of the times, and eminently satisfactory; and, if the book is referred to half as frequently as it should be, our schoolhouses will be healthier and better adapted to serve the purpose for which they are erected.

Azimuth. A Treatise on this Subject. By JOSEPH EDGAR CRAIG. New York, Wiley. 4°.

THE determination of azimuth comes up as an important practical problem on board ship, in ascertaining the variation or deviation of the compass, or on land in fixing a true meridian line, and it is desirable that the necessary astronomical observations should be made under conditions which give, at least theoretically, the most accurate results attainable. Lieutenant-Commander Craig's book is a mathematical study of the spherical triangle with respect to the azimuth problem, supplementing the text-books, and he calls attention to certain statements in the latter on some points referring to the most favorable conditions of observation, which he regards as misleading.

After devoting several pages to the elementary formulæ for the solution of a spherical triangle, and the differential variations of its parts, he considers the conditions of maximum and minimum errors, and the most favorable and least favorable position of a heavenly body for observation in a given latitude. Two-thirds of the text are then taken up with an analysis of the equations to the loci of maximum and minimum errors, and the book concludes with some thirty plates illustrating these loci.

The Ethical Import of Darwinism. By JACOB GOULD SCHURMAN. New York.

THE excitement following the appearance of Darwin's works rendered a fair criticism of their merit and import impossible. The younger generation, who had been trained to some extent to think by the methods of which Darwin forms a model, were ready for the announcement, and were at once transformed into a body of enthusiastic followers. The older thinkers, and especially such as were by their profession devoted to upholding a theory of the universe established by tradition, and in entire opposition to the discoveries of science, met the new theory with violent protestations of inconsistency with established beliefs, and denounced it as fraught with danger to morality and the religious sentiment. It is only within a few years that the smoke has been lifted off the battle-field, and made it possible to calmly contemplate the justness and the outcome of the battle. As has frequently happened before, it is found that the party who asked, not "Is it true?" but "What does it lead to?" has been the loser. The general point of view of which Darwinism is an expression, the ingenious and valuable explanations which that master-hand collected, the healthy ferment penetrating through all departments of knowledge that his writing brought about, — all these have become the inalienable inheritance of mankind. On the other hand, the majority of evolutionists will admit that their doctrines have been regarded as solving certain vexed problems of mankind which really remain as unsolved as ever; and the province and exclusiveness of the mechanism of development which Darwin discovered have been likewise exaggerated. Recent writers, such as Romanes, are acknowledging the former and supplementing the latter. The one has been termed a 'pseudo-Darwinism,' and in addition to natural selection we speak of 'physiological selection,' and so on.

Professor Schurman's book gives every mark of having been written in the latter half of this decade. There is no attempt to dwarf or warp (much less ridicule) the evolutionary position: on the contrary, its strictly scientific character is appreciated, and its main tenets admirably sketched. Contrary to the usual method in such discussions, the author has taken the trouble to find out what Darwinism is. Nor do these negative virtues complete the list of the merits of the book. The author practically illustrates, by a vigorous and intelligible style, his opinion that "there is no theory, or criticism, or system (not even Kant's or Hegel's), that cannot be clearly expressed in a language which in Locke's hands was strong and homely, in Berkeley's rich and subtle, in Hume's easy, graceful, and finished, and in all three alike plain, transparent, and unmistakable." Moreover, each chapter is devoted to the expression of a real point without irrelevant matter or needless repetition. The several chapters form a logical train of argument, and the book is thus worthy of the attention of the scientist. The unfortunate fact that so many works in this field are strikingly deficient in all these qualities makes it necessary to signalize the exceptional character of this work.

Professor Schurman holds that 'evolution' is a strictly scientific hypothesis warranted by facts, and is to be accepted, whether for the sake of argument or as a real belief, by all who seek to determine its ethical import. He denies that the system of utilitarian hedonism which Darwin and Darwinists have attached to the theory is at all a legitimate inference from that theory, and regards it as accidental, and due to the fact that these men were raised in this school of ethics. Darwinism is to him consistent with any theory of ethics, and does not favor one above another. As long as evolution simply explains the method of development, and not the fact that there is something to develop, a further philosophic theory is made necessary. In the second place, the author holds that the attempt of Darwin himself, as of his followers, to account for the existence of a moral sense, is deficient, and does not make unnecessary the assumption of an omnipotent and authoritative 'ought.'

