the top of Holborn Hill, found a girl of 18 dying of disease and starvation at midnight upon the steps of St. Andrew's Church, in Holborn. He conveyed her in a hackney coach to three or four of the large hospitals, but at each she was refused admission because the necessary letter of recommendation was wanting, and eventually he was obliged to take her to a lodging, where she died unrecognised two days later. This scandal produced so great an effect upon Marsden's mind that he determined to found a hospital into which disease and destitution should be the sole passports for admission. Friends came forward, and in 1828 a house was opened in Greville Street, Hatton Garden, under the name of the London General Institution for the Gratuitous Cure of Malignant Disease. The sympathies of Mr. (afterwards Sir) Robert Peel—the Home Secretary—were enlisted, and through him the patronage of King George IV was obtained, and the Duke of Gloucester became the first President.

The reputation of the hospital was greatly increased by the liberal policy pursued by its managers during the great epidemics of cholera in 1832-33-34, 1848, and 1854. The doors of the hospital were thrown open to all persons afflicted with the disease, at a time when the other hospitals closed theirs on the ground that the admission of cholera patients would endanger the safety of those already in the hospital.

A fund was started in the spring of 1843 to build a larger hospital. A site was obtained in the Gray's Inn Road, which had been formerly in the occupation of the Light Horse Volunteers, and the nucleus of the present building was erected. The hospital is still supported by spontaneous contributions from charitable people. It is recorded that the subscription box at the gate has more than once been found to contain banknotes of great value contributed by persons who desired that their donations should be absolutely without a name.

No school was attached to the hospital for many years; but in 1877 an agreement was entered into by which the medical staff of the hospital were permitted to give clinical instruction to students attending the London School of Medicine for Women in Handel Street, Brunswick Square.

THE LABORATORIES OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON AND ROYAL COLLEGE OF SURGEONS OF ENGLAND.

In 1886 a Joint Committee was appointed by the two Royal Colleges to report on the subject of the disposal of an unoccupied plot of land adjoining the Examination Hall on the Embankment. The Committee reported that it was desirable to utilise the vacant ground for scientific purposes under the control and management of the two Colleges, and that the "scientific purposes" should be in the first place the investigation and exposition of such branches of science connected with medicine and surgery as the two Colleges should from time to time determine. It was then agreed to erect a building suitable for the purposes named above, together with a Lecture Theatre capable of accommodating 400 persons. Plans were prepared by Mr. Stephen Salter, the architect of the Examination Hall, and a contract was entered into with the builders for £24,667. Modifications having been subsequently introduced, the original estimate was reduced by £909 3s. 9d. In 1889 regulations were drawn up for the management of the laboratories by the Joint Committee of Management appointed by the two Colleges. In 1890 Dr. German Sims Woodhead was appointed Director, and the Committee were able to report that the laboratories were in working order. Permission to work in the laboratories is not restricted to those whose names are on the *Medical Register*. Application for this permission must be made to the Director in the first instance; the application is then submitted by him to the Committee at their next meeting. The publication of the results of work done in the laboratories is under the control of the Committee of Management. Ever since the completion of the building the workrooms have been fully occupied, and much good original work has been accomplished. The laboratories and workrooms are thoroughly fitted up with the most modern appliances for bacteriological and other kinds of research. A note of the work done in

each year is published in the Report of the Secretary of the Royal College of Surgeons, which may be found in the *Calendar* of that institution. No separate publication has been issued by the Laboratories Committee, but the results of the work done have been for the most part communicated by the various workers to the medical journals.

DONARIA OF MEDICAL INTEREST

IN THE OPPENHEIMER COLLECTION OF ETRUSCAN AND
ROMAN ANTIQUITIES.

FROM NOTES BY DR. LUIGI SAMBON,
Rome.

THE custom of making offerings to the gods is found among the ancients from the earliest times of which we have any record. Such gifts were called *donaria* by the Romans, and were generally offered as tokens of gratitude but often they were intended to induce the deity to grant some favour.

Anything could be offered to the gods—land, buildings, cattle, fruit, war implements, tools of trade, jewellery, cast-off clothes. Repairs of the temple and embellishments of the sanctuary by paintings and decorations were considered most suitable *donaria*. Some *donaria*, such as materials for the religious ceremonies, statues of gods and money were given indifferently to all deities; other offerings were given only to some special divinity; thus the temple of Artemis Brauronia was filled with women's clothing.

