History.		Hutchinson.
Locke . . .	Variation, Heredity and Evolution.	7*s.* 6*d.*	Murray.
Thomson . .	Study of Animal Life.	5*s.*	
Kearton (R.) .	With Nature and a Camera.	7*s.* 6*d.*	
,,	Wild Life at Home—how to study and photograph.	6*s.*	
Davies (T.) . .	Preparation and Mounting of Microscopic Objects.	2*s.* 6*d.*	
Darwin (C.) .	Origin of Species.	2*s.* 6*d.*	
,,	Descent of Man.	2*s.* 6*d.*	
,,	Journal of a Naturalist during a Voyage round the World.	2*s.* 6*d.*	
Wallace (A. R.) .	Geographical Distribution of Animals. 2 vols.	42*s.*	
,,	Island Life.	7*s.* 6*d.*	
	MAMMALIA.		
Flower and Lydekker	Mammals, Living and Extinct.		Black.
Matchie . .	Book of Fauna of East Africa, in German.		
Thomas (O.) and Wroughton (R.C.)	Trans. Zool. Soc. London, Vol. XIX, Pt. IV. Ruwenzori Expedition Reports—Mammalia.		
	ORNITHOLOGY.		
	Cambridge Natural History, Vol. IX.	17*s.*	

Author.	Title of Book.	Price.	Publisher.
	ORNITHOLOGY—*cont.*		
Hudson & Beddard	Structure and Classification of Birds.	6*s.*	
Headley (F. W.) .	Structure and Flight of Birds.		
Finn (F.) . .	World's Birds.	5*s.*	
Dixon (C.) . .	Migration of Birds.	10*s.* 6*d.*	
Chapman (A.) .	Bird Life of the Borders.	14*s.*	
Shelley . . .	Birds of Africa.	£9 9*s.*	
Sharpe (R. B.) .	Wonders of the Bird World.	6*s.*	
Reichenow . .	Die Vögel Afrikas.		Reimer.
Ogilvie-Grant (W. R.) . .	Trans. Zool. Soc. London. Vol. XIX, Pt. IV. Ruwenzori Expedition Reports—Aves.		
,,	Game-Birds. 2 vols.	12*s.*	Allen.
	REPTILES AND AMPHIBIA.		
Gadow (H.) .	Cambridge Natural History. Vol. VIII.	17*s.*	
	Reptiles and Amphibia, edited by R. Lydekker	5*s.*	
Boulenger (G. A.)	Trans. Zool. Soc. London, Vol. XIX, Pt. III. Ruwenzori Expedition Reports—Reptilia and Amphibia.		
	FISHES.		
	Cambridge Natural History, Vol. VII.	17*s.*	
Lydekker (R.) .	Book of Fishes.	5*s.*	
Playfair and Günther	Fishes of Zanzibar. (Out of print.)		
Moore (J. E.) .	Tanganyika Problem.	£1 1*s.*	
Jordan (D. S.) .	Study of Fishes, Guide to. 2 vols.	50*s.*	
Boulenger (G. A.)	Trans. Zool. Soc. London, Vol. XIX, Pt. III. Ruwenzori Expedition Reports—Pisces.		
	CONCHOLOGY.		
	Cambridge Natural History, Vol. III.	17*s.*	
	ENTOMOLOGY.		
	Cambridge Natural History, Vols. V and VI.	17*s.* each	
Trimen . .	South African Butterflies. (Out of print.)	£3 3*s.*	
Theobald . .	Mosquitoes.		

