**Historic item - (1877) Waste products and undeveloped substances**

This is a phenomenally interesting 1877 book review. It is taken from **The Argus** (Melbourne, Victoria, Australia) where it appeared on Tuesday 2 January 1877 (page 6).

**Waste Products and Undeveloped Substances: a Synopsis of Progress made In their Economic Utilisation during the last quarter of a century, at home and abroad. By P. L. Simmonds of London.**

When Hamlet traced the dead body of Imperial Caesar to the bunghole of a barrel, his friend Horatio suggested that he was inquiring too curiously. But the human mind has become much more inquisitive since Shakespeare's day. Not only is the progress of matter now traced through all the varying stages which it assumes, whether under the influence of natural agencies or under the hands of man, but it is laid hold of at every succeeding stage, and made to minister in some way to man's wants or enjoyments.

Every succeeding year sees some substance formerly considered valueless put to economic use. and it is scarcely too much to say that by and by there will be no such thing as a waste product It is not only that matter is indestructible; clothes and shoes, kettles and pans, are also indestructible, or nearly so, inasmuch as their materials, to a large extent, can be used over and over again, assuming now one form and again another, but always serving man's uses. It is only when materials are destroyed by fire, or carried away into the sea, that they can be said to be lost, and they are not always altogether lost even then, since they may be recovered in part, or be restored to us in some new form by natural processes. Science and ingenuity can find no more profitable and beneficent field of usefulness than in turning waste products to account. Every new application of an abundant material is economically equivalent to an enlargement of the earth's surface, since it increases the supply of commodities in general demand, and consequently cheapens them, to the advantage of the consumer. But there is another and no less substantial benefit conferred upon mankind by the utilisation of waste products. It removes out of the way substances that would otherwise accumulate and become causes of offence to the senses and dangerous to health. In whatever light the subject is examined, it is therefore obvious that the scientists who give their attention to the utilisation of waste substances are engaged in a most useful work.

Prominent among these is Mr. P. L. Simmonds, author of the work of which the title stands at the head of this article. Eleven years ago he published a book on the same subject, which attracted a good deal of attention, and obtained a large circulation. Since then he has been collecting the materials used in the later and larger work, and his labours in this direction took tangible form when he prepared for the Vienna Exhibition, by authority, an illustrative collection of the utilised waste products of Great Britain.

The book before us abounds with interesting and commercially-valuable information, which becomes at times curious and amusing as well. Our author is an enthusiast in the particular branch of scientific inquiry which he has made his specialty, and falls occasionally into little extravagances, or what appear to be extravagances to readers who have not yet learned to regard the muck-rake as the most potent agent in modern civilisation. Nothing seems to him to be of real importance that has not been I picked out of the gutter or gathered from a dust heap, and he thinks meanly of the human family because there is but little to be made of its "waste" (other than excreted substances).

It is true that he sees a way in which much can be done with human hair under more intelligent management, and does not despair of seeing a profit made out of the used soap of the barber's shop; but still from his point of view man is but a poor creature. A little exaggeration may be overlooked, however, in the author, since only for the zeal out of which it grows he would not have given us so useful a book. One idea'd men are not to be thought lightly of if their solitary idea is sound, and has in it valuable germs of usefulness, as is unquestionably the character of the one which Mr. Simmonds elaborates so instructively in the book before us.

To glance first at some of his little extravagances, we find him going into minute calculations to show that a profit of £118,000 might be made on a cargo of rats, to be pickled in Kurrachee and sold in Hong Kong. And this profitable speculation could be carried out by means of a little ship of only 400 tons. Had he chosen to employ a steamer like the late Queensland, instead of a paltry 400-ton vessel, he could have shown a profit of £700,000 on the trip, which would have been something like a transaction.

But then the cargo would have consisted of 42 millions of rats, which it would take time to catch, and gut, and skin, and salt, and pack in the ship, not to speak of the time it would take to sell them on arrival at the Chinese port. From rats to cats is an easy transition, and Mr Simmonds explains how a very beautiful textile fabric can be manufactured out of the hair of the latter. He does not state, however, whether we are to wait for pussy's death before despoiling her of her hair, or to treat her like a sheep and shear her once a year, a process which would probably be found both difficult and dangerous.

Dogs, too, can be turned to good account. The fat can be rendered out of their carcasses and their skins sold to the glovers, while their bones and flesh make an excellent compost for manuring land. Dead dogs are worth from 7d. to 8d. each. But inasmuch as they are known to be sometimes used in the composition of sausages intended for human use, their utilisation is a subject which has its unpleasant side.

