far south. Ndoruma wished him to remain some time at his village, and therefore Junker resolved to set up a station there for the coming months. With the help of Ndoruma's people, who were despatched to the work by hundreds, he was able to erect good substantial dwellings, which were surrounded by a high stockade to keep off the leopards which abound in this country. He staid here until August, when he left his companion, Bohndorff, in charge of the station, while he travelled south with only twenty bearers. He crossed the Welle and traversed the land of the Mangbatu, where he made friendship with the chief Mambango, and returned in December to Ndoruma. But as the best season for travelling had approached, he did not rest, but started in January, 1881, by a new road to the south-west, the country of the A-Madi, crossed the Welle there again, and obtained, though with the greatest difficulty, the necessary number of bearers among the A-Barambo; these, however, robbed him of part of his goods; and it was only with the help of Sasa, a friendly Niam-Niam chief, that he safely returned to the A-Madi country north of the Welle. At the end of April he sent Bohndorff with the baggage, under the care of Sasa, into the latter's country south of the Mbomo, where he was to establish another permanent station. In the mean time war had broken out between the Mangbatu and Emin Bey, the governor of the Equatorial Province, but by Junker's mediation further hostilities were prevented. This, however, detained him until the end of November, 1881. Then he made another start, and was almost uninterruptedly on the way up to June, 1882, exploring the region south of the Welle and Bomokandi. He was kindly received by the Niam-Niam chiefs Bakangai and Kana, whose villages are situated south of the Bomokandi, whence he turned north and reached Semio, north of the Mbomo, where his station had been meanwhile established, in September, 1882. Here he had the misfortune to lose a great part of his valuable property by fire. Bohndorff, who had frequently been sick, wished to return to Europe, and therefore Junker packed his collections and sent him to the Bar-el-Gasal Province, where, in the mean while, Lupton Bey had become governor. But at this time the Dinka tribes revolted against the Egyptian Government; and thus Bohndorff, being unable to reach Meshra-er-Rek, was compelled to return to Semio. This was in October, 1882, the commencement of long and bloody wars in the Bar-el-Gasal territory, on which finally the invasion of the Mahdi's troops followed.

Before Bohndorff's return, Junker had started on an extensive journey west. He reached the Welle, near the mouth of the Werre and Mbima, and traversed the territory of the Bandjia, who, though speaking a dialect of the Niam-Niam language, pretend to be of an independent descent. The islands of the Welle are inhabited by the A-Basango, who speak a distinct language. After having reached Ali-Kobo, he turned north, crossed the Mbomo, ascended the Shinko, and returned to Semio by way of Mbanga. He arrived on May 1, 1883.

He now regarded his travels as finished, and intended to start for the Bar-el-Gasal, where Bohndorff had gone a short time before, as Lupton Bey hoped that the route to Meshra-er-Rek would be open. But, although Lupton called in all the outlying garrisons on the Welle, he did not succeed in putting down the Dinka, who afterwards were joined by the Nuer, Agar, and other tribes. This war lasted eighteen months, and was far more bloody and exhausting for both parties than the later engagements against the troops of the Mahdi in Emin Pacha's province. Finally the Dinka were supported by the Mahdi's forces; and Lupton, betrayed by those about him, was compelled to deliver his province without resistance to the emissary of the Mahdi, Emir Karm Allah. Junker says that the chief cause of this surrender is to be sought in the fact that Lupton had almost exclusively irregular troops at his disposal, consisting of Dongola people and Arabs of all kinds. In October, 1883, the state of Lupton's troops was very precarious, and he sent a letter to Junker entreating him to persuade the chief Semio to collect about a thousand of his people with spear and shield, as well as all those who had guns, and come to his help. He said, "I now see no other way of putting down the insurrection than by the help of the Niam-Niam chiefs. Do every thing in your power to persuade Semio to lose no time, and send him to meet me as soon as possible."

As Junker saw the routes north closed, he resolved to go east to Lado. He left Semio in November, 1883, and reached Emin at Lado in January, 1884, after fifty-five days' march. During this time Bohndorff was able to reach Khartum with the steamer, returning thither at the end of December, but all collections remained behind.

