

sitions will be reversed, Jupiter being to the west instead of to the east of Mars as heretofore.

Saturn is advancing in the eastern heavens and can be well seen after midnight. It is now in Virgo, a little more than ten degrees directly east of the first magnitude star Spica, and it is interesting to compare the light of the planet with that of the star. The former appears slightly larger than the latter, but it does not sparkle as Spica does, and it is not so white. The wonderful rings of Saturn can be viewed with a three inch telescope.

Uranus remains near the fifth magnitude star Nu in Libra, while Neptune is still between the golden horns of Taurus, a little above a line joining the fifth magnitude stars  $\alpha$  and Iota.

Mercury is too near the sun in the morning sky to be observed.

The month begins with the moon near first quarter in Gemini. The phase occurs on the 2d, at half past 4 P. M. The moon fulls on the morning of the 9th, in Virgo, and reaches last quarter on the evening of the 16th, in Capricornus. New moon occurs on the 24th, at 8:11 P. M. The moon will be in perigee half an hour before midnight on the 6th and in apogee at 7:44 P. M. on the 18th.

The moon's planetary conjunctions occur in the following order: With Jupiter on the 1st at 4:10 P. M.; with Saturn on the 10th at 2:42 P. M.; with Uranus on the 11th at 1:27 P. M.; with Mercury on the 23d at 11:48 P. M.; with Venus on the 27th at 5 P. M.; with Neptune on the 27th at 6:05 P. M.; with Jupiter (second visit) on the 29th at 4:27 A. M.; with Mars on the 29th at 6:56 A. M.

Venus and Neptune will be in conjunction at 6 P. M. on the 29th. The planets will be three degrees apart, Venus being situated on the north.

A few phenomena of Jupiter's satellites in Eastern standard time follow: On April 2, at 5:27 P. M., the shadow of satellite IV will pass upon the planet's disk, and will pass off at 7:51 P. M. On April 4, at 9:52 P. M., satellite I will pass upon the planet's disk; its shadow will follow at 11:07 P. M., and will remain upon the disk until after the planet has set. On April 13, at 6:19 P. M., satellite I will enter upon the planet's disk; its shadow will follow at 7:31 P. M., and will be half way across at 8:40 P. M. On the same evening, at 8:27 P. M., satellite II will be occulted by passing behind the planet. On April 21, at 8 o'clock 59 minutes and 59 seconds, satellite I will reappear from eclipse in the planet's shadow. Watch for it on the eastern side of the planet at a distance of about half the diameter of the disk.

GARRETT P. SERVISS.

#### THE CAREER OF A CHEMIST—A REJOINDER.

The pathetic lament of J. G. L., on page 130 of the SCIENTIFIC AMERICAN, who acknowledges his career to have been a failure, has but little to do with the sentiments expressed in the article, "On the Choice of a Career," that appeared some weeks previous. There are men, yes, and worse, who have not succeeded in the life work planned for them, not because they were incompetent, but because they were lacking in that peculiar ability of persisting in spite of obstacles that is typical of the best Americans. Grant had it and showed it when he wrote the famous sentence, "I propose to fight it out on this line if it takes all summer." Goodyear had it when he persisted in his efforts to accomplish the vulcanization of rubber, although he became an object of ridicule and was called an India rubber maniac. Ericsson had it when he built the "cheese box on a raft" that saved the Union on March 9, 1862, by driving the Merrimac under cover. Castner had it, too, when the electrolytic processes for the production of aluminum threatened the annihilation of his patents. He did not say, "I am no bookkeeper," "I cannot accept a position as a druggist," "I cannot enter a shoe store as a clerk, nor can I work as stevedore." No. He did what Grant did the close of the first day at Shiloh—namely, he gave orders for "an advance all along the lines the next morning." Finding the benefits of the aluminum process taken from him, he created the sodium industry.

I wonder if J. G. L. knows anything about the history of American chemistry. Prof. Chandler came to New York and accepted his appointment at the then newly organized School of Mines without salary, because he knew that he could make something out of it. His gratuitous services to the Board of Health in this city resulted in the creation of the office of chemist in that department for him. The younger Silliman organized a school of chemistry in the basement of one of the buildings in Yale College, and the result is the Sheffield Scientific School. He received no salary at first.