In the temples of healing gods were gathered mostly instruments of surgery, pharmaceutical appliances, painted tablets representing miraculous healings, and great numbers of images of various parts of the human frame shaped in metal, stone and terra-cotta.

Some of these temples were magnificent buildings richly decorated, but often they were mere shrines at the source of some hot spring or mineral water where great numbers of patients flocked from far and near. Here they would bathe or else only drink the water. The priests regulated the use of the waters and prescribed further for each patient. The patient always threw an offering into the water before leaving, a bronze astragalus, a silver cup, a coin or some terra-cotta model of a limb, which was left bubbling in the water while the sufferer, dragged himself off muttering a prayer. A representation of a woman throwing her *donarium* into a tank of healing water appears in a painting on a Greek vase in the Louvre. More often the *donaria* were hung about the walls of the temple and clustered round the statues of the gods, as we learn from the inventories engraved on marble which have been found among the ruins of the old temples.

When the temples or the tanks of healing waters were overcrowded with valueless *donaria*, the priests used to remove them to grottoes or wells dug in the neighbourhood or they buried them enclosed in large wooden boxes or simply in deep furrows from which they are now occasionally disinterred.

Magnificent offerings such as cups of valuable metal with votive inscriptions have occasionally been found. The old temples contained many objects of gold and silver, but few remain because *donaria* of precious metals were, after a time, melted into ingots, and disposed of by the priests according to special regulations peculiar to each temple.

Amongst the votive deposits are nearly always found coins of every epoch and place, from the shapeless pieces of bronze called *as rude* which was the primitive money of Italy and preceded the coined metal or *as signatum*, to coins of the empire. Such coins give most interesting information as to the approximate dates of the period in which the sanctuary where they are found was frequented, and perhaps of how far its fame was spread. The coins were sometimes attached by means of wax to the hands of the images worshipped. Many bear countermarks very likely to prevent their returning into use, others *grafito* inscriptions such as "sacred to Apollo."

Surgical instruments were offered by patients or surgeons often as a thanksgiving for a successful operation. Erostratus offered to Apollo in the temple of Delphus a forceps of lead to show how little he approved of the extraction of teeth which were not loose enough to be pulled out by the fingers.

Among the many surgical instruments and appliances found in all parts of the Roman Empire more than a hundred different ones are known, which are certainly not inferior to those of the present day. The old Roman instruments were entirely of metal, mostly of bronze and iron; some were beautifully shaped and richly inlaid with silver.

Large quantities of pottery are usually found, mostly broken into fragments; there are cups and vessels of every form and description, but generally of the coarsest kind. Even this pottery can give a certain idea of the epoch at which the sanctuary was frequented. Sometimes the cups are pierced with a hole by which they were hung up as a votive offering after they had been used, but generally they were thrown into the water. We are told gravely in a Greek inscription from Epidauros of a boy who had been carrying his master's favourite cup, and had gone to sleep by the roadside, to wake up and find the cup broken in pieces. He was in despair, when a passer-by remarked that only Asclepius, the healing god of Epidauros, could mend the crock. This the god is recorded to have done, to the delight not only of the boy but also of his master, who, when he heard of the incident presented the cup to the temple.

Among the pottery I have found invalid medicine cups and feeding bottles for infants (*gutti*). Many of these are ingeniously fashioned in the shape of the female breast, some offer curious shapes of animals. I have found some which have a woman suckling her infant worked in relief on their surface evidently indicating their use, but what positively confirms these *gutti* to be feeding bottles is that they have been found by Mr. E. Toulouze, Dr. Allaire and myself in the tombs of children who died during the period of lactation. Here they had been deposited by mothers sometimes together with a rattling toy, as the most suitable furniture for the tiny grave. They replaced the dishes of various foods which were placed in the tombs of grown up people.

