

squares of the diameters of the glasses. The square of 36 is 1,296, and the square of 40 is 1,600. It appears, then, that while the diameter of the new glass will be only one-ninth greater than that of the Lick glass, its light-grasping power will be about one-fourth greater. This will be a very important gain, if the workmanship upon the new glass is equal to that displayed by the old one, for celestial phenomena, such as faint stars and nebulae, that lie beyond the reach of the great telescope on Mount Hamilton, will be readily seen with the aid of its larger rival in Southern California. Among the discoveries which Dr. Holden has achieved with the Lick telescope is that of the existence of heliacal nebulae, that is to say, of nebulous masses which, by some wonderful process, have been drawn out into vast spiral coils like the thread of a screw. These are not insignificant, but so extensive that if our own huge solid globe were expanded into a cloud of the thinnest vapour it would be but a speck beside them. The new 40-inch telescope ought to throw a flood of light upon these strange forms. Then in astronomical photography, which has made astonishing strides within a few years past, the new telescope may fairly be expected to perform wonders. Its great object glass will grasp forty thousand times as much light as can enter the pupil of an average human eye, and this light, concentrated upon the extremely sensitive plates which the modern art of photography furnishes, will picture there scenes in the depth of space which no eye has ever beheld or could ever hope to behold in any other way. A marvellous field for research of this description has, within a few months, been discovered in the constellation of Orion, where many square degrees of the sky surrounding the Belt of Orion have been found to be covered with a network of nebulous streaks and patches, amid which shine thousands of stars. How this wonderful region will appear in the new telescope when it has been mounted on its mountain top in the transparent air of Southern California can, as yet, only be imagined. A great deal of light may be thrown upon some of the vexed questions concerning Mars, Venus, and the other planets by the new telescope. There are very puzzling appearances on their surfaces, some of which seem to demand for their solution but a comparatively slight increase of telescopic power beyond our present limit.—*New York Sun.*

THE SURFACE OF THE SUN.

ON an examination of the solar disc for the first time there appears little to be seen, especially after our study of the surface of the moon, which appears so diversified with plains, mountains, craters, and shining streaks. On a general view the surface of the sun through the telescope appears somewhat like curdled milk seen at a little distance, or like rough drawing paper, but on a more careful scrutiny irregular grains of extreme brilliancy will be seen arranged in groups, and streaks will appear floating in a darker medium with a larger telescopic power. The grains appear to be an aggregation of granules or luminous dots about 100 miles in diameter, forming about a fifth part of the sun's disc, and probably giving at least three-fourths of its light. They are compared to rice grains by Secchi, and to Nasmyth they appeared like willow leaves thousands of miles long, and interlaced somewhat like basket work. There are irregular bright streaks occurring near the solar limbs, sometimes extending for 20,000 miles, termed faculae, which appear to be luminous matter elevated above the general surface in crests and ridges protruding through the solar atmosphere like mountains, which, to be seen at all, must be at least 230 miles in height, or about forty-five times the height of the highest mountains on the earth. These faculae are merely elevations, and have not the permanence or stability of mountains. They are continually changing like terrestrial clouds rolling and tossing, and changing their form like a sheet of flame. The photosphere itself is merely a sheet of self-luminous clouds like those of our own atmosphere, our rain being replaced by a rain of molten metal condensed from the vapours of metal that so largely exist in the sun's atmosphere. The solar atmosphere in which these clouds are suspended is really a burning fiery furnace at an inconceivable temperature, in which faculae and granules are formed by a commotion, raging with an intense and awful fury so much beyond our conception, that we are utterly unable at such an immense distance to grasp or realize it in even the faintest degree. Dante's Inferno, or the lake burning with fire and brimstone, cannot be compared to it for one moment.—*Newberry House Magazine.*

INVENTION THE FRIEND OF WOMAN.

THE most conspicuous, as well as the most beneficent, of the sociological changes which this century has witnessed has been a steady and great improvement in the condition of woman as a result of inventive progress. Within the memory of persons who are not very old, the average woman's life was one of cheerless drudgery. Sixty or seventy years ago there were comparatively few American families whose "women folks" did not do all the house work without the aid of servants. It was hard work—brutally hard we should call it in these days—for it was unrelieved by any of the varied appliances that have since been devised to facilitate or obviate it. And this tedious toil, including spinning, weaving, and churning, was performed in houses whose inmates had never heard or dreamed of the thousands of elegancies, luxuries, and comforts that are now within the easy reach of the "common people." Then there were but two kinds of occupation open to our young women—housework and school-teaching—and the

