

pearance by polarized light, were peculiar to butter, and could serve as a means of distinguishing it from imitations; and the commissioner of agriculture, in his last report (p. 36), states, that, at the time of writing, two convictions for violations of the butter-laws had been secured in the District of Columbia by the aid of Dr. Taylor's method.

Professor Weber, of the Ohio state university, however, has recently shown that lard and oleo-oil do not differ essentially from butter in this respect. By 'boiling' the butter as Dr. Taylor directs, some of its water is removed, and a formation of minute salt-crystals takes place. As the butter cools, these minute crystals of salt serve as nuclei for the formation of the butter-globules. Professor Weber shows that if melted lard or tallow be allowed to cool under the same conditions, they too form globules which exhibit the St. Andrew's cross.

In an open letter to Dr. E. Lewis Sturtevant, director of the New York agricultural experiment-station, Dr. Taylor attempts to break the force of Professor Weber's experiments, and also shifts his ground, claiming that the distinguishing difference between butter and other fats under the microscope is that the former, when viewed by polarized light through a selenite, shows a uniform tint, while the latter exhibits prismatic colors.

Whether this claim rests on any better foundation than the former, the writer will not undertake to say; but it is plain that further investigation would not be out of place.

H. P. ARMSBY.

ENGLAND'S COLONIES.

THE opening of the Colonial and Indian exhibition at South Kensington gave rise to an article in the London *Times*, on the growth of England's colonial possessions. The Portuguese and Spaniards, and even the French, were in the field long before England. Spain had a settlement in Dominica as early as 1493, and Vasco da Gama reached India in 1498. Within very few years India and South America had their Portuguese and Spanish viceroys. In 1534 Jacques Cartier made his famous voyage up the St. Lawrence, taking possession of the country in the name of the French sovereign. True, Cabot discovered Newfoundland and the mainland of North America in 1497; but he, like other early western navigators, simply regarded the new world as a barrier on the way to India. It was this latter land of fabulous riches that was the goal of the infant naval enterprise of England for many years after Cabot's discovery. The Portuguese monopolized

the routes by the southern seas, and England had not yet a navy to cope with its rival.

So effort after effort was made, in craft not much more formidable than cock-boats, to find a passage to India either by the north-west or north-east. Not till our own days have these passages been sailed over; but long before had they been given up as hopeless routes to China and India. Many a life did these early attempts cost England; but to them, no doubt, is greatly due the rapid progress she made as a naval power.

Up to the end of the sixteenth century, while Portugal and Spain were rapidly extending their sway in Asia and America, England had only a doubtful possession of Newfoundland along with powerful French rivals. Even Sir Humphry Gilbert's attempt to effect a settlement on the island in 1583 can hardly be regarded as other than abortive, though it gives Newfoundland a claim to be regarded as the earliest British colony. The first effective English settlement on the island cannot be dated earlier than 1623, long before which Virginia had been planted and Jamestown founded. True, in 1580 the British flag was planted in the West India island of Tobago, but that island was not effectively occupied by England till 1763.

Meanwhile, some roving Englishmen had in 1605 planted a cross in Barbadoes, inscribed 'James, king of England and of this island,' though there was no actual settlement till 1625. Barbadoes is one of the two or three British West India islands that never changed hands. After all, however, Bermuda may fairly claim to be considered the earliest of existing English colonies, as it was colonized both from Virginia and England shortly after 1609. But later, during the seventeenth century, the growth of England's colonial possessions was slow, if we except the New England states and the settlements on the east American coast to the south. Leaving these last out of view, her colonies at the close of the century were few and scattered, compared with the enormous territories which Portugal and Spain, France and Holland, were endeavoring to drain of their wealth. Even in India, during the seventeenth century, she can hardly be said to have got beyond the factory stage. The East India company were simply lease-holders of the native princes. Newfoundland, as already indicated, was only permanently settled in 1623, fourteen years after the planting of Bermuda. In the same year an English colony was planted in Nova Scotia, which then included New Brunswick, though it was only at the peace of Utrecht (1713) that England can be said to have obtained undisputed possession.

