The Thermal Energy of Radium Salts.

IT is well known that when ordinary chlorine gas is exposed to sunlight its temperature rises above that of the surrounding medium. The rise of temperature is proportional to the intensity of the light. A certain maximum temperature is finally attained at which the rate of cooling is proportional to the rate of conversion of actinic into thermal energy. If the light stimulus be removed, the temperature of the chlorine takes about half an hour to return to that of its surroundings.

I have just read the interesting paper by MM. P. Curie and A. Laborde in the *Electrician* for April 3 (my only source of information at present), and it is reasonable to suppose that the increased temperature of radium salts there recorded might be traced to the same source. The effect with radium salts would be more persistent than with chlorine gas. But this matter can only be decided experimentally by those possessing specimens of the salts of this remarkable compound. J. W. MELLOR.

London Villa, Newcastle, Staffs, April 9.

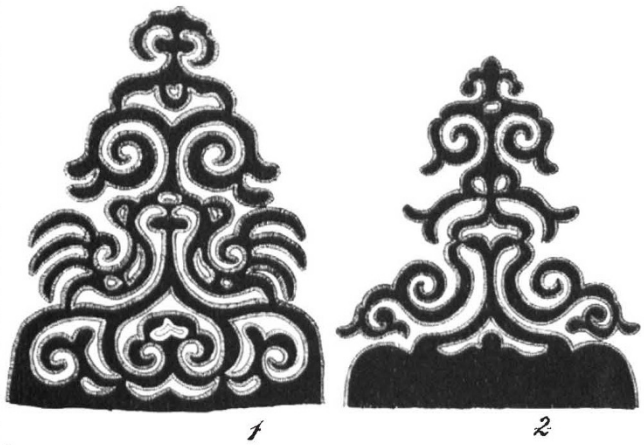
EAST SIBERIAN DECORATIVE ART.[1]

ALTHOUGH of late years the investigation of the decorative art of primitive peoples has received considerable attention, yet the interest taken in the subject is not so great as its importance merits. There are two methods of study, (1) the collation of specimens which happen to be in museums, with armchair deductions from the material examined; and (2) investigations in the field. When we recall the errors into which the former method has landed students, we must endorse the following remarks made by Mr. Laufer:—"I must confess," he says, "I adhere to the principle that ornaments should not be regarded as enigmas which can be easily puzzled out by the homely fireside. Neither are ornaments of primitive tribes like inscriptions, that may be deciphered; they are rather productions of their art, which can receive proper explanation only from the lips of their creators." Mr. Laufer speaks from experience, as he spent two years among the various tribes of Saghalin Island and the Amur region, and one result of his painstaking investigations is an exhaustive memoir on the decorative art of the Amur Tribes, which has recently been published in the *Memoirs* of the American Museum of Natural History. The researches were undertaken under the auspices of the Jesup North Pacific Expedition, and they have been published with that wealth of excellent illustration to which our American colleagues have accustomed us.

Among the Amur tribes plastic art is practically unrepresented, except among the Gilyak, but they excel in the decoration of surfaces. The Gold are well versed in all branches of this latter art, especially in embroidery, while the Tungusian tribes of the Amgun and Ussuri Rivers are unsurpassed in cutting ornaments for decorating birch-bark baskets. The farther to the east the more destitute is the art, but it attains its climax where it is in direct contact with Chinese influence. It is extremely probable that the decorative art of these Tungusian tribes was primitively very poor in quality, but from very early times they adopted Chinese devices and, very likely, further developed them independently. It is, however, surprising that exactly corresponding devices have never been found in China, nor adequate explanations obtained for related ones, the explanation being that traditions regarding the meaning of certain patterns are fuller, and have been better preserved in the minds of the unlettered tribes than in the fleeting memory of a writing nation; but, after all, we know very little about the significance of Chinese decorative art. On the whole, we may regard the decorative art of the Amur tribes as an independent branch of East Asiatic art which sprang from the Sino-Japanese cultural centre.

The materials used by the Amur tribes for decorative purposes are wood, birch-bark, fish-skin, elk and reindeer skin, cotton and silk. The general style of the decorative art can be gathered from the accompanying illustrations. The Gilyak used to carve spoons for domestic use; these are now replaced by spoons of Russian make, but carved spoons are still employed for the bear-festival, the decoration of which has special reference to the festival; all are provided with an interlaced band ornament, which represents the ropes with which the living bear is bound.

There are many patterns and devices which appear to be simple or grouped spirals, sometimes associated with bands and circles, but in the vast majority of the designs Mr. Laufer has demonstrated that the cock and the fish play a very important part; the former is more frequently reproduced than all other animals together. The cock is not indigenous, but was first introduced by the Chinese, nor does it enter into the mythology of the natives as it does with the Chinese.



FIGS. 1 and 2.—Embroidered designs for trimming the pocket of a shirt.

In China, the cock is a symbol of the sun, because it announces the rising of the sun; besides the earthly cocks there is a heavenly cock, which sings at sunrise perched on a willow tree, which also symbolises the sun; further, it belongs to the class of animals that protect man from the evil influence of demons.

