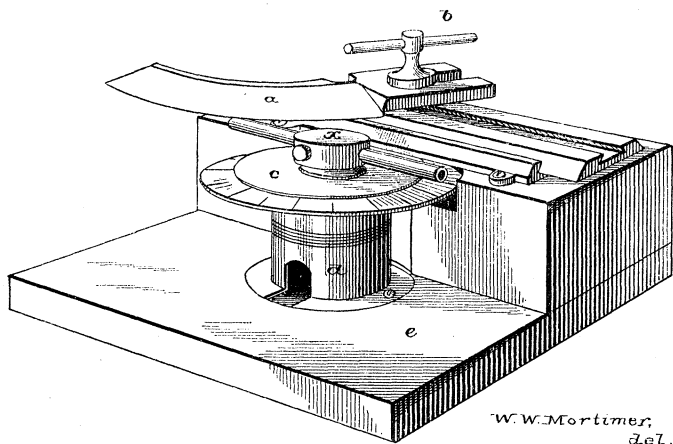


Dr. Thomas Taylor's New Improved Freezing-Microtome, adapted to Three Methods of Section-Cutting.

Dr. Thomas Taylor of the Agricultural Department, who several years ago invented a microtome, which was described and illustrated in *Science*, gave the first public exhibition of a new microtome at the last meeting of the Microscopical Society of Washington. The following diagram and description will show the advantages claimed for it. It may also be added that it is simpler, and can be manufactured at much less cost, than the microtomes now generally in use; and, as those persons employed by the government are not allowed to patent inventions made in the line of the work they are engaged in, any microscopist in the country may make and use the instrument here described.



a, curved knife, adjustable at any angle; *b*, binding-screw; *c*, graduated disk, which revolves on stand (*d*) by means of a finely cut screw-thread; *e*, mahogany stand upon which the instrument is secured.

A cork with a central opening is fitted into a descending tube (one inch deep, by one and a half inches in diameter) in the centre of disk (*c*). Cork and tube revolve with the disk. In the central opening is fitted an ordinary stopper or cork, on top of which the object to be shaved may be secured by paraffine or wax.

In order to freeze objects, remove the central cork, and insert the hollow metal box (*x*), a prolongation of which fits into the hollow cork in disk (*c*). Two tubes of metal project from the freezing-box, — one to admit water, the other to allow it to flow out. The water is supplied and carried off by means of rubber tubing attached to the metal tubes, the terminal end of the rubber tube which carries off the water being contracted to control the flow.

In the use of ether as a means of freezing objects for the cutter, remove the plug in front of the freezing-box, and detach the rubber tubing. Apply ether in the usual manner.

ETHNOLOGY.

Tales from Venezuela.

DR. A. ERNST, who has done so much to increase our knowledge of Venezuelan ethnology, has collected a few popular tales, which are very interesting on account of their Tupi and Spanish affinities. The tales are entitled 'Tio Tigre and Tio Conejo' ('Uncle Tiger and Uncle Rabbit'), and all of them have for their subject the superiority of cunning and craft over sheer force. We give here translations of a few of these tales.

"Uncle Tiger had a field of splendid watermelons. He observed that somebody visited his field at night, and stole the melons: therefore he made a figure of a man of black wax, and placed it in the field. At night Uncle Rabbit came, and saw the figure. 'What are you doing there, you black man? Get away!' The figure did not reply. Then Uncle Rabbit went up to the black man and boxed his ears; but his right hand stuck to the wax. 'Let go my hand, or I'll box your other ear!' cried he. When he did so, his left hand also stuck to the wax. Then he knocked his head against the forehead of the figure: his head stuck to it. Then he worked with his hind-legs to get away: they also stuck to the wax, and Uncle Rabbit was caught. Early in the morning Uncle Tiger

came, and when he saw Uncle Rabbit, he cried, 'Oho! have we got the thief? Now I'll eat you!' — 'Wait a moment,' said Uncle Rabbit; 'set me free, and I will show you a pit in which two large deer have been caught. You had better eat those.' Uncle Tiger thought, 'Two large deer are better than Uncle Rabbit,' and he set him free. Uncle Rabbit led him to a deep pit, and said, 'Stoop down, and you will see the deer.' When Uncle Tiger did so, Uncle Rabbit pushed him from behind, and Uncle Tiger fell into the pit. Uncle Rabbit, however, ran away as fast as his legs would carry him."