To the reviewer's mind, this argument is open to the following criticism. In the first place, the 'ethical import of Darwinism' that we to-day are interested in is not that here discussed, but consists in very practical and momentous questions: 'How does heredity affect responsibility?' 'What does evolution show to be the best method of treating criminals?' It is in this field of practical ethics, formerly neglected or dogmatically passed upon, that the spirit of evolutionary research has and will radically modify our views and practices. Second, the author fails to recognize that the kind of chance with which evolution deals is synonymous with 'something that needs no explanation.' If I hazard the guess that a die I am about to throw will fall on 'six,' and it really does so, I say it is 'chance,' and thereby mean that it needs no further explanation. The fact that this 'chance' may have momentous consequences does not change its character. That there is a strong temptation to be dissatisfied with this casual answer will be readily admitted, and it is this temptation to which the author has yielded in a portion of his criticism. Finally, the fact that the followers of Darwin tend to take a view of life easily distinguishable from that of those who oppose him, is itself significant of the ethical import of Darwinism. It may be true that it is *a priori* as possible to be a Darwinist and at the same time an adherent of any one of a half-dozen schools of ethics; but, as a matter of fact, ethics takes its character quite as much from the relative order and dignity of the several virtues leading to the *summum bonum* as from the view of the *summum bonum* itself.

It would be unjust to close this notice without calling attention to the plea for a science of historical ethics, and the contribution to it, by way of criticism, of current theories of 'family development,' to which the last chapter is devoted.

NOTES AND NEWS.

A VOLUME of great interest to the meteorologists of the country has recently been issued by the National Academy of Sciences, containing the first chapter of a revision, by Prof. Elias Loomis, of his numerous 'Contributions to Meteorology,' or studies based on the daily weather-maps of the Signal Service during the last thirteen years. These contributions in their original form, as presented to the National Academy and published semi-annually in the *American Journal of Science*, considered one topic after another in sequence, determined by convenience rather than by system, and therefore were greatly in need of orderly revision for use by the many students who must make frequent reference to them. Translations and abstracts of the originals have appeared in France, England, and Italy; and a serviceable review and discussion of the results gained have recently been prepared by Mr. H. H. Clayton for the *American Meteorological Journal;* but a revision by the author of the papers himself has naturally an interest and a value of its own. Professor Loomis has performed a threefold service in this work, — first, in utilizing the weather-maps to an extent not approached by any one else in the country; again, in now systematizing the results gained; and, most of all, in developing his method of simple, inductive in-

vestigation, that will long stand as a model for meteorologists to follow. It is to be hoped that the later chapters of the work may appear in due time.

— Lieutenant Dunwoody of the Signal Service, who for a number of years has taken an active interest in developing the State weather-services, has recently accomplished a good piece of work in securing the adoption of a uniform system of summarizing and tabulating the data published monthly in the various State bulletins. Hitherto every State has had pretty much its own plan, and the change to a single form of statement cannot fail to be advantageous to all concerned. The reports of fifteen State weather-services are abstracted in the last monthly weather-review of the Signal Service.

— The second annual meeting of the New England Association of Colleges and Preparatory Schools will be held at the College of Liberal Arts, Boston University, Oct. 28 and 29. The programme of the meeting will be as follows: 'The Place of the Fitting-School in American Education,' paper by Prof. George T. Ladd of Yale University, discussion to be opened by Dr. Walter Q. Scott, principal of the Phillips Academy, Exeter, N.H.; 'Aims and Methods in Modern-Language Teaching,' paper by Mr. Samuel Thurber, master in Girls' High School, Boston, discussion to be opened by Prof. Richard A. Rice of Williams College; the following question may also be taken up for discussion: 'How can the Interests of Higher Education secure a more Appreciative and Hearty Support?'

— Dr. Simpson, health-officer at Calcutta, reports two simultaneous outbreaks of cholera, — one on land, and the other on the ship 'Ardenclutha,'—both being due to the same cause. The land epidemic was cause by drinking-water into which the dejections of a cholera patient had found their way. In the epidemic on board the ship it was demonstrated that milk had been drunk by those who afterwards suffered from the disease, and that to this milk cholera-infected water had been added.