Emin Pacha's province had been quiet up to the first months of 1884; but the successes of the Dinka were too tempting for the other negro tribes, and so in the Equatorial Province the rebellion assumed more formidable proportions. Emin was compelled to give up all stations east of the Nile and to concentrate his troops. On the 27th of May he and Junker received letters from Lupton Bey and Emir Karm Allah, which contained the news that the province had fallen into the hands of the Mahdi, and the demand to surrender the Equatorial Province. Emin answered the Emir's letter, saying that he was ready to deliver the province into the hands of the representative of the Mahdi in order to prevent useless bloodshed, and till his arrival he would try to hold the province for the Mahdi. Meanwhile a defence was organized, and the outlying stations were called in. But it was not until January, 1885, that the troops of the Mahdi attacked Emin's province. After they had taken the station Amadi in April of the same year, they retreated, for unknown reasons, by forced marches, to the Bar-el-Gasal region. Since that time Emin's province has been unmolested by the troops of the Mahdi. On Jan. 2, 1886, Junker left Emin Pacha and Casati, going south. He crossed the Mvutan Nsige to Kibiro, and went to Kabrega, king of Unyoro. Here he learned by letters from Zanzibar of the events in the Sudan, of King Mwanga's hostility towards the Europeans, and of Dr. Fischer's unsuccessful expedition sent out by Junker's brother to seek him. In the mean time war had broken out between the Waganda and Wanyoro, and it was not until June that he received permission to enter Mwanga's capital. It took him a month and a half to cross the Victoria Nyanza; and at last Tabora was reached, whence he proceeded with one of Tippo-Tip's caravans to Zanzibar.

Thus his eventful wanderings in Central Africa were ended. It is hardly necessary to mention the importance of his explorations, which cover a large area, and of his interesting observations on the tribes with whom he lived for so long a time. The loss of his large collections will be regretted by naturalists and ethnologists, but nevertheless we should be glad that the enterprising traveller succeeded in extricating himself from the innumerable dangers and difficulties surrounding him.

BOOK-REVIEWS.

Report of the Committee on Disinfectants, of the American Public Health Association. Concord, N.H., Republ. Pr. Assoc. 8°.

THE report of the committee on disinfectants, of the American Public Health Association, presented at the Toronto meeting in October last, has just been printed. It deals with the various apparatuses now in use in this country and Europe for disinfection by means of heat, and is abundantly illustrated. The experiments of this committee have demonstrated that the most efficient non-destructive disinfectants are, (1) steam under pressure at 110° C. (230° F.) for ten minutes, (2) dry heat at 110° C. (230° F.) for two hours (in the absence of spores), (3) boiling in water for one-half to one hour. It will be seen from this that the apparatus for disinfection by heat may be divided into three classes: (1) that in which dry hot air is employed, (2) that in which hot moist air is used, and (3) that in which steam is the disinfecting agent. In the disinfection of mattresses, feather beds, etc., where great penetrating power is required, dry hot air cannot be relied upon. In addition to this, there is another objection to the use of this agent, — that, when the temperature is sufficiently high to act as a disinfectant, certain articles are permanently injured by it. The committee expresses its conviction that the use of steam, and especially when superheated or under pressure, is the most efficient agent for the destruction of all sorts of infectious material. At the Boston quarantine station, Dr. S. H. Durgin, president of the Boston board of health, and a member of the committee, has been employing moist heat for disinfecting purposes since the spring of

1885. The disinfecting-chamber is a room ten by twelve feet, and seven feet high. It is made fairly tight, and has one window, on which is a thermometer so arranged as to be read from the outside. A hole two inches in diameter in the door admits a rubber hose, which discharges superheated steam from a boiler on a steamboat. The temperature of the room can by this means be raised in seven minutes to 230° F. It may easily be raised to 250° F. or more, but is generally brought to 230° F., and maintained at that point for twenty minutes. The articles to be disinfected are hung about the room loosely, and when removed, which is done as soon as the heat will permit, are found to be perfectly dry, not even the polish on freshly laundered shirts being damaged or changed. Boots, trunks, valises, and all other articles made of leather, are quickly destroyed by the high temperature, and should not be subjected to this process. Wood-work and paint are also damaged, and articles which are joined by cement fall apart. This process can be quickly applied, easily managed, and is without appreciable cost. Its trustworthiness as a disinfectant has already been established. Dr. Durgin describes the experience of the Boston board of health with the disinfection of rags in bales by means of superheated steam admitted to the interior of the bales through perforated hollow screws. In the first trial of this method a pyrometer indicated the temperature of the steam after it escaped from the bale to be 300° F. Bacteriologists had already shown that disease-germs of the greatest resisting power had been sterilized within the bale of rags which passed through this process. The evidence seemed sufficient to establish the claim that this process was effectual in its power to disinfect bales of rags. Subsequent tests showed that the rags might be intensely hot in one place, while in another they were perfectly cold. In one of these trials the moist heat used was at 300° F., and the time of exposure was four minutes. In some parts of the bales, after being removed from the steam-boxes, the intense heat could not be borne by the hand a moment, while at other points the rags were found to be cold. A still further test was made with steam at 500° F., and the time of exposure increased to eight minutes. Three bales were examined after being thus treated, and the cold places were found as before. Dr. Durgin was informed by the overseer of the process that a large number of bales had been set on fire by this intense heat, and that water had been required to extinguish them. The conclusions drawn by Dr. Durgin from these experiments are that the moist heat passing from the centre to the surface of a bale of rags must encounter knots or bunches of rags varying in degrees of density and of resistance to the penetration of heat; that while the temperature of the principal part of the bale is raised to a degree far above what is required for disinfection, other parts of the bale are found to be wholly unaffected by the heat. That anthrax bacilli have been killed and metals melted at 240° F. within bales of rags subjected to this process are facts not inconsistent with the experiences in Boston, and do not prove the disinfection of the whole bale. The degree of heat, the amount of pressure, and the time necessary for moist heat to penetrate and raise the temperature of *all* parts of a bale of rags to a degree necessary for disinfection without burning the rags, have not yet been declared.