Coming back to recent years, Remsen knew what he was about when he set Fahlberg to work on those compounds among which he discovered saccharine. I am afraid there is no place for J. G. L. among chemists, and there are many who are like him. But, on the other hand, Lafayette, among our colleges, advertises for young men to study chemistry. Edward Hart, who fills the chair of chemistry there, said in 1893, in his address before the chemical section of the American

Association for the Advancement of Science, "In the Lehigh Valley, Pennsylvania, a district which took the lead in the iron district, there were not at that time [1868] more than two or three persons capable of making an analysis. Now the number of persons who would come under the same head, most of them actually engaged in such work, is fifty." Dr. Peter T. Austen, of the Brooklyn Polytechnic Institute, finds places for all his graduates, and even in the same issue of the SCIENTIFIC AMERICAN as J. G. L.'s communication calls attention to "an invention needed." By the way, Dr. Austen, since his return from Germany in 1876, has never found that his "training and schooling" have made it necessary for him to regret his choice of a profession. If J. G. L. will dine with him, as I have done, and hear of the opportunities that have come to him, he will wish he was that kind of a chemist.

Perhaps J. G. L. may think that there is nothing practical in these hastily written notes. There are some persons who cannot be led; they must be driven. When I think of the good work that is being done by our chemists through the United States, I feel that there is no cause for despondency. Indeed the future is brighter than ever before. I wish my many friends in the chemical profession would testify in full to what I know only in part. If Dr. C. A. Doremus would tell what he has done for the improvement of glass, or Dr. G. W. Drummond would tell what he has accomplished in the manufacture of paints, or H. M. Murphy would tell what he has done for the varnish industry, or if Dr. Waldron Shapleigh would tell what he has accomplished for the economic production of the rare earths for artificial illumination, or if E. K. Mitting would tell what he has done for the soap industry, or if Dr. Charles M. Shepard would tell what he has done for the development of a tea industry in the country, or, last of all, read what Prof. H. W. Wiley has done for the sorghum and beet sugar industries. By talking with these men and learning what they have done then perhaps J. G. L. will appreciate what it is to be a chemist. It is such men—and perhaps my illustrations are not the best ones—who are making great strides in the advancement of our American industries, and the time is steadily approaching when American genius will make these United States the greatest industrial country of the world.

The French government sent to the World's Fair, held in Chicago during 1893, as its special representative, Prof. A. Haller, of the technical school in Nancy, to study the advances made in industrial chemistry as shown by the exhibits there. His report, which has just been issued, and sent to me by him, contains the following paragraph concerning the States. He says: "No nation in the world possesses such wonderful natural resources and in no other country is it possible to produce under equal conditions of cheapness. And the time will come when it will have men educated to appreciate this condition of affairs and who know the state of European industries. Then the artificial conditions that have existed for almost a half a century will come to an end."

I commend this article to J. G. L.

#### New Englanders the Finest Mechanics in the World.

Hiram S. Maxim, the inventor of the Maxim gun, who has had a large experience during many years in manufacturing in various countries, and who ranks personally as a great mechanical expert, has the following to say, in a recent interview published in the New York Sun, touching the skill of the mechanics of different countries:

"Regarding the comparative skill of mechanics—American, French, British, Spanish, German—it would be impossible for me to mention one nation that excels in everything. Each nation has its own peculiarities and its own specialties. So far as my experience goes, and I have had a great deal of it, I should say that the New Englanders are the finest mechanics in the world. I think any one who has investigated the subject will have to admit this. The tools which are designed and made in New England are incomparably ahead of those made in any other country. There is nothing in Europe that can at all compare, for instance, with the tools made by Brown & Sharpe, of Providence, R. I., Pratt & Whitney, of Hartford, Conn., and the American Tool Company, of Boston. The Americans also excel in the manufacture of revolvers and sporting rifles, while for wood-working tools and machinery they are far ahead of all other nations. They are also ahead in automatic machinery for working metals and also in boot and shoe machinery, etc. There are, perhaps, about as many great inventions made in the United States as in all the rest of the world. The English may be considered the most skillful manufacturers of high class woolen goods. They are quite equal to any in the manufacture of velvets and plushes. The hand-made double-barreled guns used for sporting purposes have reached a higher degree of excellence in England than in any other country. The English also have a leading position as builders of ships and marine engines. Microscopic and photographic apparatus is also very well done in England.