These old feeding bottles are so constructed that no flies or dust can reach their contents. The milk was generally introduced by inverting the bottle and pouring it through an open tube ascending within from the middle of the base almost to the apex, which also prevented its escape when the bottle was placed again on its base. The child obtained

Fig. 1.—Feeding bottle.

nourishment by sucking through a spout on the side of the article. On the opposite side is a small round handle. In my collection is a tiny feeding bottle of lead which had probably been made to be offered as a thanksgiving for successful feeding by artificial means.

Amongst the pottery of votive offering are often found vessels of very minute dimensions, which certainly could not have been of any practical use, some being hardly an inch high; this toy-like pottery had evidently been brought to the shrine as a symbolical offering, instead of the usual vessels which now filled up the tanks. A great number were found in Cività Lavina by Lord Savile; they have also been found in tombs.

The most interesting and least known donaria are certainly those representing limbs and viscera of the human body or

images of patients showing evident marks of disease upon them. There is hardly any part of the body which has not been shaped out of the clay. It was a common custom amongst patients to offer an image of a limb or organ which was diseased.

Fig. 2.—Section to show construction of feeding bottle.

Innumerable are the heads found in each votive deposit. They are of every epoch and size; some few are of bearded men, a large number of youths and children, but the great majority is of women of every age. Mostly the whole head is represented, but sometimes only one side of it is shaped, the other being replaced by a flat surface. The most archaic are solid, the later ones are hollow and generally have a square or round hole behind by which they might be suspended. All these heads of different epochs from the most archaic to those of the latest periods offer an interesting study on the hairdressing and adornment. The hairdressing in return giving a certain information as to the period and locality to which they belong. In a general way those wearing diadems belong to the earliest period, the others veiled in many ways to the latest. Their age varies from the fifth century B.C. to the second A.D.

These heads or half heads were most commonly consecrated as representing the part of the body affected by disease, but many represented the grateful patient himself, and some, which are modelled by the hand instead of being cast, are perhaps portraits of the same. Of the many hundreds I have examined none present signs of disease; only one head modelled which was found in a votive deposit consecrated to Minerva Medica in Rome, suggests alopecia areata, but the locks which are missing, chiefly at the back of the head, may have fallen off accidentally, the tresses or ringlets having, as was not infrequent, been separately modelled, and attached afterwards to the head. None of these heads offer

Fig. 3.—Ear from Palestrina.

any special attributes which might prove them to be images

of gods. Often only a part of the face or head is represented, generally the fronto-labial region, on a square or rounded plaque.

Fig. 4.—Eye found at Veii.

Ears and eyes are found singly in large numbers and vary immensely in shape and size. In the National Museum of Rome are two terra-cottas representing the labial region. In my own collection is a very neat representation of a tongue with its ligaments (glosso-epiglott. med. and glosso-

Fig. 5.—Dissected trunk found near Rome.

epiglott. later.), on each side of its base are two rounded prominences, probably representing the tonsils.

Numerous trunks of both sexes and all sizes are found.

In many of them we observe large openings, either limited to the chest, or extending to the pubes and exposing the internal organs. The openings present the *technique* of our days. Sometimes only the pelvis is represented; one in the Florence Museum shows the uterus through an abdominal section. Often the internal organs of one or both cavities are represented on distinct plaques. The anatomy of these sections is generally very poor, but the workmanship varies immensely from one terra-cotta to another, and while some of them offer a totally mistaken and conventional form or grouping, others are formed with extraordinary skill. These terra-cottas had no aim at scientific accuracy; they were modelled in vast quantities by any wayside potter and sold for a trifling sum on the road to the temples, mostly to ignorant peasants. A careful study of human anatomy was therefore not needed and the majority of potters who shaped these donaria probably contented themselves with a short examination of the butcher's shop.

Very different must have been the anatomical knowledge of the medical men of those days, because we know that human anatomy was eagerly studied on the bodies of prisoners and slaves. Celsus, in his work which is the masterpiece of Roman medical literature, repeatedly emphasises that there can be no rational medicine without a complete knowledge of human anatomy. Erasistratus had dissected the human body at Alexandria and Herophilus had even vivisected criminals under sentence of death.

From the vast quantities of anatomical terra-cottas bought and dedicated by patients of all classes, we can surmise that gross anatomy was thus far better known to the general public than it is at the present day.

