

own slaves, and have owned them since the memory of man runneth not to the contrary. The original stock of slaves generally consisted of children captured in warfare, whose posterity remain in a condition of bondage. Slaves have been sold by these more northern tribes to the Indians of Puget Sound; and the power over such chattels has been so complete that they have been killed out of compliment to or regard for a dying master, and the women have been leased out for even worse purposes. When a chief dies, it is supposed he will need servants in the felicitous fishing-fields, and that the best way to secure them is to take them with him.

"The records of the Hudson Bay Company at Post Simpson show that in 1842, on one occasion, the agent visited a dying man of some note, and entered the place where he lay just in time to find him engaged in an attempt to strangle his nephew. The agent rescued the boy, and took him into the post, where he was kept till after the departure of the spirit of his kingly uncle. Then the mother of the lad demanded compensation of the company for the annoyance and inconvenience to which her departed brother would be put in the other world by reason of not having the attendance of the spirit of her son, murdered, upon his ghostly majesty. The company paid for that interference in a strictly family affair."

The writer also witnessed a cremation, which he describes as follows: "We were hardly at anchor yesterday [at Sitka] before we were informed that a body was to be cremated. The funeral pyre consisted of a crib of dried logs, about six inches in diameter and six feet in length, arranged four on the ground and three upon each side, supported by green stakes.

"The arrangements were very simple. The body of a woman who had died three days previous was hoisted out of the smoke-hole in the centre of the house. Dead bodies are never permitted to go out through the doorway among these Indians. The body was wrapped in a common bark mat, such as these Indians make, and laid in the crib, the top and ends being closed with logs laid crosswise. The fire was then started; and the mourners, who consisted of female relatives, sat around upon the ground to the windward, and slightly to the right of the burning pile. Their hair had been cut short, their faces were all blackened, and, as the tears from their weeping eyes cut channels through the lamp-black, the effect was rather ludicrous, if grief can be ludicrous under any circumstances. The women, who numbered fifteen or twenty, sobbed, sniffled, and whined with every evidence of genuine grief. This is mentioned because it is the custom here for Indians to hire professional mourners who officiate at the 'wake,'—an important affair among the natives.

"To the left of the women, a number of male relatives of the deceased put in the time chanting continually, and keeping time with staffs about five feet long, which they raised and dropped upon pieces of board so as to produce a rapping noise. The men stood erect all this time, and were led by an old man who held a crow-frog totem in one hand, which, being shaken, produced a rattling noise, owing to pebbles being within the hollow instrument.

"The ceremony continued for about three hours and a half, when the remains were consumed, with the exception of some of the larger leg and arm bones and a portion of the skull. As soon as the residuum was cool enough to be taken up, the mass, along with some wood-ashes, was placed in a box, which was deposited in a small sort of hencoop on stakes, scores of which dot the hill behind the village. After the cremation, the tired Indians turned in and slept during the afternoon, and at night had their customary dance in honor of the successful issue of the enterprise."

**DEFORMATION OF HEADS IN BRITISH COLUMBIA.**—It is well known that many tribes of the north-west coast of America are in the habit of deforming the heads of their children. It is an interesting fact that the "fashion" of deformation is distinct in various localities. Thus it becomes possible to distinguish natives from different parts of the country readily by the artificially acquired shape of their heads. In British Columbia three methods of head-deformation are in use. The tribes inhabiting the north point of Vancouver Island compress their heads, particularly those of female children, by means of bandages, the head thus acquiring an extremely long, almost conical shape, the vertex being pushed far back. Farther south the head is compressed between cushions of

cedar-bark. The remarkable form resulting from this procedure is shown in Fig. 1. The marked depression behind the coronal suture indicates the place where a bandage passes over the head. In many instances the heads of adults, by this procedure, attain an enormous width, being wider than they are long. The third shape of head results from the application of a strong pressure on the forehead and occiput, which are compressed between boards. Fig. 2 shows the head of a male adult. It will be seen that the forehead and occiput are perfectly flat. The second method fre-

