THE RADICAL: FRIDAY, MARCH 14. 1873.

SPECTRUM ANALYSIS. What it has Done for Physics, Chemis-

try, and Astronomy. By spectrum is not understood in physics a spectre or ghostly apparition, as the verbal interpretation of the word might well lead one to suppose, but that beautiful image, brilliant with all the colors of the rainbow, which is obtained when the light of the sun, or any other brilliant object, is allowed to pass through a trianguiar piece of glass-a prism.

The unassisted eye can perceive no difference in the light from the heavenly bodies and that from various artificial sources, beyond a variation in color and brilliancy; but it is quite otherwise when the light is viewed through a prism. There are then formed very beautiful colored images or spectra, the constitution and appearance of which depend up on the nature of the substance emitting the light. The different appearances presepted by these colored images are so entirely characteristic, that to every sub stance, when luminous in a gaseous form, there corresponds a peculiar spectrum, which belongs only to that peculiar substance.

It follows, therefore, that when the spectra of different substances have been determined once for all, by previous re searches, and have been recorded in maps or impressed upon the memory, it is easy in any future investigation to recognize at once, from the form of the spectrum which a body of unknown constituents presents, the individual substances of which it is composed.

This statement presents in general terms of nature of spectrum analysis. It analyzes bodies into their constituents parts, not as the chemist, with alembics and wtorts, with reagents and precipitates but by means of the spectra which these substances give when in a state of intense luminosity.

Spectrum analysis in no way supplants the methods of chemical analysis hitherto in use; for its fanction is neither to decompose wir to combine bodies, but rathes to reconnoitre an unknown territow, and to stand sentinel and to signalize

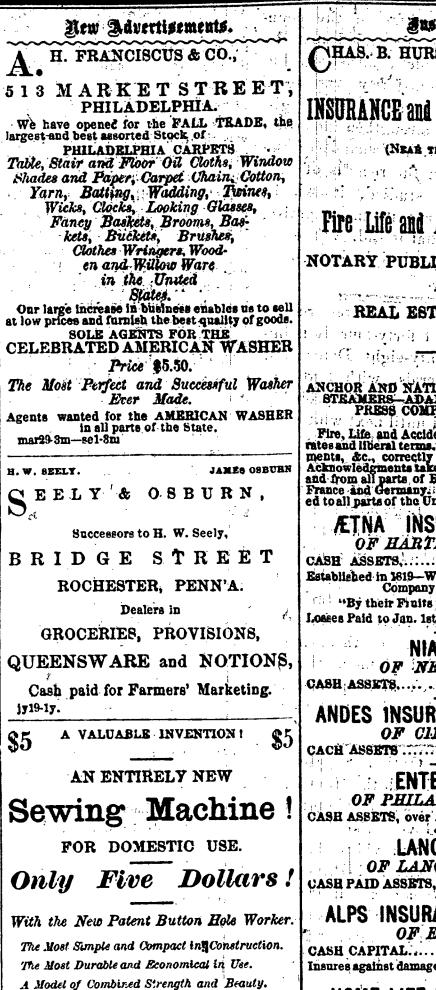
WASHINGTON IN WAR TIME. John Hay, the well-known private Secretary of President Lincoln, lectured in Troy, Tuesday night. His lecture is highly praised by the local press. From the report of the Whig, we take the following reference to the young hero who sleeps on the hillside at Mcchanicsville: Of these he could only mention two-Baker and Ellsworth. Paying an eloquent tribute to the former, he said that of Ellsworth it had often been remarked, "It was well for his fame that he died when he did," and that his death was the result of his own recklessness. Perhaps it was, but the man who is guilty of no recklessness at twenty-one will not be apt to show much heroism during the rest of his life. The lecturer had known Ellsworth when he shared with the young law student his purse in return for his brilliant fancy, and he could testify that he (the speaker) was the one most benefitted As he stood beside his corpse, a Zouave, from whose cheeks the tears had only partly washed the dust, said, "Did you know him ?" The reply was "Yes." "Then," said the soldier, "you know'd

the bulliest little man that ever stood inside of a pair of boots."

Mr. Hay closed with the following beautiful and eloquent tribute to the soldiers of the late war :

"As in the old tragedies after the fall of the hero came the flourish of the trumpets and the entry of the forces, so after Lincoln had gone from Washington came in the victorious soldiers. It seems to me no such touching pageant was ever seen. There was not a regiment with half its complement of men. There was scarcely a soldier or an officer with a whole uniform. There was scarcely a banner but what was blackened with smoke and riddled with the fiery hail of fight. Yet, as it marched past the reviewing generals, past Grant, and Sherman, and Stanton, and the Representatives of the Old World. all in gala dress, no one doubted any more that this was the greatest army that ever went to war. In that colossal and in-

spiring picture of Kaulbach, which shows





to the physicist, the chemist, and the astronomer the presence of any substance brought beneath its scrutiny. With what acuteness, with what delica-

cy does spectrum analysis accomplish this task? When the balance, the microscope, and every other means of research at the command of the physicist and the chemist utterly fail, one look in the spectroscope is sufficient, in most cases, to reveal the presence of a substance. If a pound of common salt be divided into 500,000 equal parts, the weight of one of these portions is called a milligramme. The chemist is able, by the use of the most delicate scales and the application of special skill, to determine the weight of such a particle; but, in³doing so, he comes close upon the limits of his power of detecting by chemical means the presence of sodium, the chief element in common salt. But if that small milligramme be subdivided into three million parts, we arive at so minute a particle that all power of Jiscerning it fails, and yet even this excessively small quantity is sufficient to be recognized with certainty in a spectro scope. We have but to strike together the pages of an old dusty book in order to perceive immediately in a spectroscope placed at some distance, the flash of a line of yellow light which we shall presently learn is an unfailing sign of the presence of sodium.

