

Australia.

The problem as to the possibility of crossing the continent of Australia, from South to North, has been virtually solved, and no question now remains that a land transit may be opened up, available, not only for the general purposes of commerce, but also for telegraphic communication. Mr. Stuart, who started from Adelaide about last March on an exploring expedition, with two companions and a number of horses, has returned, after having crossed the country to a distance of about 1,600 miles from Adelaide and to within 300 miles of the Victoria river. Here he was turned back by a body of hostile natives; but, as he had already reached 100 miles further north than the point to which Gregory's expedition in 1856 descended from the Victoria, the continent may be considered, by the joint results of these surveys, to have been fairly opened up from one end to the other. Instead of an arid desert, it is described to be a practicable country throughout. The full details of the observations made were for the present, however, kept secret, the Parliament of South Australia having voted £2,500 to enable Mr. Stuart to start again with a larger and more strongly organised party, and a desire being entertained to prevent the triumph of final success being snatched from him by rival explorers in the other colonies, who might hastily avail themselves of all his information. Still, enough had been allowed to transpire to give a general idea of the route traversed. Mr. Stuart and his companions suffered terribly from want, not only of water, but of food, and also from an attack of scurvy. The part of the route in which water was totally absent, however, was only 60 miles. In many parts there was fine grass, besides splendid gum and other trees, including at least four kinds of palm. A very large salt lake was also discovered in the interior, supposed, from the blueness of its water, to be of great depth. The event had created great excitement and rejoicing at Adelaide, and the general impression was that a number of new provinces would ultimately be formed in the territory thus explored, and that meanwhile the tract might be made available almost immediately to facilitate communication with India, and especially the export trade in horses. The new expedition, which was to start immediately, would consist of Mr. Stuart and one of his former companions, ten other well-armed men, and a suitable number of horses.

The Disc Wheel Propeller.

An experiment of a novel mode of propulsion in steam navigation has recently been made in a trip from Blackwall to Erith. The paddle-wheel and screw have hitherto been the means employed for utilising steam power in navigation, but Mr. James Jones Aston, of the Middle Temple, has, it appears, taken out a patent for propelling steam-ships by a very different contrivance. *A priori*, the arrangement invented by Mr. Aston, is the very last that would suggest itself to an observer, and the inventor himself candidly admits that both practical men and men of science ridiculed his idea when first propounded. The steam-tug *Saucy Jack*—by no means a favorable boat for the success of the experiment—was propelled down the river at a rate of six knots an hour by the agency of a disc wheel, and with a far less expenditure of coal than if either paddles or screw had been used. The earliest objection to the locomotive was that it would not "bite" the rail,

but the experiment soon proved the objection to be worthless. It is still more difficult to conceive what hold a thin metal or wooden plate, not striking the water horizontally or obliquely, but cutting into it edgewise, like a knife, can have of the water. The diameter of the disc used in the experiment was 14 feet, with about two feet in the water. The thickness of the plate was only three-eighths of an inch, and it is asserted that the thinner the plate the greater the power. The engines of the tug were 30-inch, with a stroke of 42. The greatest number of revolutions made was 47. In the trip down the river the pressure in the boilers was 6lbs., and coming up 4lbs., the speed attained being about six knots. With the paddles the tug used to make about eight knots, but the expenditure of fuel was about 40 per cent. in favor of the disc. The conditions under which the trial was made was unfavorable to the experiment. She was not so readily started or so speedily stopped as the ordinary steamboats, but, perhaps, these disadvantages may disappear under more favourable circumstances. The disc may be constructed of metal or wood, or of both in combination, and several discs may be used on the same shaft, at convenient distances apart. There were five plates on each side in this experiment. The advantages of the disc, as enumerated by the inventor, are the following;—

1. It is less likely to be disabled in storm or battle, and is therefore a safer propeller.
2. There are no paddles or blades to agitate the water, and the boat is free from vibration.
3. All the action of the propeller is in the direction in which the boat travels, and the motive power being more perfectly utilised, a much greater rate of speed may be attained than has hitherto been deemed practicable.
4. Its action is perpetual, and not intermittent.
5. There is no backwater, or loss of power on that account.
6. It is much less affected by wind and tide.
7. It is the only propeller well suited for canals and shallow rivers.
8. It may be used for small boats and other craft.
9. It may be worked with lower power, and at great saving of fuel.
10. It is of more simple construction, less costly, less liable to injury, and causes less water and tear of the boat.

There were present to witness the experiment:—Capt. Lovell, of the Peninsular and Oriental Company; Mr. Wright, Assistant-engineer-in-chief to the Admiralty; Mr. Adams, Mr. Macrory, and Mr. Aston himself, the inventor and patentee.

Selection of Solders.

Solders must be selected in reference to their appropriate metals. Tin plates are soldered with an alloy consisting of from one to two parts tin, with one of lead. Pewter is soldered with a more fusible alloy containing a certain proportion of bismuth, added to the lead and tin. Iron, copper and brass are soldered with spelter—an alloy of zinc and copper in nearly equal parts. Silver is soldered, sometimes with pure tin, but generally with silver-solder—an alloy of five parts of silver, six of brass, and two of zinc. Zinc and lead are soldered with an alloy of from one to two parts of lead with one of tin. Platinum, with fine gold. Gold, with an alloy of silver and gold, or of copper and gold; &c.