With one or two exceptions, England's footing in the West India Islands during the seventeenth and even the eighteenth centuries was exceedingly unstable: they were being continually banded about between England, France, and Spain before the final adjustment at the beginning of the present century. As stated above, an effective settlement was made in Barbadoes in 1625. Two years previously some Englishmen established themselves in St. Christopher's, which, however, was not finally ceded to Great Britain till 1713. Between 1628 and 1650, Nevis and Turk's Island, Antigua, Montserrat, St. Lucia, and Anguilla received English settlers, though St. Lucia, at least, changed hands several times before finally becoming English, in 1803.

Crossing over to Africa, we find, that, as early as 1588, Queen Elizabeth granted a patent to a company to trade to the Gambia; but no settlement seems to have been established till 1631, and even that can hardly have come to much, since a resettlement was made in 1817. Still there was a very considerable trade between England and West Africa in the seventeenth century, and Gambia and other stations became notorious as centres of the slave-trade. But their value for colonizing and trading purposes soon sank far below that of the West Indies and other annexations.

St. Helena became hers by capture in 1651; and four years later (1655) Jamaica, the largest and richest of her West India possessions, capitulated to an expedition sent out by Cromwell. English factories seem to have been established on the Gold Coast in 1661, and her first settlement on the Virgin Islands dates from 1668. A small English colony was planted in New Providence in the Bahamas in 1629, though she had frequently to give up possession before the islands finally became hers, in 1783.

Meantime, England was rapidly extending her sway over the eastern coast of what is now the United States; and these possessions, even in the seventeenth century, were of far greater importance than all her other acquisitions.

At the end of the seventeenth century, then, besides Newfoundland and Bermudas, and a few factories on the West African coast and in India, of the present colonial empire England had possession, more or less stable, of Jamaica, Barbadoes, St. Christopher's, Nevis, Turk's Island, Antigua, Montserrat, Anguilla, Virgin Islands, Bahamas, and St. Helena out in the Atlantic. The total area of these did not much exceed sixty thousand square miles, for her African and Indian settlements were little more than stations. Even if we added such parts of Nova Scotia and New Bruns-

wick as were not occupied by France, the total area could scarcely be more than eighty thousand square miles.

During the first half of the eighteenth century, if we except the confirmation to Great Britain of the ten North American colonies just mentioned, and one or two of the West India islands already included, the only acquisition of importance as a foreign possession was Gibraltar (1704), and that not as a colony, but as a strategical station.

A period of comparative quiescence prevailed during these fifty years previous to the outbreak of the great and long-continued struggle between England and France for supremacy on the seas, if not on land. During the first half of the eighteenth century The East India company's business was steadily extending in India. Comparatively few additions were made to the English possessions on the North American coast. France claimed all Canada, only tolerating the station of the Hudson's Bay company, founded in 1670, and holding the Alleghanies as the western limit of English dominion. The position in the West Indies remained essentially unaltered, though the development of the English plantations in that region was proceeding with profitable activity. The few factories on the West African coast were of little account, the Dutch were still supreme at the Cape, and Cook was only beginning his career in the Royal navy.

During the last forty years of the eighteenth century, on the other hand, the broad foundations of England's empire beyond the seas were firmly laid; subsequent operations have mainly been in the way of development and consolidation. The great struggle between England and France for supremacy beyond Europe may be said to have begun simultaneously in India and Canada. On the latter field it resulted in the capitulation of Quebec in 1759, followed four years later by the cession of the whole of Canada; so that England was virtually mistress of the whole of North America. In 1776 the declaration of independence was signed, and in 1783 England had to resign herself to the loss of by far the most valuable half of her dominions in America.

In the same year as Canada became an English possession, the islands of Dominica, Granada, St. Vincent, and Tobago were added to her West Indian possessions, followed in 1797 by the surrender of Trinidad to Abercrombie by the Spaniards. Although Commodore Byron took possession of the Falkland Islands in 1765, no effective establishment was formed there till 1833. In 1783-86 British Honduras was acquired by treaties; in 1787 Sierra Leone was ceded by the native chiefs; while in 1788, not quite a century ago, the not

very promising foundation of the great Australasian group of colonies was laid by the establishment of a small convict establishment at Botany Bay.