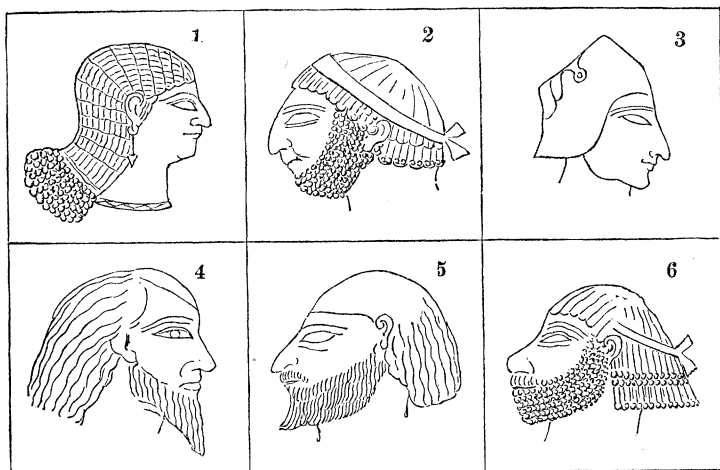
Here is another story: "Uncle Rabbit was very sad because he was so small. He went to God, and wanted to be made taller. God said, 'I will do so, but first bring me a coral snake, a wasp swarm, and a calabash filled with women's tears.' Uncle Rabbit started on his journey, and arrived in a forest where there were many snakes. Walking along there, he said, 'I bet there is room for him, I bet there is room for him!' A coral snake heard him, and asked what his speech meant. He replied, 'The wasps say that there is not room enough for you in this calabash, and I bet that you can get in there.' — 'We will see at once who is right,' said the snake, and crawled into the calabash. When he was in it, Uncle Rabbit at once put the stopper into the opening, and thus the snake was caught. Then he went on, and said, 'I bet there is room for them, I bet there is room for them.' The wasps heard him, and asked what his speech meant. 'Oh!' said Uncle Rabbit, 'the snake says there is not room enough for your swarm in this calabash, and I bet that all of you can get in there.' — 'We will see at once who is right,' said the wasps, and crawled into the calabash. When the whole swarm was in, Uncle Rabbit put the stopper into the opening, and thus the wasps were caught. He next went to a village, and when near the huts he began to cry and lament. Then all the women gathered, and asked the cause of his grief. 'Oh!' said Uncle Rabbit, 'why should I not cry and lament? The world is going to be destroyed to-day, and all of us will perish.' When the women heard this, they began to cry wofully, and Uncle Rabbit filled a calabash with their tears. Then he returned to God. When the latter saw the three calabashes with the snake, the wasps, and the tears, he said, 'Uncle Rabbit, you are more cunning than any one else. Why do you want to be taller? But as you wish it, I will at least make your ears larger.' Saying so, he pulled Uncle Rabbit's ears, and since that day they have remained long."

The Races of the Babylonian Empire.

In a recent number of the *Journal of the Anthropological Institute*, Mr. G. Bertin publishes an interesting study of the types of man found on Babylonian monuments. One of the most remarkable results of his researches is the proof that the Armenian race of these early times exhibits the same characteristics to be noticed in the modern Armenians (Fig. 3). This is the more remarkable from the fact that at this period the language spoken in Armenia, and illustrated by the inscriptions of Van, is totally different from Armenian, and linguistically connected with Akkadian and Media. Evidently the Armenian population has, in course of time, acquired a new language, while its physical characteristics survive. Dr. von Luschan has shown that the Turks and Greeks of Asia Minor are of the same Armenian type, and thus the great antiquity of the native population of this region is proved.

Conclusions derived from types represented on ancient monuments cannot be of the same value as craniological researches; the individuality of the artist, the conventionalism of art, and the object of the monument having a ruling influence upon the character of the representations. Captive enemies will not be represented in the same way as a victorious king and his allies. Nevertheless a variety of types may readily be recognized, as the artists undoubtedly represent typical individuals. A few figures from the plate accompanying Mr. Bertin's paper have been reproduced here. It will be noted that the faces are represented in profile, with eyes in full face. Figs. 2, 4, 5, and 6 are of peculiar interest. The persons represented resemble the types of figures on Assyrian monuments showing people of inferior condition. Fig. 2 is taken from an Assyrian monument. The head is small and round, the forehead low and slanting, the cheek-bones high, the lips thin, and the chin

retreating. In many of these figures a marked prognathism may be observed. The nose is often large, and does not appear to have ever been flat and wide, as among the Tatars; hair and beard are frizzy; the stature, short. In some parts of Babylonia this type seems to have formed the great mass of the population. According to Mr. Bertin's theory, this people was the 'ground race' of western Asia, and he goes so far as to identify it with the European prehistoric races, which are by many authors believed to be of Berber origin. He adds, "An important point to notice is that this race is everywhere found in an inferior social position, and it was equally so in the remotest age. Nowhere did it rise to the rank of a dominating or ruling race, but everywhere it accepted the yoke of the conquering tribe invading its land. It is the race of the land, and accepts every new master with a passive obedience. This explains why this race has no language of its own, for it accepts willingly



that of its masters." The author believes that this people was conquered by Akkadians and by Semites, and that the mixture of these races, with the addition of some Armenian blood, resulted in a population showing the various types found on the monuments.