— Mr. G. Taylor, in the *China Review*, March and April, 1887, gives the following amusing Chinese stories: A young tiger met an old one and said, "I got hold of a man to-day whose upper parts were so tasteless and his nether parts so sour, that, hungry as I was, I left him in disgust. I wonder what sort of a man this could be." — "A student who has had to buy his degree," was the reply. The Lord of Hades considered a certain spirit to have been a great sinner indeed, so he adjudged that he should re-enter the world to become a poor scholar with five children. "Is not that a rather light punishment?" remonstrated an angel. "No," said his Eminence, "the five hungry children will soon drive him mad." Chang and Chung mutually agreed to start a brewery. Said Chang to Chung, "You supply the rice, and I will furnish the water." — "But," queried Chung, "if the profits are divided according to the capital embarked, I am afraid it will be difficult to apportion your share." — "Oh, I'm not afraid," said Chang: "when the brew is over, give me the water; you can have the remainder." A man was seized by a tiger. The victim's son took his bow and pursued. "Hit him in the leg," cried the father, "else you'll spoil the market-value of the skin." A bibulous individual, on entering a restaurant, noticed that the wine-cups were small. After seating himself, he gave vent to a most demoniacal series of howls and groans. "What is the matter?" asked the startled landlord. "Ah!" answered the man, "my father, a hale, hearty man, met his death at a friend's table by accidentally swallowing a small wine-cup, so, whenever I see similar ones, the memory of the sad event overcomes me." It is needless to add that the cup was replaced by a larger one. A hard drinker dreamed that he had become possessed of a bottle of genuine stuff, but, determined to enjoy it thoroughly, he had begun to heat it. During the heating process he awoke. "Hoo, hoo!" he groaned, "if I had known this was to happen, I would have drunk it cold." A servant did not fill a guest's cup to the brim. The latter, holding it up, remarked, "This cup is too deep," and broke a piece off. "How is that?" cried the host. "If the upper part can't hold liquor, of what use is it?" was the smart retort.

— Dr. Daniel G. Brinton, professor of American archæology and linguistics in the University of Pennsylvania, will read twice a week with students who desire to pursue these branches. The course on archæology will be associated with the examination of specimens and visits to typical collections. The readings in American linguistics will begin with the structure of American languages in general, and proceed to the special consideration of the Nahuatl and Algonkian groups.

— The *British Medical Journal* reports a case of leprosy which is believed to have been contracted through vaccination. A physician living in the tropics vaccinated his own son with virus obtained from a native child in whose family leprosy existed. At the time the virus was taken, the child gave no evidence of being affected with the disease, although subsequently it manifested itself in him. A third child was vaccinated by the physician with virus taken from his own son. Subsequently the son developed leprosy in a mild form; but the child who was vaccinated with virus taken from him had the disease in a most severe form, and died from it. The physician's son is now attending school in England, eminent physicians having given the opinion that there is no danger that the other students will contract the disease.

— A correspondent of *Indian Engineering* points out that the fibre industry of Burma is well worthy of attention and development, at a time when energy and capital are being expended in increasing the resources and industries of that province. The country abounds in fibre-producing plants, and the different species of bamboo, China-grass, and pineapple, grow wild everywhere. Some years since, an American missionary at Toungoo prepared a quantity of paper stock and fibre from these plants, and sent it to the United States, where it was manufactured into a superior kind of cloth, much resembling silk, and also into paper of different qualities. Subsequently the same gentleman modelled a loom from the bamboo, which he instructed the Karens how to use, and coarse cloth is now woven by them for their own use. Bamboo is pre-eminently the best substitute, if properly prepared, for esparto grass, rags, and other materials used in the production of paper, and it has been so stated by one of the leading authorities in England on commercial fibres. In Burma the bamboo grows in profuse luxuriance and variety. It ranges from the thickness of the ordinary rattan to two feet in circumference. The stems of the latter, the *Bambusa gigantea*, are used by the natives for water-pails. The bamboo needs preparation to fit it for commerce, like hemp, jute, and other articles, and this preparation, the writer argues, should take place in Burma. Favorable sites for erecting factories for this treatment are to be found on the banks of the Irrawaddy and Salween, where communication is easy both with the interior and the principal seaports. The fibres of bamboo, China-grass, and pineapple, can be treated in the same manner as jute, and spun so fine that an expert could barely distinguish the product from real silk. These fibres possess an advantage over jute, in that they require little chlorine when bleaching, and they remain stronger in consequence. At present large quantities of cloth woven from China-grass and bamboo are brought into the Rangoon markets by Chinese from Bhamo, and, although the material is not manufactured with modern looms, the quality appears so fine as to resemble tussore silk. The cultivation of jute as an experiment undertaken by the government was very successful. With a view to encourage the industry, the authorities offer to purchase good jute from Karen cultivators, and also offer a bonus for the largest production.