Arms, legs, hands and feet are found very abundantly and sometimes single fingers. The hands are generally represented as opened in the attitude of worship. A left hand in Dr. Charles's collection in Rome presents nodulated tumours over the first phalanx of the ring and little fingers; another one in the same collection has two fingers flexed at the metacarpophalangeal joint, probably the result of broken extensor tendons. One in my collection offers over-extended fingers as occurs from injury of one of the main nerves of the arm supplying the flexors and skin.

The feet are sometimes clad in sandals, the sole being shaped in the clay and the straps only painted. A foot in Professor Charles's collection stands on a very high sole probably to improve the gait in ankylosis.

Hearts (Fig. 6) with their auricles very prominently

Fig. 6—Heart.

shaped, kidneys, uteri, ovaries and coils of intestines are often found singly. In the National Museum of Rome is a rough model of the larynx and trachea (Fig. 7).

Female breasts are extremely common.

Male genitals are also found in great number, always with long foreskin completely covering the glans penis; many of these terra-cottas suggest phimosis from venereal disease.

Reproductions of the vulva are often found, sometimes offering the characteristics of childhood, at other times those of puberty.

Fig. 7.—Larynx and Trachea.

Uteri are found in great numbers, some generally of the size of the normal viscus with a smooth surface; others are larger in size and offer a wrinkled surface and patulous cervix as after delivery (Fig. 8). They were offered as pro-

Fig. 8.—Uteru after delivery

pitatory gifts to ensure an easy labour or given by way of thanksgiving after safe delivery, or after recovery from difficult labour or disease.

Some of these uteri have on one side the appendages attached (Fig. 9). I have found that the left ovary and tube is far

Fig. 9.—Ovaro-salpingitis with adhesions.

more commonly represented, proving even in those days a marked prevalence of disease of the appendages of the left side.

Some uteri present a double opening at the os (Fig. 10); they

Fig. 10.—Uterus septus.

are undoubtedly representations of uteri septi. I have found no other malformation of the womb represented by these terra-cottas, such as uterus bicornis, although they are, com-

paratively far more frequent. But this is not surprising because uterus septus is easily diagnosed during life by a simple manual examination if the septum extends as far as the os, while other malformations are difficult to detect except in *post-mortem* examinations. As the *terra-cottas* representing uteri septi are rather frequent although the malformation is rare, I believe that the idea of twin pregnancy was closely connected with it, and thus the double opening may be considered, in most cases, as a conventional form indicating it.

(To be concluded.)

A REPORT ON THE MILK SUPPLY OF LONDON BY A SPECIAL ANALYTICAL AND BIOLOGICAL COMMISSION.

II.

IN carrying out our investigation into the quality of the milk supplied to London, we have, in the first instance, caused samples to be taken in poor districts by reliable persons who made the purchases in such a manner as to ensure that each sample represented what was being supplied at the time to the ordinary customers of the shops selected. The quantity asked for in each instance was small, and no information was given as to the object of the purchase. In this manner, during the month of June, thirty samples were taken in the poorer districts of Westminster, Marylebone, Lambeth, and Battersea. The report which we have received upon these samples shows results of a striking kind. Of the 30 samples only 6 were reported as being of "genuine composition," 16 were found to be more or less sophisticated by the addition of water or the abstraction of fat, or both, even where the calculations of the results were based on the lowest limits of quality which it is possible to adopt, 7 were unquestionably sophisticated upon the basis of a somewhat higher but perfectly fair standard of quality in regard to fat; and 1, while otherwise of genuine composition and fair quality, had been tampered with by the admixture of a boric acid preparation, 9 of the otherwise sophisticated samples having also been found to contain boric acid.

There are different ways of reporting the results of analyses of this kind, and the variations necessarily existing in the composition of a natural product like milk create some amount of difficulty; but the composition of genuine cow's milk is well known to vary within such limits that, leaving out of consideration the peculiar fluids that single animals may be made to yield or that may be extracted from abnormal ones, the assertion of important sophistication in any given case is a fairly easy matter with the aid of a full and accurate analysis. If deficiency of fat is found, the amount of that deficiency may be calculated on the assumption that a genuine milk should contain not less than 3 per cent. of fat as determined by modern and accurate methods of analysis, or on the higher and fairer standard of 3.5 per cent. The deficiency may be stated as a percentage of "original fat abstracted," but inasmuch as deficiency of fat is now generally brought about by the admixture of "separated milk"—which contains practically no fat—with a milk of genuine composition, it is convenient to regard milks sophisticated in respect of fat deficiency as made up of "milk devoid of fat" and of a milk of genuine composition.

