SCIENCE

FRIDAY, MAY 11, 1888.

THE GRAVE APPREHENSIONS as to the fate of Stanley's expedition, that are occasionally published in the daily papers, have no other foundation than the lack of any news since Stanley's departure from the mouth of the Aruvimi. We know from Junker's descriptions, that the region he has to pass through is a very difficult one, and that his original estimates of the time required to reach the Mvutan Nsige from the Kongo were too low. If any serious mishap should have occurred to him, exaggerated rumors would undoubtedly have reached the coast; for even in Africa a caravan of hundreds of men, including several white men, does not disappear never to be heard of again. News did not reach the lower Kongo, as no steamer has been able to visit Stanley Falls and the mouth of the Aruvimi since Stanley's departure. It is somewhat difficult to understand the reason for this state of affairs, except it may be that the steamers have suffered from their long-continued service, or are needed for the actual use of the stations near Leopoldville. The steamers of the missions and of the Sandford Exploring Expedition are not at the disposal of the Free State. The 'En Avant' has just returned from her great expedition up the Welle, and thus the number of available steamers was practically very small. Recent papers inform us that a new steamer, the 'Roi des Belges,' was launched on Stanley Pool Feb. 18, while the 'Ville de Bruxelles' is being transported to the upper Kongo. It is to be hoped that communication with the upper Kongo, which has practically been interrupted since the capture of Stanley Falls Station by the Arabs, — except when Stanley and Tippo-Tip ascended the Kongo, — will be resumed ere long.

WILLIAM C. WYCKOFF, late editor of the *American Magazine*, who died in Brooklyn last week, was well known among the scientific men of the United States. A few years ago, when the *New York Tribune* devoted much more space to scientific matters than now, Mr. Wyckoff, then a member of its editorial staff, reported the annual meetings of the American Association for the Advancement of Science; and it is doing him only justice to say that no equally good reports have ever been made for a daily newspaper, rarely if ever for a weekly or monthly journal devoted to science. He was singularly careful and painstaking as a reporter, and his work received wide recognition among those most interested in and best able to judge of it. The same conscientiousness characterized all of his work as a writer and editor. His service upon the *Tribune* extended through many years. More recently, as secretary of the Silk Association of America, he has published a number of very valuable volumes in relation to that industry. His latest work was upon the *American Magazine*, as its editor, which in one year he built up from the old *Brooklyn Magazine*. This work speaks for itself. Mr. Wyckoff had a very wide circle of acquaintances and friends in the journalistic profession.

THE PROJECT of having a refuge-hut high up on the main range of the White Mountains — one which should afford adequate shelter in any weather — has long been entertained by members of the Appalachian Mountain Club, and the council of the society believe that the time has come for an effort in this direction. It is their desire to build this summer a permanent stone cabin at Madison Spring, in the saddle between Mount Adams and Mount Madison, provided with sleeping-bunks, a stove, and the most necessary furniture. Cooking-utensils and axe would be kept there, and there is a good supply of fuel at hand. The structure will be useful in two ways: first, as a resting-point for persons who wish to visit the Northern Peaks, or to traverse the ridge to or from Mount Washington, but who have not the strength to accomplish these expeditions (distinctly the most interesting in the White Mountains) in a single day; second, as a comfortable camping-place for scientists, photographers, and lovers of scenery, who will be able to make prolonged stays in this interesting upper region, and be independent of the weather. The structure which the council have in mind will cost (at that altitude) from five hundred to seven hundred and fifty dollars, if built in a thorough manner. Until five hundred dollars are secured, it will hardly be prudent to begin the work. The council have appropriated one hundred and fifty dollars from the yearly income, and some subscriptions can probably be obtained outside; but at least three hundred dollars ought to be made up by subscriptions inside the club. The council make, therefore, an earnest appeal to all persons interested in this enterprise to indicate at once the sums they are willing to contribute. Assistance from any one interested will be gladly received. Subscriptions should be sent to the councillor of improvements, Frederic D. Allen, 10 Homboldt Street, Cambridge, Mass.

DR. EMIL BESSELS.