latter was accessible to but a limited number and at small compensation. When invention began to open up manufacturing industries, the area of woman's work grew immensely. Then came the sewing-machine—as great a blessing as if it had been handed down from the Great White Throne. Meantime, the progress of civilization brought about a better appreciation of women's value as teachers, and they began to supersede men in that great calling. Manufacturing industries, in which women had a place, multiplied rapidly between 1840 and 1860. Since that date the telephone, the type-writer, increased demands for stenographic clerks, and a constant advancement of correct notions of woman's place in the world have opened avenues in which vast numbers of women and girls are usefully and happily employed. There are few occupations now to which women are strangers, and the condition of society is immeasurably improved by this multiplication of the employments of woman. Greater than the influence of the schoolmaster or the preacher has been that of the inventor in bringing about the emancipation and elevation of the "better half" of the human family.—*Inventive Age.*

AT THE TURN OF THE ROAD.

THE glory has passed from the goldenrod's plume,  
The purple-hued asters still linger in bloom;  
The birch is bright yellow, the sumachs are red,  
The maples like torches aflame overhead.

But what if the joy of the summer is past,  
And winter's wild herald is blowing his blast?  
For me dull November is sweeter than May,  
For my Love is its sunshine—she meets me to-day!

Will she come? Will the ring-dove return to her nest?  
Will the needle swing back from the east or the west?  
At the stroke of the hour she will be at her gate;  
A friend may prove laggard—love never comes late.

Do I see her afar in the distance? Not yet.  
Too early! Too early! She could not forget!  
When I cross the old bridge where the brook overflowed,  
She will flash full in sight at the turn of the road.

I pass the low wall where the ivy entwines;  
I tried the brown pathway that leads through the pines;  
I haste by the boulder that lies in the field,  
Where her promise at parting was lovingly sealed.

Will she come by the hillside or round through the wood?  
Will she wear her brown dress or her mantle and hood?  
The minute draws near—but her watch may go wrong,  
My heart will be asking: What keeps her so long?

Why doubt for a moment? More shame if I do!  
Why question? Why tremble? Are angels more true?  
She would come to the lover who calls her his own  
Though she trod in the track of a whirling cyclone!

I crossed the old bridge ere the minute had passed.  
I looked: lo! my Love stood before me at last.  
Her eyes, how they sparkled, her cheeks, how they glowed,  
As we met, face to face, at the turn of the road!

—*Oliver Wendell Holmes, in October Atlantic.*

A LEVEL HEAD.

THE ADVANTAGE OF PRESENCE OF MIND IN AN EMERGENCY.

DURING the late strike on the New York Central Railroad, the militia were ordered to be in readiness in case of a riot, but they were not called out.

In an interview, Gov. Hill said the troops were not to be called upon except in case of an emergency. The emergency had not arisen, therefore they would not be ordered out. He remarked that this was the first great strike with which he had experience, and he did not propose to lose his head; the only point at which there had then been serious trouble was at Syracuse, and there a deputy sheriff had lost his head and precipitated an encounter.

The strike continued several weeks, and there was riotous action at various points along the road, but the civil authorities were able to cope with it without calling on the militia.

The test of a man's real ability comes when an emergency arises which makes a hasty call on his good judgment and discretion. The man who retains his presence of mind, maintains his equipoise and exercises sound discretion at such critical junctures, is to be relied on and will be put to the front.

Men with level heads have the staying qualities which do not falter in the face of danger. Otis A. Cole, of Kinsman, O., June 10, 1890, writes: "In the fall of 1888 I was feeling very ill. I consulted a doctor and he said I had Bright's disease of the kidneys and that he would not stand in my shoes for the State of Ohio." But he did not lose courage or give up; he says: "I saw the testimonial of Mr. John Coleman, 100 Gregory St., New Haven, Conn., and I wrote to him. In due time I received an answer, stating that the testimonial that he gave was genuine and not overdrawn in any particular. I took a good many bottles of Warner's Safe Cure; have not taken any for one year."

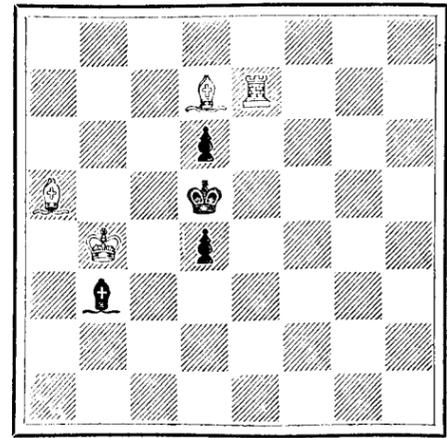
Gov. Hill is accounted a very successful man; he is cool and calculating and belongs to the class that do not lose their heads when emergencies arise.