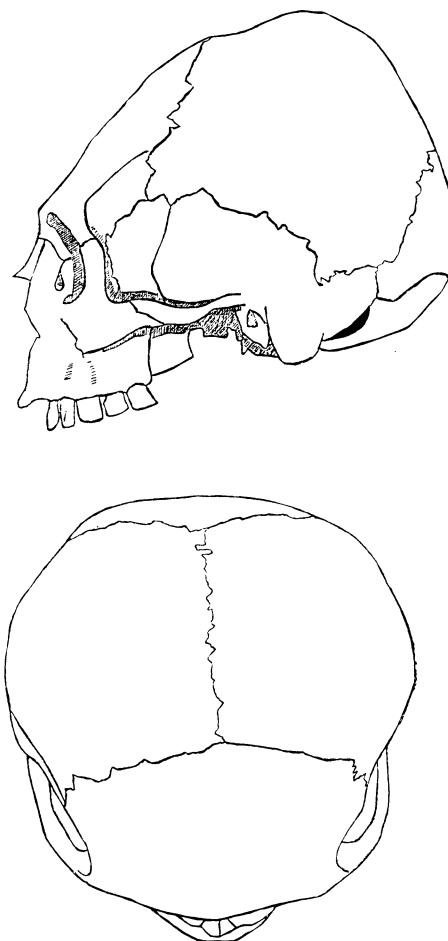


FIG. 2.—ORTHOGONAL VIEWS OF SKULL OF AN ADULT MALE, COWICHAN, B.C.

quently results in extremely asymmetric forms, the parietal bones bulging out very strongly. It is a noteworthy fact that in the majority of cases the left side of the head is more prominent than the right side. Presumably this is due to the fact that the child mostly lies on his right side when in the cradle. In Fig. 1, a well-developed Wormian bone is seen. These are of frequent occurrence in the deformed crania, while the true *Os Inca* is observed not rarely. Anomalies of persistence or premature synostosis of suture are characteristic of these crania. The frontal suture is often persistent, while in a few instances the sagittal suture was found closed at an early age.

#### ELECTRICAL NEWS.

##### A New Alternating-Current Electro-Motor.

PROBABLY the two things most needed in the field of electrical engineering are a good storage-battery and a successful alternating-current electro-motor. A year ago, Mr. Tesla described an alternating-current motor before the Institute of Electrical Engineers,—a motor which it was promised would overcome all the defects and

difficulties which had seemed inherent to that type of apparatus. The Tesla motor is now controlled by the Westinghouse Electric Company, and that powerful organization has been exerting all of its energies to make the machine a success, but apparently to no great effect.

There comes from Europe, however, the account of a new motor, which, if we are to believe the figures given, accomplishes all that the Tesla motor promised; and while the latter required a special distributing system, using at least three wires to bring current to the motor, the new machine can be used in connection with the ordinary alternating system employed for incandescent lighting, and only two wires are necessary for the connections.

Messrs. Ganz & Co. of Buda-Pesth have been engaged for four years in experiments on various forms and types of alternating-current motors. Their most recent production gives results such that they feel confident that the performance of continuous-current motors will be attained. The machine in question gave, at 730 revolutions, 30.7 horse-power, or 22,700 watts of work, while the apparent energy consumed was 29,800 watts, and the real energy 27,700 watts, thus giving an efficiency of 80.9 per cent. The ratio between the real and apparent energy consumed was .92, or nearly unity, and this is a very important point. Ordinarily the ratio is less than one-half, the difference of phase between the current and electro-motive force being considerable; so that a great deal of current flows through the motor, which does little more than heat it, the machine running first as a motor, then as a dynamo, the difference between the work done on and by it being small, while the current might have a considerable value. The figures given above were obtained from a model, which was not constructed to give the greatest possible efficiency or output, but which was designed for purposes of study. When properly made machines are turned out, the efficiency should not be less, according to the designers, than 90 per cent.

It is a pity that no description of the machine, nor more accurate experimental data, is available. One can hardly see why such very meagre results should be sent out by the makers. If any thing is given, it should be enough to enable people to judge for themselves the merits of the invention; but the firm of Ganz & Co. is one of great respectability, and there seems to be now some hope that a successful alternating-current motor has been discovered.

RELATION BETWEEN DENSITY OF ACID AND CAPACITY IN SECONDARY BATTERIES. — M. Heim, at the Electro-technical Institute at Hanover, has experimented on the capacity of storage-cells with different strengths of acid. Two types of cells were used, — the Tudor and the Julien. These had a normal capacity of about 50 ampere hours; and, for a first experiment, acid of a strength of from 15 to 20 per cent was used, and the cells were charged and discharged three times, there being an interval of a day allowed between the charge and discharge. The next step was to fill the cells with acid of a strength of, say, 9 or 10 per cent, and again determine the capacity, there being always a number of discharges for each strength of acid, the discharge always lasting until the electro-motive force had fallen 10 per cent from its original value. The results obtained are, that the capacity increases rapidly with an increase of from 10 to 14 per cent in the strength of the acid; that it reaches a maximum at a strength of 16 per cent; then decreases slowly at first, and afterwards rapidly, as the density of the solution increases. M. Heim also made experiments to find out the strength of solution at which the support-plate begins to be attacked. He found that strengths even as low as 20 to 25 per cent were too concentrated, and, as the result of his work, recommends a density of 16 per cent (1.108). This is not so high as that ordinarily employed, the usual density varying from 1.150 to 1.200.