Ethik als Grundwissenschaft der Pädagogik: ein Lehrbuch für Seminaristen, Studierende und Lehrer. Von Dr. MAX JAHN. Leipzig, 1887.

BOTH theoretically and practically the two foundation-stones of a system of education are psychology and ethics, — the one to set forth the nature of the mental activities, the other to expound the actual and ideal tendencies of human action. The systems of education that are prominent in its history derive an important characteristic from the kind and amount of attention they give to one or other of these underlying sciences. The history of educational methods similarly shows a recognition of this twofold origin in all stages: it may be as the education of the State or of the army, and that of the Church or the home. To-day our education has taken on a scientific tone: this advance was conditioned upon the scientific development of psychology and ethics. Any system of education that shall have the slightest chance of gaining a hearing in the future must take full account of the modern aspects of psychology and ethics; and any teacher anxious to command success must have within himself the power to healthily unfold these two sides of human character.

Dr. Jahn's handbook is intended to present a convenient sketch of the natural basis of a moral education. It is an excellent example of the useful kind of a book which a German teacher can produce. It is admirable as much for what it does not do as for what it does. The danger in all such books is to deal in meaningless generalities, to drift into long casuistical discussions, to neglect the important moral aspect of little habits, and in general urging the teacher to present to the child an ideal from which its healthy instincts revolt as from something artificial and pitiable.

The first section treats of the self-regarding and the social instincts and feelings. These furnish the material upon which a moral education is to be built. They present themselves in the earliest days of life; they are the deepest elements in human nature; a child in whom they are weak is defective quite as much as one born without eyes. The development of these instincts is the beginning of a moral education. That is essentially a wrong method that allows the child to act as whim directs, excusing it on the ground of ignorance, and then suddenly deciding to begin its moral training, and subjecting it to an internal revolution, — quite as wrong as that other current method that begins at once to appeal to the child with high motives and far-reaching theoretical considerations, and is satisfied with the consciousness that the child is learning what is the *maximum bonum*, while constantly neglecting to exercise the little virtues. A moral training that keeps pace with the emotional susceptibilities as founded upon the growth of mind and body utilizes each element when it is at its best, and produces that firm tissue in which morality is embedded as a habit.

Passing from the consideration of morality as conditioned upon the psycho-physical organism, the main ethical conceptions and ideas that inspire the acts of mankind are described, ingenious distinctions are drawn, and suggestive hints are given, which any good teacher can illustrate and enlarge upon for himself.

It is not sufficient to feel what is right or to know what is good: the deep emotion and the high ideal find their true purpose in action. Weakness of will is a greater source of crime than lack of sympathy. That breach between knowing and doing — which Socrates could scarcely realize — is to-day a widely current source of break-down. The will needs to be trained by action: the daily occasions which call for the exercise of emotional kindness must find to hand a habit that does them without effort. Thus the will-power is left free for the larger occasions of life, on the same principle that allows us to walk and talk at once, because our automaton does the former, leaving the higher centres free for mental work.

The moral will realizes itself in the social government and customs of families, of tribes, of nations. The altruistic feelings here find an appropriate field of action, and the good man becomes a good father and a good citizen. The relations of life are diverse, but a common idea of final good runs through them all. Again: these relations are the result of a development; they are connected with a history which explains their defects, and shows the dear price paid for their virtues. It is in this way that Dr. Jahn understands the educational function of ethics. What is new about it is more in the spirit in which the position is upheld, and in the order and proportion in which the several points are emphasized. It is a book well adapted to present needs, and will doubtless find wide use in Germany. Would that we could substitute some such work as this for the dry compends of mental and moral science that we put in the hands of normal-school students.

NOTES AND NEWS.

AT the last session of Congress a considerable sum was appropriated for the purpose of the establishment of several stations throughout the country for the distribution of fish by the United States Fish Commission, similar to the central station situated in Washington. The law provided that these stations should only be established in places where sufficient protection is afforded by law to the fisheries. For the purpose of investigating these conditions, and of making some observations relative to the propagation and distribution of young fish, Col. M. McDonald of the commission