It is a well-known fact that, under existing conditions, public analysts to whom samples of milk are officially submitted under the Adulteration Acts are compelled to base any condemnatory reports or certificates upon very low

limits of quality. It must be admitted that 3 per cent. of fat is as low an amount as can possibly be allowed in an article to which the term "milk"—meaning thereby cow's milk—can still be legitimately applied. It is true that certain animals may be made to produce almost any liquid from their udders by improper or inadequate feeding and by bad management and unhealthy surroundings; but because this is the case it is absurd to contend, as it is sometimes contended, that a purchaser who asks for milk is entitled only to get the very worst product that can be extracted from the udder of an abnormal cow. It has been proved by thousands of analyses that, especially at this time of year, a purchaser may justly expect to get at least 3.5 per cent. of fat in the milk with which he is supplied. If he does not get it, and the "milk" which he does get is, as we have already pointed out, "standardised" by the admixture of separated milk until the amount of fat present is just on the limit that will "pass" the public analyst, the fraud is as obvious as any for which the law provides punishment far more drastic than that which is ever visited upon the milk swindler.

Some idea of the nature of this form of milk fraud and of the profits attending it may be gained by a consideration of the fact that a sample such as No. 1 in the table which we print on the next page, reported as containing 8 per cent. of milk devoid of fat, or as having had 8 per cent. of the original fat abstracted—which amounts to the same thing—would be reported as being deficient to the extent of 20 per cent. of the original fat, or as containing 20 per cent. of milk devoid of fat, upon the 3.5 standard. The magnitude of the frauds revealed by the results shown in the table is made more striking by observing what the figures mean when applied to "bulk," that is, to considerable quantities; 23 per cent. of added water means that in 100 gallons of mixture foisted on the public there are 23 gallons of water—perhaps in itself filthy and dangerous—and 77 gallons of a fluid defined as "milk of the poorest quality." A glaring case is furnished by a sample of a preparation 100 gallons of which would contain 26 gallons of separated milk having no fat, 21 gallons of water, and 53 gallons of "milk of the poorest quality." The artificial colouring and the dosing with boric acid preparations, whereby stale milk is made to pass as fresh, afford additional illustrations of the manner in which so many milk purveyors conduct their trade, and are points which, with those previously commented upon, may well be pondered over by those who consider that adulteration and sophistication are only "forms of trade competition," and that no Acts of Parliament are required to keep certain traders, shopkeepers, and trading companies from committing the meanest and most atrocious frauds.

REPORT UPON THE ANALYSIS OF THIRTY SAMPLES OF MILK.

By CHARLES E. CASSAL, F.I.C.,

Public Analyst for Kensington, St. George Hanover Square, etc.

I CERTIFY that I have analysed 30 samples of milk, numbered from 1 to 30, on behalf of the British Medical Association Special Commission. From a consideration of the results of my analyses I have arrived at the understated opinions concerning the composition of the samples (see Table). It is to be noted that 3 per cent. of fat is the lowest amount which should be present in a sample to which the term "milk" can still justifiably be applied, and that a purchaser ought fairly to receive not less than 3.5 per cent. of fat in an article sold to him as milk. A sample of milk of the Aylesbury Dairy Company, purchased in the ordinary way shows 4.2 per cent. of fat. In those cases where the fat found was less than 3.5 per cent. but not below 3 per cent., the percentage of fat deficiency on the 3.5 standard is shown. Inasmuch as deficiency of fat is generally brought about by the admixture of separated milk, which contains practically no fat, with a milk of genuine composition, it is convenient to regard milks deficient in fat as made up of "milk devoid of fat" and milk of "genuine" composition. In those cases where the amount of fat found was below 3 per cent. the calculations have been made on the lowest or 3 per cent. limit, a fact which is indicated by the genuine milk present being reported as "milk of genuine composition but of the poorest quality."