IN a recent number of *Science* we announced the death of Dr. Emil Bessels, who won so much well-deserved renown on the 'Polaris' expedition. The deceased was born in 1847 at Heidelberg. At an early age he left school and entered business, but his love of science prompted him to resume his studies. He became a student at the University of Heidelberg, and paid particular attention to zoölogy. His first publication of importance was on the distribution of the American deer. In 1869, at the instance of the late Dr. A. Petermann, he joined the first German polar expedition, which, although unsuccessful in its attempts to reach Gillis Land, made important discoveries in those parts of the Arctic Ocean lying between Spitzbergen and Nova Zembla. Particular attention was paid to observations on the temperature and salinity of the ocean. His work on this expedition had proved him to be an energetic worker and excellent observer; and when the American polar expedition was organized, in 1870, he was invited to join it as scientist. The progress and the events of this expedition are so well known that it is unnecessary to dwell upon them. It ought to be stated, however, that the scientific results are almost solely the work of the deceased. Setting aside the valuable geographical discoveries which Bessels made on excursions by sledge, and among which the exploration of Petermann Fiord ranks highest, his hydrographical and meteorological observations are of great importance. He was the first to give the explanation of foehn-like winds now universally adopted; he was the first to pronounce the insularity of Greenland, founding his conclusion upon the fact that the Atlantic tide entered the northern part of Robeson Channel. It will be remembered that his conclusions were fully corroborated by the discoveries of the Nares and Greely expeditions. After his return from the Arctic, he was engaged in working up the results of the expedition; but he had hardly finished this task, when he began to make preparations for a new expedition, the prime object of which was to be physical observations. He corresponded about his plans with Weyprecht and Dorst, and preparations were made; but, when all was ready, unfortunate events prevented the carrying-out of the plan, which would doubtlessly have resulted in great additions to our knowledge of the polar regions. During the last years of his life he resided in Washington, engaged in completing a work on physical geography

and an anthropological work on the Eskimo, both of which he left unfinished. Besides this, he wrote a popular account of Eskimo life, which it is hoped will be published at an early date. When the first expeditions to the rescue of Greely were prepared, he strongly advocated that a well-equipped expedition be sent out at once. During this period he wrote his valuable contributions to the history of the American polar expeditions. He died while on a visit to his friends in Germany. His amiability will be remembered by all his friends. His valuable contributions to science will make scientists regret that he was not allowed to complete the numerous works he had begun, which would have secured to him one of the most prominent places among modern scientists.

THE COURSE OF HUMAN PROGRESS.[1]

THE course of human events is not an eternal round. In the wisdom of the ancients there are many proverbs to the effect that that which is, has been before and will be again. So far as human experience extends, unaided by reason, days and nights come and go, winter follows summer, and summer follows winter, and all the phenomena of nature seem to constitute an endless succession of recurrent events. But there is a higher knowledge which observes a progress by steps so minute that it was left to modern science to discover it. In the history of humanity the changes which result in progress are more readily perceived; and the aphorism of the ancients, that "there is nothing new under the sun," is but a proverb of ignorance.

Every child is born destitute of things possessed in manhood which distinguish him from the lower animals. Of all industries he is artless, of all institutions he is lawless, of all languages he is speechless, of all philosophies he is opinionless, of all reasoning he is thoughtless; but arts, institutions, languages, opinions, and mentations he acquires as the years go by. In all of these respects the new-born babe is hardly the peer of the new-born beast; but, as the years pass, ever and ever he exhibits his superiority in all of the great classes of activities, until the distance by which he is separated from infancy is so great that he seems to live in another realm. These activities that separate the man from the babe are the humanities. In like manner the human race has been segregated from the tribes of beasts by the gradual acquisition of these humanities, by the invention of arts, the establishment of institutions, the growth of languages, the formation of opinions, and the evolution of reason.

The road by which man has travelled away from purely animal life is very long; but this long way has its landmarks, so that it can be divided into parts. There are stages of human culture, and they have been denominated savagery, barbarism, and civilization.

All the grand classes of human activity are inter-related in such manner that one presupposes another, and no one can exist without all of the others. Arts are impossible without institutions, languages, opinions, and reasoning; and in like manner every one is developed by aid of the others. If, then, all of the grand classes of human activities are interdependent, any great change in one must effect corresponding change in the others. The five classes of activities must progress together. Art-stages must have corresponding institutional, linguistic, philosophic, and psychic stages.