How to make excellent bread out of sawdust is fully explained in the book. "Wood flour," we are told, "does not ferment so readily as wheaten flour, but 15 1b. of birch wood flour, with 3 1b. of sour wheat leaven and 2 1b. of wheat flour, mixed up with eight measures of new milk, will yield 36 lb. of very good bread." We wonder whether it would be any loss to have the sawdust out altogether, except in the bulk of the bread produced. In regard to the economical value of excrementitions substances.

Mr. Simmonds holds, as was to have been expected, rather sanguine notions. He estimates them for what chemical analysis shows them to contain rather than for what has ever been got out of them, and almost makes it appear that a numerous family should be a source of revenue to a man rather than of outlay. But theories on this subject and accomplished facts differ very widely. Other instances of exaggeration on Mr. Simmonds' part might be given, but these will suffice.

Coming to the more serious and really valuable portions of the work, we find it difficult to give in brief space an adequate notion of its contents, so varied are they, and so numerous are the substances discoursed upon. But some idea of its value may be conveyed by showing what the author has to say upon one class of waste products, and we select left-off apparel as an illustrative example. That the trade in old clothes is a very large one most people already know, but there are but few who realise its importance, or are aware of the thoroughness with which it is systematised. On this subject Mr. Simmonds says (quoting from The Times), after describing the various modes in which old clothes are collected :

"But the true interest in the story of old clothes begins just at the point where they leave off. To the question of what now becomes of them, we might answer that the greater part of them are now about to set out upon their travels, to enter new circles of society, and to see life, both savage and civilised, under a thousand new phases. Those that are intended to remain in this country have to be tutored and transformed.

The 'clobberer,' the 'reviver,' and the ' translator ' lay hands upon them. The duty of the ' clobberer ' is to patch, to sew up, and to restore as far as possible the garments to their pristine appearance; black cloth garments pass into the hands of the 'revivers,' who rejuvenate seedy black coats, and, for the moment, make them look as good as new. The ' translator's' duty is of a higher order; his office is to transform one garment into another-the skirts of a cast-off coat, being the least worn part of the garment, make capital waistcoats and tunics for children, etc. Hats are revived in a still more wonderful manner, they are cut down to take out the grease marks, re-lined, and appear in the shops like new ones. The streets surrounding the old clothes' market are full of shops where these 'clobbered and 'revived' goods are exposed for sale, and really a stronger to the trade would not know but what they

were new goods. There is a department of the market also dedicated to old clothes for males and females, 'clobbered' and revived. It is a touching sight to see the class of persons who frequent the men's market and turn over the seedy black garments that are doing their best to put on a good appearance-the toil worn clerks, who for some social reason are expected to apparel themselves in black and the equally careworn members of the clerical profession chiefly curates whose meagre stipends do not permit of the extravagance of new suits of clothes.

The ladies' market is a vast wardrobe of silk dresses, but if we are to believe the saleswoman, the matrons of England are more thrifty than we gave them credit for. 'Servants come here to purchase, sir ' No, indeed, sir ladies worth hundreds of pounds ' was the reply we got to our inquiries as to the class of purchasers Black cloth clothes that ore too far gone to be ' clobbered' and ' revived are always sent abroad to be cut up to make caps. France takes the best of these old clothes for this purpose The linings are stripped out, and in this condition they are admitted duty-free as old rags Russia and Poland, where caps seem to be universally worn by the working population, are content with still more threadbare garments to be cut up for that purpose.

The great bulk of our cast off clothes of all kinds however find their way to two markets-Ireland and Holland The old clothes bag of the collectors may in fact, be said to be emptied out in the land of Erin, as far as the ordinary order of clothes go, while to Holland only special articles of apparel are exported. Singularly enough, the destination of the red tunics of the whole British infantry is the chests of the sturdy Dutchman. There seems to be some popular belief or superstition in that waterlogged country that red cloth affords the best protection against rheumatism, consequently these jackets all find their way to the land of dykes. The sleeves are cut off, and they are made to button in a double-breasted fashion thus remodelled, they are worn next to the skin, like a flannel waistcoat, by all careful Dutchmen among the working classes. The Irish chiefly favour corduroys and we suspect the worn out legs of British pantaloons of this material are cut off and converted into breeches for Pat. Where he gets these wonderful swallow-tailed coats with brass buttons is a puzzle to all the dealers It is very certain they do not come from this side of the Channel and it is equally clear they are remnants of costume two generations back.