The study of the west Asiatic and Egyptian monuments from an anthropological and philological point of view has recently yielded most interesting results, and opened entirely new views of the early history of the ancient world. The intercourse between the various peoples, and their mutual influence upon each other, were so important, that a comprehensive and comparative study of all these numerous peoples is necessary to reach satisfactory results. The theories of Mr. Bertin are suggestive, and well worth a careful consideration; but they must be verified by a comparative study of the monuments of other races, and, what is still more important, by exact anthropometric researches.

ELECTRICAL NEWS.

Submarine Boats.

THERE are few books that have been read with so much pleasure by young and old as Jules Verne's 'Twenty Thousand Leagues under the Sea.' The submarine boat 'Nautilus,' propelled by electric motors, — very complicated ones, if the writer remembers the picture correctly, — the electricity furnished by powerful batteries, was able to move at a wonderful speed beneath the ocean at the will of her mysterious commander.

The folly of one generation is the wisdom of the next, and to-day we are in all seriousness trying to faintly rival the vessel of Captain Nemo. The boats that are being built are for torpedo purposes, and are neither large, nor do they attain a very high speed, nor can they remain long beneath the water; but we look for a steady improvement in their performance, and we believe that some day such vessels will be of practical use to mankind. The great difficulty in submarine propulsion is the obtaining of some propelling agent that can be used beneath the water. Hand-power was first tried, and later compressed air and carbonic acid have been employed. For automatic torpedoes, such as the Whitehead or Lay, the two latter agents are fairly successful, but the amount of energy

that can be practically stored by either means is too small to be of use in a real submarine boat.

The history of the early experiments in submarine navigation is the history of disaster. There are stories of partial successes, but the sequel is usually tragic. A successful submarine boat is said to have been made by a Chicago shoemaker, who was in the habit of going out in it and spending his afternoons in the bottom of the lake. One evening he failed to return, and, as he had not communicated the plans of his boat to any one, his experience is lost to us. The writer remembers, in the war between Chili and Peru, that a submarine boat was built by the latter government to destroy the Chilean fleet, at that time blockading Callao. It was to have been run by compressed air, and was calculated to attain a speed of four miles an hour. An unfortunate miscalculation resulted in the weight of the vessel being greater than her displacement; and, on being launched, she immediately went to the bottom, where, owing to the characteristics of her builders, she was allowed to remain. During the late war a number of experiments were tried with submarine torpedo-boats; but, excepting in one case, they resulted in failure.

There is no inherent impossibility in navigating boats beneath the surface for any length of time. The atmosphere can be purified and its oxygen renewed by chemical means, and the depth that can be attained depends only on the ability of the boat to resist the enormous pressures to which it is subjected at any considerable depth. The distance beneath the surface can be regulated in a number of ways, for the density of the water is practically the same at any depth. The only drawback has been in the difficulty of obtaining power. In the last few years electricity has promised to remedy this.

The latest and largest submarine boats are being tried in Toulon and at San Fernando respectively. Let us first describe the French boat, the 'Gymnote.' She is driven by an electro-motor coupled directly to the armature shaft, and supplied with electricity from storage-batteries. The motor absorbs 52 electrical horsepower at 280 revolutions a minute. The total weight of the motor is about two tons. The electric energy is furnished by a battery of 564 storage-cells of the Commelin-Desmaures-Bailhache type, described in this journal (No. 305). Each of the cells weighs about forty pounds, making over ten tons for the weight of the battery. They have furnished 58 horse-power for four hours. The experiments made on this set of cells show that to store one horse-power of energy requires about eighty pounds, while energy can be taken out from them at the rate of a horse-power for four hundred pounds. The 'Gymnote' has been tested in the roadstead of Toulon to determine her behavior, but so far the experiments have only shown how long she can safely remain beneath the water. Half an hour is the longest time as yet, but it is hoped that the time of submersion will be considerably increased. What the speed of this vessel will be, how easily she can be controlled, and what depth she can safely reach, are questions yet to be determined.

The boat being tested at San Fernando, 'Le Peral,' has been constructed from the designs of Lieut. Isaac Peral of the Spanish Navy. It is about seventy-two feet long, by nine feet and a half at its greatest diameter. It is driven by five electro-motors, — two of twenty, three of nine horse-power, — furnished with current from 600 cells of storage-battery. No experiments have been made on this boat, but it is calculated that she will have a speed of twelve knots at the surface, and of ten knots when half submerged. It is also calculated that she can remain below the water for two hours without requiring a fresh supply of air.

Germany is not behindhand in these experiments, and has built at Kiel a boat one hundred and twelve feet long. Its immersion is regulated by two vertical screws driven by a six-horse-power motor. What the propelling power is, and what its performance may be, we have no data that will enable us to guess; but that the motive power is furnished by electricity there can be little doubt.

These three boats, the most ambitious yet constructed and the most probable of success, contrast but meanly with the 'Nautilus.' The immense size of the latter, her speed of fifty miles an hour, the depths to which she descended, will be for many years, if not always, the imaginings of a story-writer, with no practical counter-