Author.	Title of Book.	Price.	Publisher.
	ENTOMOLOGY—*cont.*		
Comstock . .	Manual for Study of Insects.	25*s.*	
Avebury, Lord .	Origin and Metamorphoses of Insects.	5*s.*	
"	Ants, Bees and Wasps.	5*s.*	
Kirby . . .	Entomology.		Swan Sonnenschein.
Poulton (E. B.) .	Colours of Animals and Insects.	5*s.*	
Miall, Professor .	Natural History of Aquatic Insects.	3*s.* 6*d.*	
Darwin . .	Fertilisation of Orchids by Insects.	2*s.* 6*d.*	
	CRUSTACEA AND MOLLUSCA.		
	Treatise on Zoology, edited by R. Lankester.		
Pilseneer (Dr. P.) .	Mollusca. Vol. V.	12*s.* 6*d.*	
Calman (W. T.) .	Crustacea. Vol. VII.	12*s.* 6*d.*	
	Mollusca: Cambridge Natural History. Vol. III.		
	Crustacea: Cambridge Natural History. Vol. IV.		
	BOTANY.		
Oliver . . .	The Flora of Tropical Africa, published under authority of Colonial Office.		Lowell Reeve & Co.
	Vol. I–III.	£1 each.	
	Vol. IV.	8*s.*	
	Vol. V.	25*s.* 6*d.*	
	Vol. VII.	27*s.* 6*d.*	
	Vol. VIII.	16*s.*	
Engler . .	Die Pflanzenwelt Ost-Afrikas.	about £3.	Reimer, Berlin.
	Treasury of Botany. 2 vols.	15*s.*	Longmans.
Green (Reynolds) .	Manual of Botany.		J. A. Churchill.
Percival (John) .	Agricultural Botany.	12*s.* 6*d.*	Duckworth & Co.
	The Classification of Flowering Plants. Vol. I.	10*s.* 6*d.*	Cambridge Press.
Strasburger (Prof.)	Text Book Practical Botany.	10*s.* 6*d.*	
Ward (Marshall) .	Grasses.	6*s.*	Cambridge Press.
Cooke (M. C.) .	Introduction to Study of Fungi Classification and Distribution.		
Gray . . .	Structural Botany.	10*s.* 6*d.*	
Hall (A. D.) .	The Soil.	5*s.*	

Author.	Title of Book.	Price.	Publisher.
	GEOLOGY.		
Geikie (A.) . .	Text Book of Geology.	30*s.*	Macmillan.
Zittel . . .	Text Book of Palaeontology. 2 vols.	35*s.*	
Marr (J. E.) .	Principles of Stratigraphical Geology.	6*s.*	
Harker (A.) .	Petrology for Students.	7*s.* 6*d.*	
Seward (A. C.) .	Fossil Plants. Vol. I.	12*s.*	
Woods (H.) .	Elementary Palaeontology Invertebrate.	6*s.*	
Woodward (A. S.) .	Outlines of Vertebrate Palaeontology.	14*s.*	
Russell (Prof. I. C.)	River Development.	6*s.*	J. Murray.
Bonney (Prof.) .	Volcanoes.	6*s.*	J. Murray.
Dutton (C. E.) .	Earthquakes.	6*s.*	J. Murray.
Dana . . .	Mineralogy.	18*s.*	J. Wiley.
	ANTHROPOLOGY.		
Tyler . . .	Primitive Culture.		
Westermarck .	Human Marriage.	14*s.*	
Haddon . .	Study of Man.	6*s.*	
,,	Evolution of Art.	4*s.* 6*d.*	
	Anthropological Essays presented to E. B. Tylor.	21*s.*	
Hollis . . .	Masai.	14*s.*	
,,	Nandi.	14*s.*	
Frazer . . .	Origin of the Kingship.	8*s.* 6*d.*	
,,	Adonis, Attis, and Osiris.	8*s.* 6*d.*	
Duckworth . .	Morphology and Anthropology.	10*s.*	Cambridge Press.

DISTRIBUTION OF PLANTS IN BRITISH EAST AFRICA

By E. Battiscombe.

In a country such as this where there are lands stretching away from the coast up to the line of perpetual snow, and all subject to the rays of the equatorial sun, the floral distribution must, of necessity, form a very interesting study.

In order to give a small idea of the wonderful variety of flowering plants to be met with in the Protectorate it may