Our readers will perhaps have noticed the special avidity the dealers in old clothes evince for all kinds of regimentals full dress liveries, volunteers uniforms, beadles' coat, &c. Anything specially splendid in this hue is marked by the collector as a sportsman marks any rare and brilliantly plumaged bird and ultimately it is sure to be bagged by them. One of the largest dealers in London in these showy dresses once said to us, seeing a Guardsman going along the street, ' A thousand to one that coat comes into my hands.' Really the inevitability there appears to be about the destination of these regimentals if known to their wearers should make them very un comfortable The dealers would, if they could, strip them off their backs just as an eel woman skins an eel. A lord mayor's footman's full dress livery is viewed by these gentry with wolfish eyes.

These are the great prizes of the profession, and their barbaric splendours are destined for a special market, the West Coast of Africa, where nature puts on her most gorgeous apparel and the great ones of the land are determined to have something to match. Travellers often tell us of the marvellous appearance of the chiefs of these parts when in full mufti but we scarcely expected to find our old clothes dealers the regular costumiers of these sable dignitaries, transmitting regimentals, laced liveries and cocked hats as regularly to them as a London tailor sends his clothes to his country customers.

And Mumbo Jumbo will not be put off with inferior articles-the slightest blemish in colour or inferiority in cloth is instantly detected and rejected by these semi savages, hence the greatest care is necessary in catering for their wants. It is just possible that the lord mayors for these last dozen years would be able to recognise their own splendid liveries on the backs of a council of these potentates, if they could ever be got together or any purpose whatever. We ourselves saw an assortment of well preserved liveries of the heir to the proudest throne in the world just being packed for exportation to the grand destination of all fine liveries we have just mentioned. It should be a solace to the parish beadle that his clothes, instead of

descending in the social scale like those of ordinary civilians are destined to flame upon the back of some autocrat who holds the lives of thousands of men at his disposal, instead of only being the emblems of terror to poor parish boys The vast majority of the scarlet coats of our officers that are a little worn find their way to the great annual fair at Leipsic. There is a belief in the trade that the destination of this bright scarlet cloth is the cuffs and facings of the civil officials in the Russian Government However this may be the fact of secondhand regimentals finding their way to the great German fair is undoubted.

The pepper and salt greatcoats of our infantry go to our agricultural districts and the Cape, but the heavier and more valuable artillery cloaks find their way to Holland, and that country and Ireland absorb between them the cast off clothes of the police. There is one odd item of old clothes that has a singular history. There are still a certain class in the community addicted to the use of silk velvet waistcoats This class is gene rally to be found among the well-to-do trades men of country towns. The longevity of a black silk velvet waistcoat is proverbial, it will not wear out. After adorning the respectable corporation of a provincial grocer until he is thoroughly tired of it, what does our reader think is its ultimate destination the pate of some street German or Polish Jew! In obedience to a Rabbinical law it is not considered right by some of the more conscientious Hebrews to go uncovered and these secondhand waistcoats are bought up to make skull caps for their use."

But the history of old clothes by no means ends at this point When beggars have finally discarded them, and they will no longer hang together even upon scarecrows behold ' they start into life again as "raw material ' and commence a new career of usefulness. Cotton and linen rags go to the paper mill and woollen rags are torn to pieces to be mixed with wool in the manufacture of new cloth. Some of the most beautiful of fabrics have a considerable percentage of shoddy, or mungo, in their composition, viz, pilot cloths, Petershams beavers, Talmas Chesterfields &c.

The greatest of dandies, of either sex habitually wear garments made of such materials, and it is quite a mistake to sup pose that the production of shoddy cloth is necessarily a fraud. The cloth is not really bad, it is only a little weaker than whole wool material. It will not wear so long, nor withstand so much friction, but then it is not always required that clothes shall wear long-rather that they shall look pretty for a time. Then, the use of old material keeps down prices, and brings woollen clothes within the reach of vast numbers who but for shoddy would not be able to get them at all or only at rare intervals. It is estimated that shoddy and mungo supply the materials for a third of the woollen manufactures of Great Britain. Portions of the torn-up old clothes that are too short to be worked up with fresh wool become devil's dust and with the aid of this material elegant wall papers are made. Designs are traced upon the paper in some adhesive fluid, and the woolly dust being thrown upon this, remains there. Not the most fastidious person has any assurance that the clothes upon his back, or the paper on the walls of her boudoir, have not been worn by a beggar in some previous stage of their existence. To give some idea of the magnitude and importance of the shoddy trade, it may be mentioned that in addition to the large quantities of home produced rags used in its manufacture in Great Britain, there is an annual importation from foreign countries of no less than 67,500 000 1b of rags. But we have not yet reached the end of the history of clothes. When at length they are fit for no other purpose they are buried in the earth at the foot of hop or grape vines and after a time their constituent parts, enter into our composition under the most agreeable circumstances.