A NEW ARC-LAMP. — A new type of arc-lamp has been introduced into England from France by the Planet Electrical Engineering Company. The upper carbon is fed by means of an electric motor which drives a worm and a train of gearing. The field-magnets of the motor are in series with the arc, the armature being connected as a shunt to the field-magnets. The difference of potential at the two brushes of the motor is two volts. When the lamp is burning steadily, the motor is at rest; but, when the resistance of the arc increases, a solenoid core pulls down a lever,

making contact to the armature, which immediately commences to revolve. Should the arc be made too short, the solenoid reverses the connections, and the armature revolves in the opposite direction. The advantage of the arrangement is, that there is plenty of power to overcome the friction of the slide, and that, with the exception of the solenoid, there are no fine adjustments.

QUARTZ AS AN INSULATOR. — At a recent meeting of the London Physical Society, Mr. C. V. Boys read a paper on the above subject, which is not without some practical interest. It will be remembered that Mr. Boys some time ago succeeded in obtaining extremely fine and strong fibres of quartz by shooting an arrow to which was attached a piece of quartz softened by heat. These fibres may be used instead of silk for delicate suspensions in electrical instruments. In making these fibres, Mr. Boys observed that if they were very fine, and broke between the bow and the target, the extremities assumed the form of a screw about half an inch in diameter and eight or ten inches long. If any body were brought near this screw, the end of it would shoot out toward it, retreating again when the body was removed. It hardly seemed possible to account for this in any other manner than by supposing the fibre to be electrified. If this were the case, it would show that quartz was an exceptionally good insulator, since ordinarily the exceedingly minute charge on the extremely slender fibre would be dissipated almost as soon as it was formed. Carrying his experiments further, Mr. Boys found, that while, even under any circumstances, quartz is a better insulator than glass, under ordinary atmospheric conditions there is no comparison between them. To show these insulating properties, a gold-leaf electroscope was made, the leaves being suspended by a quartz hook. In order to make the conditions as unfavorable as possible, a dish of water was placed in the case. After five hours, the deflection of the charged leaves had only decreased about a quarter. If glass had been substituted for the quartz, the leaves would have been completely discharged in considerably less than a minute. As quartz can be easily softened, and can be readily worked when soft, it should be of great value for electrostatic instruments, where there is always great trouble from leakage. Mr. Boys stated that even when quartz was dipped in ammonia, or boiled in potash, it only required washing to completely restore its insulating properties, and, even when it is raised to a red heat, these properties are recovered on cooling. Some quartz which was kept in fused potash for a considerable time lost its insulating properties to some extent; but, even after this treatment, it was better than glass.

#### HEALTH MATTERS.

VENTILATION. — The *Sanitary News* gives the following advice in reference to the admission of air to rooms: "Air should be introduced and removed at those parts of the room where it would not cause a sensible draught. Air flowing against the body at, or even somewhat above, the temperature of the air of the room, will cause an inconvenient draught, from the fact, that, as it removes the moisture of the body, it causes evaporation or a sensation of cold. Air should never, as a rule, be introduced at or close to the floor-level. The opening would be liable to be fouled with sweepings and dirt. The air, unless very much above the temperature of the air of the room, would produce a sensation of cold to the feet. It may be regarded as an axiom in ventilating and warming, that the feet should be kept warm and the head cool. The orifices at which air is admitted should be above the level of the heads of the persons occupying the room. The current of inflowing air should be directed toward the ceiling, and should either be as much subdivided as possible by means of numerous orifices, or be admitted through conical openings with the smaller opening toward the outer air and the larger openings toward the room, by which means the air of the entering current is very rapidly dispersed. Air admitted near the ceiling very soon ceases to exist as a distinct current, and will be found at a very short distance from the inlet to have mingled with the general mass of the air, and to have attained the temperature of the room, partly owing to the longer mass of air in the room with which the inflowing current mingles, partly to the action of gravity in cases where the inflowing air is colder than the air in the room."