— By a decree dated July 20, M. Bihourd, resident-general in Annam and Tonquin, has laid down the regulations by which opium can be sold, wholesale or retail, or transported in the country. The exclusive right to open opium-shops in a district is given to a farmer or contractor, and is to extend over a definite area corresponding with one or more of the administrative divisions. A fee must be paid for each shop, of 100 francs in the three chief towns, 50 francs in the capitals of districts, and 20 francs elsewhere. Trading wholesale in the drug is only permitted in places where customs stations exist. Wholesale merchants must pay an annual tax of 600 francs for each place at which business is carried on, and they can sell only to the licensed farmers: they must keep a register open to official inspection, recording each sale, the name of the purchaser, and the place to which the opium was sent. Each

package containing more than a certain amount must be accompanied by a customs permit or certificate from the local farmer, and heavy penalties are appointed for breach of these regulations or infringement of the privileges of the farmers. The effect of the decree is to establish a monopoly in the trade in opium in the government, which will work through the licensed farmers. But no provision is made for the sale by public auction of the right to deal in opium, as is usual in British and other colonies where opium is farmed.

— We learn from *The Critic* that a periodical of a somewhat new character is to appear in The Hague (Netherlands). It will be a fortnightly in four languages, — English, French, Spanish, and Italian, — containing original correspondence on letters, arts, and science from London, Paris, Madrid, and Naples. A New York correspondent has been invited to contribute an American letter to the quartet already named. The object is to promote the study of languages. The editor of the new periodical is to be M. Taco H. deBeer, editor of *de Portefeuille*, the *Dutch Art Chronicle*, and *Literary Review*.

— A new process of electroplating natural objects, such as animals, flowers, and tissues, has been brought out in France, and, as described in *Engineering*, is as follows: An albuminous liquid is obtained by washing some slugs or snails in water to clean them, then placing them in distilled water until they give off their albuminous matter. This is filtered and boiled for an hour, then distilled water is added to make up for that lost by boiling, and also about 3 per cent of nitrate of silver. This solution is then kept in bottles hermetically sealed, and in a dark place. When required for use, about 30 grams of the liquid are mixed with about 100 grams of distilled water, and into this solution the objects to be electroplated are immersed for a few moments. They are then put into a bath consisting of about 20 per cent of nitrate of silver dissolved in distilled water, and afterwards submitted to the action of sulphuretted-hydrogen gas, which reduces the nitrate of silver on the albumen-coated object. Thus treated, an organic object becomes fitted to receive the electro-deposited metal intended for it; and the layer is said to be of superior fineness to that produced by the other known processes for coating natural objects with metal by galvanoplasty. It shows the texture of the object with much delicacy.

— Improvements have been made at the glacial pot-hole on Colonel Hackley's land in Archbald Borough, Lackawanna Co., Penn. Mr. Hackley has generously appropriated the sum of five hundred dollars for the purpose of protecting it against the action of the weather, and also to make it more attractive to visitors. All the underbrush has been cleared and the ground graded, leaving the shade-trees standing, forming a little park. At present the pot-hole is divided in two by a wooden brattice for the purpose of mine-ventilation. All this timber-work will be taken out, so that the entire pot-hole can be seen.