Turning to the east, we find Malacca captured from the Dutch in 1795, though it did not finally become English till 1823. Penang was colonized in 1785, and Province Wellesley in 1798. Much more important was the capture of Ceylon from the same once supreme colonial power in 1796. The battle of Plassey was fought in 1757, and within about half a century thereafter, through the genius of Clive and Hastings and Wellesley, English supremacy was virtually established, directly or indirectly, over a great part of the Indian peninsula. Bengal was ceded in 1765, and Madras conquered in 1792-1800, having between them an area estimated at two hundred and ninety thousand square miles, and a population of fifty-five millions.

Thus, then, during the latter half of the eighteenth century, England had succeeded in rapidly increasing her foreign possessions by something like six and a half millions of square miles, reckoning the whole of Australia as virtually annexed. During the present century she has been able to increase this area by about one-third, half of it, at least, in India. While, during the last eighty-six years, she has been extending and confirming her hold over India, and while she has acquired one or two really important additions to her colonial possessions, it will be seen that her chief work has been to develop and consolidate the acquisitions of the latter half of the eighteenth century.

In the West India region, British Guiana was finally annexed in 1803, and St. Lucia in the same year, thus completing the present list of her possessions in that quarter. Also in 1803 the first settlement was established in Tasmania. While in this quarter, twenty-six years later (1829) West Australia was settled, followed, seven years after (1836), by the modest beginnings of South Australia at Port Philip. In 1841 New Zealand began her wonderful career as a British colony. Ten years later (1851) Victoria separated from New South Wales, and set up for herself, — an example followed by Queensland in 1859. In 1806 the Dutch were compelled to hand over to England their possessions in South Africa, which by the formation of the Natal colony in 1838, and other subsequent annexations, have been extended far beyond their original boundaries. In 1807 England captured the tiny islet of Heligoland, and three years later (1810) Mauritius capitulated, her possession of the island being confirmed by the treaty of Paris, 1814. A year later (1815) she acquired the Ionian Islands by treaty, only to give

them up to Greece some fifty years after; and in the same year she established her naval station in Ascension. Singapore was settled in 1818, and the Falklands in 1833. Aden as an outpost of India was occupied in 1833. Labuan was ceded in 1846, followed by Lagos in 1861, and Fiji in 1874. The Straits Settlements were detached from India in 1867, and set up for themselves as a separate colony; and in 1874 the native states of Perak, Selangore, and Sungei Ujong, were placed under its protection.

We all remember the excitement over the occupation of Cyprus in 1878; and while England pays tribute for it to the sultan, her real relation to the interesting island is indicated by the fact that it figures among her other colonies at South Kensington. The British North Borneo company was incorporated by royal charter in 1881; and the fact of its having a court to itself at South Kensington may be taken as a tacit admission that its territory is reckoned among her colonies. England has hardly yet recovered from the excitement of raising the British flag over southern New Guinea, the Niger mouths, and Bechuanaland, in 1884; while at this very moment her soldiers and civil servants are busy getting into working-order the extensive territory of upper Burmah, proclaimed English on the first day of the present year. This last annexation, however, belongs rather to the record of her dominion in India, which has advanced so rapidly that the two hundred and ninety thousand square miles and the fifty-five million inhabitants of 1800 have grown to something like a million and a half of square miles and two hundred and eighty millions of population. To the above might be added such outlying spots as the Kuria-Muria Islands, the Keeling Islands, and Port Hamilton, in Asiatic waters; Berbera on the north-east African coast, and Socotra off it; the islands of Rotumah, Auckland, Lord Howe, Caroline, Starbuck, Malden, and Fanning, in the Pacific; not to mention the Nicobars and Andamans, attached to India.

Thus, then, while the beginnings of the greatest colonial empire on record go back some three hundred years, by far the greater proportion of England's foreign possessions have been acquired during the last hundred and twenty years.

LONDON LETTER.

THE *conversazione* of the Royal society, on Wednesday evening last (May 12), was even more successful than usual, special pains having been taken to bring together objects of interest. Partly, perhaps, on this account, and also because it was the first reception of the new president, Prof. G.