CHESS.

PROBLEM No. 507.

By W. A. SHINKMAN and OTTO WURZBERG, Grand Rapids, Mich.

BLACK.



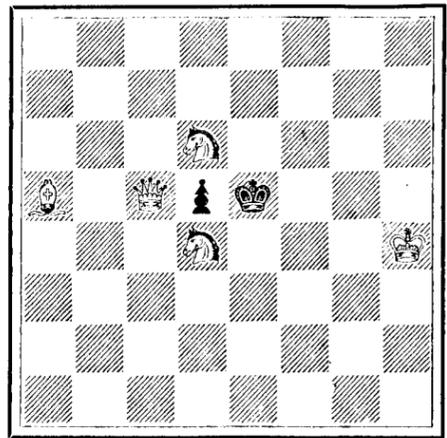
WHITE.

White to play and mate in three moves.

PROBLEM No. 508.

By H. M. PRIDEAUX.

BLACK.



WHITE.

White to play and mate in two moves.

SOLUTIONS TO PROBLEMS.

- |               |          |          |         |
|---------------|----------|----------|---------|
| No. 501.      |          | No. 502. |         |
| White.        | Black.   | 1. P-B 5 | R-K R 5 |
| 1. Q-Q Kt 8   | 2. K-Q 5 |          |         |
| 2. P x P      |          |          |         |
| 3. Q-K 5 mate |          |          |         |

GAME PLAYED IN BRITISH INTERNATIONAL TOURNEY AT MANCHESTER, ENG.

SICILIAN DEFENCE.

GUNSBERG.	BIRD.	GUNSBERG.	BIRD.
White.	Black.	White.	Black.
1. P-K 4	P-Q B 4	21. K R-R	R x R
2. Kt-Q B 3	Kt-Q B 3	22. R x R	P-Q B 4
3. Kt-B 3	P K-Kt 3	23. R x P	Q-Kt 3
4. P-Q 4	P x P	24. R-R 3	Q-Kt 7
5. Kt x P	B-Kt 2	25. R-Kt 3	Q-R 8 +
6. B-K 3	P-Q 3	26. Kt-Q 1	B-Q B 3
7. B-K 2	B-Q 2	27. B-Q 2	B x P
8. Castles	Kt-B 3	28. R-K 3	P-B 4
9. P-B 4	P-K R 4	29. R-K 1	Q-R 5
10. P-K R 3	P-R 5	30. B x R P	Q-Q 5 +
11. Q-Q 2	Q-R 4	31. Q x Q	P x Q
12. Q R-Q 1	Q R-B 1	32. Kt-B 2	P-Q 4
13. P-R 3	Kt-R 4	33. R-K 2	R x P
14. B x Kt	R x B	34. R-K 1	P-Q 6
15. P-Q Kt 4	Q x R P	35. Kt x P	B x Kt
16. R-R 1	Q x P	36. R x P +	K-B 1
17. R-R 4 (a)	Q-Kt 3	37. R-K 6	B-Q 5 +
18. Kt-Q 5	Q-Q 1	38. K-R 2	B-K 5
19. Kt x Kt	P x Kt	39. R x P	K-B 2
20. Kt-B 3	R-Q R 4	40. Resigns	

NOTES.

(a) Why not K R-Kt 1. It would I think win the Q for a Rook and a minor piece.

SOME manuscript fragments of Dante's "Divina Commedia" have been found at Sarzana in two parchment rolls, discovered among the papers left by Signor De Tomei, a notary. They are of great importance, as they belong to one of the first copies of the poem ever made. The Biblioteca Marciana of Venice has recently acquired a valuable codex of the "Divina Commedia," written in the first half of the fifteenth century, in semi-Gothic characters, and with marginal notes in Latin made by the same hand. The manuscript belonged to the rich library of the Counts Piloni of Belluno.

ACCORDING to "Mufti," of the *Ottawa Citizen*, it is to Sir Edmund Walker Head, formerly Governor General of Canada, whose widow has lately died in England at the advanced age of eighty-two, that Canada is indebted for the selection made of the particular designs from which the national buildings at Ottawa were constructed, the decision being left entirely to his well-known taste and judgment. Of Lady Head, Mr. Morgan says she will be best remembered for her active benevolence and devoted deeds of kindness to the poor and distressed of Toronto during the great financial crash of 1857-58.