Some years since it was discovered that vast quantities of valuable material were being permitted to go to waste. In the course of manufacturing progress textile fabrics came to be produced of which the weft was cotton and the warp woollen.

These of the class known as muslin-delaines, were both finer and cheaper than goods made wholly of wool, and consequently a great demand for them speedily arose. But then, how were they to be utilised when worn out? They contained two substances of different kinds, and after a considerable period it was found necessary to sacrifice one to obtain the other. If you desired to save the wool, you steeped the rags in acids, and converted the cellulose, or woody fibre of which the cotton consisted into sugar, which was washed out of the mass and lost. If, on the other hand, you wished to save the cotton of the mixed fabric, you dipped the

material into an alkali and dissolved the wool. The alkali did not dissolve the cotton, which was saved, but the converted wool was washed out and lost. But, obviously, this wasteful course of proceeding could not be permitted to go on. Both cotton and wool must be recovered, and economic science was equal to the task, as our author explains :

"Mr. F O Ward, of Lonoon, showed at the International Exhibition of 1862 a pretty process for economising both fibres, or, at least, for getting a chemical product from each, which is very simple. The rags are subjected to a current of high pressure steam at three or four atmospheres, that is to say, hotter than ordinary, and when this heated steam passes through the rags, it converts, without the aid of any chemical adjunct, the wool into a sort of bituminous or resinous matter, which becomes brittle When this wool is dry it can be separated by a kind of combined beating and sifting process, and then there remains the cotton rags, which are sold to the bleacher, and afterwards con verted into paper The wool refuse contains 12 or 13 per cent of nitrogen, and is a good manure, being sold under the name of ulmate of ammonia. All the early broccoli which comes up from Cornwall is forced on by being manured with these woollen rags. Thus we have, as resulting products from these mixed fabric rags a vegetable fibrous product, which is left on the sieve after the digested rags have been dried and beaten and sifted so as to separate the disintegrated pulverulent product of the animal threads, woollen and silken, and of the leather materials (old shoes, &c ), as the raw material (the animal pulverulent product, above mentioned as a manure, contains nitrogen = 13 per cent of ammonia), a kind of flock which floats off in heating the heated and dried rags, and which is available in making the so-called flock paperhangings made in imitation of velvet, the fibrous vegetable product bleached for papermaking, and I have samples of very good paper made of it The following is another patented process of an American (J M Collins, Albany, New York) for separating wool from rags of cotton and wool. Sulphuric acid and water, salt and alum, are made into a solution and boiled to a temperature of 10° to 19° (medium 13°). The rags are placed in the solution, and allowed to remain four to 12 minutes, they are then removed and rinsed in water, by which the cotton or vegetable fibre in the rags destroyed by the action of the mixture, will separate and leave the wool."

Scraps and parings of leather, old boots and shoes, dilapidated portmanteaus, and old leather flowers and picture-frame decorations, are of the utmost value in the arts and manufactures of Great Britain. Endless are the useful purposes to which they are put. We can only enumerate a few of these-Leather cuttings treated with organic acids, at a temperature not exceeding 80° centigrade, are converted into a kind of modified gelatine, insoluble in water, and presenting a hard and brittle substance which it has not yet been found possible to change. This substance can be used for printers' inking rollers. It mixes well with india rubber, and may be economically used for the uppers of shoes and galoshes. The two substances being dissolved in combination can be moulded into any shape, or the tannic acid may be discharged from old leather, and glue made from it which is stronger and better than that manufactured in the ordinary way. Endless are the purposes of usefulness to which modern ingenuity and thrift have put old leather, and a sympathetic reader of Mr. Simmond's pages will no longer be able to pass a discarded boot in the gutter without tracing it, in his imagination, to new and quite different scenes.

On the general subject of the utilisation of waste animal substance, our author has much to say. There is no part or portion of any animal usually killed for food that he does not find a profitable use for, and although our own meat preservers and animal manure manufacturers are by no means slow to turn to account everything that passes through their hands, still they would derive much useful information from a careful perusal of his pages. The book may also be commended to the attention of the general reader. Its materials are not very lucidly arranged, and it owes little to the literary skill of its author, but it abounds in facts, laboriously collected from all available sources, which are not only interesting and curious but of great commercial importance.