Stages of progress common to all the five grand classes of human activities may properly be denominated culture-stages, and such culture-stages should be defined by characterizing all these activities in each stage. This I shall attempt to do, but in a brief way. [The lecturer then described savagery with regard to its arts, institutions, language, philosophy, and mind, and summed up his description in the following way.]

The savage has invented rude arts by which he obtains food, clothing, and shelter. He has invented a rude system of kinship society, with descent in the female line. He has spoken language, gesture-speech, and picture-writing, but is without hieroglyphic, syllabic, or alphabetic writing. He has a philosophy which informs conspicuous and important inanimate objects with spirit-life, and which deifies the brute; and a mind whose perceptions are so slightly developed that conventional characters do not convey ideas, and his arithmetic is yet counting. Such, in general, are the characteristics of all savage people that have been carefully studied by anthropologists.

How was this savagery transformed into barbarism, and what is that barbarism? [The lecturer began his answer to these questions by considering the change in arts.] There are two arts, intimately associated, the invention of which causes a radical change in all the departments of humanity; viz., agriculture and the domestication of animals. Agriculture began in savagery. Many savage tribes cultivate little patches of ground, and thereby provide themselves with a part of their subsistence. This petty agriculture does not of itself result in any radical change; but when the art has developed to such an extent that the people obtain their chief subsistence therefrom, and especially when it is connected to the domestication of animals, so that these are reared for food and used as beasts of burden, the change for which we seek is wrought. It seems that extensive agriculture was first practised in arid lands by means of artificial irrigation. In more humid lands the supply is more abundant and the incentive to agriculture is less. On the other hand, agriculture is more difficult in humid lands than in arid lands. The savage is provided with rude tools, and with them he can more easily train water upon desert soils than he can repress the growth of valueless plants as they compete for life with those which furnish food. The desert soil has no sod to be destroyed, no *chaparral* to be eradicated, no trees to be cut down with their great stumps to be extracted from the earth. The soil is ready for the seed. Throw upon that soil a handful of seed, and then sprinkle it with a few calabashes of water once or twice through the season, and the crop is raised; or train upon a larger garden-patch the water of a stream, and let it flood the surface once or twice a year, and a harvest may be reaped.

Petty agriculture, such as I have described as belonging properly to savagery, has been widely practised in the four quarters of the globe among savage people, quite as much in humid as in arid regions; but the art seems not to have indigenously extended beyond that stage in any but arid regions. The earliest real agriculture known to man was in the valley of the Nile, an almost rainless land, but the floods of the Nile were used to fertilize the soil; again, in the land of Babylon, along the Tigris and the Euphrates, extensive agriculture grew up, but it was dependent upon artificial irrigation; still farther to the south-east, in the Punjab, another system of indigenous agriculture was developed by utilizing the waters of the five great rivers; still farther to the east an indigenous agriculture was developed on an extensive scale, all dependent upon artificial irrigation, as the Chinese use the waters of the Hoang-ho and the Yang-tse-kiang; in South America the first system of agriculture was developed in Peru, all dependent upon artificial irrigation; and, finally, to the north of the Isthmus of Panama, in Central America and Mexico, agricultural art was highly developed, and here also they were dependent upon artificial irrigation. From these six examples of high agricultural art, all the agriculture of the world has been developed; from these centres it has spread. The petty agriculture of humid lands never went beyond the utilization of little patches of ground in the forest glades, until it was borrowed in a higher state from arid lands. Everywhere with the development of agriculture in the arid lands the art of domesticating animals was associated, and everywhere such animals were raised for food, and to a large extent they were used as beasts of burden.

[The lecturer, in continuation, showed how changes in the arts wrought changes in institutions, changes in language, changes in philosophy, and psychic changes during the transition period from savagery to barbarism, and summed up this portion of his discourse as follows.]

From the foregoing brief characterization it will be seen that barbaric culture implies a somewhat high state of agriculture and the domestication of animals, one or both; it implies that patriarchal institutions have been organized, that descent is in the male line, that ranks in society have been established, and that new laws regulating property have been enacted; it implies that the people use hieroglyphs; it implies that domestic worship is ancestral worship, that tribal worship is based on physitheism, and that the phenomena of the universe are attributed to nature-gods; and, finally,

[1] Lecture delivered May 5, by Major J. W. Powell, in the course of free lectures under the auspices of the Philosophical, Biological, and Anthropological Societies of Washington.