— Reports of two journeys through Yemen have recently been published, — one of a German scientist, E. Glaser, who visited the country for the purpose of collecting Sabian inscriptions and manuscripts, in which he was eminently successful; one by the English major-general, F. T. Haig. The latter made only a flying trip through the country, starting from Hodeida on the western coast, to Sanaa, the capital, a distance of 140 miles, and from Sanaa turning due south to Aden, 260 miles. Including a week spent in Sanaa, the journey occupied, in all, thirty-one days. The object of the journey was to ascertain whether it might be possible to do any thing for the Christianization of the inhabitants. Glaser, on the other hand, staid in southern Arabia from October, 1882, to March, 1884, and from May, 1885, to February, 1886; and at the present time he is again at work in his old field. It is somewhat amusing to compare the statements of both travellers. Haig describes the severity of the Turkish taxation, and their cruelty against the natives. Glaser, on the other hand, praises the safety of the territories occupied by the Turks, and states that the English have no control whatever over the tribes inhabiting the colony of Aden, who receive an annuity amounting in the aggregate to twelve thousand dollars a year. During the last fifteen years the Turks have succeeded in establishing their authority in several parts of Arabia, but it is only in Sanaa that the influence extends into the interior. According to Haig's description, they cannot feel very safe here: "The town has an Arab population intensely hating the few thousand Turks by whom it is held down, heavily taxed, and generally obliged to furnish gratis the supplies required for the large garrison of Turkish soldiers. The latter are not allowed to go into the narrow streets for fear of assassination. There is a citadel at one part of the walls, with its guns turned significantly, not to the outside, but upon the town. Glaser staid most of his time in Sanaa, and made numerous excursions in the neighborhood. He made astronomical observations and surveys in addition to his important archæological collections. The following notes are taken from his description in the Proceedings of the Geographical Society of Vienna. The west side of Arabia is occupied by a mountain-range from eight thousand to ten thousand feet in height. The western declivity of this range is very steep, falling abruptly to the Tihâma, a plain about two thousand feet in height, with a gradual slope towards the sea. The eastern slope of the mountain-range is very gradual. The south coast of Arabia is also occupied by high mountains. While the high land between these ranges is a desert, the slopes are drained by numerous rivers, some of which are running throughout the year. The slopes of the mountains are highly cultivated, terraces being built from the summit of the range to its foot. Those which can be easily irrigated yield four crops annually, and are highly prized. Coffee is one of the principal products of this country. While Haig describes the climate of the high parts as wholesome and agreeable, it is quite the reverse according to Glaser. He says that malarial fevers prevail in the high land as well as in the low land. In Sanaa the temperature frequently falls below the freezing-point, and during the hottest season a temperature of 92° F. was observed. In winter the daily variations are very great, a temperature of 32° in the morning being followed by one of 68° after noon. The western slopes of the mountains are moistened by heavy fogs which every day ascend from the low land to the summit, though they do not extend into the interior of the country.

LETTERS TO THE EDITOR.

*** The attention of scientific men is called to the advantages of the correspondence columns of* SCIENCE *for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

The Scientific Swindler Again.

A MAN answering the description of the impostor given in previous numbers of *Science*, appeared at the rooms of the Boston Society of Natural History on Saturday last, having in his possession a microscope, which he offered for sale at a very low price. We suspected his character, but, having no charge against him, were unable to do any thing, and were in hopes he would return on Monday with his microscope, as he engaged to do. He did not return, and we could therefore do nothing. ALPHEUS HYATT.

Boston, Oct. 18.

Savagery in Boyhood.

EVERY thing, we suppose, must be considered hereditary in the present age; even the tendency to wear cocked hats, or to throw cabbage-heads on hallow eve. At any rate, the *Popular Science Monthly* for October brings this doctrine to bear upon the phenomena of savagery in boyhood, as noticed in *Science* of Oct. 7. The author explains that cruelty in children is the transmitted habit of ancestral savages, and observes that "the emotion of pity appeared late in the history of the race." In the same connection we may mention the intense interest which children take in narratives of warfare: torturing animals is a less general incident. But the callousness of children in contemplating the horrors of war and its consequences has always been an interesting fact to us. However, is no other analysis of this possible than the supposition that our savage forefathers were cruel? May we not be in danger of making