III. — Work, Disposition.

1. When is mental labor easiest to you? "In the forenoon," 182; "late in the afternoon," 6; "at evening and night," 133; "forenoon and evening," 43; "no difference," 28.

2. What is the nature of the work? The object was to ascertain whether the kind of work limited the time of doing it, but the question was not successfully formulated.

3. Do you suffer with nervous disorders (headache, uneasiness, moodiness)? A decided "no" was given only 18 times; "seldom," 196; and "yes," 210.

4. Is your temperament sanguine, choleric, phlegmatic, or melancholic? "Sanguine," 132; "choleric," 70; "phlegmatic," 74; "melancholic," 20; various combinations, 102.

The results for the two sexes were so different that they demanded separation, while the students formed a homogeneous class interesting as a special study. The first problem that was proposed was the relation between the frequency and the vividness of dreams. It appears that 62.5 per cent of those who dream every night dream vividly, 60.5 per cent of those who dream frequently, and only 26.8 per cent of those who dream seldom, showing that the vividness of dreams increases very markedly with their frequency.

Next, how is the intensity of sleep related to the frequency of dreams? Of the students who dream nightly, 68 per cent have a light sleep (and only 28 per cent a deep sleep); of those dreaming frequently, 40 per cent; of those dreaming seldom, 32.8 per cent. Similar percentages for the other males are 68.8, 42.1, and 39.3; and for women, 72.4, 60, and 50 per cent. We conclude, then, that frequent dreams are a concomitant of light sleep, though the relation is far from universal.

These are the questions that formed the starting-point of the investigation. The rest of the information is grouped together in one large table and an admirably arranged diagram, from which more conclusions can be drawn than can find mention in this *résumé*. Those that the author singles out may be noted.

As regards sex, women have 73 per cent of their number dreaming nightly or frequently, while students have only 50 per cent, and the other males 48 per cent. Again: 63 per cent of the women sleep lightly, and only 42 per cent of students, and 44 per cent of other males. We conclude, then, that women have a very much lighter sleep than men, and that their dreams are proportionately more frequent.

Another conclusion, the evidence of which is too detailed to present, is, that as we grow older, our dreams become less frequent, but our sleep becomes lighter; age affecting the intensity of sleep more than the frequency of dreams. The author regards the students as in the period of maximum dreaming (twenty to twenty-five years of age). The deep sleep of childhood (hostile to frequency of dreams) is then least counterbalanced by the lessening of dreams due to age. The vividness of dreams shows a similar relation to age and sex: the women dream most vividly; the students, being younger than the other men, have more vivid dreams. The power of remembering dreams is also dependent upon vividness and frequency of dreaming: it is accordingly greatest in women, and greater in students than in more mature men. The liveliness of the emotional nature, a prominent feature of women and youth, seems thus to be marked out as the causative agent in the production of dreams.

The duration of sleep should naturally be related to the habit of dreaming, but in the men no such relation can be discovered. In the women, however, it appears that those who dream frequently sleep nearly an hour longer than those who seldom dream. This difference is regarded as due to the fact that men are more under duty to break short their sleep, and thus vitiate the statistics. This is corroborated by the frequency with which the men who dream frequently declare themselves tired in the morning, indicating incomplete sleep. The need of sleep is greater in women than in men; the duration of sleep being longer, and the percentage of "tired morning and evening" and of "not tired" being 3 to 2 and 2 to 3 respectively as compared with the men. Students sleep longer, and are less tired, than other men.

The time needed to fall asleep is about the same in all three classes, — 20.8 minutes for the men, 17.1 minutes for students, and 21.2 minutes for women. In each case, however, it takes longer for those who are frequent dreamers and light sleepers to fall asleep than persons of opposite characteristics. Eighty per cent of students sleep uninterruptedly through the night, 70 per cent of other men, and only 43 per cent of women. Light sleep and frequent dreams increase the interruptedness of sleep.

The power of falling asleep at will is possessed by few. It is greater in youth than in age. Twenty-eight per cent of men, 19 per cent of students, and 20 per cent of women sleep in the afternoon, indicating a making-up of insufficient sleep on the part of the men.

The effect of dream-habits upon mental work is also evident. Those who dream seldom, or sleep deeply, are better disposed for work in the forenoon than light sleepers and frequent dreamers. The forenoon seems in general to be the preferred time of work.

The statistics regarding nervousness confirm the accepted fact that this is greater among women than men. It is greater among students than among men at large. It is, too, a concomitant of light sleep and frequent dreams. As to temperament, the phlegmatic people are quite constantly deep sleepers and infrequent dreamers.

