dexterity that turns out good iron or steel work adds the mental training that perceives whether such and such a piece of machinery is the best for such and such a purpose. To use Mr. Clarke's words: "Theory without practice to test it, to verify it, to correct it, is idle speculation, but practice without theory to animate it, is mere mechanism."

COSTLY LIFE INSURANCE.

It is not by the early failure of assessment schemes that their members lose most money. The longer some of them live the heavier the loss becomes, in expenses apart from death losses. It is astonishing how much money it takes, out of each \$100 received, to run an assessment machine. Here are a few specimens from the official reports of their business for the one year, 1884 :---

| Name. | Income. | Expenses. | per \$100 |
|--------------------|------------|-----------|--------------|
| BankersLife Ass'n | | - | |
| Iowa | \$103.131 | \$ 24.486 | \$23.70 |
| CommercialMutual | *100,101 | * =-, | |
| Detroit | 15.897 | 9.954 | 62.60 |
| Detroit M Benefit | 10,001 | 0,000- | |
| Association | 14 937 | 5.074 | 33.90 |
| Equit Reserve F. | 11,001 | 0,011 | |
| New York | 11.506 | 5.910 | 51.30 |
| Home Benefit S'v. | 11,000 | -, | |
| New York | 34,436 | 15.429 | 44.80 |
| Home Prov't Safety | | , | |
| F New York | 16.380 | 6.374 | 38.90 |
| Magonic Mutual | | | |
| Cleveland | 10.772 | 7.000 | 64.90 |
| Magonic Mut Bene | | | |
| fit Indiana | 271.218 | 81.567 | 30.00 |
| Magonia Aid Ass'n | 2,1,210 | 02,001 | |
| Chiengo | 571 629 | 99.728 | 17.40 |
| Mutual Boyefit N V | 87 350 | 53.763 | 61.50 |
| " Delief Bo | . 01,000 | 00,100 | 01.00 |
| abostor | . 9.10.968 | 60 626 | 25.20 |
| Mutual Deserve F | 240,200 | 00,020 | 20.20 |
| New Vork | 045 961 | 200 206 | 31 73 |
| Addellows' P G | . 940,201 | 500,500 | |
| Oddienows D. S. | , 19 101 | 5 551 | .19.00 |
| Denergo | 15,191 | 0,001 | 42.00 |
| Mish | , 0.691 | 4 4 4 4 | 46 10 |
| Milch | . 9,001 | 1,111 | 10.10 |
| Security M. Ben nt | , | 7 561 | 89 QA |
| New 10rk | . 22,922 | 1,001 | 52.50 |
| U.S. Mut. Accident | , 206 021 | 171 910 | 50.90 |
| New IOrK | . 000,004 | 171,010 | 09.20 |
| womens' Mut. Ins. | , | 90 400 | 76 50 |
| New York | 20,000 | 20,400 | 10.00 |
| Loung Men's Mut. | 16.004 | 7 690 | 47 40 |
| Unio | . 10,094 | 1,029 | 31.30 |
| | | | |

A MARINE RAILWAY.

The St. John Telegraph contains the following account of the Chignecto Marine Transport railway, now in course of construction across the isthmus between Bay Verte and Chignecto Bay, nearly bordering upon Westmoreland county in New Brunswick and Cumberland county in Nova Scotia :

"The Chignecto Marine Transport Railway is making gratifying progress. Since the clearing was commenced three months ago ten miles have been completed, and there now remain only seven miles more to do to finish this portion of the work. The construction of the road bed will immediately follow the completion of the clearing.

The practicability of lifting steam and sailing vessels out of their natural element and transporting them overland is accepted with considerable doubt by those unac-Why these quainted with engineering. doubts should exist is not clear. A ship across the Chignecto isthmus, is simply the sport railway is a combination of both, the year may see the line in a position to begin

adoption and combination of two wellknown and successfully applied engineering principles. For many years vessels, with cargoes, have been lifted without accident in the Victoria Dock, London, and by the hydraulic ship lifts at Bombay and Malta. In each of these docks vessels of a greater size and weight than any likely to be engaged in the Bay of Fundy and Gulf of St. Lawrence trade have been raised clear of the water while being repaired. As the lifts which are to be used at the two ends of the Chignecto Marine railway are to be identical with those above enumerated, all of which have now been in operation for over fifteen years, it is only fair to presume that the Chignecto lifts will be operated with equal success as those at London, Bombay, and Malta. In the last mentioned dock, within a short time, the following cargo-laden vessels, which are but a few of the many, have been raised :---

| | Name of | Gross | Weight | Total dead |
|---|-------------|----------|-----------|------------|
| | vessel. | tonnage. | of cargo. | weighttons |
| | Alice Otto | 1,267 | 700 | 2,255 |
|) | Eghert | 1.717 | 1,600 | 3,414 |
| | Volmer | 1.531 | 1,200 | 2,645 |
|) | Magdala | 2.154 | 1,700 | 3,236 |
| | Good Hope | 1.555 | 1,500 | 2,984 |
| ۶ | T W Barber. | 1.443 | 1,140 | 2,580 |
| | Crimdon | 1.710 | 1.334 | 3,044 |
|) | Compton | 1 804 | 1,008 | 2.878 |
| | Tom Martin | 1 400 | 1.370 | 2.58 |