"I find that the Germans are very good mechanics; they are quick to appreciate the advantages of a new system and to adopt it. The German tool makers have profited very largely by the introduction of American tools. Only a very few such tools, as, for instance, milling machines, etc., are imitated in England, but the Germans imitate every mortal thing of any value made in the States, and their work is only slightly inferior to that of the Americans. I have purchased and compared genuine American tools with German imitations, and have found that the castings of the former are sounder and stronger, and that the deviation from truth, though very small, in the German tools is three or four times as great as in well made American machines. The Germans excel in all sorts of cheap bronze articles, colored printing, etc. While the Austrians are very backward in tool making, they excel in leather work.

"The Frenchmen are all-round good mechanics. The imitations of American tools made in France are nearly as accurate as the genuine articles themselves, while their instruments of precision are quite as accurate as those made in the States, but they are not made in quantities as is done there, and so the price of the French instruments is four or five times as great as the American. The French are a nation of workers; they seem to like it, and I believe, everything considered, the Frenchman is the best mechanic in Europe.

"In regard to Spanish mechanics, the number of manufactured articles which the Spaniard excels in is exceedingly small. Steel work inlaid with gold and silver and Damascus steel are their specialties. Some of this is very beautifully executed, and perhaps superior to anything else that is done in the world.

"Forty years ago England was by far the greatest manufacturing nation in the world. In America, if any one wanted a good saw, a good plane, a reliable file, or a chisel that could be depended upon, he insisted that it should be made in England; nothing except of English make would bring a fair price. At the present moment the Americans not only make their own tools, but are exporting largely to England. At the time when it was necessary to pay forty per cent duty on English steel to get it into the United States the Americans purchased it, paid the forty per cent duty, manufactured it into twist drills and other small articles paid about one and a half times the daily wage demanded in England, and sold at a price considerably below what the same work could be produced for in England a much better article than ever had been made in England. Take the Morse twist drills, for instance. I have no doubt that these are largely manufactured from English steel on which a duty has been paid. Still, they are very largely sold in England to-day. In fact, if anybody wants a reliable one, they always demand the American drill made by the Morse Twist Drill Company.

"A few years ago while in St. Petersburg I visited a large dealer in hardware. I asked him where his tools came from. He said: 'Originally we got nearly everything from England. At the present time the very cheap and poor tools are made in Russia, the common tools that we sell to everybody are made in Germany; we get a few articles from France. From England we only buy a few Stubs' files, reamers, and engraving tools, while our very high priced instruments of precision, such, for example, as micrometer calipers, squares, scales, rules, etc., come from the United States.' He told me that the sale of English goods had fallen off lately so much that he was only selling a small fraction of what he originally sold.

"Some few years ago, if any one in Europe wanted a drill press, a turning lathe, a planer, or shaping machine, he was sure to get it from England. When the German government decided to make their rifles on the American interchangeable plan they purchased from Messrs. Pratt & Whitney, of Hartford, Conn., about \$1,500,000 worth of American tools. These were brought to Germany, and a very enterprising manufacturer in Berlin, seeing the great advantage of the American style of tools over those of European make, established a factory and commenced to build them on a very large scale. To-day this enterprising manufacturer has not only practically driven the English tools from the market on the Continent of Europe, but he is also sending tools to England and selling them at prices considerably below those of English tools, and moreover, as they are close copies of American designs, they are found to be much handier and better adapted to the work than tools of English design."

#### Good Business Maxims.

Carefully examine every detail of your business. Be prompt in everything. Take time to consider and then decide positively. Dare to go forward. Bear troubles patiently. Be brave in the struggle of life. Maintain your integrity as a sacred thing. Never tell business lies. Make no useless acquaintances. Never appear something more than you are. Pay your debts promptly. Shun strong liquor. Employ your time well. Do not reckon upon chance. Be polite to everybody. Never be discouraged. Then work hard, and you will succeed.—Notes and Queries.