Finally, a contrast between teachers and professors of the same average age shows the effect of occupation. The teacher, with his daily toil, has a lighter sleep and more frequent dreams; while the professor, leading a comparatively congenial and worriless life, is a deeper sleeper and a less frequent dreamer. This, perhaps, is related to the lack of visualizing power that Mr. Galton found to be current among men of science.

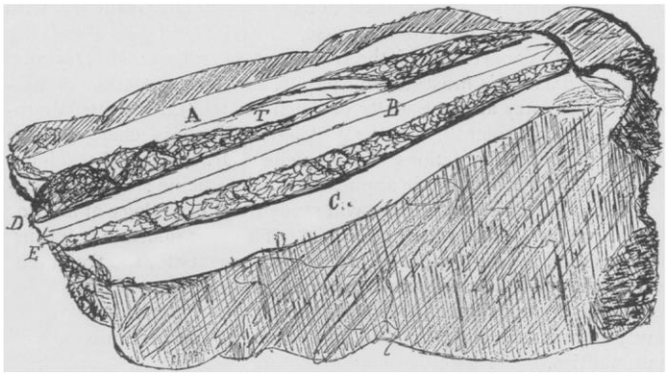
The relation between depth of sleep and frequency of dreams seems explicable on the supposition that the insensitiveness to outside excitations present in deep sleep, also induces insensitiveness to internal impressions. The threshold of mental life is raised. If the normal psychical activity is great, then, even in a deep sleeper, will the dreams be frequent, thus accounting for the exceptions.

In addition to the interesting results that this study has brought out, it increases one's sense of the utility of such inquiries, and shows the truth of Galton's experience, indorsed by the author, that "it is a much easier matter than I had anticipated to obtain trustworthy replies to psychological questions."

ETHNOLOGY.

Jade in Alaska.

LIEUT. G. T. Emmons, who is continuing his interesting researches in Alaska, recently made an interesting find at Sitka. He writes: "A bowlder of jade was dug up on the site of the present Indian village, at a depth of some three feet in loose black soil. Two pieces have been cut from it for knives or adzes, each about



20 centimetres long, from 3 to 4 centimetres wide, and from 1 to 1.5 centimetres in thickness. The three faces on which the bowlder has been cut are highly polished, and show a mottled green surface, ranging in color from a yellow green to a rich dark green. After the pieces were cut down on either side, they were broken from the body of the bowlder by a shock, probably by means of a wedge. On another side, where a wedge-shaped adze could be re-

moved with the least work, a cut has been commenced, forming a somewhat irregular groove, following to some extent the irregular surface of the bowlder. It is 12 centimetres long, and 0.2 of a centimetre deep. From inspection, I should say it had been worked by means of a stone knife or the edge of some silicious rock not having a cutting edge of more than 2 or 3 centimetres at the greatest. The whole bowlder is wedge-shaped, and 29 centimetres in length. Its weight is a few ounces less than 20 pounds. The four faces are of olive green, the more prominent rounded surfaces being veined with a rich dark green. In my collection in the American Museum of Natural History there is a small nugget about the size of a hen's egg, with a groove in it; a dark green jade; and I have also in my possession a piece of unworked jade of a rich sea-green, which I found an Indian wearing as a scratcher. It has well-rounded edges and well-polished surfaces, proving long wear. Among forty-three pieces I have collected among the Tlingit, these are the only ones that show that jade has been worked on the spot. Jade has been used for implements, generally for adzes, axes, or fighting-picks, the last mounted in wooden handles."

The finding of this bowlder of jade showing worked surfaces is important, as it proves that the material was found and worked in southern Alaska. It will be remembered that Dr. G. M. Dawson found a bowlder of the same description on the lower Fraser River, and that Jacobsen and Dawson found bowlders of this material, although the rock has not been found *in situ*. Lieut. Emmons adds that he is very hopeful of finding the exact locality from which the Alaskan jade is obtained, as he received trustworthy information referring to this interesting question from the natives.

NAVAJO INDUSTRIES. — While in former years the "Proceedings of the United States National Museum" contained almost exclusively essays on zoölogical, botanical, and geological subjects, in the new volume, which is being issued in signatures, much attention is paid to ethnological points. To Professor Otis T. Mason's energetic endeavors we owe some interesting notes on the methods of manufacture among the Navajo, for Dr. Shufeldt's remarks on the method of preparing deer-skins by this people was written at his instance. The most interesting portion of this essay is the description of the process of tanning, which is done by means of a decoction of brains applied to the outer side of the skin after the hair has been removed. It is said that by this process the skin attains its softness and pliability. Mr. A. M. Stephen contributes some notes on the art of shoemaking and a myth explaining certain customs connected with this art. He tells that in olden times the Navajo used to wear grass shoes, until a deity came and taught them the art of making leather shoes. As this deity's face is gray, the Navajo must avoid looking at any thing gray, — for instance, the fresh-cut edges of a skin, — and therefore the latter must always be painted red, yellow, blue, or black.