If any additional testimony were neces-90 sary it is obtainable in the statement of the president of the New York Balance Dock .90 Company, who furnishes the following list of vessels taken out on his dock with car-00 goes in them :-40

| 50 | Ships Tons, Steamers, Tons, |
|----------------|---|
| | Great Victoria. 2.386 Colorado2,765 |
| 20 | Triumphant 2.046 Rio Grande 2,565 |
| | America2,054 Thing Valla2,436 |
| 73 | Hagerstown1,903 Monarch2,366 |
| | S. Č. Blanchard1.903 State of Nevada2,488 |
| .00 | Respecting the transportation of ships |
| .10 | overland. In all probability the Chignecto |
| | Marine railway will be the first road of the |
| .90 | kind to be built. But still the principle is |
| 20 | not new by any means. In scores of places |
| - | in different parts of the world marine rail- |
| .50 | ways have been successfully operated, and |
| .40 | hundreds of vessels of every size, with and |
| | without cargoes, have been drawn out of |
| | the water on them and repaired. As to the |
| | the water on anothe and repaired. The volte |
| , | success of marine ranways for time purpose |
| ol- | it is just as well to let one who has had ex- |
| ne | perience testify. Mr. Epes Sargent, writing |
| \mathbf{n} - | to Mr. Cortell, an English engineer of pro- |
| av | minence, says of one marine railway : |
| | |

In reply to your questions I would state that I was manager and superintendent of the Marine Railway, Nassau, N. P. (Baha-mas), for ten years, and during that time, as near as I can remember, I hauled out and repaired between 800 and 900 vessels, about one-third of which were steamers and perhaps one-fifth of them loaded. As we charged so much per ton for cargo on board, as far as practicable the vessels were dis-charged before being taken out. My experience was that it was easier and safer to take out a loaded vessel than one in ballast.

"From the above statements, furnished by persons of experience in ship lifting, it is clear that cargo laden vessels can be raised out of the water by hydraulic ship lifts with perfect safety; or drawn up on dry land by a marine railway with equal security. Each of these methods is now

only difference being that the vessel is lifted out of the water to be carried overland a distance of 17 miles instead of to receive repairs. If it is practical to haul a ship 100 yards overland, why is it not also practical to transport the vessel as many miles? Engineers say that there are no difficulties in the way, and it does not seem reasonable that any should exist. Similar appliances to those now in use will serve to keep the vessel on an even keel and prevent injury to the bottom while in transport. But to set all doubts at rest the company will insure all vessels crossing the isthmus against damage."

This contrivance is not new either in ininvention or application as our contemporary supposes; it was tried as a means of carrying vessels over a considerable height in the United States, certainly more than half a century ago. The experiments, if our recollection be not at fault, proved that the plan was practicable; but it never came into general use and is now so far forgotten that the Chignecto Marine Transport Railway is believed to be a new invention.

Vessels with their cargoes are regularly lifted out of the water for repairs. The difference between this feat and the Chignecto Marine Railway, as the Telegraph remarks, is that the vessels are to be carried over a railway a distance of seventeen miles. This difference is not inconsiderable. A vessel in motion for a considerable distance will be subjected to a strain that cannot be good for her, though she may be able to bear it. It is not impossible that the carrying of vessels in this way will be done with comparative safety.

Another scheme of a similar kind which had been projected is that referred to by the Montreal Gazette : "Mr. Corthell. who recently made a report on the Tehuantepec scheme, quotes figures to show that the average speed attained by vessels passing through the Suez canal is only two miles per hour, and thinks that much better than this can be done by the railway. The same authority places the cost of operating the railway at the low rate of onetenth of a cent per ton per mile; Mr. Ketchum, another engineer, estimates it at one-half of a cent at the outside. This, with the cost of raising and lowering, would enable vessels to be transferred at the rate of $12\frac{1}{2}$ cents per ton net cost, or, allowing for dead weight of the cradles, etc., a profitable business could be done at a charge of 25 cents per ton. This seems a rather high figure, in these days of low freights, especially as the merchandise likely to seek transport would be of comparatively great bulk in proportion to its value. such as lumber, plaster, coal, etc., but the projectors are confident that shippers of these even will find it profitable to avail themselves of the railway. However that may be, all things now point to the experiment being The company, pushed to completion. which is under the presidency of Lord Brabourne, has secured Mr. Fowler, an engineer of good repute in England, to superintend the work of construction, and has made a contract with a London syndicate to supply the necessary funds, and a