In Fig. 1, two combatant cocks are grouped about a central axis; in Fig. 2, the cocks are highly conventionalised, their tails being in the form of an ornamental double fish-tail. The bifurcated arms projecting on either side above the cocks are meant for fishes, which are essentially characterised by the form of the tail. In the large triangle to the left in Fig. 3 we have two musk deer, which is the animal most frequently represented after the cock and fish, but their bodies are implicated in cock and fish motives. The other large triangle should be looked at upside down; there is an oval object between the two cocks' beaks in the centre; above the beaks are the cocks' combs, and below are two easily recognised fishes. The smaller triangles contain a medley of bird and fish-motives. In Fig. 4 a fish is represented at *a*, above its head is a beak-like figure *c*, and two curves *b*, which are probably the tail feathers of a cock; *d* is a spirally-

[1] "The Decorative Art of the Amur Tribes." By Berthold Laufer. The Jesup North Pacific Expedition: *Memoirs* of the American Museum of Natural History. Vol. vii. (Anthropology, vol. vi.) Pp. 86, 33 plates containing 230 figures, and 24 figures in the text. (New York, 1902.)

formed fish which passes into a beak at *e*; but this fish forms the body of a cock (there is also a fish in the body of each cock in Fig. 1); *f* is its beak with an oval in front of it, behind it is an eye which touches the crest, or cockscomb, which itself terminates in a fish's tail *g*. Between this and the corresponding figure are two degenerate cocks rampant, their feet are united, the long falciform beaks directed upward and the tails downward, the latter being connected by a pair of small ellipsoids. Decorated fish-skin garments, worn only by women, illustrate nearly all the forms of cock and fish ornaments, and numerous hybrids besides. The body of a cock is often shaped like a fish, and frequently has another fish enclosed within it; there are also numerous, rather complicated, ornamental arrangements, which are built up of spirals, trigrams, leaves, conventionalised fishes, and elements of the cock ornaments. Those who take the trouble to study Mr. Laufer's memoir with the care it deserves will satisfy themselves that the figures will bear these interpretations, which, after all, it must be remembered, are the explanations that the natives gave to him.

According to our author, no other explanation of the predominance of the cock and fish in the decorative art of the Amur tribes can be found than that these

FIGS. 3 and 4.—Decoration in red and light green on the rim of the cover of a lacquered tobacco box.

particular animals have an extremely ornamental character because of the great permutations of their graceful motions, and they thus lend themselves admirably to the spirit which strives after beauty of form. There is no chronological sequence in the stages of development; the single phases of development are merely various forms of different kinds of adaptation to certain spaces or to given geometrical forms, mostly spiral. The spiral, in his opinion, is not the final result of the gradual conventionalisation of realistic images, but is employed for the symbolic expression of the most varied things, since its forms are so convenient for this particular purpose. The same applies to the triskele; an entire cock is never represented by a purely geometrical triskele; the triskele plays an active *rôle* in indicating single parts of the body, but not for the whole creature. As an independent element, having a definite meaning, the triskele never occurs.

Mr. Laufer insists it should not be imagined that the representations of animal life continued to lose more and more of their original forms, and gradually shrunk into geometrical devices. On the contrary, the multifarious kinds of conventionalisation have their final cause, last but not least, in a faithful observation of nature, especially in that ability to watch motions which is so highly developed in the East Asiatic mind. The conception of a fish in the form of a spiral is based, he contends, on a true observation of that animal in its natural state; it would never have been drawn in spiral form, never have clung to a spiral, without a foundation of fact. This very capacity of the fish for motion, together with the highly cultivated power of the people to observe its motions, formed the reason for its adoption in ornamentation. The same remark holds good for the cock. It is doubtful whether this view of the author's will appeal to all of his readers; the idea that the bulk of the ornamentation of a group of people is based mainly upon conceptions of motion is certainly new. Whatever diversity of opinion there may be on minor points, there can be none as to the value and excellence of Mr. Laufer's work. It is no exaggeration to say that this is the most minute and thorough study we possess of the decorative art of an uncivilised people.

ALFRED C. HADDON.

FLORA OF THE GALAPAGOS ISLANDS.[1]

IT is now more than half a century since Sir Joseph Hooker published his famous essay on the flora of this archipelago, founded mainly on the collections made by Charles Darwin. Since then, until within the last decade, little had been done towards a more complete investigation of this highly interesting flora and fauna. It is to various American expeditions that we are indebted for a more complete knowledge. The late Dr. G. Baur was foremost in this work, and his collections and theories were briefly discussed in NATURE (lii., 1895, p. 623). Baur boldly promulgated the theory of subsidence, in opposition to upheaval, in accounting for the origin of the islands, basing it upon biological evidence. Dr. Robinson, the author of the essay under consideration, and Mr. J. M. Greenman, his collaborator, in working out Baur's botanical collections were almost converted to Baur's theory. In the present work Dr. Robinson practically recants, and attempts to demonstrate that the composition of the flora favours the assumption that it is derived rather than original. I will first give some particulars of the general composition of the flora, limiting them, however, to the vascular plants.

Unfortunately for purposes of comparison, Robinson's enumeration and tabulation of the plants include all that were found growing in the islands, amongst them *Brassica campestris, B. Sinapistrum, Raphanus*

[1] "Flora of the Galapagos Islands." By B. L. Robinson. *Proceedings* of the American Academy of Arts and Sciences, xxxviii. (1902). Pp. 77-270 with three plates.