BOOK-REVIEWS.

Elements of Machine Design. By J. F. KLEIN. Bethlehem, Penn., The Comenius Press. 8°. $6.

Gear Tables for laying out Accurate Tooth Profiles. By J. F. KLEIN. Bethlehem, Penn., The Comenius Press.

IN this work, Professor Klein, who is professor of mechanical engineering at Lehigh University, treats of the most important of the machine parts that appear in practice, giving their proportions and the main considerations governing their use and construction. The work is not, nor does it claim to be, a complete treatise upon the subject of machine design, but it is a series of notes and plates specially arranged for students of machinery desiring practice in designing the commonly occurring machine forms, and is well adapted, in extent and character, to the requirements of technical schools. It contains much that is new, including a diagram and tables for determining the diameter of stepped-cone pulleys, extensive tables of co-ordinates for laying out toothed profiles, a determination of the cross-sections of connecting-rods, and a method of finding belt-widths from their specific duty.

Pains have evidently been taken to make the work convenient for reference. The symbols used in the formulas are placed in alphabetical order at the beginning of each chapter, which consists of a plate with its accompanying notes; the formulas are numbered; and the index is very full, being divided into four columns, referring respectively to pages, formulas, figures, and tables. To insure durability, the plates and gear tables are printed on strong bond-paper.

The first five chapters of the book are devoted to fastenings, including bolts and nuts, rivets and riveted joints, keys, and gibs and cotters. Seven chapters treat of gearing, toothed and belt. Of the remaining chapters, one each is devoted to rotating pieces, bearings, connecting-rods, and gear tables.

That portion of the book devoted to gear tables has been issued in separate form, for the use of pattern-makers, machinists, draughtsmen, and students of engineering. The tables are printed on both sides of one large card, 17 by 20 inches, so as to get them into compact form for use in the shop, draughting-room, or college. The use of the tables is made clear by examples worked out in detail, and illustrated by suitably drawn figures.

The Secret Doctrine: The Synthesis of Science, Religion, and Philosophy. 2 vols. By H. P. BLAVATSKY. New York, William Q. Judge. 8°.

THE connection between this work and science can only be shown on the Hegelian principle of the identity of contradictories; for it has not a single characteristic of a scientific treatise. It is a pure fiction from beginning to end, — a work of imagination, pretending to give an account of the creation and evolution of the world, but without even an attempt at proof. The nucleus of the book consists of some passages alleged to be taken from the "Secret Book of Dzyan," which, the authoress tells us, "is utterly unknown to our philologists, or, at any rate, was never heard of by them under its present name." And in her preface she says, "The writer, therefore, is fully prepared to take all the responsibility for what is contained in this work, and even to face the charge of having invented the whole of it." The passages from the "Book of Dzyan" are followed by an elaborate commentary; and that they need it will be evident from the following extracts, which relate to the beginning of creation: "The eternal parent wrapped in her ever invisible robes had slumbered once again for seven eternities. . . . But where was the Dangma when the Alaya of the universe was in Paramartha, and the great wheel was Anupadaka? . . . The root remains, the light remains, the curds remain; but still Oeaohoo is one;" and so on for many pages.

When we inquire more closely into Mrs. Blavatsky's doctrine, we find it at bottom pantheistic. She holds to the existence of "an omnipresent, eternal, boundless, and immutable Principle, on which all speculation is impossible, since it transcends the power of human conception." Sometimes, however, she speaks as if this first Principle was the same as Space, which she calls "the seven-skinned eternal Mother-Father." To trace the evolution of the universe and of man from this first Principle is the object of this work, and is pursued through over fourteen hundred octavo pages, with more to come. We cannot undertake to give even the shortest abstract of the work, which reads like the Hindu and Babylonian cosmologies; but those who wish to see what antics the human imagination is capable of may profitably consult these volumes. There is one item, however, to which we must call attention. It seems that this occult and incomprehensible doctrine is connected with the Keely motor. We are told that there is in the universe a mysterious force capable of reducing a whole army to atoms in a few seconds; and "this great *archæus* is now discovered by, and only for, one man, — Mr. J. W. Keely of Philadelphia." It appears, however, that Keely is not destined to succeed with his discovery, because it "would lead to a knowledge of one of the most occult secrets, — a secret which can never be allowed to fall into the hands of the masses." We are also informed that "the secret teachings with regard to the evolution of the universal Kosmos cannot be given, since they could not be undertsood by the highest minds in this age;" so that we shall have to content ourselves with what Mrs. Blavatsky may reveal to us. The extracts we have here given, which might have been multiplied indefinitely, will give our readers a general idea of her work, and will show that whatever may be the value of her "science, religion, and