It was to be expected that so sensitive a means of investigation, from which no known substance can escape, would very soon lead to the tracking out and discovery of new elements which, till then, had remained unknown, either because they are scattered very spairingly in nature, or stand out with so little that is characteristic, from some other substance, that the imperfect chemical methods hitherto in them.

This expectation was brilliantly real ized even by the first steps taken in this direction. The two Heidelberg professors, Bunsen and Kirchhoff, to whom we are indebted for the discovery of spectrum analysis and its application to practical new instrument, two new metals, casium and rubidium, to which two others, thallium and indium, have been since ødded.

· saits which spectrum analysis has furnished in the provinces of physics and chem-

It is possible by means of a prism to thing acting or inserted in another like a Orders solicited and promptly filled at lowest decompose into its component parts the wedge or the piston of a steam engine. orice. light of the sun, the planets, the fixed In pathological science the term is ap stars, comets, rebulæ, and thus obtain plied to express the formation of a clot, their spectra in the same way as that of either in the heart itself or in one of the earthly luminous substances. By a carelarge blood vessels, which operates as a ful comparison of the spectra of the stars plug or like a pistou that will not work. with the well-known spectra of terrestrial This clot is said to have been the immesubstances, it can be determined, from diate cause of Napoleon's death; and we their complete agreement or disagreesuppose there have been hundreds of strong ment, with a certainty almost amounting men in common life who have died in the to mathematical precision, whether these same way, and none of their friends knew substances do or do not exist in those re- they had "embolism." mote heavenly bodies. The foregoing Nor content with dividing the honors statements present, in general terms, the tesence and scope of spectrum analysis. of "Mary's little lamb" with the dear lit-Its starting point is the spectrum of each the duck which follows the Boston young individual substance, and in order to ob- lady to matinees, waits outside until the this it is requisite that the substance performance is over, and then cheerfully should not only be luminous, but should quacks itself home again with her, there and cmit a sufficient quantity of light. Dark is now brought forward a horse who not st bodies are not available for spectrum only takes the children of his owner to the analysis; if they are to be submitted to school in the morning, but returns in the its scrutiny, they must first be brought evening when school is dismissed, and Ja into a state of vivid luminosity.-From rubs his intelligent nose against the win-Spectrum Analysis Explained, by Schellen. dows to let them know he is there.

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the legendary fight of Attila, there are two fields and two contests, the one between the soldiers arrayed in deadly combat on the turf, and the other a shadowy battle set in the upper air, among the ghosts of the heroes slain below; so all hearts that day were divided in reverence and gratitude between our two armies, the one on its way homeward crowned with love and laurule, preparing its own unselfish disarmament and its return to the peaceful interests of the country it had saved; and the men of the other, invisible forevermore, in those wasted columns who had gained their promotion on the battle field to a higher and wider sphere of duty, fulfilling now the scheme of the Lord of Hosts in some activity above the clouds.

"Thus they passed on, the victors and the martyrs out of the army into peace, out of sorrow into holy memories. And with the sweet and thrilling sounds of the bugles, and the rising dust of the columns smitten into golden glory by the sun setting over Georgetown Heights, passed away the Heroic Age from Washington."

Taste in Dress.

It is well to follow the mandates o Dame Fashion to a certain extent, when they are not injurious to health or abso lutely opposed to good taste. It does not show good sense to persist in wearing garments se oid fashioned as to attract attention; neither is it sensible or in good taste to adopt the extreme of a fashion, especially if that fashion is, to say the least, of doubtful beauty. For example, many ladies are apparently unconscious of the ridicule to which they expose themselves by their absurd use of monstrous paniers. This addition to dress can scarcely be called "a thing of beauty" in use have not been able to distinguish itself, and when affixed in its appointed place it sometimes produces a most ludicrous effect, and often positively deforms the human figure. Why can not ladies of really good taste show it by following fashion in such moderation that they can be distinguished from those who. destitute of taste themselves, are forced science, very soon discovered with their | blindly to adopt every style, or to follow the dictates of their dress makers? Especially for the street should such costumes be discarded as will render one conspicuous. A true lady never desires But all the brilliant and astounding re- to attract the gaze of rude eyes in public CAN, BUCKET AND SHELL OYS places.

THE word "embolism," used to express istry have been far surpassed by its perthe cause of Napoleon's death, is derived formances in that of astronomy. from the Greek "embolus," meaning any.

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